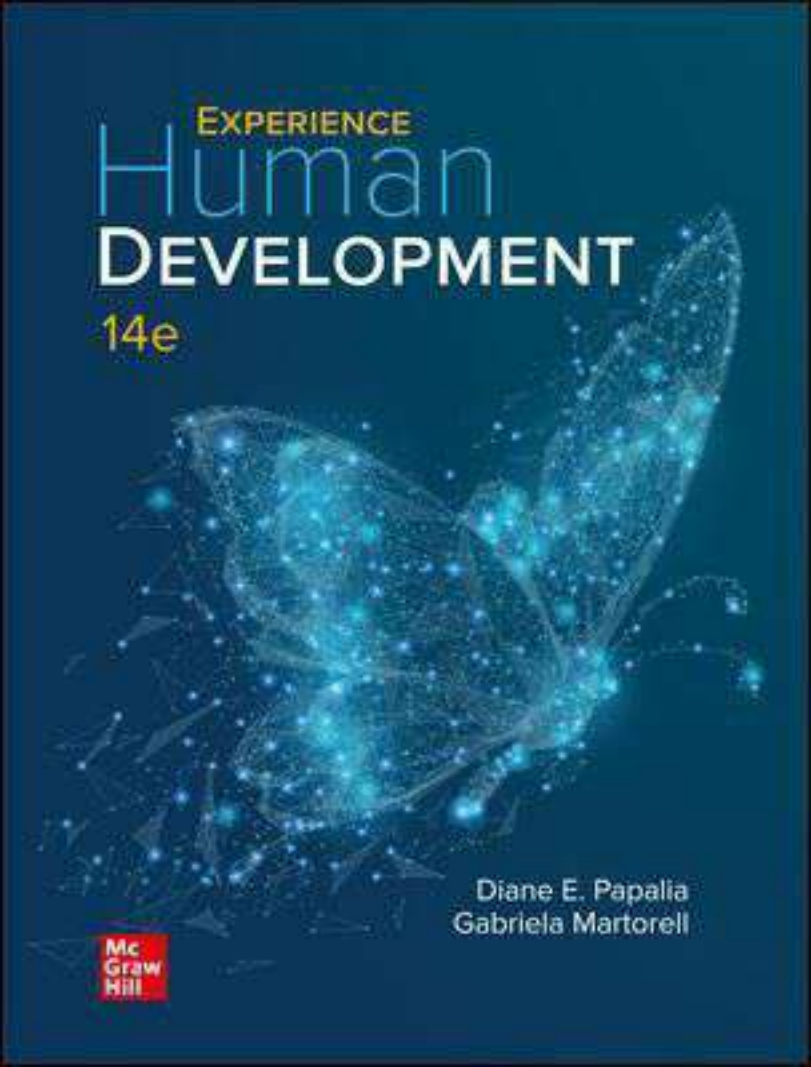
Experience Human Development 14e



Diane E. Papalia
Gabriela Martorell

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EXPERIENCE Human Development

FOURTEENTH EDITION

Diane E. **PAPALIA**

Gabriela **MARTORELL**

Mc Graw Hill



EXPERIENCE HUMAN DEVELOPMENT, FOURTEENTH EDITION

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about the authors



Diane E. Papalia As a professor, Diane E. Papalia taught thousands of undergraduates at the University of Wisconsin–Madison. She received her bachelor's degree, majoring in Psychology, from Vassar College and both her master's degree in Child Development and Family Relations and her Ph.D. in Lifespan Developmental Psychology from West Virginia University. She has published numerous articles in such professional journals as *Human Development, International Journal of Aging and Human Development, Sex Roles, Journal of Experimental Child Psychology,* and *Journal of Gerontology.* Most of these papers have dealt with her major research focus, cognitive development from childhood through old age. She is especially interested in intelligence in old age and factors that contribute to the maintenance of intellectual functioning in late adulthood. She is a Fellow in the Gerontological Society of America. She is the coauthor of *Human Development,* now in its 11th edition, with Sally Wendkos Olds and Ruth Duskin Feldman; of *Adult Development and Aging,* now in its 3rd edition, with Harvey L. Sterns, Ruth Duskin Feldman, and Cameron J. Camp; and of *Child Development: A Topical Approach* with Dana Gross and Ruth Duskin Feldman.



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To Charles Robert Zappa,
with love.

To my grandmother Alicia. I don't know that I can aspire to your kindness and generosity, but I hope to someday be as wise.

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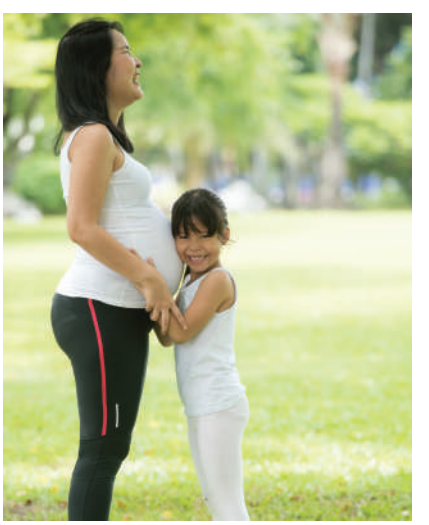
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EXPERIENCE THE Human Side

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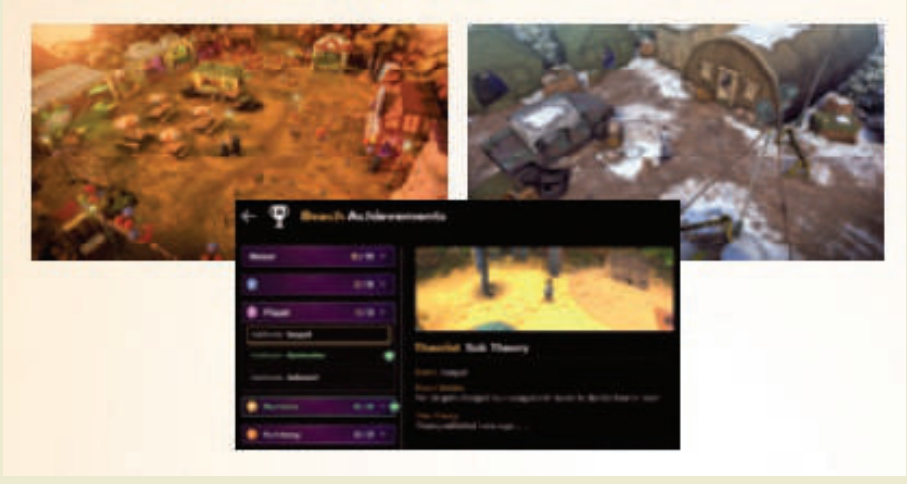
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SMARTBOOK® SmartBook™ personalizes student learning to individual student needs, continually adapting to pinpoint knowledge gaps and focus learning on topics that need the most attention. Study time is productive and, as a result, students are better prepared for class and coursework. For instructors, SmartBook tracks student progress and provides insights that can help guide teaching strategies.

New to this edition, SmartBook Is now optimized for mobile and tablet and is accessible for students with disabilities. Content-wise, it has been enhanced with improved learning objectives that are measurable and observable to improve student outcomes.

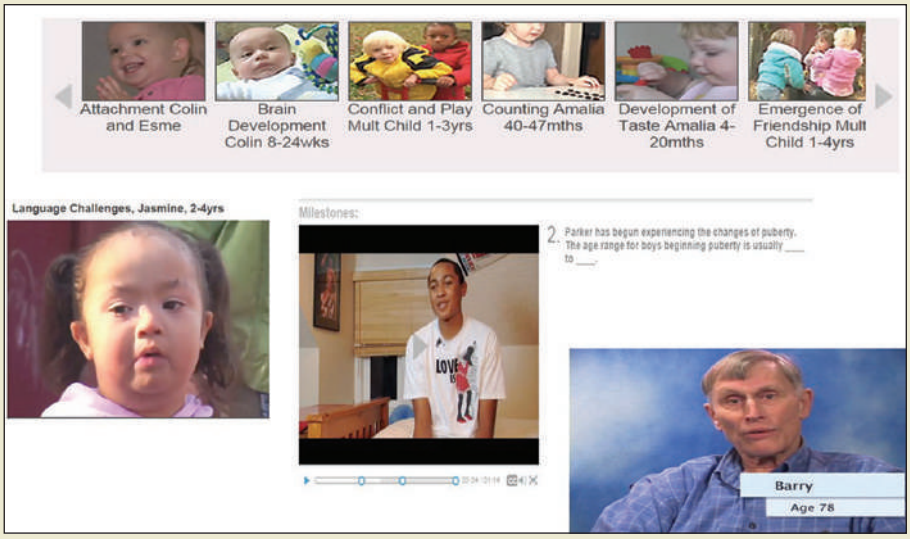
Apply Concepts and Theory in an Immersive Learning Environment

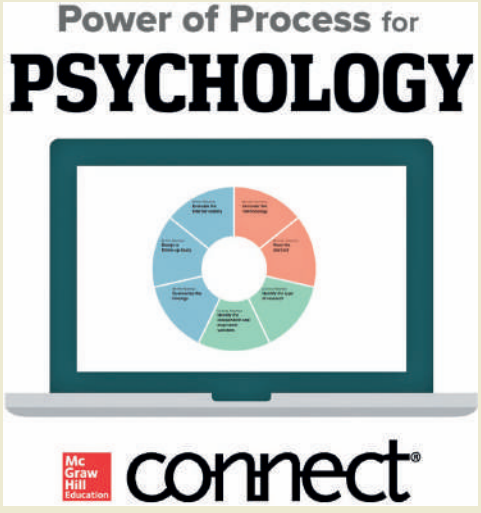


An engaging and innovative learning game, **Quest: Journey Through the Lifespan,** provides students with opportunities to apply content from their human development curriculum to real-life scenarios. Students play unique characters who range in age and make decisions that apply key concepts and theories for each age as they negotiate events in an array of authentic environments. Additionally, as students analyze real-world behaviors and contexts, they are exposed to different cultures and intersecting biological, cognitive, and socioemotional processes. Each quest has layered replayability, allowing students to make new choices each time they play—or offering different students in the same class different experiences. Fresh possibilities and outcomes shine light on the complexity of and variations in real human development. This new experiential learning game includes follow-up questions, assignable in Connect and auto-graded, to reach a higher level of critical thinking.

Real People, Real World, Real Life

At the higher end of Bloom's taxonomy (analyze, evaluate, create), the McGraw-Hill **Milestones** video series is an observational tool that allows students to experience life as it unfolds, from infancy to late adulthood. This groundbreaking, longitudinal video series tracks the development of real children as they progress through the early stages of physical, social, and emotional development In their first few weeks, months, and years of life. Assignable and assessable within Connect Lifespan Development, Milestones also includes interviews with adolescents and adults to reflect development through the entire life span.



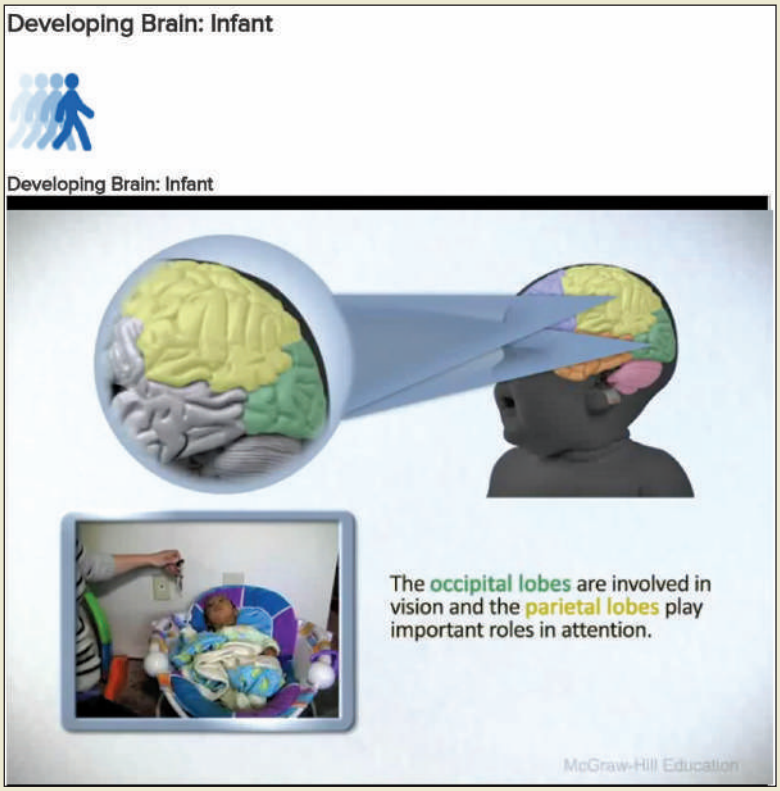


Prepare Students for Higher-Level Thinking

Also at the higher end of Bloom's taxonomy, **Power of Process of Lifespan Development** helps students Improve critical-thinking skills and allows instructors to assess these skills efficiently and effectively in an online environment. Available through Connect, preloaded journal articles are available for instructors to assign. Using a scaffolded framework such as understanding, synthesizing, and analyzing, Power of Process moves students toward higher-level thinking and analysis.

Inform and Engage on Psychological Concepts

At the lower end of Bloom's taxonomy, students are introduced to **Concept Clips**—the dynamic, colorful graphics and stimulating animations that break down some of psychology's most difficult concepts in a step-by-step manner, engaging students and aiding in retention. They are assignable and assessable in Connect or can be used as a jumping-off point in class. Now with audio narration, this edition also includes new Concept Clips on topics such as object permanence and conservation, as well as theories and theorists such as Bandura's social cognitive theory, Vygotsky's sociocultural theory, Buss's evolutionary theory, and Kuhl's language development theory.



Powerful Reporting

Whether a class is face-to-face, hybrid, or entirely online, McGraw-Hill Connect provides the tools needed to reduce the amount of time and energy instructors spend administering their courses. Easy-to-use course management tools allow instructors to spend less time administering and more time teaching, while reports allow students to monitor their progress and optimize their study time.

- The **At-Risk Student Report** provides instructors with one-click access to a dashboard that identifies students who are at risk of dropping out of the course due to low engagement levels.
- The **Category Analysis Report** details student performance relative to specific learning objectives and goals, including APA learning goals and outcomes and levels of Bloom's taxonomy.
- **Connect Insight** is a one-of-a-kind visual analytics dashboard—available for both instructors and students—that provides at-a-glance information regarding student performance.
- The **SmartBook Reports** allow instructors and students to easily monitor progress and pinpoint areas of weakness, giving each student a personalized study plan to achieve success.

chapter-by-chapter changes

This is a chapter-by-chapter list of topics that are new to this edition or have been substantially revised or updated.

1 The Study of Human Development

- Updated example on applied impact of psychological research on lives.
- New metaphor added on how domains of development interact.
- Revised description of nature and nurture.
- Updated statistics on family composition in the United States, global and United States poverty rates, and majority/minority group population projections.
- Revised section on socioeconomic status.
- New research added on risks to children raised in affluent families.
- New concept added: ethnic gloss.
- Updated Window on the World box.
- New Research in Action box on infant-directed speech.

2 Theory and Research

- Expanded discussion on why theories are revised when new evidence emerges.
- Expanded discussion on qualitative change and the addition of an example.
- Expanded critique and review of Erikson's theory of psychosocial development and its impact on the field.
- Expanded discussion of, introduction to, and critique of learning perspectives.
- New example added for observational learning.
- Revised introduction to Piaget.
- Expanded description of disequilibrium.
- New example added for scaffolding.
- Revised discussion of evolutionary and sociobiological approaches.
- New key term added: operational definition.
- Inclusion of updated research to illustrate longitudinal design.
- New information added on the reproducibility crisis in the social sciences and the open science movement.

3 Forming a New Life

- New research added on the timing of the fertile window of conception.
- Expanded and updated information on the causes and consequences of twins and multiple births in the United States and globally.
- Revised and updated research on sexual differentiation.
- Revised example of dominant/recessive inheritance.
- Revised description and new example of multifactorial transmission of traits.
- Revised and updated explanation of epigenetic processes with new examples.
- Updated statistics on rates of genetic and chromosomal abnormalities in infants born to different racial and ethnic groups and birthrates for children with Down syndrome in the United States.
- Updated research on outcomes for people with Down syndrome.
- New Research in Action box on epigenetics.
- Revised explanation of heritability estimates and canalization.
- Updated obesity statistics and updated genetic and environmental risk factors for obesity.
- Revised and updated research on influences on intelligence.
- Revised section on temperament and updated research on temperament influences.
- Updated research on genetic and environmental risk factors for schizophrenia.
- New key terms added: cephalocaudal and proximodistal principles of development.
- New research added on when fetuses can feel pain.
- Revised and updated research on fetal perceptual and cognitive development.
- Updated information on recommended weight gain and diet during pregnancy.
- New research added on calorie deficits and micronutrient deficiencies during pregnancy.

- New section added on opioid use and abuse during pregnancy and neonatal abstinence syndrome.
- Updated research on caffeine intake, marijuana, cocaine, and methamphetamine use during pregnancy.
- Updated statistics on the risk of contracting measles and maternal age in the United States.
- Updated research on the influence of environmental hazards and advanced paternal age on pregnancy outcomes.
- Updated information on monitoring pregnancies, including new information on prenatal cell-free DNA scans, embryoscopy, and umbilical cord sampling.
- Updated information on U.S. prenatal care disparities and fetal and infant mortality.
- New Window on the World box on prenatal care around the world.

4 Birth and Physical Development during the First Three Years

- Updated global and U.S. statistics on complications of childbirth.
- Updated statistics on cesarean delivery and the use of forceps during delivery in the United States.
- Updated statistics and research on outcomes for women who attempt a vaginal birth after cesarean (VBAC).
- New research added on the use of epidurals for pain relief during delivery.
- Expanded material on doulas, including new research on improved outcomes and economic benefits associated with the use of doulas.
- New research added on developmental changes and cultural differences in sleep patterns, and outcomes associated with poor sleep.
- Updated statistics on the prevalence of low-birth-weight babies.
- Revised and updated research on treatment and immediate and long-term outcomes for preterm infants.
- Updated statistics on the prevalence of postterm delivery and stillbirth in the United States.
- Updated global and U.S. statistics on infant and maternal mortality.
- Updated statistics and research on racial and ethnic disparities in infant mortality in the United States.
- Updated statistics on the prevalence of sudden infant death syndrome (SIDS).
- New information added on the "triple risk" model of SIDS.
- Updated research on genetic and environment triggers for SIDS.
- Updated statistics on infant deaths from unintentional injuries.
- Updated statistics on global and U.S. childhood immunization statistics and research showing no link between vaccines and autism.
- Updated research on eating patterns in infants and toddlers.
- Updated statistics and research on the prevalence of obesity in infants and toddlers and risk factors for obesity.
- New Window on the World box on the effects of malnutrition in the first 1,000 days of life.
- Revised Research in Action feature on autism.
- Revised and updated section on myelination of the brain.
- Expanded section on pain perception in infancy.
- Revised and updated research on the development of smell and taste and visually guided reaching.
- Revised, updated, and expanded research on the development of hearing.
- New research added on infants' preference for faces.
- Updated and expanded research on haptic perception.

5 Cognitive Development during the First Three Years

- Revised and updated research on the use of operant training to test infant memory.
- Updated research on correlates of the Home Observation for Measurement of the Environment (HOME) inventory and outcomes of early intervention programs.
- Revised and updated research on the development of imitative abilities in young children.
- Revised and reorganized research on the object concept.
- New research added on children's understanding of symbols presented in picture books, e-books, and television.
- Expanded and updated research on auditory discrimination in fetuses and newborns and developmental processes in attention.
- Updated research on core cognitive domains in infancy associated with later IQ.
- Updated Research in Action box on the effects of television viewing on infants and toddlers.
- New research added on infant categorization of language and music.

- Updated research on the development of an understanding of causality in infants.
- Expanded description of how violation-of-expectations research has allowed researchers to investigate naïve principles of physics in infants.
- Revised and updated research on the development of number sense in infants.
- Expanded defense of violation-of-expectations research and the existence of cognitive modules and core systems of knowledge.
- New information added on the application of the Vygotskian approach to early childhood education.
- Expanded definition of phonemes and added new example.
- Revised and updated information and research on the development of phonemic perception and understanding structural features of language.
- Expanded the information and research on symbolic gestures in toddlers.
- Revised and updated research on first words.
- New section added on variations in language development, including new research on deaf and bilingual children.
- Revised and updated research on brain development and language, and the role of social interaction in language development.
- Expanded information and research on child directed speech (CDS) across cultures and the link between CDS and later language development.
- Added new Window on the World box on literacy and children's books.

6 Psychosocial Development during the First Three Years

- Revised and expanded discussion of crying, with a greater focus on its functional nature.
- New research added on reciprocal positive exchanges between infants and adults.
- Updated research and theory on the development of altruistic behavior in infants.
- Updated research on mirror neurons and new critique added.
- New section added on the development of collaborative activities and cultural transmission.
- Revised and updated section on the stability of temperament with new research added on cultural differences.
- Revised and updated research on goodness of fit.
- Revised and updated research on behavioral inhibition, with an increased focus on brain areas associated with inhibition and the development of self-regulatory strategies.
- Revised and updated research on gender differences in infants and toddlers, with new research added on differences in social behavior, sex-typed toy preferences, and the role of prenatal androgen exposure.
- Revised and updated research on parental influences on gender, with new research added on implicit messages and expanded research on cultural differences in fathers' interactions.
- New research added on neurological correlates of parental attachment history, and cardiac and hormonal correlates of interactional synchrony in parent-child interactions.
- Revised Research in Action box on postpartum depression.
- Updated and expanded research on the development of self-awareness in the 2nd year of life and successful socialization processes.
- Revised and expanded section on siblings.
- New information added on preschoolers' preferred playmates.
- Updated statistics on maternal labor force participation rates, early child care, child maltreatment in infancy and toddlerhood, and characteristics of abusive and neglectful parents and families.
- New research added on cultural influences on abuse and neglect.
- Revised and updated research on long-term effects of maltreatment.

7 Physical and Cognitive Development in Early Childhood

- Updated statistics on physical growth norms in children.
- Updated and expanded research and statistics on sleep problems in children.
- New research added on links between sleepwalking, sleeptalking, and night terrors.
- Updated and expanded research on nightmares, enuresis, and handedness.
- New research added on correlates of motor coordination in childhood.
- Updated statistics on global and U.S. childhood obesity prevalence rates.
- Updated research on environmental influences on obesity.
- Updated research and discussion on obesity prevention and intervention programs.

- Revised, updated, and expanded information on undernutrition, including a new focus on the differentiation of stunting and wasting.
- Revised Research in Action box on food insecurity.
- Updated statistics on the prevalence of food allergies in U.S. children.
- Updated research and theory on the causes of food and skin allergies.
- New section added on oral health.
- Updated global and U.S. statistics on deaths and accidental injuries.
- Expanded information on car accidents and young children.
- Updated statistics on health insurance coverage and racial, ethnic and socioeconomic disparities in coverage for U.S. children.
- Updated information on the Affordable Care Act and the repeal of the individual mandate.
- Revised Window on the World box on surviving the first 5 years of life.
- Updated statistics and research on homelessness in U.S. children.
- Updated statistics on U.S. children's exposure to environmental pollutants.
- New research added on children's ability to reason causally, deception, children's ability to lie, the influence of religion on children's understanding of stories, the relationship between imagination and creativity, cultural influences on theory of mind development, and executive function.
- Revised and updated research on animism in children.
- Revised, updated, and expanded research on children's understanding of number.
- New example added to illustrate theory of mind.
- Updated research on and revised discussion of theory of mind.
- Updated research on children's knowledge about thinking and mental states.
- New example added to illustrate false beliefs.
- Updated research on children's ability to distinguish between appearance and reality.
- Revised and updated research on individual differences in theory of mind development.
- Revised and updated theory and research on genetic and environmental influences on intelligence, with an enhanced focus on interactions.
- Updated examples of the use of scaffolding in childhood education.
- Revised and updated theory and research on private speech.
- Updated statistics on speech and language disorders in children.
- Revised and updated research and discussion on preparation for literacy.
- Revised, updated, and expanded research on media and cognition.

8 Psychosocial Development in Early Childhood

- New section added on cultural differences in self-definition.
- Revised and updated research on contingent self-esteem.
- Revised and updated research on emotion regulation, with added emphasis on cultural differences.
- Revised, updated, and expanded research on understanding emotions and gender differences in cognition.
- New key term added: social emotions.
- Revised and updated research on the influence of prenatal hormone exposure on gender development.
- New research added on biological influences in transgender gender development.
- Revised discussion of evolutionary influences on gender.
- Expanded and updated critique of Kohlberg's analysis of cognitive influences on gender development.
- Updated critique of theories relating gender schema to gender-typing.
- Revised and updated research on family, peer, and cultural influences on gender-typing in children.
- Revised Research in Action box on the evolutionary significance of play.
- Revised and updated research on the social dimensions of play, and gender and play.
- Revised, updated, and expanded section on culture and play and corporal punishment, with an emphasis on bidirectionality between parent-child interactions and cultural differences.
- Expanded critique of Baumrind's model of parenting styles with a focus on cultural differences.
- Revised and updated research on the development of prosocial behavior.

- New research added on cross-cultural differences in levels of relational aggression.
- Updated statistics on only children in the United States and China.
- New Window on the World box on age segregation and mixed-age play in children.

9 Physical and Cognitive Development in Middle Childhood

- Updated statistics on physical growth norms for middle childhood.
- Added new section on tooth development and dental care.
- Revised, updated, and expanded research on nutrition and sleep in middle childhood.
- New research added on outcomes associated with poor sleep quality.
- Revised and updated research on brain development in middle childhood.
- Updated U.S. statistics on physical activity and trends in childhood obesity.
- Revised and updated research on recess and participation in organized sports.
- Updated global and U.S. statistics on childhood overweight and obesity.
- Revised and updated research on the causes and outcomes of obesity.
- Revised Research in Action box on the influence of Barbie dolls on girls' body image.
- Updated research and discussion on childhood obesity prevention and intervention programs.
- Revised and updated research on asthma prevalence rates and causes.
- New section added on childhood hypertension.
- Updated statistics on accidental injuries in middle childhood.
- New section added on the understanding of causality in middle childhood.
- Revised and updated research on the development of categorization, number and mathematics understanding, executive functioning, and the influence of brain development and race/ethnicity on intelligence.
- New research added on the influence of training programs on working memory.
- Revised, updated, and expanded research on the development of metamemory processes and the influence of schooling on IQ scores.
- New Window on the World box on the influence of culture on IQ scores.
- Updated statistics on non-English-speaking children in the United States.
- New research added on the influence of e-books on emerging literacy skills.
- Revised and updated research on the influence of self-efficacy, gender differences, parental involvement, socioeconomic status, and class size on academic achievement.
- Revised, updated, and expanded research on the influence of peer acceptance on academic achievement.
- Updated information on U.S. government regulatory processes and their effects on student academic achievement outcomes.
- Updated statistics on the number of U.S. children being homeschooled and in charter and schools.
- New research and critique added on the efficacy of homeschooling.
- Updated U.S. statistics on media usage in classrooms, media use habits in children, the prevalence of learning disabilities, the use of special education services, and the number of gifted children in the public school system.
- Updated global and U.S. statistics on the prevalence of attention-deficit/hyperactivity disorder in childhood.

10 Psychosocial Development in Middle Childhood

- Revised and updated research on emotional growth and coregulation, with expanded content on cultural differences.
- Updated statistics and research on maternal employment and child care arrangements.
- Updated U.S. statistics on the number of children living in poverty, trends in family structure, divorce rates, and single-parent, cohabitating, and gay/lesbian families.
- Revised and updated research on the effects of poverty and family conflict on children's development, buffers for negative outcomes, and immediate and long-term adjustment to divorce.
- Revised and expanded research on children's adjustment to custody and coparenting and outcomes associated with cohabitating families.
- Revised and updated research on outcomes for children from single-parent families.

- Updated statistics and research on stepfamilies.
- Updated research on the development and outcomes of children from gay and lesbian families.
- Updated statistics on U.S. adoption, including a review of social and economic changes affecting trends in adoption.
- Revised and updated research on the outcomes of adopted children.
- Revised, updated, and expanded research on sibling relationships.
- Revised and updated research on prejudice in the peer group, sociometric popularity and rejection, friendship in middle childhood, physical and relational aggression, and risk factors in bullying.
- New section added on gender and peer groups.
- Updated statistics and research on the influence of media violence on aggression.
- New Window on the World box on bullying around the world.
- Added new statistics and research on cyberbullying.
- Updated statistics on the prevalence of mental health problems in middle childhood.
- Updated and revised statistics and research and disruptive conduct disorders in middle childhood.
- New information added on global rates of child depression and updated statistics on the prevalence of childhood depression in the United States.
- New discussion added on the use of drug therapy to address childhood emotional disorders.

11 Physical and Cognitive Development in Adolescence

- Revised and updated research on timing of puberty and ethnicity.
- Updated statistics on the age at menarche in the United States.
- Revised, updated, and expanded research on pubertal timing, with new research added on the role of endocrine-disrupting chemicals.
- New section added on the implications of pubertal timing for physical and psychosocial outcomes.
- Revised, updated, and expanded research on brain changes in adolescence, including new research on neurobehavioral susceptibility to social reward cues.
- New section added on physical activity in adolescence.
- Updated statistics on sleep patterns in adolescence.
- Revised and updated research on sleep deprivation in adolescence.
- Updated global and U.S. statistics on overweight and obesity in adolescence.
- Revised and updated research on the causes, consequences, and interventions to address obesity in adolescence, body image, body satisfaction, and risk factors for unhealthy weight control behaviors in adolescence.
- Updated statistics on the prevalence of anorexia nervosa, bulimia nervosa, and binge eating disorder.
- New key term: binge eating disorder.
- Updated research on the treatment of eating disorders.
- Updated statistics on U.S. drug use and abuse in adolescence, including information on overall trends, dextromethorphan, legal and illegal narcotics, alcohol, marijuana, and cigarettes, with new statistics added on the use of e-cigarettes.
- Updated statistics on global trends in alcohol and tobacco use in adolescence.
- New research added on brain changes in adolescence associated with alcohol use.
- Updated research on correlates of marijuana use.
- Updated statistics on the prevalence of depression in U.S. adolescents.
- Updated research on risk factors and treatment options for depression.
- Updated global and U.S. statistics on adolescent mortality.
- Revised, updated, and expanded research on deaths from accidents and firearms in U.S. adolescents.
- Updated statistics on and research for prevalence rates and risk factors of suicide.
- New section added on immature aspects of adolescent thought.
- New Window on the World box on culture and cognition.
- Expanded critique of Kohlberg's theory of moral reasoning.
- Revised, updated, and expanded research on prosocial development.

- Updated statistics on U.S. high school graduation rates and international comparisons.
- Revised and updated research on the influence of motivation and self-efficacy on academic achievement.
- Revised, updated, and expanded research on gender differences in brain structure and organization relevant to academic achievement, the influence of parenting, ethnicity, and peers on academic achievement.
- New statistics added on trends in number of doctoral degrees awarded to men and women in the United States and media use by adolescents and teachers.
- Revised, updated, and expanded research on the influence of media use on cognitive processes.
- Updated statistics on U.S. high school dropout rates, gender and vocational choice, and student employment rates.
- New statistics added on unemployment rates and median income by degree obtained.
- New Research in Action box on teens and media multitasking.

12 Psychosocial Development in Adolescence

- Revised and updated research on gender and ethnic differences in identity formation.
- New research added on perceived discrimination.
- Updated statistics on self-reported prevalence of gay, lesbian, and bisexual identity and behaviors in adolescents.
- Revised, updated, and expanded research on the origins of sexual orientation, gender identity development in sexual minority youth, and risk and protective factors for sexual risk-taking in adolescence.
- New research added on the influence of prenatal hormones on sexual orientation.
- New research added on identity development in transgender youth.
- Updated U.S. statistics on sexual behavior, the use of contraceptives, and human papilloma virus (HPV), chlamydia, and gonorrhea infections.
- Updated statistics for global and U.S. rates of adolescent sexually transmitted infections, hepatitis B and human immunodeficiency virus (HIV) infections, pregnancy, miscarriage, and abortion rates.
- New research added on HPV vaccination rates, risks, and benefits in U.S. adolescents.
- Revised and updated research on risk factors for teen pregnancy.
- Revised, updated, and expanded research on the impact of abstinence versus comprehensive sexual education programs, with new information added on recent changes in funding priorities in the United States.
- New Window on the World box on culture and discretionary time in adolescence.
- Revised and updated research on individuation and family conflict.
- New critique added on Baumrind's model of parenting styles.
- Revised and updated research on the influence of cohabitation and same-sex parenting, maternal employment, sibling influences, and friendships in adolescence.
- New section added on social media and electronic interactions.
- New Research in Action box on teen dating and technology.
- Revised and updated research on romantic relationships.
- Updated statistics on teen dating violence.
- Revised, updated, and expanded research on biological influences in juvenile delinquency, with new information added on the influence of arousal and attentional processes and neurobiological differences.
- Revised and updated research on environmental influences in juvenile delinquency, long-term prospects of juvenile delinquents, and the prevention and treatment of juvenile delinquency.

13 Physical and Cognitive Development in Emerging and Young Adulthood

- Updated statistics on health status in young adults in the United States.
- New information added on health insurance coverage in the United States, the passage of the Affordable Care Act, and the repeal of the individual mandate.
- Revised and updated research on genetic influences on health with depression as an illustrative example.
- Updated global and U.S. research on diet, nutrition, and obesity and overweight.

- Revised and updated research on the causes and consequences of and treatments for obesity.
- New research added on bariatric surgery.
- Revised and updated research and statistics on physical activity in young adults.
- New Window on the World box on internet use around the world.
- Updated research on stress and coping in young adults.
- Revised and updated research on the effect of sleep deprivation and cognitive and psychosocial functioning.
- Updated global and U.S. statistics on the prevalence of smoking.
- Updated statistics on alcohol use in U.S. college students and young adults.
- Updated research on smoking, smoking cessation programs, alcohol use, risky drinking, and the effects of social integration and social support on health.
- Updated statistics and research on prevalence of and risks associated with substance use disorders.
- New research added on developmental trends in the diagnosis of depression.
- Revised and updated research on sexual behaviors and attitudes in young adulthood.
- Updated global and U.S. statistics for the prevalence of sexually transmitted infection and human immunodeficiency virus (HIV) infection.
- Updated research on HIV prevention and intervention programs.
- Revised and updated research on menstrual disorders.
- Updated global and U.S. statistics on infertility.
- Updated research on causes of infertility.
- New Research in Action box on in vitro fertilization.
- Updated research on emotional intelligence.
- Updated statistics on U.S. college enrollment and graduation rates, with new information added on international college enrollment rates.
- Revised, updated, and expanded research on the influence of gender on occupational success.
- Updated statistics and discussion on the influence of socioeconomic status and race/ethnicity on college success, income, and college completion, the gender gap in earnings, and working while attending college.
- Revised and updated research on factors related to successful adjustment to college.

14 Psychosocial Development in Emerging and Young Adulthood

- New research added on three primary trajectories to adulthood.
- Revised and updated research on ethnic and cultural factors in identity formation, and relationships with parents in young adulthood.
- New U.S. statistics added on failure to launch.
- Revised and updated research on failure to launch in the United States and cross-culturally.
- New research added on gender differences in the development of intimacy.
- Revised and updated research on continuity and change in the five-factor model of personality, evaluations of the five-factor model, ego resiliency, friendships, and romantic relationships.
- New research added on the role of social media in friendships.
- Updated statistics and research on single life in the United States.
- New research added on the "friends-with-benefits" relationship pattern.
- Updated information on U.S. and international legality and acceptance of same-sex marriage and activity.
- New research added on the association between political and religious affiliations and acceptance of homosexuality.
- New statistics and research added on same-sex marriage in the United States.
- Updated research on relationships in gay and lesbian couples.
- Updated statistics and research on rates and attitudes about cohabitation internationally and in the United States.
- Revised and updated research on cohabitating relationships.
- Updated international and U.S. marriage statistics.
- New research added on the association of marriage and religious beliefs.
- New Window on the World box on cross-cultural marriage traditions.
- Revised, updated, and expanded research on infidelity and marital satisfaction.
- New research added on the use of technology for the purposes of extramarital affairs.
- New research added on the role of sexual activity in marital satisfaction.
- Updated U.S. statistics on childbirth and parenthood, women's labor force participation rates, fathers' participation in child care activities, dual-income families, remarriage, and stepparenthood.

- Updated research on parenthood and marital satisfaction.
- New research added on cultural differences in dual-income families.
- Updated statistics and research on U.S. divorce rates, attitudes, and predictors.
- New research added on gender differences for the relationship between employment and divorce.
- Revised and updated Research in Action box on intimate partner violence.
- Updated research on adjustment to divorce.

15 Physical and Cognitive Development in Middle Adulthood

- Updated U.S. statistics on middle-aged adults.
- Revised and updated research on health and psychological status in midlife.
- Updated statistics on visual and hearing problems in midlife.
- New statistics added on global prevalence rates for hearing loss.
- Revised, updated, and extended research on hearing loss in midlife.
- New research added on the loss of smell and taste in midlife.
- Revised and updated research of risk factors for and consequences of the loss of smell and taste.
- Revised, updated, and expanded research on loss of muscle strength and coordination in midlife and the brain at midlife.
- Updated research for declines in manual dexterity in midlife.
- New research added on the role of education, cognitive stimulation, and physical activity on brain functioning.
- Updated research on systemic changes in midlife.
- Revised, updated, and expanded information on the frequency and consequences of hot flashes and night sweats in menopausal women and the treatment of menopausal symptoms.
- Revised and updated Window on the World box on cultural differences in menopause.
- New Research in Action box on andropause and testosterone replacement therapy.
- New research added on international prevalence of erectile dysfunction.
- Updated research on causes of and treatments for erectile dysfunction.
- Updated U.S. statistics on sexual activity, health, cancer, heart attacks, and overweight in middle-aged adults.
- Revised and updated research on correlates of sexual activity and sexual satisfaction in middle-aged adults.
- Updated global and U.S. statistics on hypertension, with new information added on recent changes in risk cutoff guidelines.
- Revised and updated research on the association between physical activity, socioeconomic status, gender, and health at midlife.
- New information added on screening guidelines for prostate cancer.
- Revised, updated, and expanded research on bone loss in women at midlife.
- Updated statistics on prevalence rates of breast cancer in globally and in the United States.
- Updated research on risks for and treatment of breast cancer.
- Revised and updated research on and recommendations for the use of hormone therapy.
- Revised and updated research on how stress and emotions affect health.
- Updated statistics on subclinical and behavioral or emotional disorders meeting criteria for diagnosis in American adults at midlife.
- Revised and updated research on developmental trajectories of fluid and crystallized intelligence and characteristics of creative achievers.
- New research added on neurological correlates of creative achievers.
- New research added critiquing prior findings on declines in creative output with age.
- Updated statistics on U.S. participation in adult education programs.
- Updated statistics on global and U.S. literacy rates.

16 Psychosocial Development in Middle Adulthood

- New discussion added on recent trends on research on midlife.
- Revised and updated research on trait models of personality in midlife.
- New research added on contextual influences and cultural variations on personality.
- Revised, updated, and expanded research on gender differences in, and expression and consequences of generativity.
- New research added on the subjective sense of aging and outcomes associated with an "off-track" social clock.
- Revised and updated research on midlife crises.
- New Research in Action box on midlife career change.
- Updated research on generativity and positive life outcomes.
- Revised, updated, and expanded research on midlife changes in emotionality and personality and developmental changes in the size of social convoys.
- New research added on international data on well-being.
- New research added on the association of income and exercise with well-being.
- Revised and updated research on Wyff's well-being scale, the association between relationships and well-being, and changes in marriage satisfaction over time.
- New statistics added on the prevalence of cohabitation in middle-aged American adults.
- Revised and updated research on reasons for and consequences of cohabitation.
- New cross-cultural research added on cohabitation.
- New statistics added on the prevalence of divorce in middle-aged American adults.
- Revised, updated, and expanded research on causes of and outcomes associated with divorce, and the relationship between marriage and well-being and health.
- New cross-cultural research added on marriage and well-being.
- Revised, updated, and expanded research on gay and lesbian relationships.
- New research added on the effects of the legalization of gay marriage in the United States.
- Updated research on the relationship between friendship and well-being.
- Revised and updated research on the relationship between adolescent children and parents, the empty nest, and prolonged parenting.
- Added new statistics on the number of middle-aged American adults caring for aging parents.
- Revised and updated research on strains of caregiving and sibling relationships at midlife.
- New Window on the World box added on the sandwich generation.
- Updated U.S. statistics on grandparenthood, extended family households, and grandparent care.
- Revised and expanded research on grandparent care across cultures.
- New statistics added on grandparent care in other cultures.
- Updated research on grandparent care after divorce and remarriage.
- Updated statistics and research on surrogate parenting by grandparents in the United States.

17 Physical and Cognitive Development in Late Adulthood

- Updated global and U.S. statistics on aging population demographics, gender differences in mortality, and mortality and life expectancy rate disparities across countries, racial/ethnic groups, socioeconomic status, and region.
- New Window on the World box on elder care worldwide.
- Revised and updated research on life expectancy, genetic and variable rate programming theories of death, and longevity.
- New research added on mitochondrial theories of aging.
- New research added on the signaling role of free radicals.
- New Research in Action box on the oldest old.
- New research added on morbidity compression.
- Revised and updated research on systemic changes with age.
- Revised, updated, and expanded research on brain changes with age.
- New research added on semanticized cognition.
- Updated U.S. and global statistics on visual impairment, cataracts, glaucoma, and hearing loss.

- Updated research on visual and hearing impairments.
- New research on cataract surgery and mortality risk.
- Updated statistics and research on physical changes and falls.
- New research added on functional fitness intervention programs.
- New key term: functional fitness.
- New research added on the relationship of exercise and cognition.
- Revised, updated, and expanded research on sleep.
- Updated statistics and research on sexual functioning and health status in old age.
- Updated global and U.S. statistics on leading causes of death and prevalence of dementia.
- Updated U.S. statistics on diabetes, hypertension, common chronic conditions, functional impairments, nutrition and periodontal disease, mental and behavioral problems, depression, and memory impairment in old age.
- Updated research on inactivity, diet, and periodontal disease in old age.
- Revised and updated research on depression.
- New statistics added on U.S. prevalence rates of Alzheimer's disease and Parkinson's disease in aged populations.
- Updated research on risk and protective factors for dementia, Alzheimer's disease, and dementia treatment approaches.
- New research added on the role of myelin repair in dementia progression.
- New research added on the use of computer algorithms and biomarkers in dementia diagnosis, and the outcome of early trials on immunotherapy for Alzheimer's disease.
- Revised and updated research on cognitive processes and driving in the elderly, and the relationship between intelligence and mortality risk.
- New research on the role of socioeconomic status as a mediator between intelligence and health.
- Revised and updated research on neurological changes with age.
- New methodological critique on memory intervention research.

18 Psychosocial Development in Late Adulthood

- Revised, updated, and expanded research on personality stability and change in old age and its relationship to health, age differences, and outcomes of coping styles, and the relationship between religion and health.
- New research on the predictive use of personality change in old age.
- New cross-cultural research added on well-being in late adulthood.
- New research added on socioemotional selectivity and well-being.
- Updated U.S. statistics on religion.
- New statistics added on global religious affiliation and belief.
- Updated research on models of successful aging.
- Revised and updated research on productivity and leisure activities in late life, life after retirement, aging-in place, and living alone in old age.
- Updated U.S. statistics on work and retirement, financial health after retirement, sources of income, poverty rates, institutionalization, aging-in-place, living alone, and living with relatives in old age.
- New Window on the World box on global aging stereotypes.
- New resource model of retirement added.
- New research added on the use of technological aids to delay entry into institutionalized care.
- Revised, updated, and expanded research on living with adult children and in institutions.
- New Research in Action box on elder abuse.
- Updated global and U.S. statistics on institutionalization in old age.
- New statistics added on the average cost of assisted living in the United States.
- Revised and updated research on personal relationship in late life and the link between social relationships and health.
- Updated U.S. statistics on multigenerational families, divorce and remarriage, and cohabitation late in life.
- Revised, updated, and expanded research on multigenerational families and cultural variations.
- Revised, updated, and expanded research on marital relationships late in life, widowhood, and cohabitation.

- New research added on marital conflict in older married couples.
- Updated global and U.S. statistics on single life in the elderly, and co-residence with adult children.
- New research added on dating in old age.
- New research added on "living apart together" relationships.
- Updated research on gay and lesbian relationships in late life.
- Revised and updated research on friendship and relationships with adult children later in life.
- New U.S. and international statistics added on the number of childless aging adults.
- New research added on well-being in older adults without children.

19 Dealing with Death and Bereavement

- New Window on the World box on funeral customs across the world.
- Updated research on outcomes associated with hospice and palliative care, changes preceding death, and near-death experiences.
- New research added on neurological correlates of near-death experiences.
- Revised and updated research on patterns of grieving.
- Revised, updated, and expanded research on understanding of death and bereavement in children.
- New research added on the impact of religion on children's understanding of death.
- New section added on terror management theory.
- Revised and updated research on surviving a spouse and mourning a miscarriage.
- Revised, updated, and expanded research on losing a parent or child in adulthood.
- Updated global and U.S. statistics on suicide.
- Updated research on risk factors, predictors, and method of suicide.
- Updated U.S. statistics on advance directives, assisted suicide, attitudes about assisted suicide, and utilization of Oregon's Death with Dignity law.
- Revised and updated research on advance directives, palliative services, hospice care, and ethnic and cultural differences in beliefs about end-of-life care.
- New section added on euthanasia.
- New Research in Action box on physician-assisted suicide.
- Updated international data on euthanasia laws.
- Revised and updated research on U.S. and international attitudes about end-of-life options.
- New research added on religious beliefs and attitudes about end-of-life care.

Instructor's Manual The instructor's manual provides a wide variety of tools and resources for presenting the course, including learning objectives and ideas for lectures and discussions.

Test Bank By increasing the rigor of the test bank development process, McGraw-Hill Education has raised the bar for student assessment. A coordinated team of subject-matter experts methodically vetted each question and set of possible answers for accuracy, clarity, effectiveness, and accessibility; each question has been annotated for level of difficulty, Bloom's taxonomy, APA learning outcomes, and corresponding coverage in the text. Organized by chapter, the questions are designed to test factual, conceptual, and applied understanding.

Test Builder New to this edition and available within Connect, Test Builder is a cloud-based tool that enables instructors to format tests that can be printed or administered within a Learning Management System. Test Builder offers a modern, streamlined interface for easy content configuration that matches course needs, without requiring a download.

Test Builder enables instructors to:

- Access all test bank content from a particular title
- Easily pinpoint the most relevant content through robust filtering options
- Manipulate the order of questions or scramble questions and / or answers
- Pin questions to a specific location within a test
- Determine your preferred treatment of algorithmic questions
- Choose the layout and spacing
- Add instructions and configure default settings

PowerPoint Presentations The PowerPoint presentations, available in both dynamic, lecture-ready and accessible, WCAG-compliant versions, highlight the key points of the chapter and include supporting visuals. All of the slides can be modified to meet individual needs.

EXPERIENCE

Human Development

part 1
ABOUT HUMAN DEVELOPMENT

chapter 1

The Study of Human Development

outline

Human Development: An Ever-Evolving Field

The Study of Human Development: Basic Concepts

Influences on Development

The Life-Span Developmental Approach

learning objectives

Describe human development and how its study has evolved.

Describe the domains and periods of human development.

Give examples of the influences that make one person different from another.

Discuss the principles of the life-span perspective.



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did you know?

- In some societies there is no concept of adolescence or middle age.
- Many scholars today agree that race is not a concept that can be defended on a biological basis.
- Almost 13 million U.S. children live in poverty and are at risk for health, cognitive, emotional, and behavioral problems.

In this chapter we describe how the field of human development has itself developed. We identify aspects of development and show how they interrelate. We summarize major developments during each period of life. We look at influences on development and the contexts in which each occurs.

The only lasting truth is change.

—Octavia Butler

Human Development: An Ever-Evolving Field

From the moment of conception, human beings begin a process of change that will continue until the last flicker of life ends. A single cell divides and divides again, over and over, in an orchestrated, organized fashion. Although each child born of this process is a unique individual, development is nonetheless patterned and orderly and follows a blueprint laid out by our evolutionary history. Eventually, a living, breathing, squalling infant is born and begins to be influenced by and to influence the surrounding world. Babies grow and become children, and then adolescents, and then adults. It is not until the heart ceases beating and the neurons of the brain stop firing that our stories end. These patterns of development are explored in this book.

The field of **human development** focuses on the scientific study of the systematic processes of change and stability in people. Developmental scientists look at ways in which people change from conception through maturity as well as at characteristics that remain fairly stable.

human development
Scientific study of processes of change and stability throughout the human life span.

The work of developmentalists can have a dramatic impact on people's lives. Research findings often have applications to child rearing, education, health, and social policy. For example, research has shown that delaying middle and high school start times results in improved student outcomes on a wide variety of measures. When school start time is pushed back to 8:30 AM or later, students are more likely to report longer total sleep times, reduced daytime sleepiness, less difficulty staying awake in class, lower levels of depression, and greater participation in extracurricular activities. Additionally, their improved alertness has been associated with increased driving safety. These effects exist because later start times are more in sync with adolescent biological circadian rhythms, which prevent most teens from going to sleep early enough in the evening to get sufficient sleep (Watson et al., 2017; Minges & Redeker, 2016).



Developmental psychologists have helped identify key achievements in development across childhood. Many parenting websites include lists of these milestones to help parents track their children's growth.

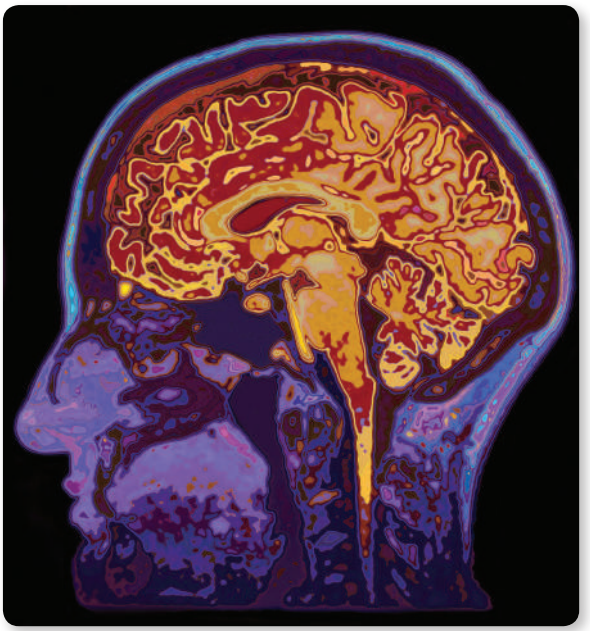
STUDYING THE LIFE SPAN

When the field of developmental psychology emerged as a scientific discipline, most researchers focused their energies on infant and child development. Growth and development are more obvious during these times given the rapid pace of change. As the field matured, however, it became clear that development included more than infancy and childhood. Now researchers consider **life-span development** to be from "womb to tomb," comprising the entire human life span from conception to death. Moreover, they acknowledge that development can be either positive (e.g., becoming toilet trained or enrolling in a college course after retirement) or negative (e.g., once again wetting the bed after a traumatic event or isolating yourself after retirement). For these reasons, events such as the timing of parenthood, maternal employment, and marital satisfaction are now also studied as part of developmental psychology.

life-span development
Concept of human development as a lifelong process, which can be studied scientifically.

HUMAN DEVELOPMENT TODAY

As the field of human development itself developed, its goals came to include description, explanation, prediction, and intervention. For example, to *describe* when most children say their first word or how large their vocabulary is at a certain age, developmental scientists



Brain imaging techniques, such as functional magnetic resonance imaging (fMRI), positron emission tomography (PET), and electroencephalogram (EEG), are used to map where certain thought processes take place within the structure of the brain.
SpeedKingz/Shutterstock

observe large groups of children and establish norms, or averages, for behavior at various ages. They then attempt to *explain* how children acquire language and why some children learn to speak later than usual. This knowledge may make it possible to *predict* future behavior, such as the likelihood that a child will have serious speech problems. Finally, an understanding of how language develops may be used to *intervene* in development, for example, by giving a child speech therapy.

The scientific study of human development is ever evolving. The questions that developmental scientists try to answer, the methods they use, and the explanations they propose are more sophisticated and more varied than they were even five years ago. These shifts reflect progress in understanding as new investigations build on or challenge those that went before. They also reflect advances in technology. Scientists now have access to sensitive instruments that measure eye movement, heart rate, and muscle tension. They are able to use digital technology that allows them to analyze how mothers and babies communicate. Advances in brain imaging make it possible to probe the mysteries of temperament or to compare a normally aging brain with the brain of a person with dementia.

Development is messy. It's complex and multifaceted and shaped by interacting arcs of influence. Thus development is best understood with input from a variety of theoretical and research orientations and is most appropriately studied using multiple disciplines. Not surprisingly, the study of development has been interdisciplinary almost from the start (Parke, 2004b). Students of human development draw collaboratively from a wide range of disciplines, including psychology, psychiatry, sociology, anthropology, biology, genetics, family science, education, history, and medicine. This book includes findings from research in all these fields.

checkpoint can you . . .

- Give examples of practical applications of research on human development?
- Identify four goals of the scientific study of human development?
- Name at least six disciplines involved in the study of human development?

The Study of Human Development: Basic Concepts

Developmentalists study processes of change and stability in all domains, or aspects, of development throughout all periods of the life span.

DOMAINS OF DEVELOPMENT

Developmental scientists study three major *domains,* or aspects, of the self: physical, cognitive, and psychosocial. Growth of the body and brain, sensory capacities, motor skills, and health are parts of **physical development.** Learning, attention, memory, language, thinking, reasoning, and creativity make up **cognitive development.** Emotions, personality, and social relationships are aspects of **psychosocial development.**

physical development
Growth of body and brain, including patterns of change in sensory capacities, motor skills, and health.

cognitive development
Pattern of change in mental abilities, such as learning, attention, memory, language, thinking, reasoning, and creativity.

psychosocial development
Pattern of change in emotions, personality, and social relationships.

Although in this book we talk separately about physical, cognitive, and psychosocial development, these domains are intricately interconnected. But to understand their complexity, we need to establish boundaries somewhere. Thus, we separate these spheres of influence. Despite this, it is important to remember that each aspect of development affects the others. Child development is a complex and tangled web of multiple influences, and understanding these influences requires thinking carefully about their interactions. Just as a fly caught on one thread of a web sends reverberations across the entire structure, development in one area sends ripples though all other areas. For example, physical development affects cognitive and psychosocial development. A child with frequent ear

infections may develop language more slowly than a child without this physical problem. During puberty, dramatic physical and hormonal changes affect the developing sense of self. Physical changes in the brains of some older adults may lead to intellectual and personality deterioration.

Similarly, cognitive advances and declines are related to physical and psychosocial development. A child who is precocious in language development may bring about positive reactions in others and thus gain in self-worth. Memory development reflects gains or losses in physical connections in the brain. An adult who has trouble remembering people's names may feel shy in social situations.

And finally, psychosocial development can affect cognitive and physical functioning. Indeed, without meaningful social connections, physical and mental health suffers. Motivation and self-confidence are important contributors to school success, whereas negative emotions such as anxiety can impair performance. Researchers even have identified possible links between a conscientious personality and length of life.



These children are engaging in all three domains of development: sensory perception (physical development), learning (cognitive development), and social relationships building (psychosocial development).
Ariel Skelley/Blend Images LLC

PERIODS OF THE LIFE SPAN

Division of the life span into periods is a **social construction:** a concept or practice that is an invention of a particular culture or society. There is no objectively definable moment when a child becomes an adult or a young person becomes old. Because the concept of childhood is a social construction, the form it takes varies across cultures. In contrast to the relative freedom children have in the United States today, young children in Colonial times were expected to do adultlike tasks such as knitting socks and spinning wool (Ehrenreich & English, 2005). Inuit parents in the Canadian Arctic believe that young children are not yet capable of thought and reason and therefore are lenient when their children cry or become angry. But parents on the Pacific Island of Tonga regularly beat 3- to 5-year-olds, whose crying is attributed to willfulness (Briggs, 1970; Morton, 1996).

social construction
A concept or practice that may appear natural and obvious to those who accept it, but that in reality is an invention of a particular culture or society.

A similar construction involves *adolescence,* which is a recent concept that emerged as society became more industrialized. Until the early twentieth century, young people in the United States were considered children until they left school, married or got a job, and entered the adult world. By the 1920s, with the establishment of comprehensive high schools to meet the needs of a growing economy and with more families able to support extended formal education for their children, the teenage years became a distinct period of development (Keller, 1999). In some preindustrial societies, such as the Chippewa Indians, the concept of adolescence still does not exist. The Chippewa have only two periods of childhood: from birth until the child walks, and from walking to puberty. What we call adolescence is part of adulthood (Broude, 1995).

In this book, we follow a sequence of eight periods generally accepted in Western industrial societies. After describing the crucial changes that occur in the first period, before birth, we trace all three domains of development through infancy and toddlerhood, early childhood, middle childhood, adolescence, emerging and young adulthood, middle adulthood, and late adulthood (Table 1). For each period after infancy and toddlerhood, we have combined physical and cognitive development into a single chapter.

The age divisions shown in Table 1 are approximate and somewhat arbitrary. This is especially true of adulthood, when there are no clear-cut social or physical landmarks, such as starting school or entering puberty, to signal a shift from one period to another.

TABLE 1 Typical Major Developments in Eight Periods of Human Development

Age Period	Physical Developments	Cognitive Developments	Psychosocial Developments
Prenatal Period (conception to birth)	Conception occurs by normal fertilization or other means. The genetic endowment interacts with environmental influences from the start. Basic body structures and organs form; brain growth spurt begins. Physical growth is the most rapid in the life span. Vulnerability to environmental influences is great.	Abilities to learn and remember and to respond to sensory stimuli are developing.	Fetus responds to mother's voice and develops a preference for it.
Infancy and Toddlerhood (birth to age 3)	All senses and body systems operate at birth to varying degrees. The brain grows in complexity and is highly sensitive to environmental influence. Physical growth and development of motor skills are rapid.	Abilities to learn and remember are present, even in early weeks. Use of symbols and ability to solve problems develop by end of second year. Comprehension and use of language develop rapidly.	Attachments to parents and others form. Self-awareness develops. Shift from dependence toward autonomy occurs. Interest in other children increases.
Early Childhood (ages 3 to 6)	Growth is steady; appearance becomes more slender and proportions more adultlike. Appetite diminishes, and sleep problems are common. Handedness appears; fine and gross motor skills and strength improve.	Thinking is somewhat egocentric, but understanding of other people's perspectives grows. Cognitive immaturity results in some illogical ideas about the world. Memory and language improve. Intelligence becomes more predictable. Preschool experience is common, and kindergarten experience is more so.	Self-concept and understanding of emotions become more complex; self-esteem is global. Independence, initiative, and self-control increase. Gender identity develops. Play becomes more imaginative, more elaborate, and usually more social. Altruism, aggression, and fearfulness are common. Family is still the focus of social life, but other children become more important.
Middle Childhood (ages 6 to 11)	Growth slows. Strength and athletic skills improve. Respiratory illnesses are common, but health is generally better than at any other time in the life span.	Egocentrism diminishes. Children begin to think logically but concretely. Memory and language skills increase. Cognitive gains permit children to benefit from formal schooling. Some children show special educational needs and strengths.	Self-concept becomes more complex, affecting self-esteem. Coregulation reflects gradual shift in control from parents to child. Peers assume central importance.

TABLE 1 Typical Major Developments in Eight Periods of Human Development

Age Period	Physical Developments	Cognitive Developments	Psychosocial Developments
Adolescence (ages 11 to about 20)	Physical growth and other changes are rapid and profound. Reproductive maturity occurs. Major health risks arise from behavioral issues, such as eating disorders and drug abuse.	Ability to think abstractly and use scientific reasoning develops. Immature thinking persists in some attitudes and behaviors. Education focuses on preparation for college or vocation.	Search for identity, including sexual identity, becomes central. Relationships with parents are generally good. Peer group may exert a positive or negative influence.
Emerging and Young Adulthood (ages 20 to 40)	Physical condition peaks, then declines slightly. Lifestyle choices influence health.	Thought and moral judgments become more complex. Educational and occupational choices are made, sometimes after period of exploration.	Personality traits and styles become relatively stable, but changes in personality may be influenced by life stages and events. Intimate relationships and personal lifestyles are established but may not be lasting. Most people marry, and most become parents.
Middle Adulthood (ages 40 to 65)	Slow deterioration of sensory abilities, health, stamina, and strength may begin, but individual differences are wide. Women experience menopause.	Mental abilities peak; expertise and practical problem-solving skills are high. Creative output may decline but improve in quality. For some, career success and earning powers peak; for others, burnout or career change may occur.	Sense of identity continues to develop; midlife transition may occur. Dual responsibilities of caring for children and parents may cause stress. Launching of children leaves empty nest.
Late Adulthood (age 65 and over)	Most people are healthy and active, although health and physical abilities generally decline. Slowing of reaction time affects some aspects of functioning.	Most people are mentally alert. Although intelligence and memory may deteriorate in some areas, most people find ways to compensate.	Retirement from workforce may occur and may offer new options for use of time. People develop more flexible strategies to cope with personal losses and impending death. Relationships with family and close friends can provide important support. Search for meaning in life assumes central importance.

Although individual differences exist in the way people deal with the characteristic events and issues of each period, developmentalists suggest that certain basic needs must be met and certain tasks mastered for typical development to occur. Infants, for example, are dependent on adults for food, clothing, and shelter as well as for human contact and affection. They form attachments to parents and caregivers, who also become attached to them. With the development of speech and self-locomotion, toddlers become more self-reliant; they need to assert their autonomy but also need parents to set limits on their behavior. During early childhood, children gain more self-control and become more interested in other children. During middle childhood, control over behavior gradually shifts from parent to child, and the peer group becomes increasingly important. A central task of adolescence is the search for identity—personal, sexual, and occupational. As adolescents become physically mature, they deal with conflicting needs and emotions as they prepare to leave the parental nest.

During emerging adulthood, an exploratory period in the early to midtwenties, many people are not yet ready to settle down to the typical tasks of young adulthood: establishing independent lifestyles, occupations, and families. By the thirties, most adults have successfully fulfilled those tasks. During middle adulthood, some decline in physical capabilities is likely. At the same time, many middle-aged people find excitement and challenge in life changes—launching new careers and adult children—while some face the need to care for elderly parents. In late adulthood, people need to cope with losses in their faculties, the loss of loved ones, and preparations for death. If they retire, they must deal with the loss of work-based relationships but may get increased pleasure out of friendships, family, volunteer work, and the opportunity to explore previously neglected interests. Many older people become more introspective, searching out the meaning of their lives.

checkpoint
can **you** . . .

- Identify the three domains of development and give examples of how they are interrelated?
- Name eight periods of human development and list several key issues or tasks of each period?

Influences on Development

What makes each person unique? Although students of development are interested in the universal processes of development experienced by all normal human beings, they also study **individual differences** in characteristics, influences, and developmental outcomes. People differ in gender, height, weight, and body build; in health and energy level; in intelligence; and in temperament, personality, and emotional reactions. The contexts of their lives differ too: the homes, communities, and societies they live in, the relationships they have, the schools they go to (or whether they go to school at all), and how they spend their free time. Every person has a unique developmental trajectory, an individual path to follow. One challenge in developmental psychology is to identify the universal influences on development, and then apply those to understanding individual differences in developmental trajectories.

individual differences
Differences in characteristics, influences, or developmental outcomes.

HEREDITY, ENVIRONMENT, AND MATURATION

Influences on development can be described in two primary ways. Some influences are internal and driven by **heredity** and biological processes. Heredity can be conceptualized as the genetic roll of the dice. It consists of the inborn traits and characteristics provided by a child's biological parents. Other influences stem from the **environment** outside the body, starting at conception with the prenatal environment in the womb and continuing throughout life. The relative influence of nature (heredity and biological processes) and nurture (environmental influences) is fiercely debated, and theorists differ in the weight they assign to each.

heredity
Inborn traits or characteristics inherited from the biological parents.

environment
Totality of nonhereditary, or experiential, influences on development.

Today scientists have found ways to measure more precisely the roles of heredity and environment in the development of specific traits within a population. When we look at a particular person, however, research with regard to almost all characteristics points to a blend of inheritance and experience. Thus, even though intelligence is strongly influenced by heredity, it is also affected by parental stimulation, education, peer influence, and other variables. Contemporary theorists and researchers are more interested in finding ways to explain how nature and nurture work together than in arguing about which factor is more important.

Many typical changes of infancy and early childhood, such as the abilities to walk and talk, are tied to **maturation** of the body and brain—the unfolding of a natural sequence of physical changes and behavior patterns. As children grow into adolescents and then into adults, individual differences in innate characteristics and life experience play a greater role. Throughout life, however, maturation continues to influence certain biological processes, such as brain development.

maturation
Unfolding of a natural sequence of physical and behavioral changes.

Even in processes that all people undergo, rates and timing of development vary. Throughout this book, we talk about average ages for the occurrence of certain events: the first word, the first step, the first menstruation or nocturnal emission, the development of logical thought, and menopause. But these ages are merely averages, and there is wide variation among people with respect to these norms. Only when deviation from the average is extreme should we consider development exceptionally advanced or delayed.



To get a callus, you have to have "callus-making" genes of some sort, but the environmental input of repeated friction on your skin is also required or a callus would never form. So are calluses more nature or more nurture?

To understand development, then, we need to look at the *inherited* characteristics that give each person a start in life. We also need to consider the many *environmental* factors that affect development, especially such major contexts as family, neighborhood, socioeconomic status, race/ethnicity, and culture. We need to consider how heredity and environment interact. We need to understand which developments are primarily maturational and which are not. We need to look at influences that affect many or most people at a certain age or a certain time in history and also at those that affect only certain individuals. Finally, we need to look at how timing can accentuate the impact of certain influences.

CONTEXTS OF DEVELOPMENT

Human beings are social beings. From the beginning they develop within a social and historical context. For an infant, the immediate context normally is the family, but the family in turn is subject to the wider and ever-changing influences of neighborhood, community, and society.

Family The **nuclear family** is a household unit consisting of one or two parents and their children, whether biological, adopted, or stepchildren. Historically, the two-parent nuclear family was the normative family unit in the United States and other Western societies. In 1960, 73 percent of children lived in families with two married parents in their first marriage and 37 percent of households were composed of nuclear families. In 2014, only 69 percent of children and 16 percent of households could be described in the same fashion (Pew Research Center, 2015). Instead of a large, rural family in which parents and children work side by side on the family farm, we are now more likely to see smaller, urban families in which parents work outside the home and children spend much of their time in school or child care.

nuclear family
Two-generational kinship, economic, and household unit consisting of one or two parents and their biological children, adopted children, or stepchildren.

The increased incidence of divorce also has affected the nuclear family. Children of divorced parents may live with one or the other parent or may



An extended-family household might include grandparents, aunts, and cousins.
Ronnie Kaufman/Blend Images/Alamy Stock Photo

move back and forth between them. The household may include a stepparent and stepsiblings or a parent's live-in partner. There are increasing numbers of single and childless adults, unmarried parents, gay and lesbian households, and mixed-race households (Krogstad, 2014). There is no longer one dominant family form (Pew Research Center, 2015). Instead families are now best described as being characterized by diversity.

extended family
Multigenerational kinship network of parents, children, and other relatives, sometimes living together in an extended-family household.

In many societies in Asia, Africa, and Latin America and among some U.S. families that trace their lineage to those countries, the **extended family**—a multigenerational network of grandparents, aunts, uncles, cousins, and more distant relatives—is the traditional family form. Many people live in extended-family households, where they have daily contact with kin. Adults often share breadwinning and child-raising responsibilities, and older children are responsible for younger brothers and sisters.

Today the extended-family household is becoming slightly less typical in many developing countries (Bradbury, Peterson & Liu, 2014) due in part to industrialization and migration to urban centers (Kinsella & Phillips, 2005). Meanwhile, in the United States, economic pressures, housing shortages, and out-of-wedlock childbearing have helped to fuel a trend toward three- and even four-generation family households. In 2016, a record 20 percent of the U.S. population, or 64 million people, lived in multigenerational families. This number has been steadily increasing since the low reached in the early 1980s (Cohn & Passel, 2018).

Multigenerational households have become more common in recent years for a variety of reasons. First, both men and women are marrying at later ages and thus remaining at home for longer than was previously typical. This becomes more common during downturns in the U.S. economy. Second, there has been an influx of immigrant populations since 1970, and these immigrants are more likely than native-born families to seek out multigenerational homes for reasons of practicality as well as preference. Indeed, even among nonimmigrants, race and ethnicity play a part. Latinos, African Americans, and Asians are all more likely to live in multigenerational families than are whites. The last reason for the increase in multigenerational households is that people are living longer, and elderly parents may sometimes benefit from inclusion in their children's households (Krogstad, 2015).



When we are immersed in a culture, it is difficult to see how much of what we do is affected by it. For example, there are regional differences in the United States regarding what soft drinks are called. The term "pop" is most common in the Midwest, Great Plains, and Northwest, "coke" is commonly used in the South and New Mexico, and "soda" is primarily used in California and bordering states.

Socioeconomic Status Poverty is a problem worldwide. Although the number of poor people has fallen by more than 1.1 billion since 1990, more than 736 million people lived on less than $1.90 a day in 2015 (Figure 1). While areas such as East Asia, Pacific, Europe, and Central Asia have already achieved their 2030 targets of reducing poverty to below 3 percent, sub-Saharan Africa still struggles greatly with this issue. The majority of the global poor live in rural areas, work in agriculture, and are poorly educated (World Bank, 2018).

Poverty is also an issue in the United States. The number of children living in poor or low-income families has increased since the recession of 2008 (Jiang, Ekono & Skinner, 2016). In 2017, about 12.8 million American children, or 17.5 percent, lived in poverty, making them the poorest group in the nation. Almost 6 million of these children lived in extreme poverty, defined as living on less than $12,642 a year for a family of four. Youngest children, who are the most vulnerable, are also the most likely to live in poverty (Children's Defense Fund, 2018).

socioeconomic status (SES)
Combination of economic and social factors describing an individual or family, including income, education, and occupation.

Although children from middle- and lower-income families, even those above the poverty line, are not as negatively affected, they nonetheless are at a disadvantage relative to wealthy peers with respect to employment insecurity and income inequality (Foundation for Child Development, 2015). In the United States, race or ethnicity are often associated with **socioeconomic status**. African American, Asian and Pacific Islander, American Indian/Alaskan Native, and Hispanic children are more likely to live in poverty than their white counterparts (Kids Count Data Center, 2017; Children's Defense Fund, 2018).

Poverty is stressful and can damage children's and families' physical, cognitive, and psychosocial well-being. Poor children are more likely than other children to go hungry, to have frequent illnesses, to lack access to health care, to experience violence and family conflict, and to show emotional or behavioral problems (National Academies of Sciences Engineering and Medicine, 2019; Schickedanz, Dreyer, & Halfon, 2015; Eckenrode, Smith, McCarthy, & Dineen, 2014; Yoshikawa, Aber, & Beardslee, 2012). Their cognitive potential and school performance suffer as well (Wolf, Magnuson, & Kimbro, 2017; Hair, Hanson, Wolfe & Pollak, 2015).

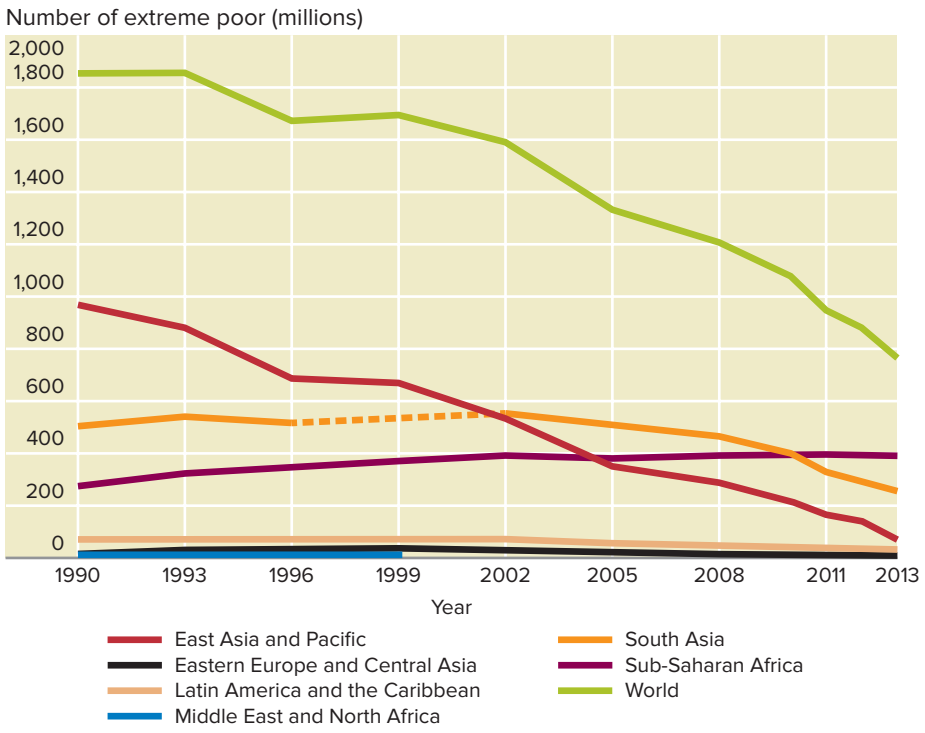


FIGURE 1
Number of Extreme Poor, 1990–2013

Source: World Bank Group (2016)

The harm poverty does is often indirect through its impact on parents' emotional state and parenting practices and on the home environment. Threats to well-being multiply if, as often happens, several **risk factors**, conditions that increase the likelihood of a negative outcome, are present. Moreover, the earlier poverty begins, the longer it lasts, and the higher the concentration of poverty in the community in which children live, the worse the outcomes for those children are (Chaudry & Wimer, 2016).

risk factors
Conditions that increase the likelihood of a negative developmental outcome.

However, negative effects of poverty are not inevitable. Positive development can still occur despite serious risk factors. For example, factors such as supportive parenting (Morris et al., 2017; Brody et al., 2017; Barton, Yu, Brody, & Ehrlich, 2018) or particular temperament profiles (Moran et al., 2017; Rudasill, Hawley, LoCasale-Crouch, & Buhs, 2017) can buffer children against ill effects. Consider the Pulitzer Prize-winning author Maya Angelou; the country singer Shania Twain; the rapper, songwriter, and record producer Jay-Z; and the talk show host and television producer Oprah Winfrey, all of whom grew up in poverty.

Moreover, affluence doesn't necessarily protect children from risk. Some research has shown that adolescents, particularly girls, from affluent families are at higher risk for substance abuse problems and show levels of substance abuse that are higher than national averages. This has been theorized to result from a combination of higher levels of disposable income in concert with greater parental tolerance for substance use relative to other violations such as stealing or academic problems (Luthar & Goldstein, 2008). While some of the increased risk may be the result of pressure to achieve and being left unsupervised by busy parents (Luthar & Latendresse, 2005), much of it seems to be driven by association with deviant peers within the school context (Coley, Sims, Dearing, & Spielvogel, 2018).



People in the United States are far more likely to self-disclose personal information than are people in Japan. Why might this be? The freer social structure in the United States might be one reason. When you can make and break friends easily, you need to cement social bonds as much as possible.

Schug, Yuki, & Maddux, 2010

Culture and Race/Ethnicity **Culture** refers to a society's or group's total way of life, including its customs, traditions, laws, knowledge, beliefs, values, language, and physical products, from tools to artworks—all of the behavior and attitudes that are learned, shared, and transmitted among members of a social group. Culture is constantly changing, often through contact with other cultures. Today cultural contact has been enhanced by computers and telecommunications. E-mail, texting, and social media sites offer almost instantaneous communication across the globe, and digital services such as iTunes give people around the world easy access to one another's music and movies.

culture
A society's or group's total way of life, including customs, traditions, beliefs, values, language, and physical products—all learned behavior, passed on from parents to children.

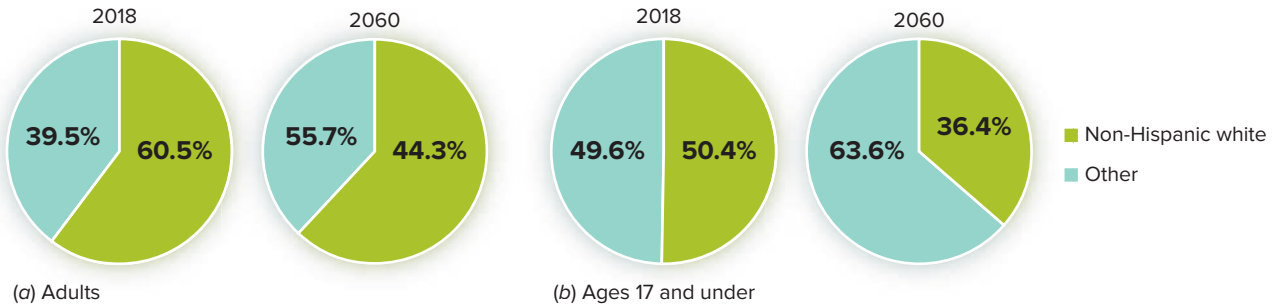


FIGURE 2

Population Projections for Non-Hispanic White and Minority Groups, 2018–2060

According to Census Bureau projections, the United States will become a minority-majority country by 2045, when minorities will comprise over 50 percent of the U.S. population. The white population is overall older, slowly growing, and predicted to decline.

Source: U.S. Census Bureau, 2008a; Frey, 2018.

ethnic group
A group united by ancestry, race, religion, language, or national origins, which contribute to a sense of shared identity.

An **ethnic group** consists of people united by a distinctive culture, ancestry, religion, language, or national origin, all of which contribute to a sense of shared identity and shared attitudes, beliefs, and values. By 2044, ethnic minorities in the United States are expected to become the majority (Figure 2). This benchmark has nearly been reached by minority children, who comprised some 48 percent of all children in the United States in 2014. It is predicted that by 2060, 64 percent of the nation's children will be members of what are now minority groups, and the proportion of Hispanic or Latino/a children—33.5 percent—will be nearly equal to the 35.6 percent who will be non-Hispanic white (Colby & Ortman, 2015).

Ethnic and cultural patterns affect development by their influence on the composition of a household, its economic and social resources, the way its members act toward one another, the foods they eat, the games children play, the way they learn, how well they do in school, the occupations adults engage in, and the way family members think and perceive the world (Parke, 2004b). For example, one study found that Hispanic immigrant parents were less likely to spank their young children than Hispanic parents born in the United States (Lee & Altschul, 2015). Presumably, those Hispanic families who had lived in the United States for longer had adopted U.S. cultural norms on the appropriateness of corporal punishment as a disciplinary strategy for young children (Taylor et al., 2016).



The existence of Marcia and Millie Biggs, who as fraternal twins share approximately 50 percent of their genes, calls into question the concept of race as a biological construct.
Worldwide Features/Barcroft Media/Getty Images

The United States has always been a nation of immigrants and ethnic groups, but the primary ethnic origins of the immigrant population have shifted from Europe and Canada to Asia and Latin America (Hernandez, 2004). In 2007, more than 20 percent of the population were immigrants or children of immigrants. More immigrants came from Mexico, than from any other country, and the remainder came from nations in the Caribbean, East and West Asia, Australia, Central and South America, Indochina, the former Soviet Union, and Africa. See Window on the World for an update on the current immigration situation in the United States.

It is important to remember that wide diversity exists within broad ethnic groups. Cuban Americans, South Americans, and Central Americans—all Hispanic Americans—have different histories and cultures and may be of African, European, Native American, or mixed descent. African Americans from the rural South

window on the world

IMMIGRANT FAMILIES

The United States is a nation of immigrants, known for its cultural diversity and appeals to those seeking refuge, freedom, financial security, or a second chance. As of 2016, estimates are that 43.7 million immigrants—13.5 percent of the population—live in the United States (Zong, Batalova, & Hallock, 2018).

The ethnic origins of the immigrant population have shifted significantly over the past 100 years. In 1910, most U.S. immigrants came from Europe and Canada. By 2010, the largest numbers of immigrants were from Mexico, Asia, and the Caribbean. Since then, the largest percentage increases have occurred in immigration from southern Asia, the Middle East, and northern Africa. However, more immigrants come from Mexico (25 percent) than from any other country (Camarota & Zeigler, 2016). This may be changing—there are indications that immigration from China and India is accelerating as that from Mexico is declining (Chishti & Hipsman, 2015).

One-fourth (25.8 percent) of U.S. children lived in immigrant families in 2016, and 88.2 percent of these children were born in the United States, making them U.S. citizens (Children in U.S. Immigrant Families, 2016). Immigrant children are the fastest growing group of children in the United States. While earlier waves of immigrants were predominantly Caucasian with Christian beliefs, this new wave of immigrants is far more diverse.

Immigrant families must navigate a different culture, religion, and language, and often different ethics and values. Immigrants may arrive with little education and are often undocumented. Thus, although there are few differences in rates of work between immigrants and U.S. natives, immigrants are more likely to work at low-paying jobs requiring manual labor. Not surprisingly, 21 percent of immigrant families live in poverty. In 2014, it was reported that 42 percent of immigrant families used at least one welfare program compared to 27 percent of U.S. natives, a number driven largely by the presence of U.S.-born children (Camarota & Zeigler, 2016). Though most of these families qualify legally for services and pay taxes into the system, 18 percent of immigrant families lack health insurance and access to proper health care.

Many immigrants live in fear of interrogation or deportation and face bigotry and discrimination. In 2012, the deferred action for childhood arrivals (DACA) program was started. It was designed to allow children of immigrants, often brought to the United States as babies or young children, more time to work out documentation, secure a work permit, and obtain a renewable 2-year period of deferred action from deportation. Individuals with felonies or serious misdemeanors on their record were ineligible (Department of Homeland Security, 2016). In 2014, President Obama attempted to expand the program, although it was blocked in the Supreme Court. In 2017, President Donald Trump rescinded the expansion and announced plans to phase out DACA. Although its constitutionality has been challenged (*State of Texas v. United States of America*, 2018), the program remains in place. However, its future is uncertain.

Though immigration can be difficult, the longer immigrants are in the United States, the more progress they make. The same struggles are not as pronounced in second- and third-generation immigrant families as they become acculturated. Immigrants bring racial, cultural, and ethnic diversity to the country. This allows Americans to experience different ways of life, languages, religions, and foods. Immigrants also bring innovative ideas and economic benefits. One-fourth of all U.S. engineering and technology companies founded between 1995 and 2005 had at least one immigrant founder (The Effects of Immigration on the United States' Economy, 2016). More than half of all patent grants in 2014 were to foreign-born individuals (Grenier, 2014). Immigrants often work in farming, food service, maintenance, construction, and manufacturing industries. Many of these industries would collapse without immigrant labor (Jacobi, 2012). It is sometimes easy to forget the United States was founded by immigrants and what role our ancestors played in that process. Immigration will continue to bring a depth and richness to the nation and its culture..

what's your view

Are you (or any members of your family) immigrants or children of immigrants? If so, what factors helped or hindered your (or their) adjustment to life in the United States? How do you imagine life may be different for children of immigrants 40 years from now?

differ from those of Caribbean ancestry. Asian Americans hail from a variety of countries with distinct cultures, from modern industrial Japan to communist China to the remote mountains of Nepal, where many people still practice their ancient way of life. Native Americans consist of hundreds of recognized nations, tribes, bands, and villages. Given this diversity within groups, a term such as *black* or *Hispanic* can be an **ethnic gloss**—an overgeneralization that obscures or blurs such variations.

The term *race*, historically and popularly viewed as an identifiable biological category, is more accurately defined as a social construct. There is no scientific consensus on its definition, and it is impossible to measure reliably (Helms, Jernigan, & Mascher, 2005; Smedley & Smedley, 2005). All humans belong to the same taxonomic classification—Homo sapiens. However, there are important differences in outward appearance of people from different geographical regions; note, for instance, the different skin color of people from northern European countries and from Africa. These salient differences have led people to speak of and treat people differently, despite 90 percent of human variation occurring within rather than among socially defined races (Bonham, Warshauer-Baker, & Collins, 2005; Ossorio & Duster, 2005). Nevertheless, race as a social category remains a factor in research because it makes a difference in "how individuals are treated, where they live, their employment opportunities, the quality of their health care, and whether [they] can fully participate" in their society (Smedley & Smedley, 2005, p. 23).

Categories of culture, race, and ethnicity are fluid, "continuously shaped and redefined by social and political forces" (Fisher et al., 2002, p. 1026). Geographic dispersion and intermarriage together with adaptation to varying local conditions have produced a great heterogeneity of physical and cultural characteristics within populations (Smedley & Smedley, 2005). Thus, President Barack Obama, who has a black, African father and a white, American mother, falls into more than one racial/ethnic category and may identify more strongly with one or another at different times (Hitlin, Brown, & Elder, 2006).

ethnic gloss
Overgeneralization about an ethnic or cultural group that obscures differences within the group.

normative
Characteristic of an event that occurs in a similar way for most people in a group.

historical generation
A group of people strongly influenced by a major historical event during their formative period.

checkpoint
can **you** . . .

- Give examples of the influences of family and neighborhood composition, socioeconomic status, culture, race/ethnicity, and historical context?

The Historical Context At one time developmentalists paid little attention to the historical context—the time in which people live. Then, as early longitudinal studies of childhood extended into the adult years, investigators began to focus on how certain experiences, tied to time and place, affect the course of people's lives. Today, the historical context is an important part of the study of development.



Widespread use of computers is a normative history-graded influence on children's development, which did not exist in earlier generations.
JGI/Jamie Grill/Getty Images

NORMATIVE AND NONNORMATIVE INFLUENCES

To understand similarities and differences in development, we need to look at two types of **normative** influences: biological or environmental events that affect many or most people in a society in similar ways and events that touch only certain individuals (Baltes & Smith, 2004).

Normative age-graded influences are highly similar for people in a particular age group. The timing of biological events is fairly predictable within a normal range. For example, people don't experience puberty at age 35 or menopause at 12.

Normative history-graded influences are significant events (such as the Great Depression or World War II) that shape the behavior and attitudes of a **historical generation:** a group of people who experience the event at a formative time in their lives. For example, the generations that came of age during the Depression and World War II tend to show a strong sense of social interdependence and trust that has declined among more recent generations (Rogler, 2002). Depending on when and where they live, entire



Newborn ducklings followed and became attached to the first moving object they saw, which happened to be ethologist Konrad Lorenz. Lorenz called this behavior imprinting.

Nina Leen/The LIFE Picture Collection/Getty Images

generations may feel the impact of famines, nuclear explosions, or terrorist attacks. In Western countries, medical advances as well as improvements in nutrition and sanitation have dramatically reduced infant and child mortality. As children grow up today, they are influenced by computers, digital television, the Internet, and other technological developments. Social changes, such as the increase in employed mothers and the increase in single-parent households, have greatly altered family life.

A historical generation is not the same as an age **cohort:** a group of people born at about the same time. A historical generation may contain more than one cohort, but cohorts are part of a historical generation only if they experience major, shaping historical events at a formative point in their lives (Rogler, 2002).

Nonnormative influences are unusual events that have a major impact on *individual* lives because they disturb the expected sequence of the life cycle. They are either typical events that happen at an atypical time of life (such as the death of a parent when a child is young) or atypical events (such as surviving a plane crash). Some of these influences are largely beyond a person's control and may present rare opportunities or severe challenges that the person perceives as turning points. On the other hand, people sometimes help create their own nonnormative life events—say, by deciding to have a baby in their midfifties or taking up a risky hobby such as skydiving—and thus participate actively in their own development. Taken together, the three types of influences—normative age-graded, normative history-graded, and nonnormative—contribute to the complexity of human development as well as to the challenges people experience in trying to build their lives.

Media exposure provides a normative influence on children today, and toddlers are now skillful at using iPhone apps developed specifically for them. How might this shape their development?

Stout, 2010

cohort
A group of people born at about the same time.

nonnormative
Characteristic of an unusual event that happens to a particular person or a typical event that happens at an unusual time of life.

checkpoint can you . . .

- **Give examples of normative age-graded, normative history-graded, and nonnormative influences?**

TIMING OF INFLUENCES: CRITICAL OR SENSITIVE PERIODS

In a well-known study, Konrad Lorenz (1957), an Austrian zoologist, showed that newly hatched ducklings will instinctively follow the first moving object they see, whether it is a member of their species or not. This phenomenon is called **imprinting,** and Lorenz believed that it was automatic and irreversible. Usually, this instinctive bond is with the mother; when the natural course of events is disturbed, however, other attachments, such as the one to Lorenz, or none at all can form. Imprinting, said Lorenz, is the result of a *predisposition toward learning:* the readiness of an organism's nervous system to acquire certain information during a brief *critical period* in early life.

A **critical period** is a specific time when a given event, or its absence, has a specific impact on development. If a necessary event does not occur during a critical period of maturation, normal development will not occur; and the resulting abnormal patterns may be irreversible (Kuhl, Conboy, Padden, Nelson, & Pruitt, 2005). However, the length of a critical period is not absolutely fixed; if ducklings' rearing conditions are varied to slow their growth, the usual critical period for imprinting can be extended, and imprinting itself may even be reversed (Bruer, 2001).

imprinting
Instinctive form of learning in which, during a critical period in early development, a young animal forms an attachment to the first moving object it sees, usually the mother.

critical period
Specific time when a given event or its absence has a specific impact on development.

research in action

BABY TALK

Imagine you're cradling a baby in your arms. She displays a toothless grin as you begin to speak. Do you notice a difference in your speech patterns? Are your words simpler? Do you make silly sounds to attract her attention?

Cross-cultural research helps us to tease out what aspects of our behavior are universal—or common to humans everywhere—or culturally specific, the product of our upbringing. One area of cross-cultural research involves "baby talk," or distinctive speech patterns with preverbal infants. Infant-directed (ID) speech includes simplified grammar, slower tempo, pitch variations, exaggerated sound intonation, and repetition of key words and phrases (Estes & Hurley, 2013; Ma, Golinkoff, Houston, & Hirsh-Pasek, 2011). Neither gender is exempt, as both women and men use ID speech patterns (Pegg, Werker, & McLeod, 1992; Soderstrom, 2007). Infants find ID speech highly engaging, and it draws their attention to spoken language. Adults speak in this fashion even to newborns (Johnson, Caskey, Rand, Tucker, & Vohr, 2014), and infants as young as 7 weeks display ID speech preferences. In fact, babies pay special attention to ID speech even in languages other than their own. Pegg, Werker, and McLeod (1992) found exaggerated intonation of ID speech (the rise and fall of the voice) attractive to infants, whether presented in their native English language or Cantonese (Chinese).

American English is the most studied language with respect to ID speech, but there is evidence of ID speech patterns cross-culturally (e.g., French, Spanish, Hebrew, Japanese, Fijian, and Luo of Kenya and Tanzania). Similarities are also found in prosody (stressed syllables and intonation) across different languages (Broesch & Bryant, 2015; Soderstrom, 2007). A study of mother-infant vocalization across 11 countries suggests that ID speech engages infants in the social function of language. Baby talk captures attention and elicits vocalization in a conversational, turn-taking manner (Bornstein, Putnick, Cote, Haynes, & Suwalsky, 2015).

ID speech may also help convey cultural norms. Fernald and Morikawa (1993) found that American mothers use noun-labeling more frequently ("Look at the car.... Those are wheels."). Japanese mothers use ID speech to emphasize social interactions ("Car goes 'vrooom'.... I give to you.... You give back"). Japanese mothers also emphasized cultural norms of empathy and politeness within ID speech, promoting cultural values of interdependence, connectedness, and harmony. Mastin and Vogt (2016) drew a similar conclusion from a study of Mozambican infants. Rural Mozambicans used more words related to kinship, emphasizing collectivist values even more so than those in urban areas.

Some cultures discourage ID speech. The Gusii of Kenya do not believe it is useful or necessary to speak to infants (Richman, Miller, & LeVine, 2010). The Ifaluk of Micronesia see no point in baby talk, as it is believed infants lack understanding (Le, 2000), and remote Senegalese villagers express fears that evil spirits will possess babies who are spoken to (Weber, Fernald, & Dion, 2017; Zeitlin, 2011). As a result, little to no effort is made to speak to infants in these cultures, despite near constant contact with caregivers.

ID speech has been associated with numerous benefits, including association of sounds of words with meanings (Estes & Hurley, 2013; Ma, Golinkoff, Houston, & Hirsch-Pasek, 2011; Bergelson & Swingley, 2012), increase in long-term word recognition (Singh, Nestor, Parikh, & Yull, 2009), and increased neural activity when words are spoken in ID speech (Zangl & Mills, 2007). The attention-grabbing features orient babies to spoken language, and the simplified and repetitive nature of ID speech is a supportive framework for language acquisition. ID speech is not the sole source of language input, perhaps representing as little as 15 percent of total language. Children also listen to the language adults direct toward each other or to other siblings and learn from that as well. ID speech preference begins to decline as early as 9 to 12 months, as infants become more linguistically sophisticated (Soderstrom, 2007). Interestingly, whether ID speech is used or not, infants achieve language fluency along roughly the same timetable worldwide. Language, it seems, is too important to be left to the vagaries of chance.



Is baby talk a common practice in your culture? What about singing lullabies, reading books, or bedtime stories to preverbal infants? How would you continue to stimulate language development once infants begin to respond using babbles or first words?

Do human beings experience critical periods, as ducklings do? If a woman receives X-rays, takes certain drugs, or contracts certain diseases at certain times during pregnancy, the fetus may show specific ill effects, depending on the nature of the insult, its timing, and characteristics of the fetus itself. If a muscle problem interfering with the ability to focus both eyes on the same object is not corrected within a critical period early in childhood, depth perception probably will not develop (Bushnell & Boudreau, 1993). All children must be exposed to linguistic input and social interaction early in life to develop language in the typical fashion, although, as discussed in Research in Action, not all cultures use "baby talk" to the same degree.

However, the concept of critical periods in humans is controversial. Because many aspects of development, even in the physical domain, have been found to show **plasticity,** or modifiability of performance, it may be more useful to think about **sensitive periods,** when a developing person is especially responsive to certain kinds of experiences (Bruer, 2001).

There is growing evidence that plasticity is not just a general characteristic of development that applies to all members of a species, but that there are individual differences in plasticity of responses to environmental events as well. It appears as if some children—especially those with difficult temperaments, those who are highly reactive, and those with particular gene variants—may be more profoundly affected by childhood experiences, whether positive or negative, than other children (Belsky & Pluess, 2009). This new research suggests that characteristics generally assumed to be negative—such as a difficult or reactive temperament—can be adaptive (positive) when the environment is supportive of development. For example, one study found that children who were highly reactive to environmental events showed, as expected, negative responses such as aggression and behavior problems when faced with stressors such as marital conflict in their families. Surprisingly, however, when the levels of family adversity were low, highly reactive children showed even more adaptive profiles than children low in reactivity. These highly reactive children were more prosocial, more engaged in school, and showed lower levels of externalizing symptoms (Obradovic, Stamperdahl, Bush, Adler, & Boyce, 2010). Research such as this clearly points to a need to reconceptualize the nature of plasticity in early development with an eye toward examining issues of resilience as well as risk.

plasticity
Range of modifiability of performance.

sensitive periods
Times in development when a person is particularly open to certain kinds of experiences.



Seeking dangerous activities may be influenced by our genes. Specifically, a mutation in genes that code for dopamine appears to be related to risk-taking behaviors.

Derringer et al., 2011

checkpoint can you . . .

- Contrast critical and sensitive periods and give examples?

The Life-Span Developmental Approach

Paul B. Baltes (1936–2006) and his colleagues (1987; Baltes & Smith, 2004; Baltes, Lindenberger, & Staudinger, 1998; Staudinger & Bluck, 2001) have identified seven key principles of a life-span developmental approach that sum up many of the concepts discussed in this chapter. Together these principles serve as a widely accepted conceptual framework for the study of life-span development:

1. *Development is lifelong.* Development is a lifelong process of change. Each period of the life span is affected by what happened before and will affect what is to come. Each period has unique characteristics and value. No period is more or less important than any other.
2. *Development is multidimensional.* It occurs along multiple interacting dimensions—biological, psychological, and social—each of which may develop at varying rates.
3. *Development is multidirectional.* As people gain in one area, they may lose in another, sometimes at the same time. Children grow mostly in one direction—up—both in size and in abilities. Then the balance gradually shifts. Adolescents typically gain in physical abilities, but their facility in learning a new language typically declines. Some abilities, such as vocabulary, often continue to increase throughout most of adulthood; others, such as the ability to solve unfamiliar problems, may diminish; but some new attributes, such as wisdom, may increase with age.

4. *Relative influences of biology and culture shift over the life span.* The process of development is influenced by both biology and culture, but the balance between these influences changes. Biological abilities, such as sensory acuity and muscular strength and coordination, weaken with age, but cultural supports, such as education, relationships, and technologically age-friendly environments, may help compensate.
5. *Development involves changing resource allocations.* Individuals choose to invest their resources of time, energy, talent, money, and social support in varying ways. Resources may be used for growth (for example, learning to play an instrument or improving one's skill), for maintenance or recovery (practicing to maintain or regain proficiency), or for dealing with loss when maintenance and recovery are not possible. The allocation of resources to these three functions changes throughout life as the total available pool of resources decreases. In childhood and young adulthood, the bulk of resources typically goes to growth; in old age, to regulation of loss. In midlife, the allocation is more evenly balanced among the three functions.
6. *Development shows plasticity.* Many abilities, such as memory, strength, and endurance, can be improved significantly with training and practice, even late in life. However, even in children, plasticity has limits that depend in part on the various influences on development. One of the tasks of developmental research is to discover to what extent particular kinds of development can be modified at various ages.
7. *Development is influenced by the historical and cultural context.* Each person develops within multiple contexts—circumstances or conditions defined in part by maturation and in part by time and place. Human beings not only influence but also are influenced by their historical-cultural context. As we discuss throughout this book, developmental scientists have found significant cohort differences, for example, in intellectual functioning, in women's midlife emotional development, and in the flexibility of personality in old age.

checkpoint
can **you** . . .

- **Summarize the seven principles of the life-span developmental approach?**

summary and key terms

Human Development: An Ever-Evolving Field

- Human development is the scientific study of processes of change and stability.
- Developmental research has important applications in various fields.
- As researchers have become interested in following development through adulthood, life-span development has become a field of study.
- The study of human development seeks to describe, explain, predict, and, when appropriate, intervene in development.
- Students of human development draw on such disciplines as psychology, psychiatry, sociology, anthropology, biology, genetics, family science, education, history, philosophy, and medicine.
- Methods of studying human development are still evolving, making use of advanced technologies.

human development (*3*)

life-span development (*3*)

The Study of Human Development: Basic Concepts

- Developmental scientists study change and stability in all domains of development throughout the life span.
- The three major domains of development are physical, cognitive, and psychosocial. Each affects the others.
- The concept of periods of development is a social construction. In this book, the life span is divided into eight periods: prenatal, infancy and toddlerhood, early childhood, middle childhood, adolescence, emerging and young adulthood, middle adulthood, and late adulthood. In each period, people have characteristic developmental needs and tasks.

physical development (*4*)

cognitive development (*4*)

psychosocial development (*4*)

social construction (*5*)

Influences on Development

- Influences on development come from both heredity and environment. Many typical changes during childhood are related to maturation. Individual differences tend to increase with age.
- In some societies, the nuclear family predominates; in others, the extended family.
- Socioeconomic status (SES) affects developmental processes and outcomes through the quality of home and neighborhood environments, nutrition, medical care, and schooling. Multiple risk factors increase the likelihood of poor outcomes.
- Important environmental influences stem from culture, race/ethnicity, and historical context. Race is viewed by most scholars as a social construction.
- Influences may be normative (age-graded or history-graded) or nonnormative.
- There is evidence of critical or sensitive periods for certain kinds of early development.

individual differences (*8*)
heredity (*8*)
environment (*8*)
maturation (*9*)
nuclear family (*9*)
extended family (*10*)
socioeconomic status (SES) (*10*)
risk factors (*11*)
culture (*11*)
ethnic group (*12*)
ethnic gloss (*14*)
normative (*14*)
historical generation (*14*)
cohort (*15*)
nonnormative (*15*)
imprinting (*15*)
critical period (*15*)
plasticity (*17*)
sensitive periods (*17*)

The Life-Span Developmental Approach

- The principles of the life-span developmental approach include the propositions that (1) development is lifelong, (2) development is multidimensional, (3) development is multidirectional, (4) the relative influences of biology and culture shift over the life span, (5) development involves changing resource allocations, (6) development shows plasticity, and (7) development is influenced by the historical and cultural context.

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chapter 2

Theory and Research

outline

Basic Theoretical Issues

Theoretical Perspectives

Research Methods

Ethics of Research

learning objectives

Describe the purpose of a theory in research and two theoretical issues on which developmental scientists differ.

Summarize the main theories of human development.

Describe the methods developmental researchers use to collect data and the advantages and disadvantages of each.

Explain ethical guidelines for researchers who study people.



Åke Ericson/Cavan Images

did you know?

- Theories are never "set in stone"; they are always open to change as a result of new findings.
- Cross-cultural research enables us to learn which aspects of development are universal and which are culturally influenced.
- The results of laboratory experiments may be less applicable than experiments carried out in a home, school, or public setting.

In this chapter we present an overview both of major theories of human development and of research methods used to study it. We explore important issues and theoretical perspectives that underlie much research in human development, and we look at how researchers gather and assess information. Ethical issues that may arise in research on humans are also addressed.

The most exciting phrase to hear in science, the one that heralds new discoveries, is not "Eureka" but "That's funny. . . ."

—Isaac Asimov

Basic Theoretical Issues

A scientific **theory** of development is a set of logically related concepts or statements that seek to describe and explain development and to predict the kinds of behavior that might occur under certain conditions. Theories organize and explain *data,* the information gathered by research. As painstaking research adds, bit by bit, to the body of knowledge, theoretical concepts help us make sense of, and see connections between, isolated pieces of data.

theory
Coherent set of logically related concepts that seeks to organize, explain, and predict data.

Theory and research are interwoven strands in the seamless fabric of scientific study. Theories inspire further research and predict its results. They do this by generating **hypotheses,** explanations or predictions that can be tested by further research. Research can indicate whether a theory is accurate in its predictions but cannot conclusively show a theory to be true. Sometimes research supports a hypothesis and the theory on which it was based. At other times, scientists must modify their theories to account for unexpected data. Research findings often suggest additional hypotheses to be examined and provide direction for dealing with practical issues.

hypotheses
Possible explanations for phenomena, used to predict the outcome of research.



People generally think theories are less well supported than laws, but in scientific terms the opposite is true. Laws are observations without explanations. Theories, by contrast, are observations and explanations. So theories have more support, not less.

Developmental science cannot be completely objective. Theories and research about human behavior are products of human individuals, whose inquiries and interpretations are inevitably influenced by their own values and experience. In striving for objectivity, researchers must scrutinize how they and their colleagues conduct their work, the assumptions on which it is based, and how they arrive at their conclusions. For example, early developmentalists assumed that human psychology was the same in every culture. However, as the science of psychology progressed, it became clear that cultural differences existed and mattered. Theories of development had to be changed to accommodate these findings.

Sometimes, people become frustrated with scientists for "changing their minds" in the face of new findings. If scientists cannot decide what is true, they argue, how can we believe anything they say? However, the willingness of scientists to reevaluate their beliefs in light of new data is one of science's greatest strengths. If scientists were to rigidly adhere to old belief systems and refuse to consider new information, then science would never progress. It is the emergence of new data, and the willingness to consider it, that moves us forward.

It can also be frustrating to be faced with multiple, sometimes conflicting, theories, and difficult to decide which is the "right" one. But once again, this is the wrong approach. All theories have something to offer our understanding of human development, and all have been influential. Something as wondrously complex as human development is not easily understood and is not likely to be captured within the constraints of one theoretical system. Each theory is one piece of the puzzle we are trying to solve.

Theories do share some common themes, however. The way theorists explain development depends in part on their assumptions about two basic issues: (1) whether people are active or reactive in their own development, and (2) whether development is continuous or occurs in stages.

checkpoint can **you** . . .

- Explain the relationships among theories, hypotheses, and research?

These issues are also applicable in the real world. For instance, if you believe in the worth of programs like Head Start, that implies you believe in the power of environmental influences. If you think such programs are not worth the financial investment, that implies you feel heredity is more important. Which do you believe?

ISSUE 1: IS DEVELOPMENT ACTIVE OR REACTIVE?

Psychology is an outgrowth of philosophy in many ways, and philosophers have frequently grappled with questions of psychology and development. There have been a variety of perspectives. For example, the eighteenth-century English philosopher John Locke held that a young child is a *tabula rasa*—a "blank slate"—upon which society writes. How the child developed, in either positive or negative ways, depended entirely on experiences. In contrast, the French philosopher Jean Jacques Rousseau believed that children are born "noble savages" who develop according to their own positive natural tendencies if not corrupted by society. This debate remains important today, although in modern terms we speak of heredity and environmental influences.

Additional philosophical debates about development, and the same basic issues philosophers argued about, are reflected in the psychological theories of today. In this section we address the debate about active and reactive development. Psychologists who believe in reactive development conceptualize the developing child as a hungry sponge that soaks up experiences and is shaped by this input over time. Psychologists who believe in active development argue that people create experiences for themselves and are motivated to learn about the world around them.

Mechanistic Model The debate over Locke's and Rousseau's philosophies led to two contrasting models, or images, of development: *mechanistic* and *organismic*. Locke's view was the forerunner of the **mechanistic model.** In this model, people are like machines that react to environmental input (Pepper, 1942, 1961).

mechanistic model
Model that views human development as a series of predictable responses to stimuli.

Machines do not operate of their own will; they react automatically to physical forces or inputs. Fill a car with gas, turn the ignition key, press the accelerator, and the car will move. In the mechanistic view, human behavior is much the same: It results from the operation of biological parts in response to external or internal stimuli. If we know enough about how the human "machine" is put together and about the forces acting on it, we can predict what the person will do.

Mechanistic researchers want to identify the factors that make people behave as they do. For example, to explain why some college students drink too much alcohol, a mechanistic theorist might look for environmental influences, such as advertising and whether the student's friends are heavy drinkers.

Organismic Model Rousseau was the precursor of the **organismic model.** This model sees people as active, growing organisms that set their own development in motion (Pepper, 1942, 1961). They initiate events; they do not just react. Thus the driving force for change is internal. Environmental influences do not *cause* development, though they can speed or slow it.

organismic model
Model that views human development as internally initiated by an active organism and as occurring in a sequence of qualitatively different stages.

Because human behavior is viewed as an organic whole, it cannot be predicted by breaking it down into simple responses to environmental stimulation. An organismic theorist, in studying why some students drink too much, looks at what kinds of situations they choose to participate in, and with whom. Do they choose friends who prefer to party or to study?

For organicists, development has an underlying, orderly structure, though it may not be obvious from moment to moment. As a fertilized egg cell develops into an embryo and then into a fetus, it goes through a series of changes not overtly predictable from what came before. Swellings on the head become eyes, ears, mouth, and nose. The brain begins to coordinate breathing, digestion, and elimination. Sex organs form. Similarly, organicists describe development after birth as a progressive sequence of stages, moving toward full maturation.

Quantitative change is like counting apples; there are fewer or more apples, but they are all apples. Qualitative change is like comparing apples and oranges.

ISSUE 2: IS DEVELOPMENT CONTINUOUS OR DISCONTINUOUS?

The mechanistic and organismic models also differ on the second issue: Is development *continuous,* that is, gradual and incremental, or *discontinuous,* that is, abrupt or uneven? Mechanist theorists see development as continuous: as occurring in small incremental stages (Figure 1a). Development is always governed by the same processes and involves the gradual

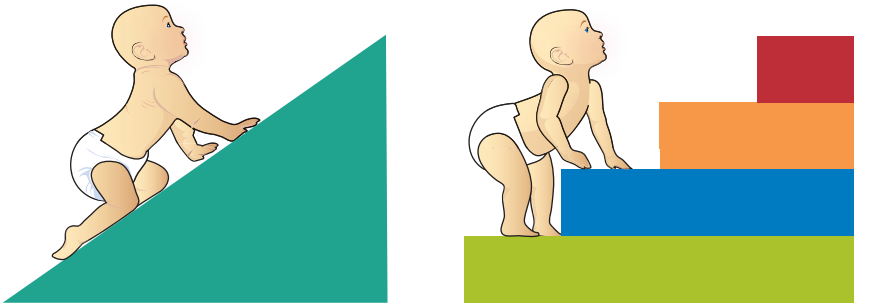


FIGURE 1
Quantitative and Qualitative Change

A major difference among developmental theories is (a) whether it proceeds continuously, as learning theorists and information-processing theorists propose, or (b) whether development occurs in distinct stages, as Freud, Erikson, and Piaget maintained.

refinement and extension of early skills into later abilities, allowing one to make predictions about future characteristics on the basis of past performance. This type of change is known as **quantitative change**—a change in number or amount, such as height, weight, or vocabulary size. A primary characteristic of quantitative change is that you are measuring fundamentally the same thing over time, even if there might be more or less of it.

quantitative change
Changes in number or amount, such as in height, weight, size of vocabulary, or frequency of communication.

Qualitative change, by contrast, is discontinuous and marked by the emergence of new phenomena that could not be easily predicted on the basis of past functioning. Development at different points in the life span is, in this view, fundamentally different in nature. It is a change in kind, structure, or organization, not just in number.

qualitative change
Discontinuous changes in kind, structure, or organization.

Be careful here. If you google "quantitative" and "qualitative," you are likely to find web pages that focus on qualitative and quantitative statistics, not change. Although these are related concepts, they are not quite the same thing.

As an example of the difference between quantitative and qualitative change, take pregnancy. Being 2 months pregnant versus being 6 months pregnant is a quantitative change—it involves being more or less pregnant. However, not being pregnant in comparison to being pregnant is a qualitative change. It is fundamentally a different state, not just a different level of the same state.

Organismic theorists are proponents of *stage theories* in which development is seen as occurring in a series of distinct stages, like stairsteps (Figure 1b). At each stage, what is going on is fundamentally different from previous stages. Moreover, stages build upon each other. Stages cannot be skipped, and development only proceeds in a positive direction. It is believed that these processes are universal and account for the development of all humans everywhere, although the particular timing may vary a bit.

checkpoint
can **you** . . .

- Discuss two issues regarding human development?
- Contrast the mechanistic and organismic models?
- Compare quantitative and qualitative change?

Theoretical Perspectives

Theories can generally be characterized as either mechanistic or organismic, and as describing change as either continuous or discontinuous, even if those beliefs are not directly stated. But all developmental theories have implicit assumptions that underlie their approach. These assumptions influence the questions researchers ask, the methods they use, and the ways they interpret data. To evaluate and interpret research, it is important to recognize the theoretical perspective on which it is based.

Five major perspectives underlie much influential theory and research on human development: (1) psychoanalytic, which focuses on unconscious emotions and drives; (2) learning, which studies observable behavior; (3) cognitive, which analyzes thought processes; (4) contextual, which emphasizes the impact of the historical, social, and cultural context; and (5) evolutionary/sociobiological, which considers evolutionary and biological underpinnings of behavior. Following is a general overview of each of these perspectives and some leading theorists. These are summarized in Table 1.

TABLE 1 Five Perspectives on Human Development

Perspective	Important Theories	Basic Propositions	Stage-Oriented	Causal Emphasis	Active/ Reactive Individual
Psycho-analytic	Freud's psychosexual theory	Behavior is controlled by powerful unconscious urges.	Yes	Innate factors modified by experience	Reactive
	Erikson's psychosocial theory	Personality is influenced by society and develops through a series of crises.		Interaction of innate and experiential factors	Active
Learning	Behaviorism, or traditional learning theory (Pavlov, Skinner, Watson)	People are responders; the environment controls behavior.	No	Experience	Reactive
	Social learning (social cognitive) theory (Bandura)	Children learn in a social context by observing and imitating models; they are active learners		Experience modified by innate factors	Active and reactive
Cognitive	Piaget's cognitive-stage theory	Qualitative changes in thought occur with development. Children are active initiators of development.	Yes	Interaction of innate and experiential factors	Active
	Vygotsky's sociocultural theory	Social interaction is central to cognitive development.	Yes (for concept formation)	Experience	
	Information-processing theory	Human beings are processors of symbols.	No	Interaction of innate and experiential factors	
Contextual	Bronfenbrenner's bioecological theory	Development occurs through interaction between a developing person and five surrounding, interlocking contextual systems of influences.	No	Interaction of innate and experiential factors	Active
Evolutionary/ sociobiological	Evolutionary psychology; Bowlby's attachment theory	Human beings are the product of adaptive processes, which interact with the current environment to shape behavior..	No	Interaction of innate and experiential factors	Active and reactive (theorists vary)

PERSPECTIVE 1: PSYCHOANALYTIC

psychoanalytic perspective
View of human development as shaped by unconscious forces that motivate human behavior.

Sigmund Freud (1856–1939) was a Viennese physician who had a profound effect on the field of psychology. He was the originator of the **psychoanalytic perspective** and believed in reactive development, as well as qualitative changes over time. Freud proposed that humans were born with a series of innate, biologically based drives such as hunger, sex,

and aggression. He thought people were motivated to satisfy their urges, and that much of development involved learning how to do so in socially acceptable ways. In addition, Freud believed that early experiences shaped later functioning, and he drew attention to childhood as an important precursor to adult behavior. Freud also promoted the idea that there was a vast, hidden reserve to our psyche, and what we consciously know about and experience is only the small tip of the iceberg of who we are.



Although this is not originally what it stood for, an easy way to remember what the id wants is by remembering "instinctual desires."

Sigmund Freud: Psychosexual Development Freud (1953, 1964a, 1964b) believed that people are born with biological drives that must be redirected to make it possible to live in society. He proposed three hypothetical parts of the personality: the *id,* the *ego,* and the *superego.* Newborns are governed by the *id,* which operates under the *pleasure principle*—the drive to seek immediate satisfaction of their needs and desires. When gratification is delayed, as it is when infants have to wait to be fed, they begin to see themselves as separate from the outside world. The *ego,* which represents reason, develops gradually during the first year or so of life and operates under the *reality principle.* The ego's aim is to find realistic ways to gratify the id that are acceptable to the *superego,* which develops at about age 5 or 6. The *superego* includes the conscience and incorporates socially approved "shoulds" and "should nots" into the child's value system. The superego is highly demanding; if its standards are not met, a child may feel guilty and anxious. The ego mediates between the impulses of the id and the demands of the superego.

Freud proposed that personality forms through unconscious childhood conflicts between the inborn urges of the id and the requirements of civilized life. These conflicts occur in a sequence of five stages of **psychosexual development** (Table 2), in which sensual pleasure shifts from one body zone to another—from the mouth to the anus and then to the genitals. At each stage, the behavior that is the chief source of gratification (or frustration) changes—from feeding to elimination and eventually to sexual activity.

psychosexual development
In Freudian theory, an unvarying sequence of stages of childhood personality development in which gratification shifts from the mouth to the anus and then to the genitals.

Freud considered the first three stages to be crucial for personality development. According to Freud, if children receive too little or too much gratification in any of these stages, they are at risk of *fixation,* an arrest in development that can show up in adult personality. Babies whose needs are not met during the *oral stage,* when feeding is the main source of pleasure, may grow up to become nail-biters or smokers. A person who, as a toddler, had too-strict toilet training may be fixated at the *anal stage,* and be obsessively clean, rigidly tied to schedules and routines, or defiantly messy.

According to Freud, a key event in psychosexual development occurs in the *phallic stage* of early childhood. Boys develop sexual attachment to their mothers, and girls to their fathers, and they have aggressive urges toward the same-sex parent, whom they regard as a rival. Freud called these developments the *Oedipus* and *Electra complexes.*

Children eventually resolve their anxiety over these feelings by identifying with the same-sex parent and move into the *latency stage* of middle childhood, a period of relative emotional calm and intellectual and social exploration. They redirect their sexual energies into other pursuits, such as schoolwork, relationships, and hobbies.

The *genital stage,* the final stage, lasts throughout adulthood. The sexual urges repressed during latency now resurface to flow in socially approved channels, which Freud defined as heterosexual relations with persons outside the family of origin.

Freud's theory made historic contributions and inspired a whole generation of followers, some of whom took psychoanalytic theory in new directions. Many of Freud's ideas now are widely considered culturally biased or obsolete or are impossible to investigate scientifically. Psychoanalysts today reject his narrow emphasis on sexual and aggressive drives to the exclusion of other motives. Nevertheless, several of his central themes have "stood the test of time" (Westen, 1998, p. 334). Freud made us aware of the importance of unconscious thoughts, feelings, and motivations; the role of childhood experiences in forming personality; the ambivalence of emotional responses, the role of mental representations of the self and others in the establishment of intimate relationships; and the path of normal development from an immature, dependent state to a mature, interdependent state.



Sigmund Freud developed an original theory of psychosexual development. His daughter, Anna, shown here, followed in his footsteps and constructed her own theories of personality development.
Imagno/Getty Images

checkpoint can you . . .

- Identify the chief focus of the psychoanalytic perspective?
- Name Freud's five stages of development and three parts of the personality?

TABLE 2 Developmental Stages According to Various Theories

Psychosexual Stages (Freud)	Psychosocial Stages (Erikson)	Cognitive Stages (Piaget)
Oral (birth to 12–18 months). Baby's chief source of pleasure involves mouth-oriented activities (sucking and feeding).	*Basic trust versus mistrust (birth to 12–18 months).* Baby develops sense of whether world is a good and safe place. Virtue: hope.	*Sensorimotor (birth to 2 years).* Infant gradually becomes able to organize activities in relation to the environment through sensory and motor activity.
Anal (12–18 months to 3 years). Child derives sensual gratification from withholding and expelling feces. Zone of gratification is anal region, and toilet training is important activity.	*Autonomy versus shame and doubt (12–18 months to 3 years).* Child develops a balance of independence and self-sufficiency over shame and doubt. Virtue: will.	*Preoperational (2 to 7 years).* Child develops a representational system and uses symbols to represent people, places, and events. Language and imaginative play are important manifestations of this stage. Thinking is still not logical.
Phallic (3 to 6 years). Child becomes attached to parent of the other sex and later identifies with same-sex parent. Superego develops. Zone of gratification shifts to genital region.	*Initiative versus guilt (3 to 6 years).* Child develops initiative when trying new activities and is not overwhelmed by guilt. Virtue: purpose.	
Latency (6 years to puberty). Time of relative calm between more turbulent stages.	*Industry versus inferiority (6 years to puberty).* Child must learn skills of the culture or face feelings of incompetence. Virtue: skill.	*Concrete operations (7 to 11 years).* Child can solve problems logically if they are focused on the here and now but cannot think abstractly.
Genital (puberty through adulthood). Reemergence of sexual impulses of phallic stage, channeled into mature adult sexuality.	*Identity versus identity confusion (puberty to young adulthood).* Adolescent must determine own sense of self ("Who am I?") or experience confusion about roles. Virtue: fidelity. *Intimacy versus isolation (young adulthood).* Person seeks to make commitments to others; if unsuccessful, may suffer from isolation and self-absorption. Virtue: love. *Generativity versus stagnation (middle adulthood).* Mature adult is concerned with establishing and guiding the next generation or else feels personal impoverishment. Virtue: care. *Integrity versus despair (late adulthood).* Older adult achieves acceptance of own life, allowing acceptance of death, or else despairs over inability to relive life. Virtue: wisdom.	*Formal operations (11 years through adulthood).* Person can think abstractly, deal with hypothetical situations, and think about possibilities.

Note: All ages are approximate.

Erik Erikson: Psychosocial Development Erik Erikson (1902–1994) modified and extended Freudian theory by emphasizing the influence of society on the developing personality. Erikson also was a pioneer in taking a life-span perspective. Note that both theorists, as they proposed stage theories, believed in qualitative change.

psychosocial development
In Erikson's eight-stage theory, the socially and culturally influenced process of development of the ego, or self.

Erikson's (1950, 1982; Erikson, Erikson, & Kivnick, 1986) theory of **psychosocial development** covers eight stages across the life span (refer to Table 2), which we discuss in the appropriate chapters throughout this book. Each stage involves what Erikson originally called a *crisis* in personality*—a major psychosocial challenge that is particularly important at that time and will remain an issue to some degree

*Erikson broadened the concept of "crisis" and later referred instead to conflicting or competing tendencies.

throughout the rest of life. These issues must be satisfactorily resolved for healthy ego development.

Each stage requires balancing a positive and a negative tendency. The positive quality should dominate, but some degree of the negative quality is needed as well for optimal development. The critical theme of infancy, for example, is *basic trust versus basic mistrust.* People need to trust the world and the people in it. However, they also need some mistrust to protect themselves from danger. The successful outcome of each stage is the development of a particular *virtue,* or strength—in this case, the virtue of *hope.*

Successful resolution of each crisis puts the person in a particularly good position to address the next crisis, a process that occurs iteratively across the life span. So, for example, a child who successfully develops a sense of trust in infancy would be well prepared for the development of a sense of autonomy—the second psychosocial challenge—in toddlerhood. After all, if you feel that others have your back, you are more likely to try to develop your skills knowing that they will be there to comfort you if you fail.

Erikson's theory is important for a number of reasons. First, while the crises that Erikson outlined were particular to one place and time—for example, across different cultures, not all children go to school—Erikson did make clear that social and cultural influences mattered. Erikson highlighted the social clock—the conventional, culturally preferred timing of important life events. Moreover, while Freud's approach implied that development stopped at adolescence, Erikson realized that development was a lifelong process. Last, Erikson held a much more positive view of development than Freud. Erikson, while acknowledging that crises could be resolved poorly, left room for improvement. At any point in the life span, development could shift in a positive direction, and a crisis might be successfully resolved and a new strength developed.



The psychoanalyst Erik H. Erikson emphasized societal influences on personality.
Bettmann/Getty Images

checkpoint can you . . .

- **Tell two ways that Erikson's theory differs from Freud's?**

PERSPECTIVE 2: LEARNING

Theorists within the **learning perspective** argued that development was the result of *learning*, a relatively long-lasting change based on experience or adaptation to the environment. Learning theorists were not interested in the inner working of the mind because those processes could not be directly observed. Because behavior is observable and countable and confers great objectivity, this was the focus. In the opinion of proponents of this view, terms could be defined precisely and theories could be tested scientifically in the laboratory, thus lending psychology greater legitimacy and respectability.

learning perspective
View of human development that holds that changes in behavior result from experience or from adaptation to the environment.

Psychologists at the time also viewed the mind as *tabula rasa*, a blank slate upon which experience could write. In this view, everything a person became depended upon experience. Thus, anyone, no matter what race or whatever individual characteristics might be present, could be anything. This implied that the ills of the world could be fixed if psychologists could just figure out the right way to raise children. While the child-rearing strategies proposed by behaviorists eventually fell out of favor, the idea that people were fundamentally the same held a powerful moral attraction.

Behaviorists saw development as continuous, emphasizing incremental quantitative changes over time, and reactive, occurring in response to environmental input. The learning approach was the dominant ideology in the field of psychology in the 1950s. Two of the major subtheories were behaviorism and the social learning approach.

Behaviorism **Behaviorism** is a mechanistic theory that describes observed behavior as a predictable response to experience. Behaviorists consider development as reactive and continuous. They hold that human beings at all ages learn about the world the same way other organisms do: by reacting to conditions or aspects of their environment that they find pleasing, painful, or threatening. Behavioral research focuses on *associative learning,* in which a mental link is formed between two events. Two kinds of associative learning are *classical conditioning* and *operant conditioning*.

behaviorism
Learning theory that emphasizes the predictable role of environment in causing observable behavior.

classical conditioning
Learning based on associating a stimulus that does not ordinarily elicit a response with another stimulus that does elicit the response.

Classical Conditioning The Russian physiologist Ivan Pavlov (1849–1936) devised experiments in which dogs learned to salivate at the sound of a bell that rang at feeding time. These experiments were the foundation for **classical conditioning,** in which a response (in this case, salivation) to a stimulus (the bell) is evoked after repeated association with a stimulus that normally elicits the response (food).

The American behaviorist John B. Watson (1878–1958) applied such stimulus-response theories to children, claiming that he could mold any infant in any way he chose. In one of the earliest and most famous demonstrations of classical conditioning in human beings (Watson & Rayner, 1920), he taught an 11-month-old baby known as "Little Albert" to fear furry white objects.

In this study, Albert was exposed to a loud noise when he started to stroke a rat. The noise frightened him, and he began to cry. After repeated pairings of the rat with the loud noise, Albert whimpered with fear when he saw the rat. Albert also started showing fear responses to white rabbits and cats, and the beards of elderly men. The study, although unethical, demonstrated that fear could be conditioned.

Classical conditioning occurs throughout life. Food likes and dislikes may be a result of conditioned learning. Fear responses to objects like a car or a dog may be the result of an accident or a bad experience.

Pavlov was originally studying salivary enzymes in dogs. He put a plate of meat in front of them so he could collect their saliva. He made his breakthrough discovery when he realized that the dogs were salivating before the meat was presented to them.

Operant Conditioning Angel lies in his crib. When he starts to babble ("ma-ma-ma"), his mother smiles and repeats the syllables. Angel learns that his behavior (babbling) can produce a desirable consequence (loving attention from a parent); and so he keeps babbling to attract his mother's attention. An originally accidental behavior (babbling) has become a conditioned response.

operant conditioning
Learning based on association of behavior with its consequences.

This type of learning is called **operant conditioning** because the individual learns from the consequences of "operating" on the environment. Unlike classical conditioning, operant conditioning involves voluntary behavior, such as Angel's babbling and involves the consequences rather than the predictors of behavior.

The American psychologist B. F. Skinner (1904–1990) argued that an organism—animal or human—will tend to repeat a response that has been reinforced by desirable consequences and will suppress a response that has been punished. Thus **reinforcement** is the process by which a behavior is strengthened, *increasing* the likelihood that the behavior will be repeated. In Angel's case, his mother's attention reinforces his babbling. **Punishment** is the process by which a behavior is weakened, *decreasing* the likelihood of repetition. If Angel's mother frowned when he babbled, he would be less likely to babble again.

You can think of classical conditioning as the before—what happens to provoke a response. And operant conditioning as the after—what happens after a response occurs that shapes the likelihood of it happening again.

reinforcement
The process by which a behavior is strengthened, increasing the likelihood that the behavior will be repeated.

punishment
The process by which a behavior is weakened, decreasing the likelihood of repetition.

Reinforcement is most effective when it immediately follows a behavior. If a response is no longer reinforced, it will eventually be *extinguished,* that is, return to its original (baseline) level. If, after a while, no one repeats Angel's babbling, he may babble less often than if his babbles still brought reinforcement.

social learning theory
Theory that behaviors are learned by observing and imitating models. Also called *social cognitive theory.*

reciprocal determinism
Bandura's term for bidirectional forces that affect development.

observational learning
Learning through watching the behavior of others.

Skinnerian psychology has been influential. For many years, the bulk of work in psychology occurred within this approach. Behavioral modification, a form of operant conditioning used to shape behaviors, has been widely used as a therapeutic approach for children with special needs. It has been extraordinarily effective in managing problem behaviors and encouraging desired behaviors. However, as an overarching theory of development, behaviorism falls short. While learning theorists advocated a *tabula rasa* approach, we know now that children come into the world with a host of individual differences that profoundly impact development. There is no room for such variability within the learning approach. Moreover, it has become clear that the "rules" for learning in different domains do not always follow behavioral predictions and can

differ depending on what is being learned. For example, children learn language far more rapidly than learned associations can account for, and the way in which children learn to talk is fundamentally different from how they learn to walk. Last, psychologists have realized, over time, that while we cannot directly access what is going on in people's heads, we can use indirect measures (such as reaction time) to make objective scientific predictions and collect empirical data. Thus, the earlier reluctance to examine mental processes has abated as the field has progressed.

Social Learning (Social Cognitive) Theory As the psychological community began to realize developmental theories that ignored all cognitive processes were incomplete, the original postulates of the behavioral approach were expanded by the American psychologist Albert Bandura (b. 1925). Bandura developed many of the principles of **social learning theory.** Whereas behaviorists see the environment as the chief impetus for development, Bandura (1977, 1989; Bandura & Walters, 1963) suggests that the impetus for development is bidirectional. Bandura called this concept **reciprocal determinism**—the person acts on the world as the world acts on the person.

Classic social learning theory maintains that people learn appropriate social behavior chiefly by observing and imitating models—that is, by watching other people. This process is called **observational learning,** or *modeling.* People tend to choose models who are prestigious, who control resources, or who are rewarded for what they do—in other words, those whose behavior is perceived as valued in their culture. Observational learning can occur even if a person does not imitate the observed behavior. For example, Clara sees her sister get disciplined for eating a cookie cooling on the counter and thus restrains herself from doing the same thing.

Bandura's (1989) updated version of social learning theory is *social cognitive theory.* The change of name reflects a greater emphasis on cognitive processes as central to development. Cognitive processes are at work as people observe models, learn *chunks* of behavior, and mentally put the chunks together into complex new behavior patterns. Rita, for example, imitates the toes-out walk of her dance teacher but models her dance steps after those of Carmen, a slightly more advanced student. Even so, she develops her own style of dancing by putting her observations together into a new pattern.

Through feedback on their behavior, children gradually form standards for judging their actions and become more selective in choosing models who demonstrate those standards. They also begin to develop a sense of **self-efficacy,** or confidence in their abilities.



According to Skinner's principles, a punishment, such as this child's time-out, reduces the likelihood that a behavior will be repeated.
Ron Nickel/Design Pics/age fotostock.

PERSPECTIVE 3: COGNITIVE

The **cognitive perspective** focuses on thought processes and the behavior that reflects those processes. This perspective encompasses both organismic and mechanistically influenced theories. It includes the cognitive-stage theory of Piaget, Vygotsky's sociocultural theory of cognitive development, and the information-processing approach.

Jean Piaget's Cognitive-Stage Theory Both cognitive psychology and developmental psychology owe an enormous debt to the work of the Swiss theoretician Jean Piaget (1896–1980). Through his careful observations and thoughtful questions, Piaget developed the **cognitive-stage theory** that reintroduced the concept of scientific inquiry into mental states. Because he developed a series of experimental paradigms that yielded hard observational data, he demonstrated that "real" science could indeed investigate hidden mental phenomena, as we will see throughout this text.

checkpoint can you . . .

- Identify the chief concerns of the learning perspective?
- Tell how classical conditioning and operant conditioning differ?
- Contrast reinforcement and punishment?
- Compare behaviorism and social learning theory?

self-efficacy
Sense of one's capability to master challenges and achieve goals.

cognitive perspective
View that thought processes are central to development.

cognitive-stage theory
Piaget's theory that children's cognitive development advances in a series of four stages involving qualitatively distinct types of mental operations.



Jean Piaget studied children's cognitive development by observing and talking with them in many settings, asking questions to find out how their minds worked.
Bill Anderson/Science Source

organization
Piaget's term for the creation of categories or systems of knowledge.

schemes
Piaget's term for organized patterns of thought and behavior used in particular situations.

adaptation
Piaget's term for adjustment to new information about the environment, achieved through processes of assimilation and accommodation.

assimilation
Piaget's term for incorporation of new information into an existing cognitive structure.

accommodation
Piaget's term for changes in a cognitive structure to include new information.

equilibration
Piaget's term for the tendency to seek a stable balance among cognitive elements; achieved through a balance between assimilation and accommodation.

checkpoint can you . . .

- **List three interrelated principles that bring about cognitive growth, according to Piaget, and give an example of each?**

Piaget viewed development organismically, as the product of children's attempts to understand and act upon their world. He also believed in qualitative development, and thus his theory delineates a series of stages characterizing development at different ages.

Piaget suggested that cognitive development begins with an inborn ability to adapt to the environment. By rooting for a nipple, feeling a pebble, or exploring the boundaries of a room, young children develop a more accurate picture of their surroundings and greater competence in dealing with them. This cognitive growth occurs through three interrelated processes: *organization, adaptation,* and *equilibration.*

Organization is the tendency to create categories, such as birds, by observing the characteristics that individual members of a category, such as sparrows and cardinals, have in common. According to Piaget, people create increasingly complex cognitive structures called **schemes,** ways of organizing information about the world that govern the way the child thinks and behaves in a particular situation. As children acquire more information, their schemes become more and more complex. Take sucking, for example. A newborn infant has a simple scheme for sucking but soon develops varied schemes for how to suck at the breast, a bottle, or a thumb. The infant may have to open her mouth wider, or turn her head to the side, or suck with varying strength. Schemes are originally concrete in nature (e.g., how to suck on objects) and become increasingly abstract over time (e.g., what a dog is).

Adaptation is Piaget's term for how children handle new information in light of what they already know. Adaptation occurs through two complementary processes: (1) **assimilation,** taking in new information and incorporating it into existing cognitive structures, and (2) **accommodation,** adjusting one's cognitive structures to fit the new information.

How does the shift from assimilation to accommodation occur? Piaget argued that children strive for **equilibration** between their cognitive structures and new experiences. In other words, children want what they understand of the world to match what they observe around them. When children's understanding of the world does not match what they are experiencing, they find themselves in a state of disequilibrium. Disequilibrium can be thought of as an uncomfortable motivational state, and it pushes children into accommodation. For example, a child knows what birds are and sees a plane for the first time. The child labels the plane a "bird" (assimilation). Over time the child notes differences between planes and birds. For example, the child might notice in picture books that planes look different from birds, even though both fly in the sky, and that birds have feathers, while planes are made of a smooth surface. These observations bring about an uneasy motivational state known as disequilibrium. The child is then motivated to change her understanding to more closely reflect her observations—perhaps by learning the label for plane and realizing that planes and birds are not, after all, the same thing. In other words, accommodation has occurred and she is now at equilibrium. Throughout life, the quest for equilibrium is the driving force behind cognitive growth.

Piaget described cognitive development as occurring in four universal, qualitatively different stages (listed in Table 2). From infancy through adolescence, mental operations evolve from learning based on simple sensory and motor activity to logical, abstract thought.

Piaget's observations have yielded much information and some surprising insights. Piaget has shown us that children's minds are not miniature adult minds. His theory provided rough benchmarks for what to expect of children at various ages and has helped educators design curricula appropriate to varying levels of development.



Piaget wrote his first scientific paper at the age of 10, on the sighting of an albino sparrow.

Yet Piaget seems to have seriously underestimated the abilities of infants and children. Further, cross-cultural research indicates that performance on formal reasoning tasks is as much a function of culture as it is of development; people from industrialized societies who have participated in a formal educational system show better performance on those tasks (Buck-Morss, 1975). Last, research on adults suggests that Piaget's focus on formal logic as the climax of cognitive development is too narrow. It does not account for the emergence of such mature abilities as practical problem solving, wisdom, and the capacity to deal with ambiguous situations.

Lev Vygotsky's Sociocultural Theory

The Russian psychologist Lev Semenovich Vygotsky (1896–1934) focused on the social and cultural processes that guide children's cognitive development. Vygotsky's (1978) **sociocultural theory** described cognitive growth as a *collaborative* process. People, said Vygotsky, learn through social interaction. They acquire cognitive skills as part of their induction into a way of life. Shared activities help children internalize their society's modes of thinking and behaving. Vygotsky placed special emphasis on *language,* not merely as an expression of knowledge and thought but as an essential tool for learning and thinking about the world.

According to Vygotsky, adults or more advanced peers must help direct and organize a child's learning before the child can master and internalize it. This guidance is most effective in helping children cross the **zone of proximal development (ZPD),** the gap between what they are already able to do by themselves and what they can accomplish with assistance. Sensitive and effective instruction, then, should be aimed at the ZPD and increase in complexity as the child's abilities improve. Responsibility for directing learning gradually shifts to the child, such as when an adult teaches a child to float: the adult first supports the child in the water and then lets go gradually as the child's body relaxes into a horizontal position.

The supportive assistance with a task that parents, teachers, or others give a child is known as **scaffolding**. For example, Noah receives a new puzzle for his birthday, but after emptying the pieces on the dining room table and trying to fit them together, he makes little progress. His older sister sees him trying, sits next to him, and offers advice on how to begin. "Try putting all the pieces of the same color in piles," she says. "That makes it easier to see what goes together. You can look at the box for clues. And if you do the edges first, then you have the outline already done." With his sister's scaffolding, Noah is able to start working on the puzzle. He can move to the high end of his zone of proximal development and maximize his learning.

Vygotsky's ideas have grown in stature and prominence as their implications for education and cognitive testing have become more apparent. For example, most intelligence tests assess what a child has already learned. By contrast, an intelligence test in the Vygotskian tradition might allow testers to offer hints to children who were having trouble answering a question, thereby focusing on that child's potential learning. Additionally, Vygotsky's ideas have had an enormous impact on early childhood education, and they show great promise for promoting the development of self-regulation, which later affects academic achievement (Barnett et al., 2008).

The Information-Processing Approach

The **information-processing approach** seeks to explain cognitive development by analyzing the processes involved in making sense of incoming information and performing tasks effectively: such processes as attention, memory, planning strategies, decision making, and goal setting. The information-processing approach is not a single theory but a framework that supports a wide range of theories and research.

Some information-processing theorists compare the brain to a computer: there are certain inputs (such as sensory impressions) and certain outputs (such as behaviors). Information-processing theorists are interested in what happens in the middle. Why does the same input sometimes result in different outputs? In large part, information-processing researchers use observational data to *infer* what goes on between a stimulus and a response.



According to Lev Vygotsky, children learn through social interaction.
Sovfoto/Universal Images Group/Getty Images

sociocultural theory
Vygotsky's theory of how contextual factors affect children's development.

zone of proximal development (ZPD)
Vygotsky's term for the difference between what a child can do alone and what the child can do with help.

scaffolding
Temporary support to help a child master a task.



Vygotsky believed that play often occurs in the ZPD, pushing children's abilities to their limit. For example, if you ask a child to pretend to be a statue, that child is likely to be able to remain motionless longer than if you ask the child just not to move. The child knows the "rules" of being a statue, and those rules provide scaffolding.

information-processing approach
Approach to the study of cognitive development by observing and analyzing the mental processes involved in perceiving and handling information.

checkpoint can you . . .

- Explain how Vygotsky's theory differs from Piaget's and how it applies to educational teaching and testing?
- Describe what information-processing researchers do, and tell three ways in which such research can be applied?

For example, they may ask a person to recall a list of words and then observe any difference in performance if the person repeats the list over and over before being asked to recall the words or is kept from doing so. Through such studies, some information-processing researchers have developed *computational models* or flowcharts that analyze the specific steps people go through in gathering, storing, retrieving, and using information.

Information-processing theorists view development as continuous. They note age-related increases in the speed, complexity, and efficiency of mental processing and in the variety of material that can be stored in memory. However, they do not consider those processes to be fundamentally different at different ages, just more sophisticated.

The information-processing approach has practical applications. By assessing certain aspects of infant information processing, researchers are able to estimate an infant's later intelligence. It enables parents and teachers to help children learn by making them more aware of their mental processes and of strategies to enhance them. Psychologists often use information-processing models to test, diagnose, and treat learning problems.

PERSPECTIVE 4: CONTEXTUAL

contextual perspective
View of human development that sees the individual as inseparable from the social context.

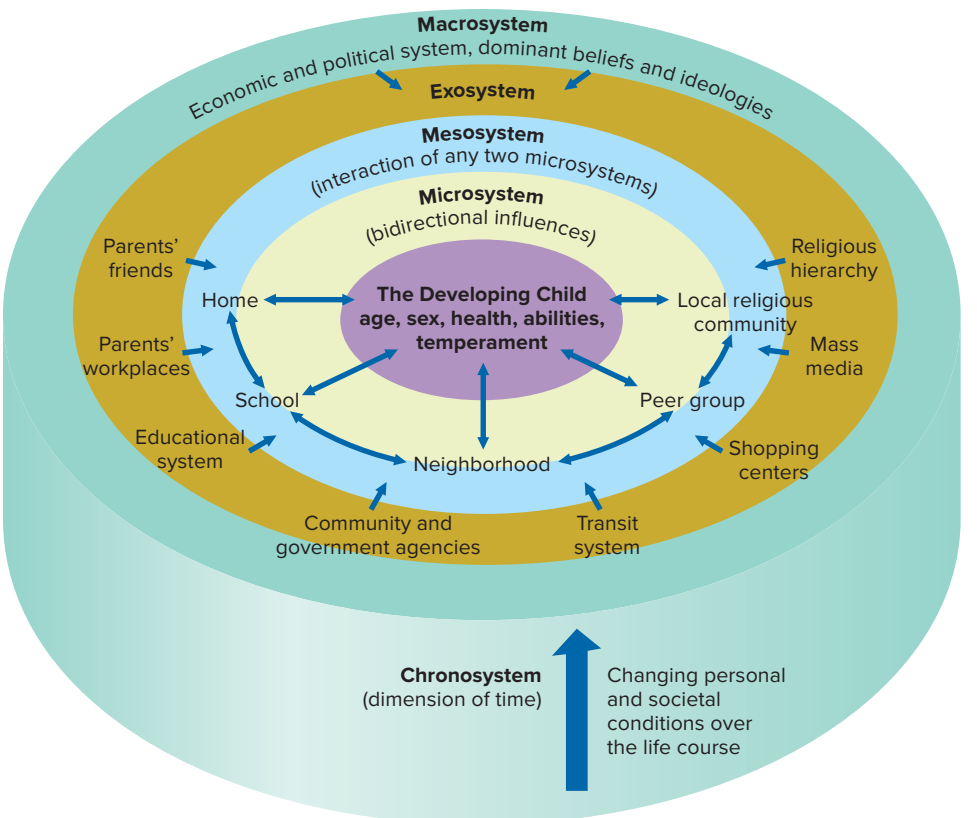
bioecological theory
Bronfenbrenner's approach to understanding processes and contexts of human development that identifies five levels of environmental influence.

According to the **contextual perspective,** development can be understood only in its social context. Contextualists see the individual, not as a separate entity interacting with the environment, but as an inseparable part of it. (Vygotsky's sociocultural theory, which we discussed as part of the cognitive perspective, also can be classified as contextual.)

The **bioecological theory** of American psychologist Urie Bronfenbrenner (1917–2005) (1979, 1986, 1994; Bronfenbrenner & Morris, 1998) is generally represented as a set of rings with the developing child in the middle (Figure 2). Here, individual difference variables such as age, sex, health, abilities, or temperament are present. The child is not seen as just an outcome of development; the child is an active shaper of development. But the child does not exist in isolation. To understand development, we must see the child within the context of the multiple environments surrounding her.

FIGURE 2
Bronfenbrenner's Bioecological Theory

Concentric circles show five levels of environmental influence on the individual, from the most intimate environment (the microsystem) to the broadest (the chronosystem), the perpendicular dimension of time.



The *microsystem* consists of the everyday environment of home, work, school, or neighborhood. It includes face-to-face interactions with siblings, parents, friends, classmates, or later in life, spouses, work colleagues, or employers.

The *mesosystem* is the interlocking influence of microsystems. It may include linkages between home and school (such as a parent-teacher conference) or between the family and the peer group (such as the relationships that develop among families in a neighborhood peer group). Because of mesosystem interactions, environments in which a child does not directly participate may nonetheless influence her.

The *exosystem* consists of interactions between a microsystem and an outside system or institution. Although the effects are indirect, they can still have a profound impact on a child. For example, countries differ with respect to what type of parental leave, if any, is available. Whether or not a parent can stay home with a newborn is a substantial influence on development. Thus, government policies trickle down and can affect a child's day-to-day experiences.

The *macrosystem* consists of overarching cultural patterns, such as dominant beliefs, ideologies, and economic and political systems. For example, individuals are affected by the type of political system they live in, and they might reasonably have different experiences if raised in an open democratic society versus an authoritarian regime with limited freedoms.

Last, the *chronosystem* represents the dimension of time. Time marches on, and as it does, changes occur. These can include changes in family composition (as when a new child is born or a divorce occurs), place of residence, or parents' employment, as well as larger events such as wars, ideological shifts, or economic cycles.

By looking at systems that affect individuals in and beyond the family, this bioecological approach helps us to see the variety of influences on development. The contextual perspective also reminds us that findings about the development of people in one culture or in one group within a culture (such as white, middle-class Americans) may not apply equally to people in other societies or cultural groups.

checkpoint can you . . .

- State the chief assumptions of the contextual perspective?
- Differentiate Bronfenbrenner's five levels of contextual influence?

PERSPECTIVE 5: EVOLUTIONARY/SOCIOBIOLOGICAL

The **evolutionary/sociobiological perspective** proposed by E. O. Wilson (1975) focuses on evolutionary and biological bases of behavior. Influenced by Darwin's theory of evolution, it draws on findings of anthropology, ecology, genetics, ethology, and evolutionary psychology to explain the adaptive, or survival, value of behavior for an individual or species.

evolutionary/sociobiological perspective
View of human development that focuses on evolutionary and biological bases of behavior.

Darwin's theory of natural selection is one of the most important theoretical advances of modern science. It is elegant in its simplicity and profound in its implications. Although it was controversial when Darwin first proposed it and remains controversial today, it is the cornerstone of the biological sciences and has many implications for human psychology.

Fundamentally, Darwin's theory can be broken down into a few major postulates. First, organisms vary. Second, there are never enough resources for all organisms to survive. Third, individual differences in organisms are heritable. The logical consequence of these simple statements is that some organisms, because of their particular characteristics, will survive and hence reproduce at higher rates than others. Their particular traits, then, will be passed on to their descendants in higher proportions, while characteristics of organisms that are not as well suited to the environment will not. Over vast spans of time, these small incremental changes in passed-down traits result in species change. This process is known as natural selection.

Natural selection is defined as the differential survival and reproduction of different variants of members of a species, and is the tool the natural world uses to shape evolutionary processes. While it is commonly described as "survival of the fittest," the key feature is in actuality reproductive success. Individuals with more adaptive traits pass on more of those traits to future generations. In this way, "fit" characteristics are selected to be passed on, and others die out.

Note that these traits can be physical (such as a tiger's stripes, which allow it to blend into the background), behavioral (such as the mating dances of many species of birds), or psychological (such as a baby monkey's need to cling to and cuddle a warm soft body).

ethology
Study of distinctive adaptive behaviors of species of animals that have evolved to increase survival of the species.

Ethology is the study of the adaptive behaviors of animal species in natural contexts. The assumption is that such behaviors evolved through natural selection. Ethologists compare animals of different species and seek to identify which behaviors are universal and which are specific to a particular species or modifiable by experience. For example, one widespread characteristic throughout the animal kingdom is called proximity-seeking, or, more casually, "staying close to mommy." Those baby animals that do not stay close to their mothers do not survive and therefore do not reproduce later in life. But why discuss animal research in a human development text? The answer is because humans also have innate adaptive behaviors. In fact, one of the most important theories in developmental psychology was strongly influenced by the ethological approach. The British psychologist John Bowlby (1969) drew upon his knowledge of proximity-seeking behavior in animals as he formed his ideas about attachment in humans. He viewed infants' attachment to a caregiver as a mechanism that evolved in part to protect them from predators.



Cognitive adaptations can be thought of as similar to apps on an iPhone—useful for specific, constrained functions. Just like in your phone, there's a mind app for almost all important human functions.

evolutionary psychology
Application of Darwinian principles of natural selection and survival of the fittest to individual behavior.

A related extension of the ethological approach can be found in **evolutionary psychology**. Ethologists focus on cross-species comparisons, whereas evolutionary psychologists focus on humans and apply Darwinian principles to human behavior. Just as we have opposable thumbs evolved for manual dexterity, a heart evolved to pump blood, and lungs evolved to exchange gases, we also have parts of our brains that evolved to address specific adaptive problems.

The psychological products of natural selection in humans are known as cognitive adaptations. So, for example, our brains have evolved to find certain faces and body types as attractive, to strive for dominance, and to perceive babies as cute because these propensities addressed the adaptive problems of mate selection, access to resources, and survival of young.

Humans have a large number of cognitive adaptations. Most cognitive adaptations are tailored to a specific problem. For example, morning sickness has been theorized to have evolved to protect the fetus from teratogens (harmful substances) during the first trimester of pregnancy when it is most vulnerable. In support of this, the types of foods women generally report aversions to are foods high in teratogens, and morning sickness generally subsides after the first trimester (Flaxman & Sherman, 2008). Other adaptations, such as human intelligence, are viewed as having evolved to help people face a wide variety of problems flexibly (Chiappe & MacDonald, 2005). These types of cognitive adaptations, in our ancestral past, led to greater survival and reproduction.

Evolutionary psychology, despite arguing that reproductive success is the key feature driving our adaptations, does not propose that people are consciously seeking to maximize their reproductive output. For example, people enjoy sexual activity even when it is not intended to lead to pregnancy. In the ancestral past where birth control was not available, sexual activity often led to pregnancy and hence greater reproductive success. Those people who had a greater desire for sex, and hence more sex, were likely to be more reproductively successful than those with less sexual desire. Thus, genes that code for sexual desire became more common. However, they are not necessarily related to a conscious desire for children. Rather, people tend to have sex because it feels good, just as natural selection designed it to feel.

Early critics of evolutionary psychology argued that evolutionary approaches reduced human behavior to the dictates of genetic imperatives. However, despite arguing that ultimately the transmission of genes is what drives evolved behaviors, evolutionary psychology is not deterministic. Evolutionary psychologists place great weight on the environment to which humans adapt and the flexibility of the human mind.

checkpoint can you . . .

- Identify the chief focus of the evolutionary/sociobiological perspective and explain how Darwin's theory of evolution underlies this perspective?
- Tell what kinds of topics ethologists and evolutionary psychologists study?

Research Methods

Researchers in human development work within two methodological traditions: quantitative and qualitative. Each of these traditions has different goals and different ways of seeing and interpreting reality and emphasizes different means of collecting and analyzing data.

QUANTITATIVE AND QUALITATIVE RESEARCH

Generally, when most people think of scientific research, they are thinking of what is called *quantitative research*. **Quantitative research** deals with objectively measurable, numerical data that can answer questions such as "how much?" or "how many?" and that is amenable to statistical analysis. For example, quantitative researchers might study the fear and anxiety children feel before surgery by asking them to answer questions, using a numerical scale, about how fearful or anxious they are. These data could then be compared to data for children not facing surgery to determine whether a statistically significant difference exists between the two groups.

quantitative research
Research that deals with objectively measurable data.

Quantitative research on human development is based on the **scientific method,** which has traditionally characterized most scientific inquiry. Its usual steps are:

1. *Identification of a problem* to be studied, often on the basis of a theory or of previous research;
2. *Formulation of hypotheses* to be tested by research;
3. *Collection of data;*
4. *Statistical analysis of the data* to determine whether they support the hypothesis;
5. *Formation of tentative conclusions;* and
6. *Dissemination of findings* so other observers can check, learn from, analyze, repeat, and build on the results.

scientific method
System of established principles and processes of scientific inquiry, which includes identifying a problem to be studied, formulating a hypothesis to be tested by research, collecting data, analyzing the data, forming tentative conclusions, and disseminating findings.

Qualitative research, in contrast, focuses on the how and why of behavior. It more commonly involves nonnumerical (verbal or pictorial) descriptions of participants' subjective understanding, feelings, or beliefs about their experiences. Qualitative researchers might study the same subject areas as quantitative researchers, but their perspective informs both how they collect data and how they interpret it. For example, if qualitative researchers were to study children's emotional state prior to surgery, they might do so with unstructured interviews or by asking children to draw their perceptions of the upcoming event. Whereas the goal in quantitative research is to generate hypotheses from previous research and empirically test them, the goal in qualitative research is to understand the "story" of the event. Qualitative research is more flexible and informal, and these researchers might be more interested in gathering and exploring large amounts of data to see what hypotheses emerge than in running statistical analyses on numerical data.

qualitative research
Research that focuses on nonnumerical data, such as subjective experiences, feelings, or beliefs.

SAMPLING

Because studying an entire *population* (a group to whom the findings may apply) is usually too costly and time-consuming, investigators select a **sample,** a smaller group within the population. To be sure that the results of quantitative research are true generally, the sample should adequately represent the population under study—that is, it should show relevant characteristics in the same proportions as in the entire population. Otherwise the results cannot properly be *generalized,* or applied to the population as a whole.

sample
Group of participants chosen to represent the entire population under study.

Often quantitative researchers seek to achieve representativeness through **random selection,** in which each person in a population has an equal and independent chance of being chosen. The result of random selection is a *random sample.* If we wanted to study the effects of an educational program, for example, one way to select a random sample of students would be to put all of their names into a large bowl, stir it, and then draw out a certain number of names. A random sample, especially a large one, is likely to represent the population well. Unfortunately, a random sample of a large population is often difficult to obtain. Instead, many studies use samples selected for convenience or accessibility (for example, children born in a particular hospital or patients in a particular nursing home). The findings of such studies may not apply to the population as a whole.

random selection
Selection of a sample in such a way that each person in a population has an equal and independent chance of being chosen.

In qualitative research, samples tend to be focused rather than random. Participants may be chosen for their ability to communicate the nature of a certain experience, such as how it feels to go through puberty or menopause. A carefully selected qualitative sample may have a fair degree of generalizability.

checkpoint can you . . .

- Compare quantitative and qualitative research and give an example of each?
- Summarize the six steps in the scientific method and tell why each is important?
- Explain the purpose of random selection and tell how it can be achieved?

There is no one "best way" of collecting data; rather, each technique has costs and benefits associated with it.

FORMS OF DATA COLLECTION

Common ways of gathering data (Table 3) include *self-reports* (verbal or visual reports by study participants), *observation* of participants in laboratory or natural settings, and *behavioral* or *performance measures.* Researchers may use one or more of these data collection techniques in any research design. Qualitative research tends to rely on self-reports, often in the form of in-depth, open-ended interviews or visual techniques (such as asking participants to draw their impressions of an experience), and on observation in natural settings. Quantitative research typically uses standardized, structured methods involving numerical measurements of behavior or performance.

Self-Reports: Diaries, Visual Techniques, Interviews, and Questionnaires The simplest form of self-report is a *diary* or log. Adolescents may be asked, for example, to record what they eat each day or the times when they feel depressed. In studying young children, *parental self-reports*—diaries, journals, interviews, or questionnaires—are commonly used, often together with other methods, such as videotaping or recording. Visual representation techniques—asking participants to draw or paint or to provide maps or graphs that illuminate their experience—can avoid reliance on verbal skills.

Which interview technique do you think would yield more reliable results—structured or open-ended?

In a face-to-face or telephone *interview,* researchers ask questions about attitudes, opinions, or behavior. In a *structured* interview, each participant is asked the same set of questions. An *open-ended* interview is more flexible; the interviewer can vary the topics and order of questions and can ask follow-up questions based on the responses. To reach more people and to protect their privacy, researchers sometimes distribute a printed or online *questionnaire,* which participants fill out.

By questioning a large number of people, investigators can get a broad picture—at least of what the respondents *say* they believe or do or did. However, people willing to participate in interviews or fill out questionnaires may not accurately represent the population as a whole. Furthermore, heavy reliance on self-reports may be unwise because

TABLE 3 Major Methods of Data Collection

Type	Main Characteristics	Advantages	Disadvantages
Self-report: diary, visual reports, interview, or questionnaire	Participants are asked about some aspect of their lives; questioning may be highly structured or more flexible; self-report may be verbal or visual.	Can provide firsthand information about a person's life, attitudes, or opinions. Visual techniques (e.g., drawing, mapping, graphing) avoid need for verbal skills.	Participant may not remember information accurately or may distort responses in a socially desirable way; how question is asked or by whom may affect answer.
Naturalistic observation	People are observed in their normal setting, with no attempt to manipulate behavior.	Provides good description of behavior; does not subject people to unnatural settings that may distort behavior.	Lack of control; observer bias.
Laboratory observation	Participants are observed in the laboratory, with no attempt to manipulate behavior.	Provides good descriptions; offers greater control than naturalistic observation because all participants are observed under same controlled conditions.	Observer bias; controlled situation can be artificial.
Behavioral and performance measures	Participants are tested on abilities, skills, knowledge, competencies, or physical responses.	Provides objectively measurable information; avoids subjective distortions.	Cannot measure attitudes or other nonbehavioral phenomena; results may be affected by extraneous factors.

people may not have thought about what they feel and think or honestly may not know. They may forget when and how events took place or may consciously or unconsciously distort their replies to fit what is considered socially desirable.

How a question is asked, and by whom, can affect the answer. When questioned about potentially risky or socially disapproved behavior, such as sexual habits and drug use, respondents may be more candid in responding to a computerized survey than to a paper-and-pencil survey (Turner et al., 1998).

Naturalistic and Laboratory Observation Observation takes two forms: *naturalistic observation* and *laboratory observation*. In **naturalistic observation,** researchers look at people in real-life settings. The researchers do not try to alter behavior or the environment; they simply record what they see. In **laboratory observation,** researchers observe and record behavior in a controlled environment, such as a laboratory. By observing all participants under the same conditions, investigators can more clearly identify any differences in behavior not attributable to the environment.

Both kinds of observation can provide valuable descriptions of behavior, but they have limitations. For one, they do not explain *why* people behave as they do, though the observers may suggest interpretations. Then, too, an observer's presence can alter behavior. When people know they are being watched, they may act differently. Finally, there is a risk of *observer bias:* the researcher's tendency to interpret data to fit expectations or to emphasize some aspects and minimize others.

Behavioral and Performance Measures For quantitative research, investigators typically use more objective measures of behavior or performance instead of, or in addition to, self-reports or observation. Tests and other behavioral and neuropsychological measures may be used to assess abilities, skills, knowledge, competencies, or physiological responses, such as heart rate and brain activity.

Some written tests, such as intelligence tests, compare performance with that of other test-takers. Such tests can be meaningful and useful only if they are both *valid* (the tests measure the abilities they claim to measure) and *reliable* (the results are reasonably consistent from one time to another). To avoid bias, tests must be *standardized,* that is, given and scored by the same methods and criteria for all test-takers.

For most of the history of psychology, theorists and researchers studied cognitive processes apart from the physical structures of the brain in which these processes occur. Now, sophisticated imaging instruments, such as functional magnetic resonance imaging (fMRI) and positron emission tomography (PET), make it possible to see the brain in action, and the new field of **cognitive neuroscience** is linking our understanding of cognitive functioning with what happens in the brain.

EVALUATING QUANTITATIVE AND QUALITATIVE RESEARCH

In comparison with quantitative research based on the scientific method, qualitative research has both strengths and limitations. On the positive side, qualitative research can examine a question in great depth and detail, and the research framework can readily be revised in the light of new data. Findings of qualitative research can be a rich source of insights into attitudes and behavior. The interactive relationship between investigators and participants can humanize the research process and reveal information that would not emerge under the more impersonal conditions of quantitative research. On the other hand, qualitative research tends to be less rigorous and more subject to bias than quantitative research. Because samples are often small and usually not random, results are less generalizable and replicable than the results of quantitative research. The large volume of data makes analysis and interpretation time-consuming, and the quality of the findings and conclusions depends greatly on the skills of the researcher (Mathie & Carnozzi, 2005).

One of the problems with the results of Cosmo *magazine polls is that they are not a random sample. The data come from "people who answer* Cosmo *magazine polls," a select group of individuals.*

naturalistic observation
Research method in which behavior is studied in natural settings without intervention or manipulation.

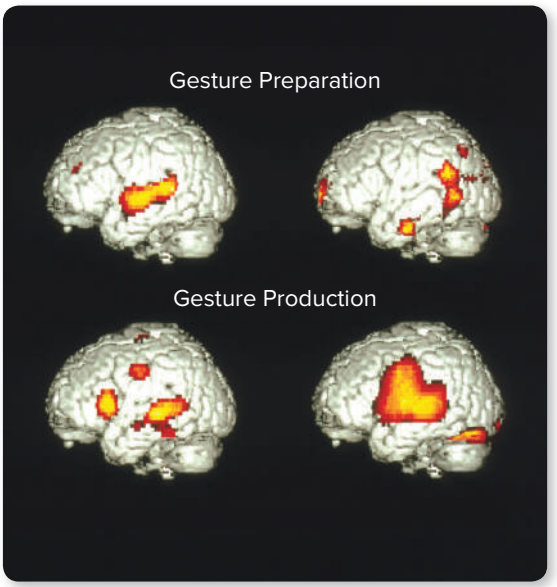
laboratory observation
Research method in which all participants are observed under the same controlled conditions.



A baby under laboratory observation may or may not behave the same way as in a naturalistic setting, such as at home, but both kinds of observation can provide valuable information.
Thierry Berrod, Mona Lisa Production/Science Source

cognitive neuroscience
Study of links between neural processes and cognitive abilities.

Observation doesn't work terribly well for very rare events either. Suppose you wanted to do research on heroic rescues and decided to wait by a bridge to observe whether anyone helps when people try to commit suicide by jumping off. How long would you be waiting?



Researchers can analyze an fMRI (functional magnetic resonance imaging) brain scan taken during an activity or task to observe the link between cognitive activity and what happens in the brain. The regions shown in red are activated when thinking about making a gesture (preparation) and then in performing it (production).
WDCN/Univ. College London/Science Source

case study
Study of a single subject, such as an individual or family.

Yet the line between these methodologies is not necessarily clear-cut. Qualitative data may be analyzed quantitatively—for example, by statistical analysis of interview transcripts or videotaped observations to see how many times certain themes or behaviors occur. Conversely, quantitative data may be illuminated by qualitative research—for example, by interviews designed to examine the motivations and attitudes of children who make high scores on achievement tests (Yoshikawa, Weisner, Kalil, & Way, 2008).

BASIC RESEARCH DESIGNS

Four basic designs used in developmental research are *case studies, ethnographic studies, correlational studies,* and *experiments.* The first two designs are qualitative; the last two are quantitative. Each design has advantages and drawbacks, and each is appropriate for certain kinds of research problems (Table 4).

Case Studies A **case study** is a study of an individual. Case studies may use behavioral or physiological measures and biographical, autobiographical, or documentary materials. Case studies are particularly useful when studying something relatively rare, when it simply is not possible to find a large enough group of people with the characteristic in question to conduct a traditional laboratory study. Case studies offer useful, in-depth information. They can explore sources of behavior and can test treatments, and they suggest directions for further research.

Case studies do have shortcomings, however. Using case studies, we can learn much about the development of a single person, but not how the information applies to people in general. Furthermore, case studies cannot explain behavior with certainty or make strong causal statements because there is no way to test their conclusions.

TABLE 4 Basic Research Designs

Type	Main Characteristics	Advantages	Disadvantages
Case study	In-depth study of single individual.	Provides detailed picture of one person's behavior and development; can generate hypotheses.	May not generalize to others; conclusions not directly testable; cannot establish cause and effect.
Ethnographic study	In-depth study of a culture or subculture.	Can help overcome culturally based biases in theory and research; can test universality of developmental phenomena.	Subject to observer bias.
Correlational study	Attempt to find positive or negative relationship between variables.	Enables prediction of one variable on basis of another; can suggest hypotheses about causal relationships.	Cannot establish cause and effect.
Experiment	Controlled procedure conducted in a laboratory or the field in which an independent variable is manipulated to determine its effect on a dependent variable.	Establishes cause-and-effect relationships; is highly controlled and can be repeated by another investigator.	Findings, especially when derived from laboratory experiments, may not generalize to situations outside the laboratory.

Ethnographic Studies An **ethnographic study** seeks to describe the pattern of relationships, customs, beliefs, technology, arts, and traditions that make up a society's way of life. In a way, it is like a case study of a culture. Ethnographic research can be qualitative, quantitative, or both. It uses a combination of methods, including informal, unstructured interviewing and **participant observation.** Participant observation is a form of naturalistic observation in which researchers live or participate in the societies or smaller groups they observe, as anthropologists often do for long periods of time.

Because of ethnographers' involvement in the events or societies they are observing, their findings are especially open to observer bias. On the positive side, ethnographic research can help overcome cultural biases in theory and research (Window on the World). Ethnography demonstrates the error of assuming that principles developed from research in Western cultures are universally applicable.



The Rorschach inkblot test asks you to say what you see in an inkblot. Presumably, what you see reveals truths about your personality and functioning. The problem? It is notoriously unreliable. What good is a test if you cannot get a straight answer about what it means?

ethnographic study
In-depth study of a culture, which uses a combination of methods including participant observation.

participant observation
Research method in which the observer lives with the people or participates in the activity being observed.

Correlational Studies A **correlational study** seeks to determine whether a *correlation,* or statistical relationship, exists between *variables,* phenomena that change or vary among people or can be varied for purposes of research. Correlations are expressed in terms of direction (positive or negative) and magnitude (degree). Two variables that are correlated *positively* increase or decrease together. Studies show a positive, or direct, correlation between televised violence and aggression. That is, children who watch more violent television tend to fight more than children who watch less violent television. Two variables have a *negative,* or inverse, correlation if, as one increases, the other decreases. Studies show a negative correlation between amount of schooling and the risk of developing dementia (mental deterioration) due to Alzheimer's disease in old age. In other words, the less education, the more dementia (Katzman, 1993).

Correlations are reported as numbers ranging from −1.0 (a perfect negative relationship) to +1.0 (a perfect positive relationship). Perfect correlations are rare. The closer a correlation comes to +1.0 or −1.0, the stronger the relationship, either positive or negative. A correlation of zero means that the variables have no relationship.

Correlations enable us to predict one variable in relation to another. On the basis of the positive correlation between watching televised violence and aggression, we can predict that children who watch violent shows are more likely to get into fights than children who do *not* watch such shows. The greater the magnitude of the correlation between the two variables, the greater the ability to predict one from the other.

Although strong correlations suggest possible cause-and-effect relationships, these are merely hypotheses and need to be examined and tested critically. We cannot be sure from a positive correlation between televised violence and aggressiveness that watching televised violence *causes* aggression; we can conclude only that the two variables are related. It is possible that the causation goes the other way: aggressive behavior may lead children to watch more violent programs. Or a third variable—perhaps an inborn predisposition toward aggressiveness or a violent living environment—may cause a child *both* to watch violent programs and to act aggressively. The only way to show with certainty that one variable causes another is through experimentation—a method that, when studying human beings, is not always possible for practical or ethical reasons.



A correlation of +/− 1.0 means you are measuring the same thing in different ways. For example, inches and centimeters are perfectly correlated.

correlational study
Research design intended to discover whether a statistical relationship between variables exists.

Experiments An **experiment** is a controlled procedure in which the experimenter manipulates variables to learn how one affects another. Scientific experiments must be conducted and reported in such a way that another experimenter can *replicate* them, that is, repeat them in exactly the same way with different participants to verify the results and conclusions.

Recently, some psychologists have become concerned over a "reproducibility crisis" in the social sciences. Data from work such as the Reproducibility Project (Aarts et al., 2015) suggest that replication of social science work is not assured. In this project, over 100 correlational and experimental psychology studies were carefully reproduced, and, depending on how replication was defined, only about half of the replications yielded the same statistical conclusion, even though results were generally in the same direction.

experiment
Rigorously controlled, replicable procedure in which the researcher manipulates variables to assess the eff ect of one on the other.

window on the world

PURPOSES OF CROSS-CULTURAL RESEARCH

When David, a European American child, was asked to identify the missing detail in a picture of a face with no mouth, he said, "The mouth." But Ari, an Asian immigrant child in Israel, said that the body was missing. Since art in his culture does not present a head as a complete picture, he thought the absence of a body was more important than the omission of "a mere detail like the mouth" (Anastasi, 1988, p. 360).

By looking at children from different cultural groups, researchers can learn in what ways development is universal (and thus intrinsic to the human condition) and in what ways it is culturally determined. For example, children everywhere learn to speak in the same sequence, advancing from cooing and babbling to single words and then to simple combinations of words. The words vary from culture to culture, but toddlers around the world put them together in the same ways to form sentences. Such findings suggest that the capacity for learning language is universal and inborn.

On the other hand, culture influences particular sets of skills learned. In the United States, children learn to read, write, and, increasingly, to operate computers. In rural Nepal, they learn how to drive water buffalo and find their way along mountain paths.

One important reason to conduct research among different cultural groups is to recognize biases in traditional Western theories and research that often go unquestioned until they are shown to be a product of cultural influences. Because so much research in child development has focused on Western industrialized societies, typical development in these societies may be seen as the norm, or standard of behavior. Measuring against this "norm" leads to narrow—and often wrong—ideas about development. Pushed to its extreme, this belief can cause the development of children in other ethnic and cultural groups to be seen as deviant (Rogoff & Morelli, 1989).

In this book we discuss several influential theories developed from research in Western societies that do not hold up when tested on people from other cultures—theories about gender roles, abstract thinking, moral reasoning, and other aspects of human development. Throughout this book, we consistently look at children in cultures and subcultures other than the dominant one in the United States to show how closely development is tied to society and culture and to add to our understanding of normal development in many settings. In so doing, however, we need to keep in mind the pitfalls involved in cross-cultural comparisons.

what's your view

Can you think of a situation in which you made an incorrect assumption about a person because you were unfamiliar with her or his cultural background?



The number of churches in a town is highly correlated with the number of liquor bottles found in the garbage cans of the town. But it would be inappropriate to conclude that religion drives people to drink. Rather, a third variable—population size—explains this relationship. We always need to include critical thinking in our observations.

Moreover, the journals where psychological research is published are biased toward the publication of novel findings (Martin & Clarke, 2017), and replications of prior work are less likely to be published. This is especially true if they fail to reach significance (in other words, if they fail to find an expected effect). Because replication of results is a cornerstone of the scientific approach, the field of psychology runs the risk of being characterized by findings that may not hold water once they are examined more closely.

Moreover, while it is considered unethical, because of the intense pressure to publish researchers sometimes engage in "p-hacking." P-hacking involves combing through data until a statistically significant result is found and then developing a post-hoc (after the fact) explanation for the finding. Because, by chance, a large enough data set will almost always provide a significant result of some sort, p-hacking can lead to the publication of misleading results with few applications to the real world.

Issues such as these have led a growing number of researchers to call for new guidelines to ensure the integrity of psychological findings. Among these guidelines are calls for a more open and transparent science, studies using larger numbers of participants, and a preference for stronger effects more likely to have an impact in the real world. Most importantly, registered pre-reports on statistical hypotheses to be tested before the collection of data would help ensure the integrity of data analysis (Lindsay, 2015; Button et al., 2013; van't Veer & Giner-Sorolla, 2016).

Groups and Variables A common way to conduct an experiment is to divide the participants into two kinds of groups. An **experimental group** consists of people who are to be exposed to the experimental manipulation or *treatment*—the phenomenon the researcher wants to study. Afterward, the effect of the treatment will be measured one or more times to find out what changes, if any, it caused. A **control group** consists of people who are similar to the experimental group but do not receive the experimental treatment or may receive a different treatment. An experiment may include one or more of each type of group. If the experimenter wants to compare the effects of different treatments (say, of two methods of teaching), the overall sample may be divided into *treatment groups,* each of which receives one of the treatments under study. To ensure objectivity, some experiments, particularly in medical research, use *double-blind* procedures, in which neither participants nor experimenters know who is receiving the treatment and who is instead receiving an inert *placebo.*

experimental group
In an experiment, the group receiving the treatment under study.

control group
In an experiment, a group of people, similar to those in the experimental group, who do not receive the treatment under study.

One team of researchers wanted to find out if 11-month-old infants could be trained to focus their attention (Wass, Porayska-Pomsta, & Johnson, 2011). The researchers brought 42 infants to their laboratory and had them participate in a variety of tasks. Half of the infants were given about an hour of attentional training. This training required babies to use sustained gaze to make a fun event happen on a computer. For example, if babies fixated on an elephant, the elephant became animated. If the babies looked away, the elephant stopped moving. The other group of children were shown television clips and animations, but were not trained. At the end of 2 weeks, the babies were tested on a series of cognitive tasks. Babies who underwent the training performed better on the tasks than did the babies who were not trained. It is reasonable to conclude, then, that the attentional training improved the babies' performance on the tasks as it was the only thing varied between the two groups.

In this experiment, the type of activity (training versus watching television) was the *independent variable,* and the children's test performance the *dependent variable*. An **independent variable** is something over which the experimenter has direct control. A **dependent variable** is something that may or may not change as a result of changes in the independent variable; in other words, it *depends* on the independent variable. In an experiment, a researcher manipulates the independent variable to see how changes in it will affect the dependent variable. The hypothesis for a study states how a researcher thinks the independent variable affects the dependent variable.

independent variable
In an experiment, the condition over which the experimenter has direct control.

dependent variable
In an experiment, the condition that may or may not change as a result of changes in the independent variable.

It is important, when conducting research, to define exactly what is to be measured in a way that other researchers can replicate, or reproduce. For this purpose, researchers use an **operational definition**–a definition stated solely in terms of the operations used to measure a phenomenon. In the Wass et al. (2011) study cited above, children's improved cognitive performance was defined as being able to sustain attention toward an interesting object for a longer period of time and being able to switch attention from an object to a person more rapidly. Had the researchers merely stated the children performed "better," it would have been unclear exactly what this meant. By specifying the variable precisely, other researchers know exactly what was done and could therefore reproduce the study and comment on the results.

operational definition
A definition stated solely in terms of the operations used to measure a phenomenon.

Random Assignment If an experiment finds a significant difference in the performance of the experimental and control groups, how do we know that the cause was the independent variable? For example, in the attentional training experiment, how can we be sure that the training and not some other factor (such as intelligence) caused the difference in test performance of the two groups? The best way to control for effects of such extraneous factors is **random assignment:** assigning the participants to groups in such a way that each person has an equal chance of being placed in any group.

random assignment
Assignment of participants in an experiment to groups in such a way that each person has an equal chance of being placed in any group.

If assignment is random and the sample is large enough, differences in such factors as age, gender, and ethnicity will be evenly distributed so that the groups initially are as alike as possible in every respect except for the variable to be tested. Otherwise, unintended differences between the groups might *confound,* or contaminate, the results, and any conclusions drawn from the experiment would have to be viewed with suspicion. To

Dependent variables are also known as "end measures" because their values are used to check whether you are right at the end of the study.

Research conducted on Hurricane Katrina survivors that compared them to people in other cities who were similar on many measures, except for the experience of living through the traumatic events of the hurricane, is an example of a quasi-experimental design.

control for confounds, the experimenter must make sure that everything except the independent variable is held constant during the course of the experiment. For example, in the attentional training study, children in the experimental and control groups must spend the same amount of time on their different tasks. When participants in an experiment are randomly assigned to treatment groups and conditions other than the independent variable are carefully controlled, the experimenter can be reasonably confident that a causal relationship has (or has not) been established. In other words, any differences found between groups can be attributed to the action of the independent variable (in this case, training) and not some other factor.

Of course, with respect to some variables we might want to study, such as age, gender, and race/ethnicity, random assignment is not possible. We cannot assign Terry to be 5 years old and Brett to be 10, or one to be a boy and the other a girl. When studying such a variable—for example, whether boys or girls are stronger in certain abilities—researchers can strengthen the validity of their conclusions by randomly selecting participants and by trying to make sure that they are statistically equivalent in other ways that might make a difference in the study.

Laboratory, Field, and Natural Experiments There are various ways to conduct research, and one essential distinction is between laboratory, field, and natural experiments. A laboratory experiment is best for determining cause and effect; it generally consists of asking participants to visit a laboratory where they are subject to conditions manipulated by the experimenter. The attentional training experiment described earlier was a laboratory study. The tight control of a laboratory study allows researchers to be more certain that their independent variable caused change in their dependent variable; however, because of the artificiality of the laboratory experience, the results may be less generalizable to real life. People may not act as they typically would.

A field experiment is a controlled study conducted in an everyday setting, such as a home or school. Variables can still be manipulated, so causal claims can still be investigated. Because the experiments occur in the real world, there is more confidence that the behaviors that are seen are generalizable to natural behaviors. However, researchers have less control over events that may occur—the real world is often messy, and things do not always go as planned.

When, for practical or ethical reasons, it is impossible to conduct a true experiment, a *natural experiment,* also called a *quasi-experiment,* may provide a way of studying certain events. A natural experiment compares people who have been accidentally "assigned" to separate groups by circumstances of life—one group who were exposed, say, to famine or HIV or superior education, and another group who were not. A natural experiment, despite its name, is actually a correlational study because controlled manipulation of variables and random assignment to treatment groups are not possible.

Controlled experiments have two important advantages over other research designs: They can establish cause-and-effect relationships, and they permit replication. However, such experiments can be too artificial and too narrowly focused. In recent decades, many researchers have concentrated less on laboratory experimentation or have supplemented it with a wider array of methods.

checkpoint can you . . .

- Compare the uses and drawbacks of case studies, ethnographic studies, correlational studies, and experiments?
- Explain why only a controlled experiment can establish causal relationships?
- Distinguish among laboratory, field, and natural experiments and tell what kinds of research seem most suitable to each?
- Compare the advantages and disadvantages of various forms of data collection?

cross-sectional study
Study designed to assess age-related differences, in which people of different ages are assessed on one occasion.

longitudinal study
Study designed to assess age changes in a sample over time.

sequential study
Study design that combines cross-sectional and longitudinal techniques.

DEVELOPMENTAL RESEARCH DESIGNS

One of the primary goals of developmental research is to study change over time, and developmental psychologists have developed a variety of methods to do so. The two most common research strategies are *cross-sectional* and *longitudinal studies* (Figure 3). A **cross-sectional study** most clearly illustrates similarities or differences among people of different ages; a **longitudinal study** tracks people over time and focuses on individual change with age. Both designs have pros and cons. A third type of study, a **sequential study,** combines the two approaches to minimize the drawbacks of the separate approaches.

Cross-Sectional, Longitudinal, and Sequential Studies In a cross-sectional study, children of different ages are assessed at one point in time. Generally, the children are matched on other important characteristics and their ages are varied. For example, in one cross-sectional study, researchers presented 193 boys and girls between the ages of 7 months and 5 years with pairs of objects. The children were invited to reach for one of the objects, which were identical with the exception that one object was always pink, and the other was either green, blue, yellow, or orange. The researchers found that girls showed no preference for pink objects until age 2, when they began to reach for the pink object more frequently. By age 4, girls chose the pink object almost 80 percent more frequently than the other colors. Boys, however, showed a different pattern. Like girls, they initially showed no preference for pink over the other colors. Starting at about 2 years of age, however, they became less and less likely to choose the pink object. By age 5, they chose the pink object only about 20 percent of the time. The researchers concluded that girls' preference for the color pink was learned over time, and they theorized that it was related to the acquisition of knowledge about gender (LoBue & DeLoache, 2011).

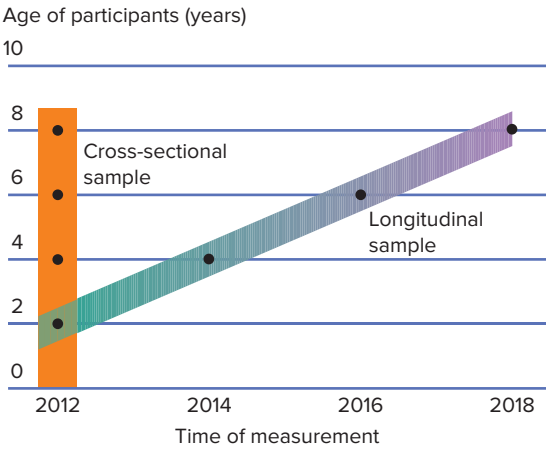


FIGURE 3
Developmental Research Designs
In the cross-sectional study, groups of 2-, 4-, 6-, and 8-year-olds were tested in 2012 to obtain data about age-related differences. In the longitudinal study, a sample of children were first measured in 2012, when they were 2 years old; follow-up testing is done when the children are 4, 6, and 8, to measure age-related changes. Note: Dots indicate times of measurement.

Can we draw this conclusion with certainty? The problem with cross-sectional studies is that we cannot know whether the 5-year-olds' preference for certain colors when they were under the age of 2 years was the same as that of the current babies in the study. For example, if a popular television program that targets children over the age of 2 and that strongly promotes gender stereotypes had been introduced in the year previous to the study, the older children might show color preferences as a result of watching the show and not because of an increased understanding of gender. Although it may appear to be a change related to age, it might instead be the result of television programming.

The only way to know whether change occurs with age is to conduct a longitudinal study of a particular person or group. In a longitudinal study, researchers study the same person or group of people over time, sometimes years apart.

In a longitudinal study, researchers study the same person or group of people more than once, sometimes years apart. One large longitudinal study examined the Internet habits of 754 people and the relationship their Internet usage had with loneliness over time. The researchers found that people who were initially lonely and spent more and more time on the web over the course of a year reported becoming more and more lonely and having lower life satisfaction at the conclusion of the study (Stepanikova, Nie, & He, 2010).

Just as with cross-sectional designs, there is a caveat. Because individual people are studied over time, researchers have access to each person's specific individual trajectory. However, the results from one cohort might not apply to a study of a different cohort. The study used data collected from 2004 to 2005, and the link between browsing history and loneliness might differ now.

In attempting to determine the best research design, neither cross-sectional nor longitudinal design is superior. Rather, both designs have strengths and weaknesses (Table 5). For example, cross-sectional design is fast—we don't have to wait 30 years for results. This also makes it a more economical choice. Moreover, because participants are assessed only once, we don't have to consider attrition (people dropping out of the study) or repeated testing (which can produce practice effects). But cross- sectional design uses group averages, so individual differences and trajectories may be obscured. More important, the results can be affected by the differing experiences of people born at different times, as previously explained.

Longitudinal research shows a different and complementary set of strengths and weaknesses. Because the same people are studied repeatedly over time, researchers can track individual patterns of continuity and change. This makes longitudinal studies more time-consuming and expensive than cross-sectional studies. In addition, repeated testing



Attrition is not random; it is almost always biased in some fashion. For example, the people most likely to drop out of a study are those with the most chaotic lifestyles. The people still in the study at its conclusion might look really good, but it could be because the people who were not doing well are gone.

TABLE 5 Cross-Sectional, Longitudinal, and Sequential Research: Pros and Cons

Type of Study	Procedure	Advantages	Disadvantages
Cross-sectional	Data are collected on people of different ages at the same time.	Can show similarities and differences among age groups; speedy, economical; presents no problem of attrition or repeated testing.	Cannot establish age effects; masks individual differences; can be confounded by cohort effects.
Longitudinal	Data are collected on same person or persons over a period of time.	Can show age-related change or continuity; avoids confounding age with cohort effects.	Is time-consuming, expensive; presents problems of attrition, bias in sample, and effects of repeated testing; results may be valid only for cohort tested or sample studied.
Sequential	Data are collected on successive cross-sectional or longitudinal samples.	Can avoid drawbacks of both cross-sectional and longitudinal designs.	Requires large amount of time and effort and analysis of very complex data.

of participants can result in practice effects. For example, your performance on an intelligence test might get better over time from practice rather than from any increase in intelligence. Attrition can be problematic in longitudinal research as well because it tends to be nonrandom, which can introduce a positive bias to the study. Those who stay with the study tend to be above average in intelligence and socioeconomic status, and those who drop out tend to have more chaotic lives and worse overall outcomes. Moreover, practical issues, such as turnover in research personnel, loss of funding, or the development of new measures or methodologies, can introduce potential problems with data collection.

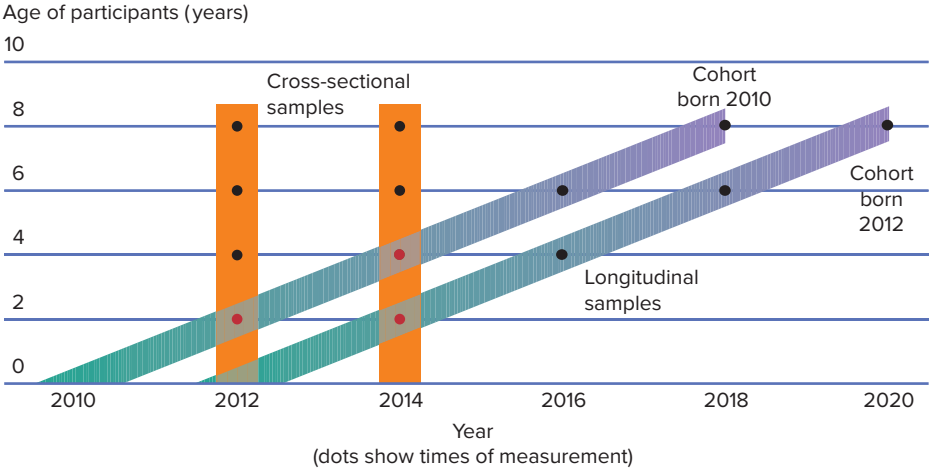
Researchers are attempting to overcome the drawbacks of longitudinal and cross-sectional design with the design of sequential studies. Sequential designs track people of different ages (like cross-sectional designs) over time (like longitudinal designs). The combination of cross-sectional and longitudinal designs (as shown in Figure 4) allows researchers to separate age-related changes from cohort effects, and provides a more complete picture of development than would be possible with either design alone. The major drawbacks of sequential studies relate to time, effort, and complexity. Sequential designs require large numbers of participants and collection and analysis of huge amounts of data over a period of years. Interpreting these findings and conclusions can demand a high degree of sophistication.

checkpoint can **you** . . .

- **List advantages and disadvantages of longitudinal, cross-sectional, and sequential research?**

FIGURE 4
A Sequential Design

Two successive cross-sectional groups of 2-, 4-, 6-, and 8-year-olds were tested in 2012 and 2014. Also, a longitudinal study of a group of children first measured in 2012, when they were 2 years old, is followed by a similar longitudinal study of another group of children who were 2 years old in 2014.



Ethics of Research

Should research that might harm its participants ever be undertaken? How can we balance the possible benefits against the risk of mental, emotional, or physical injury to individuals?

Institutional review boards at colleges, universities, and other institutions review proposed research from an ethical standpoint. Guidelines of the American Psychological Association (APA, 2002) cover such issues as *informed consent* (consent freely given with full knowledge of what the research entails), *avoidance of deception,* protection of participants from *harm and loss of dignity,* guarantees of *privacy and confidentiality,* the *right to decline or withdraw* from an experiment at any time, and the responsibility of investigators to *correct any undesirable effects,* such as anxiety or shame.

In resolving ethical dilemmas, researchers should be guided by three principles. The first is *beneficence,* which is the obligation to maximize potential benefits to participants and to minimize potential harm. For example, suppose you are a researcher studying the effect of failure on self-esteem. If you are going to deceive some of your participants by telling them they failed on a laboratory task, what steps will you take to mitigate any potential harm you might cause them? The second principle is *respect* for participants' autonomy and protection of those who are unable to exercise their own judgment. For example, if you are conducting research with toddlers, and a 2-year-old refuses to participate, should you force the child to participate? What is the appropriate action in this case? The third principle is *justice,* which, in this case, is the inclusion of diverse groups together with sensitivity to any special impact the research may have on them. For example, it may be important that your study includes an appropriate and representative selection of diverse people. If this is the case, have you developed culturally appropriate materials and methods to use?

Developmental psychologists must be particularly careful as their research frequently involves vulnerable individuals, such as infants or children. In response, the Society for Research in Child Development (2007) has developed standards for age-appropriate treatment of children in research, covering such principles as avoidance of physical or psychological harm, obtaining the child's assent as well as a parent's or guardian's informed consent, and responsibility to follow up on any information that could jeopardize the child's well-being. For example, infants' and very young children's ability to cope with the stress of the research situation may hinge on the presence of a parent or trusted caregiver, a familiar setting and procedure, and familiar objects.



Should informed consent involve telling participants about what your hypotheses for your research are? Why or why not?

checkpoint can you . . .

- List at least three ethical issues affecting rights of research participants?
- Identify three principles that should govern inclusion of participants in research?

summary and key terms

Basic Theoretical Issues

- A theory is used to organize and explain data and generate hypotheses that can be tested by research.
- Developmental theories differ on two basic issues: the active or reactive character of development and the existence of continuity or discontinuity in development.
- Two contrasting models of human development are the mechanistic model and the organismic model.

theory (*21*)
hypotheses (*21*)
mechanistic model (*22*)
organismic model (*22*)
quantitative change (*23*)
qualitative change (*23*)

Theoretical Perspectives

- The psychoanalytic perspective sees development as motivated by unconscious emotional drives or conflicts. Leading examples are Freud's and Erikson's theories.

psychoanalytic perspective (*24*)
psychosexual development (*25*)
psychosocial development (*26*)

- The learning perspective views development as a result of learning based on experience. Leading examples are Watson's and Skinner's behaviorism and Bandura's social learning (social cognitive) theory.

learning perspective (*27*)
behaviorism (*27*)
classical conditioning (*28*)
operant conditioning (*28*)
reinforcement (*28*)
punishment (*28*)
social learning theory (*28*)
reciprocal determinism (*28*)
observational learning (*28*)
self-efficacy (*29*)

- The cognitive perspective is concerned with thought processes. Leading examples are Piaget's cognitive-stage theory, Vygotsky's sociocultural theory, and the information-processing approach.

cognitive perspective (*29*)
cognitive-stage theory (*29*)
organization (*30*)
schemes (*30*)
adaptation (*30*)
assimilation (*30*)
accommodation (*30*)
equilibration (*30*)
sociocultural theory (*31*)
zone of proximal development (ZPD) (*31*)
scaffolding (*31*)
information-processing approach (*31*)

- The contextual perspective focuses on the individual in a social context. A leading example is Bronfenbrenner's bioecological theory.

contextual perspective (*32*)
bioecological theory (*32*)

- The evolutionary/sociobiological perspective focuses on the adaptiveness, or survival value, of behavior. It proposes that the mind has many cognitive adaptations designed to deal with recurrent adaptive problems.

evolutionary/sociobiological perspective (*33*)
ethology (*34*)
evolutionary psychology (*34*)

Research Methods

- Research can be either quantitative or qualitative, or both.
- To arrive at sound conclusions, quantitative researchers use the scientific method.
- Random selection of a research sample can ensure generalizability.
- Three forms of data collection are self-reports, observation, and behavioral and performance measures.

quantitative research (*35*)
scientific method (*35*)
qualitative research (*35*)
sample (*35*)
random selection (*35*)
naturalistic observation (*37*)
laboratory observation (*37*)
cognitive neuroscience (*37*)

- A design is a plan for conducting research. Two qualitative designs used in developmental research are the case study and the ethnographic study. Cross-cultural research can indicate whether certain aspects of development are universal or culturally influenced.
- Two quantitative designs are the correlational study and the experiment. Only experiments can firmly establish causal relationships.
- Experiments must be rigorously controlled to be valid and replicable. Random assignment of participants can ensure validity.
- Laboratory experiments are easiest to control and replicate, but findings of field experiments may be more generalizable. Natural experiments may be useful in situations in which true experiments would be impractical or unethical.
- The two most common designs used to study age-related development are cross-sectional and longitudinal. Cross-sectional studies assess age differences; longitudinal studies describe continuity or change in the same participants. The sequential study is intended to overcome the weaknesses of the other two designs.

case study (*38*)
ethnographic study (*39*)
participant observation (*39*)
correlational study (*39*)
experiment (*39*)
experimental group (*41*)
control group (*41*)
independent variable (*41*)
dependent variable (*41*)
operational definition (*41*)
random assignment (*41*)
cross-sectional study (*42*)
longitudinal study (*42*)
sequential study (*42*)

Ethics of Research

- Researchers seek to resolve ethical issues on the basis of principles of beneficence, respect, and justice.
- Ethical issues in research include the rights of participants to informed consent, avoidance of deception, protection from harm and loss of dignity and self-esteem, and guarantees of privacy and confidentiality.
- Standards for protection of children used in research cover such principles as parental informed consent and protection from harm or jeopardy to the child's well-being.

Design elements: (Butterfly Icon): Stockbyte/Getty Images; (World Icon): janrysavy/Getty Images

part 2
BEGINNINGS

chapter 3

Forming a New Life

outline

Conceiving New Life

Mechanisms of Heredity

Nature and Nurture: Influences of Heredity and Environment

Prenatal Development

Monitoring and Promoting Prenatal Development

learning objectives

Explain how conception occurs and what causes multiple births.

Describe the mechanisms of heredity in normal and abnormal human development.

Explain how heredity and environment interact in human development.

Describe prenatal development, including environmental influences.

Discuss the importance of high-quality prenatal care.



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did you know?

- Fetuses can learn and remember while in the womb, and they respond to their mother's voice.
- Drinking or using drugs during pregnancy can do permanent damage to an unborn child.
- Prenatal care should begin *before* conception.

We describe how conception normally occurs, how the mechanisms of heredity operate, and how biological inheritance interacts with environmental influences within and outside the womb. We trace the course of prenatal development, describe influences on it, and discuss ways to monitor it.

Life is always a rich and steady time when you are waiting for something to happen or to hatch.

—E. B. White

Conceiving New Life

Most people think of development as beginning on the day of birth, when the new child—squalling and thrashing—is introduced to the world. However, development starts earlier. It starts at conception, as sperm and egg meet and an entirely new individual is created from parental genomes. Development continues as the fertilized egg grows and differentiates and edges closer to independent life outside the womb. And it persists in the dance between nature and nurture that shapes the unique individual that is the product of these processes. This chapter is about that story.

HOW FERTILIZATION TAKES PLACE

Fertilization, or *conception,* is the process by which sperm and ovum—the male and female *gametes,* or sex cells—combine to create a single cell called a **zygote,** which then duplicates itself again and again by cell division to produce all the cells that make up a baby. But conception is not as simple as it sounds. Several independent events need to coincide to conceive a child, and not all conceptions end in birth. The "fertile window"—the time during which conception is possible—can be highly unpredictable (Ecochard, Duterque, Leiva, Bouchard, & Vigil, 2015). Although conception is far more likely at certain times, a woman may or may not conceive at any time during the month.

At birth, a girl is believed to have about 2 million immature ova in her two ovaries, each ovum in its own *follicle,* or small sac. In a sexually mature woman, *ovulation*—rupture of a mature follicle in either ovary and expulsion of its ovum—occurs about once every 28 days until menopause. The ovum is swept along through one of the fallopian tubes by the *cilia,* tiny hair cells, toward the uterus, or womb.

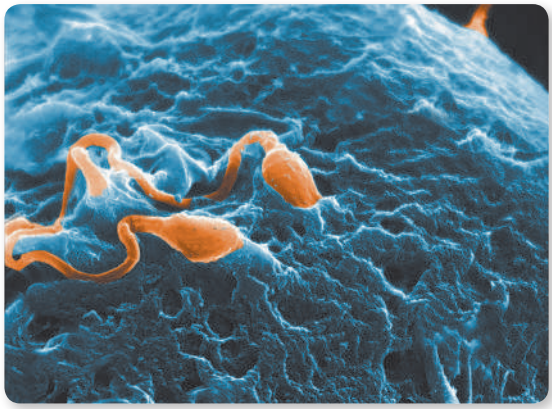
Sperm are produced in the testicles (testes), or reproductive glands, of a mature male at a rate of several hundred million a day and are ejaculated in the semen at sexual climax. Deposited in the vagina, they try to swim through the *cervix,* the opening of the uterus, and into the fallopian tubes, but only a tiny fraction make it that far.

Fertilization normally occurs while the ovum is passing through the fallopian tube. If fertilization does not occur, the ovum and any sperm cells in the woman's body die. The sperm are absorbed by the woman's white blood cells, and the ovum passes through the uterus and exits through the vagina.

fertilization
Union of sperm and ovum to produce a zygote; also called *conception.*

zygote
One-celled organism resulting from fertilization.

dizygotic twins
Twins conceived by the union of two different ova (or a single ovum that has split) with two different sperm cells; also called *fraternal twins*; they are no more alike genetically than any other siblings.



This color-enhanced scanning electron micrograph (SEM) shows two sperm (orange) attracted to an ovum's blue surface. A sperm's long tail enables it to swim through the cervix and up the fallopian tube. The sperm's rounded head releases enzymes that help it penetrate the ovum's thick surface and fertilize the ovum by fusing with its nucleus.
Pascal Goetgheluck/Science Source

WHAT CAUSES MULTIPLE BIRTHS?

Multiple births happen in two ways. Although twins are the most common variation, triplets, quadruplets, and other multiple births are possible.

Dizygotic twins, or fraternal twins, are the result of two separate eggs being fertilized by two different sperm to form two unique individuals. Genetically, they are like siblings who inhabit the same womb at the same time, and they can be the same or different sex. Dizygotic twins tend to run in families and are the result of multiple eggs being released

monozygotic twins
Twins resulting from the division of a single zygote after fertilization; also called *identical twins*; they are genetically similar.

deoxyribonucleic acid (DNA)
Chemical that carries inherited instructions for the development of all cellular forms of life.

genetic code
Sequence of bases within the DNA molecule; governs the formation of proteins that determine the structure and functions of living cells.

chromosomes
Coils of DNA that consist of genes.

checkpoint can you . . .

- Explain how and when fertilization normally takes place?
- Distinguish between and explain monozygotic and dizygotic twins?
- Give reasons for the increase in multiple births in the United States?

at one time. This tendency may have a genetic basis (Mbarek et al., 2016) and seems to be passed down from a woman's mother (Painter et al., 2010; National Center for Health Statistics [NCHS], 1999). When dizygotic twins skip generations, it is normally because a mother of dizygotic twins has only sons to whom she cannot pass on the tendency (NCHS, 1999).

Monozygotic twins are the result of a far different process. They result from the cleaving of one fertilized egg and are generally genetically identical. They can still differ outwardly, however, because people are the result of the interaction between genes and environmental influences. For example, in one condition that affects only monozygotic twins (twin-to-twin transfusion syndrome), the blood vessels of the placenta form abnormally, and the placenta is shared unequally between the twins. One twin receives a smaller share of nutrients than does the other. Mortality is high, but if both twins survive, one twin will be significantly larger than the other at birth despite being genetically identical.

Moreover, environmental differences add up over time. The differences between identical twins generally magnify as twins grow older. So, for example, 3-year-old monozygotic twins appear more similar than 30-year-old monozygotic twins. These differences may result from chemical modifications in a person's genome shortly after conception or may be due to later experiences or environmental factors, such as exposure to smoke or other pollutants (Bell & Saffery, 2012; Wong et al., 2010). This process, known as *epigenesis*, is discussed later in this chapter.

The rate of monozygotic twins (slightly under 4 per 1,000 live births) appears to be constant at all times and places, but the rate of dizygotic twins, the more common type, varies (Smits & Monden, 2011). For example, naturally occurring rates in West African women have been reported at 1 in 40, while rates in Japan are far lower at 1 in 200 (Blencowe et al., 2013). However, a larger influence on multiple births has been (1) the trend toward delayed childbearing and (2) the increased use of fertility drugs, which spur ovulation, and of assisted reproductive techniques such as in vitro fertilization, which tend to be used by older women (Martin, Kirmeyer, Osterman, & Shepherd, 2009).

Global rates for multiple births vary widely: 9.1 per 1,000 births in Romania, 26.5 in Cyprus (Heino et al., 2016), and 27.2 in South Korea (Lim, 2011). Policies limiting the number of embryos transferred during in vitro fertilization have begun to reverse the trend in some countries (Blencowe et al., 2013).

The explosion of multiple births is of concern as such births are associated with pregnancy complications, premature delivery, low-birth-weight infants, and disability or death of the infant. Because of such concerns, the proportion of assisted reproduction procedures involving three or more embryos has declined, and the birthrate for triplets and higher multiples, which had quadrupled during the 1980s and 1990s in the United States, has since taken a downturn (Martin, Hamilton, Osterman, Driscoll, & Mathews, 2017).

DNA is the genetic material in all living cells. It consists of four chemical units, called bases. These bases are the letters of the DNA alphabet. A (adenine) pairs with T (thymine) and C (cytosine) pairs with G (guanine). There are 3 billion base pairs in human DNA.

Letters of the DNA alphabet

T = Thymine
A = Adenine
G = Guanine
C = Cytosine

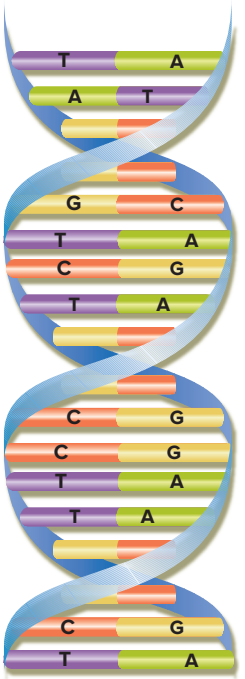


FIGURE 1
DNA: The Genetic Code

Source: Chicago Sun-Times.

Mechanisms of Heredity

The science of genetics is the study of *heredity:* the genetic transmission of heritable characteristics from parents to offspring. When ovum and sperm unite, they endow the baby-to-be with a genetic makeup that influences a wide range of characteristics from color of eyes and hair to health, intellect, and personality.

THE GENETIC CODE

The "stuff" of heredity is a chemical called **deoxyribonucleic acid (DNA).** The double-helix structure of a DNA molecule resembles a long, spiraling ladder whose steps are made of pairs of chemical units called *bases* (Figure 1). The bases—adenine (A), thymine (T), cytosine (C), and guanine (G)—are the "letters" of the **genetic code,** which cellular machinery "reads."

Chromosomes are coils of DNA that consist of smaller segments called **genes,** the functional units of heredity. Each gene is located in a definite

position on its chromosome and contains thousands of bases. The sequence of bases in a gene tells the cell how to make the proteins that enable it to carry out specific functions. The complete sequence of genes in the human body constitutes the **human genome.** Of course, every human has a unique genome. The human genome is not meant to be a recipe for making a particular human. Rather, the human genome is a reference point, or representative genome, that shows the location of all human genes.

A useful analogy is to consider the DNA of an individual as a series of books in a library. Until those books are "read" by an enzyme called RNA polymerase, and transcribed into a readable copy of messenger RNA (m-RNA), the knowledge contained within the books is not actualized. And what books will be pulled down from the shelf and read is in part determined by environmental factors that turn genes on and off at different points in development (Champagne & Mashoodh, 2009).

Every cell in the normal human body except the sex cells (sperm and ova) has 23 pairs of chromosomes—46 in all. Through a type of cell division called *meiosis,* which the sex cells undergo when they are developing, each sex cell ends up with only 23 chromosomes—one from each pair. When sperm and ovum fuse at conception, they produce a zygote with 46 chromosomes, 23 from the father and 23 from the mother (Figure 2).

At conception, then, the single-celled zygote has all the biological information needed to guide its development into a unique individual. Through *mitosis,* a process by which the non–sex cells divide in half over and over again, the DNA replicates itself, so that each newly formed cell has the same DNA structure as all the others. Each cell division creates a genetic duplicate of the original cell, with the same hereditary information. Sometimes a mistake in copying is made, and a **mutation** may result. Mutations are permanent alterations in genetic material. When development is normal, each cell (except the sex cells) continues to have 46 chromosomes identical to those in the original zygote. As the cells divide, they differentiate, specializing in a variety of complex bodily functions that enable the child to grow and develop.

Genes spring into action when conditions call for the information they can provide. Genetic action that triggers the growth of body and brain is often regulated by hormonal levels—both in the mother and in the developing baby—that are affected by such environmental conditions as nutrition and stress. Thus, from the start, heredity and environment are interrelated.

genes
Small segments of DNA located in definite positions on particular chromosomes; functional units of heredity.

human genome
Complete sequence of genes in the human body.

mutations
Permanent alterations in genes or chromosomes that may produce harmful characteristics.

autosomes
In humans, the 22 pairs of chromosomes not related to sexual expression.

sex chromosomes
Pair of chromosomes that determines sex: XX in the normal human female, XY in the normal human male.

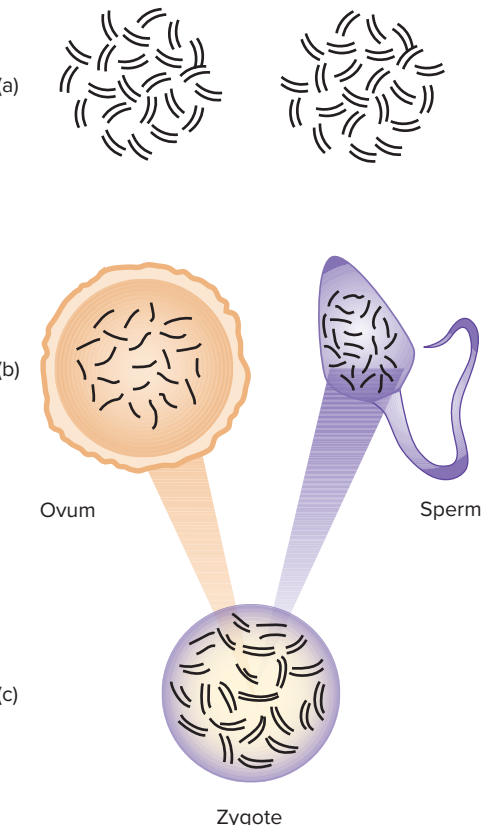


FIGURE 2
Hereditary Composition of the Zygote

(a) Body cells of women and men contain 23 pairs of chromosomes, which carry the genes, the basic units of inheritance. (b) Each sex cell (ovum and sperm) has only 23 single chromosomes because of a special kind of cell division (meiosis). (c) At fertilization, the 23 chromosomes from the sperm join the 23 from the ovum so that the zygote receives 46 chromosomes, or 23 pairs.

WHAT DETERMINES SEX?

In many villages in Nepal, it is common for a man whose wife has borne no male babies to take a second wife. In some societies, a woman's failure to produce sons is justification for divorce. The irony of these customs is that it is the father's sperm that genetically determines a child's sex.

At the moment of conception, the 23 chromosomes from the sperm and the 23 from the ovum form 23 pairs. Twenty-two pairs are **autosomes,** chromosomes that are not related to sexual expression. The twenty-third pair are **sex chromosomes**—one from the father and one from the mother—that govern the baby's sex.

Sex chromosomes are either *X chromosomes* or *Y chromosomes*. The sex chromosome of every ovum is an X chromosome, but the sperm may contain either an X or a Y chromosome. The Y chromosome contains the gene for maleness, called the *SRY* gene. When an ovum (X) is fertilized by an X-carrying sperm, the zygote formed is XX, a genetic female. When an ovum (X) is fertilized by a Y-carrying sperm, the resulting zygote is XY, a genetic male (Figure 3).

Sexual differentiation is a more complex process than simple gene determination. Early in development, the embryo's rudimentary reproductive system appears almost identical in males and in females. Surprisingly, sexual differentiation is not automatic. Research with mice has found that once hormones signal the *SRY* gene on the Y chromosome to turn on, cell differentiation and formation of the testes are triggered. At 6 to 8 weeks after conception,

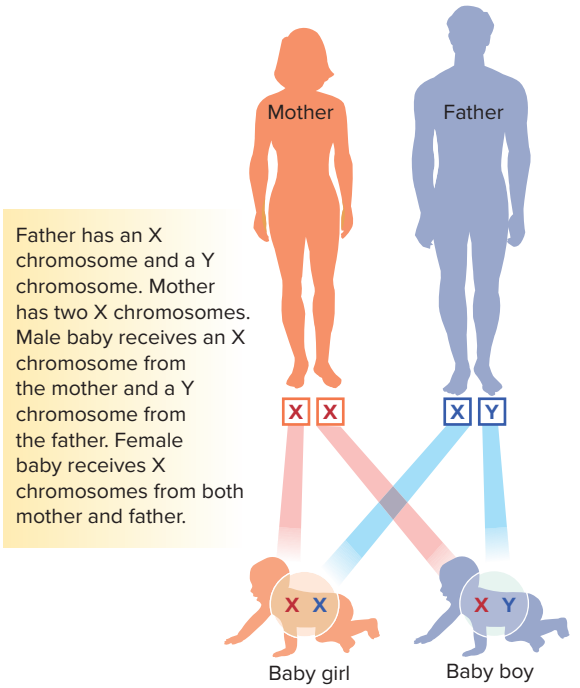


FIGURE 3
Genetic Determination of Sex

Because all babies receive an X chromosome from the mother, sex is determined by whether an X or a Y chromosome is received from the father.

the testes start to produce the male hormone testosterone. Exposure of a genetically male embryo to steady, high levels of testosterone ordinarily results in the development of a male body with male sexual organs (Kashimada & Koopman, 2010). Without this hormonal influence, a genetically male mouse will develop genitals that appear female rather than male. It is likely that a similar mechanism occurs in human males.

The development of the female reproductive system is equally complex and depends on a number of genetic variants. These variants promote ovarian development and inhibit testicular development (Ono & Harley, 2013). This includes the HOX genes (Taylor, 2000) and a signaling molecule called *Wnt-4*, a variant form of which can masculinize a genetically female fetus (Biason-Lauber, Konrad, Navratil, & Schoenle, 2004). Thus, sexual differentiation is not a matter of merely receiving a particular complement of sex chromosomes.

Further complexities arise from the fact that women have two X chromosomes, whereas men have only one. Generally, one of the two X chromosomes is randomly turned on or off in cell tissues. If there is a deleterious allele, over time, cells with the "bad" allele are likely to die off, and the proportion of cells with "good" alleles should increase (Short, Yang, & Jenkins, 2013). Moreover, only about 75 percent of the genes on the extra X chromosome are inactive. About 15 percent remain active, and 10 percent are active in some women but not in others (Carrel & Willard, 2005). Thus, harmful changes in a gene on one X chromosome may be offset by a backup copy on the other X chromosome (Migeon, 2006). This variability in gene activity can help explain gender differences in normal traits and in disorders linked to the X chromosome and health disparities between men and women (Short, Yang, & Jenkins, 2013).

The human genome was first sequenced in 2006. More recently, the Neandertal genome was also sequenced, and analysis of the commonalities between Neandertal and human genes suggests that we engaged in limited interbreeding. In other words, some of their genes live on in us.

Green et al., 2010

checkpoint
can **you** . . .

- Describe the structure of DNA and its role in the inheritance of characteristics?
- Distinguish between meiosis and mitosis?
- Explain why the sperm normally determines a baby's sex and discuss possible complicating factors?

PATTERNS OF GENETIC TRANSMISSION

During the 1860s, Gregor Mendel, an Austrian monk, crossbred pea plants that produced only yellow seeds with pea plants that produced only green seeds. The resulting hybrid plants produced only yellow seeds, meaning, he said, that yellow was *dominant* over green. Yet when he bred the yellow-seeded hybrids with each other, only 75 percent of their offspring had yellow seeds, and the other 25 percent had green seeds. This showed, Mendel said, that a hereditary characteristic (in this case, the color green) can be *recessive;* that is, be carried by an organism that does not express, or show, it.

Today we know that the genetic picture in humans is far more complex than Mendel imagined. Although some human traits are inherited via simple dominant transmission, most human traits fall along a continuous spectrum and result from the actions of many genes in concert. Nonetheless, Mendel's groundbreaking work laid the foundations for our modern understanding of genetics.

Dominant and Recessive Inheritance Do you have dimples? If so, you probably inherited them through *dominant inheritance*. If your parents have dimples but you do not, *recessive inheritance* occurred. How do these two types of inheritance work?

Genes that can produce alternative expressions of a characteristic (such as the presence or absence of dimples) are called **alleles.** Alleles are alternate versions of the same gene. Every person receives one maternal and one paternal allele for any given trait. When both alleles are the same, the person is **homozygous** for the characteristic; when they are different, the person is **heterozygous.** In **dominant inheritance,** the dominant allele is always expressed, or shows up as a trait in that person. The person will look the same whether or not he or she is heterozygous or homozygous because the recessive allele doesn't show. For the trait to be expressed in **recessive inheritance,** the person must have two recessive alleles, one from each parent. If a recessive trait is expressed, that person cannot have a dominant allele.

alleles
Two or more alternative forms of a gene that occupy the same position on paired chromosomes and affect the same trait.

homozygous
Possessing two identical alleles for a trait.

heterozygous
Possessing differing alleles for a trait.

dominant inheritance
Pattern of inheritance in which, when a child receives different alleles, only the dominant one is expressed.

recessive inheritance
Pattern of inheritance in which a child receives identical recessive alleles, resulting in expression of a nondominant trait.

Let's take red hair as an example. Because red hair is a recessive trait, you must receive two recessive copies (r) of the gene—one from each parent—in order to express red hair. Having hair that is not red (R; brown in this example) is a dominant trait, so you will have brown hair if you receive at least one copy (R) from either parent (Rr or RR) (Figure 4). If you receive one copy of the red hair allele (r) and one copy of an allele for brown hair (R), you are heterozygous (Rr or rR); if you have two copies of the allele for brown hair, you are homozygous dominant (RR). In both cases, you will have brown hair. If you inherited one allele for red hair from each parent, you are homozygous recessive for this trait (rr) and will have red hair. Thus, the only situation in which you would have red hair is if you received two recessive copies (r), one from each parent.

Relatively few traits are determined in this simple fashion. Most traits result from **polygenic inheritance,** the interaction of several genes. For example, there is not an "intelligence" gene that determines whether or not you are smart. Rather, a large number of genes work in concert to determine your intellectual potential. Like intelligence, most individual variations in complex behaviors or traits are governed by the additive influences of many genes with small but identifiable effects. In other words, they are polygenic. Although single genes often determine abnormal traits, there is no single gene that by itself significantly accounts for individual differences in any complex normal behavior.

polygenic inheritance
Pattern of inheritance in which multiple genes at different sites on chromosomes affect a complex trait.

Genotypes and Phenotypes: Multifactorial Transmission If you have brown hair that is part of your **phenotype,** the observable characteristics through which your **genotype,** or underlying genetic makeup, is expressed. The phenotype is the product of the genotype

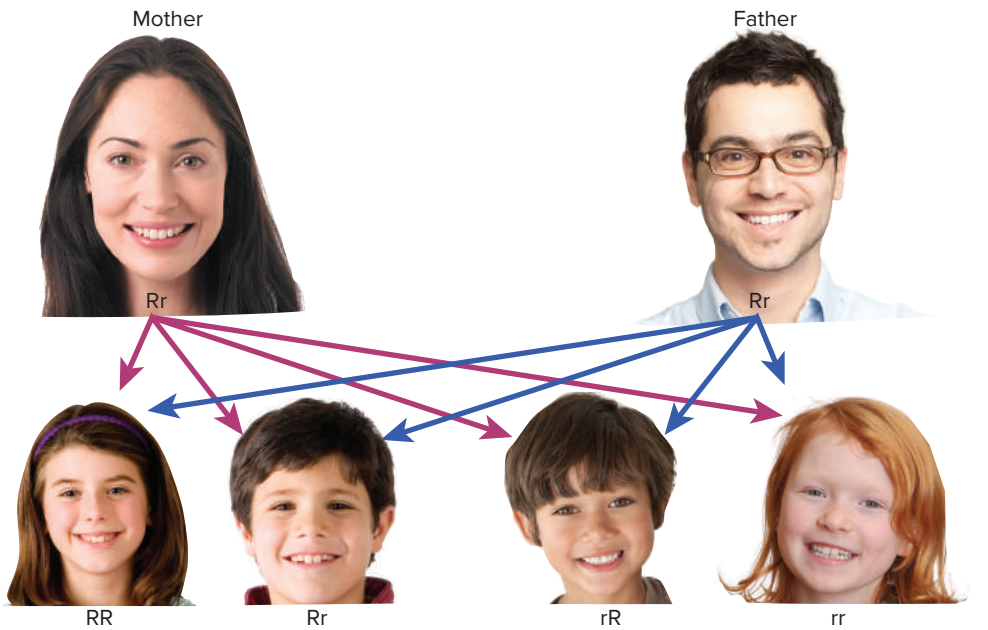
phenotype
Observable characteristics of a person.

genotype
Genetic makeup of a person, containing both expressed and unexpressed characteristics.

FIGURE 4
Dominant and Recessive Inheritance

Because of dominant inheritance, the same observable phenotype (in this case, brown hair) can result from two different genotypes (RR and Rr). A phenotype expressing a recessive characteristic (such as red hair) must have a homozygous recessive genotype (rr).

(Left to Right) Dougal Waters/Photodisc/Getty Images; Ioannis Pantzi/Shutterstock; Ed-Imaging/McGraw-Hill Education; Ed-Imaging/McGraw-Hill Education; BDLM/Cultura/Getty Images; Pete Pahham/Shutterstock





Your genotype is the recipe for making you. Your phenotype is how you actually turn out.

and any relevant environmental influences. The difference between genotype and phenotype helps explain why a clone (a genetic copy of an individual) or even an identical twin can never be an exact duplicate of another person.

As Figure 4 illustrates, people with different genotypes may exhibit the same phenotype. For example, a child who is homozygous for a dominant brown hair allele will have brown hair, but so will a child who is heterozygous for that same allele. Because it is dominant, the brown hair is expressed, and the recessive red hair allele is hidden.

Furthermore, the hidden alleles can float around undetected for generations and then be expressed if both parents carry a hidden copy. For example, if you are heterozygous for brown/red hair and you find a mate who is also heterozygous for brown/red hair, approximately one-fourth of your children should have red hair. Or, stated in terms of probability, any child you might have has a 25 percent chance of inheriting both recessive alleles and having red hair. Note that any brown-haired child might be either homozygous (25 percent chance) or heterozygous (50 percent chance) for the trait. Because the dominant trait is always expressed, all that you would know, upon seeing a brown-haired child, is that the child had to have at least one brown-hair gene.

multifactorial transmission
Combination of genetic and environmental factors to produce certain complex traits.

Environmental experience modifies the expression of the genotype for most traits—a phenomenon called **multifactorial transmission**. Multifactorial transmission illustrates the interaction of nature and nurture and how they affect outcomes. Imagine that Rio has inherited athletic talent and comes from a family of avid athletes. If his family nurtures his talent and he practices regularly, he may become a skilled athlete. However, if he is not encouraged or not motivated to engage in athletics, his genotype for athletic ability may not be expressed (or may be expressed to a lesser extent) in his phenotype. Some physical characteristics (including height and weight) and most psychological characteristics (such as intelligence and musical ability) are products of multifactorial transmission. Many disorders (such as attention-deficit/hyperactivity disorder) arise when an inherited predisposition (an abnormal variant of a normal gene) interacts with an environmental factor, either before or after birth (Yang et al., 2013).

Later in this chapter we discuss in more detail how environmental influences work together with the genetic endowment to influence development.

Epigenesis: Environmental Influence on Gene Expression Until recently, most scientists believed that the genes a child inherits were firmly established during fetal development, though their effects on behavior could be modified by experience. Now, mounting evidence suggests that gene expression itself is controlled by a third component, a mechanism that regulates the functioning of genes within a cell without affecting the structure of the cell's DNA. Genes are turned off or on as they are needed by the developing body or when triggered by the environment. This phenomenon is called **epigenesis,** or *epigenetics.* Far from being fixed once and for all, epigenetic activity is affected by a continual bidirectional interplay with nongenetic influences (Mazzio & Soliman, 2012). In other words, the environment can influence when and which genes turn on and off.

epigenesis
Mechanism that turns genes on or off and determines functions of body cells.

Epigenesis (meaning "on, or above, the genome") refers to chemical molecules (or "tags") attached to a gene that alter the way a cell "reads" the gene's DNA. If we think of the human genome as a piano keyboard, the epigenetic framework can be visualized as the particular tune being played at that time (Stelmach & Nerlich, 2015). Because every cell in the body inherits the same DNA sequence, the function of the chemical tags is to differentiate various types of body cells, such as brain cells, skin cells, and liver cells. In this way, genes for the types of cells that are needed are turned on and genes for unneeded cells are left off.

Environmental factors, such as nutrition, smoking, sleep habits, stress, and physical activity, can cause epigenetic changes (Wong et al., 2014). These epigenetic changes in turn can contribute to such common ailments as cancer, diabetes, and heart disease (Dawson & Kouzarides, 2012; Slomko, Heo, & Einstein, 2012; Webster, Yan, & Marsden, 2013). Environmental influences can also be social in nature. For example, social isolation can lead to a variety of health vulnerabilities including cardiovascular disease, decreased immune

EPIGENETICS: IDENTICAL TWINS THAT AREN'T IDENTICAL

Have you ever wondered why identical twins—who share 100 percent of their genetic code—look and act slightly different?

Epigenetic variation can help explain this. The field of epigenetics includes the study of biochemical modifications of genetic expression "above the genome"—without altering DNA sequence (van IJzendoorn, Bakermans-Kranenburg, & Ebstein, 2011). Epigenetics explains why a skin cell and a heart cell look different, even though both carry the entire genetic code. The differences arise as certain genes are turned on or off depending on need and environmental influences (Wong et al., 2010).

Previous researchers theorized that there should be a high degree of epigenetic change in the embryonic period, when cells are highly susceptible to maternal factors such as diet, nutrition, and stress (Champagne, 2014). What environmental factors might influence identical twins in this scenario? One likely factor is whether twins are monochorionic (share a placenta) and thus are subject to similar environmental influences, or they are dichorionic (have separate placentas) and are therefore exposed to somewhat different placental environments. Gordon and others (2011) examined twins' epigenetic changes in the womb by analyzing amniotic tissue samples at birth. In this study, monochorionic twins showed greater epigenetic similarity at birth; gene expression was more "alike" than in dichorionic twins with separate womb environments.

These epigenetic differences continue after birth. The Peri/Post-natal Epigenetic Twins Study is a longitudinal study of twins from birth to 5 years (Saffrey et al., 2012). This study also found a wide range of epigenetic difference between newborn twins. Similar to the Gordon (2011) study, monochorionic identicals were more similar in genetic expression than dichorionic identicals. A follow-up study of the twin pairs revealed that one-third of the epigenome changes "significantly" between birth and 18 months (Loke, Novaknovic, Ollikainen, & Wallace, 2013)—a phenomenal change for twins sharing a postnatal environment.

As twins age, even when identical and even when raised in the same family, they will have somewhat different experiences and be exposed to varied environmental influences. Over time, and particularly in adulthood where most twins will follow different life paths, these differences add up. The accumulated differences result in what has been termed "epigenetic drift." The older the twins, the more different their epigenome becomes (Bell & Spector, 2011; Martino et al., 2013; Wong et al., 2010). Epigenetic drift is often associated with adoption of differing lifestyles and less shared time together. By old age, lifestyle choices may result in very different developmental pathways. Martin (2005) describes identical twins varying in age of onset of Alzheimer's disease—one in their sixties, the other in their eighties. Another longitudinal study of elderly identical twins noted specific epigenetic biomarkers influencing disease or longevity over the span of 10 years (Tan et al., 2016).



Rainbow, on the left, nuzzles her clone, Cc, on the right. They are genetically identical, but have different appearances and personalities.
Pat Sullivan/AP Images

Epigenetic studies create a strong case that identical twins are *not* the same, even at birth and even given an identical genetic code. Epigenetic studies may confirm what many identical twins have asserted all along: They are truly individuals and have always been so.

what's your view

As epigenetic drift results in increasingly different identical twins, how might other people's responses to these increasing differences further shape the process? How might the concept of epigenetics explain differences in nonidentical siblings who share only roughly 50 percent of their genetic code?



Problems in genome imprinting may explain why a child with an asthmatic mother is more likely to develop asthma than a child with an asthmatic father.
Ian Hooton/Science Photo Library/Getty Images

responses, and an increased risk of inflammation-related diseases (Cole, 2009). Epigenetic processes explain why identical twins, even though their genomes are identical, do not look exactly the same. Because they do not have identical experiences, even in the womb, their epigenomes differ. See Research in Action for a closer look at this process.

Cells are particularly susceptible to epigenetic modification during critical periods such as puberty and pregnancy (Padmanabhan, Cardoso, & Puttabyatappa, 2016; Morrison, Rodgers, Morgan, & Bale, 2014; Ho et al., 2012). Furthermore, epigenetic modifications, especially those that occur early in life, may be heritable. Studies of human sperm cells found age-related epigenetic variations capable of being passed on to future generations (Rakyan & Beck, 2006).

One example of epigenesis is genome, or genetic, imprinting. Imprinting is the differential expression of certain genetic traits, depending on whether the trait has been inherited from the mother or the father. In imprinted gene pairs, genetic information inherited from one parent is activated, but genetic information from the other parent is suppressed. Imprinted genes play an important role in regulating fetal growth and development. When a normal pattern of imprinting is disrupted, abnormal fetal growth or congenital growth disorders may result (Hitchins & Moore, 2002).

An example of genomic imprinting can be found in Prader-Willi syndrome, a genetic disease that leads to feeding disturbances, behavioral problems, and intellectual disability. The most common form of the disorder occurs from the deletion of a gene segment on paternal chromosome 15, while the genes on the maternal chromosome 15 are turned off (Ishida & Moore, 2013).

GENETIC AND CHROMOSOMAL ABNORMALITIES

Most birth disorders are fairly rare (see Table 1), affecting only about 3 percent of live births (Centers for Disease Control, 2018a). Nevertheless, they are the leading cause of infant death in the United States, accounting for approximately 20 percent of infant deaths (Mathews, MacDorman, & Thoma, 2015). Rates of disorders vary with race and ethnicity. For example, Hispanic infants have a higher occurrence of neural tube and ear defects than do white non-Hispanic infants but lower rates of hypospadias (when the opening of the penis is on the underside rather than the tip). African American infants are more likely to have one type of a neural tube defect known as an encephalocele (in which the skull does not close correctly and part of the brain protrudes outside the head) and trisomy-18 (where an extra chromosome results in a condition called Edwards syndrome and severe developmental delays), and they are less likely to have cleft lip or palate, or gastrointestinal abnormalities. Asian American infants are at lower risk for a wide range of disorders and birth defects (Canfield et al., 2014). Survival rates also differ by ethnicity. In particular, African American and Hispanic infants are at higher risk than white, non-Hispanic infants (Wang et al., 2015).

It is in genetic defects and diseases that we see most clearly the operation of dominant and recessive transmission, and also of a variation, *sex-linked inheritance,* discussed in a subsequent section.

checkpoint can **you** . . .

- **Tell how dominant inheritance and recessive inheritance work, and why most normal traits are not the products of simple dominant or recessive transmission?**
- **Explain how epigenesis and genome imprinting occur, and give examples?**

Dominant or Recessive Inheritance of Defects Most of the time, "good" genes are dominant over those carrying abnormal traits, but sometimes the gene for an abnormal trait is dominant. When one parent has one dominant abnormal gene and one recessive "good" gene and the other parent has two recessive "good" genes, each of their children has a 50-50 chance of inheriting the abnormal gene. Among the 1,800 disorders known to be transmitted by dominant inheritance are achondroplasia (a type of dwarfism) and Huntington's disease. Defects transmitted by dominant inheritance are less likely to be lethal at an early age than those transmitted by recessive inheritance because any affected

TABLE 1 Some Birth Defects and Genetic Disorders

Problem	Characteristics of Condition	Who Is at Risk	What Can Be Done
$Alpha_1$ antitrypsin deficiency	Enzyme deficiency that can lead to cirrhosis of the liver in early infancy and emphysema and degenerative lung disease in middle age.	1 in 1,000 white births	No treatment.
Alpha thalassemia	Severe anemia that reduces ability of the blood to carry oxygen; nearly all affected infants are stillborn or die soon after birth.	Primarily families of Malaysian, African, and Southeast Asian descent	Frequent blood transfusions.
Beta thalassemia (Cooley's anemia)	Severe anemia resulting in weakness, fatigue, and frequent illness; usually fatal in adolescence or young adulthood.	Primarily families of Mediterranean descent	Frequent blood transfusions.
Cystic fibrosis	Overproduction of mucus, which collects in the lung and digestive tract; children do not grow normally; short life span; the most common inherited lethal defect among white people.	1 in 2,000 white births	Physical therapy to loosen mucus; antibiotics for lung infections; enzymes to improve digestion; experimental gene therapy.
Duchenne muscular dystrophy	Fatal disease usually found in males, marked by muscle weakness; minor mental retardation is common; respiratory failure and death usually occur in young adulthood.	1 in 3,000 to 5,000 male births	No treatment.
Hemophilia	Excessive bleeding, usually affecting males; in its most severe form, can lead to crippling arthritis in adulthood.	1 in 10,000 families with a history of hemophilia	Frequent transfusions of blood with clotting factors.
Anencephaly	Absence of brain tissues; infants are stillborn or die soon after birth.	1 in 1,000	No treatment.
Spina bifida	Incompletely closed spinal canal, muscle weakness or paralysis and loss of bladder and bowel control; often accompanied by hydrocephalus, an accumulation of spinal fluid in the brain, and mental retardation.	1 in 1,000	Surgery prevents further injury; shunt placed in brain drains excess fluid.
Phenylketonuria (PKU)	Metabolic disorder resulting in mental retardation.	1 in 15,000 births	Special diet begun in first few weeks of life can prevent mental retardation.
Polycystic kidney disease	*Infantile form:* enlarged kidneys, leading to respiratory problems and congestive heart failure. *Adult form:* kidney pain, kidney stones, and hypertension resulting in chronic kidney failure.	1 in 1,000	Kidney transplants.
Sickle-cell anemia	Deformed red blood cells that clog blood vessels, depriving the body of oxygen; symptoms include severe pain, stunted growth, infections, leg ulcers, gallstones, pneumonia, and stroke.	1 in 500 African Americans	Painkillers, transfusions for anemia and to prevent stroke, antibiotics for infections.
Tay-Sachs disease	Degenerative disease of the brain and nerve cells, resulting in death before age 5.	Historically found in Eastern European Jews	No treatment.

Source: Adapted from AAP Committee on Genetics, 1996; Tisdale, 1988, pp. 68–69.

children would be likely to die before reproducing. Therefore, that gene would not be passed on to the next generation and would soon disappear from the population.

Recessive defects are expressed only if the child is homozygous for that gene; in other words, a child must inherit a copy of the recessive gene from each parent. Because

recessive genes are not expressed if the parent is heterozygous for that trait, it may not always be apparent that a child is at risk for receiving two alleles of a recessive gene. Defects transmitted by recessive genes tend to be lethal at an earlier age, in contrast to those transmitted by dominant genes, because recessive genes can be transmitted by heterozygous carriers who do not themselves have the disorder. Thus they are able to reproduce and pass the genes down to the next generation.

incomplete dominance
Pattern of inheritance in which a child receives two different alleles, resulting in partial expression of a trait.

In **incomplete dominance,** a trait is not fully expressed. Normally the presence of a dominant/recessive gene pair results in the full expression of the dominant gene and the masking of the recessive gene. In incomplete dominance, the resulting phenotype is a combination of both genes. For example, people with only one sickle-cell allele and one "good" allele do not have sickle-cell anemia with its distinctive, abnormally shaped blood cells. Their blood cells are not the typical round shape either. They are an intermediate shape, which shows that the sickle-cell gene for these people is incompletely dominant.

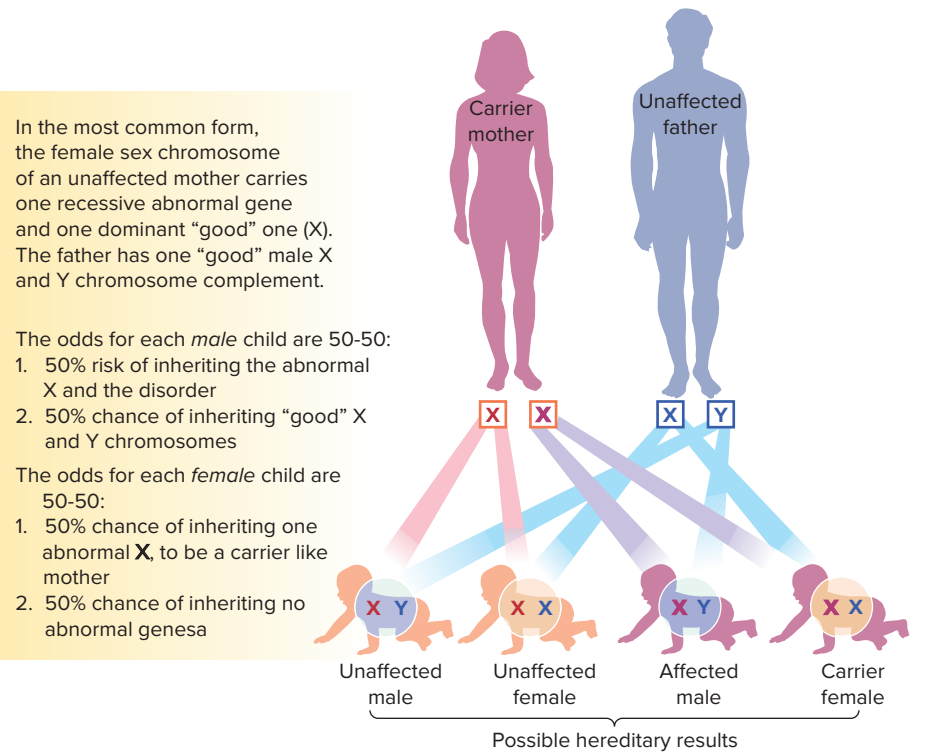
sex-linked inheritance
Pattern of inheritance in which certain characteristics carried on the X chromosome inherited from the mother are transmitted differently to her male and female offspring.

Sex-Linked Inheritance of Defects In **sex-linked inheritance** (Figure 5), certain recessive disorders affect male and female children differently. This is due to the fact that males are XY and females are XX. In humans, the Y chromosome is smaller and carries far fewer genes than the X chromosome. One outcome of this is that males receive only one copy of any gene that happens to be carried on the sex chromosomes, whereas females receive two copies. So, if a woman has a "bad" copy of a particular gene, she has a backup copy. However, if a male has a "bad" copy of a particular gene, that gene will be expressed.

Heterozygote females who carry one "bad" copy of a recessive gene and one "good" one are called carriers. If such a woman has children with an unaffected male (a man who has a "good" copy of the gene), she has a 50 percent chance of passing the disorder on to any sons they might have. If they have a son (who is XY by virtue of being male), the father contributed a Y chromosome, and the mother contributed the X chromosome. Because she has one "good" copy and one "bad" copy, either outcome is equally likely. Daughters (who are XX by virtue of being female) may be protected because the father will pass on his "good" copy to daughters, so the girls have a 50 percent chance either of being completely unaffected or of carrying a hidden recessive copy of the gene.

Sex-linked recessive disorders are more common in males than in females. For example, red-green color blindness, hemophilia (a disorder in which blood does not clot when

FIGURE 5
Sex-Linked Inheritance



it should), and Duchenne muscular dystrophy (a disorder that results in muscle degeneration and eventually death) are all more common in males, and all result from genes located on the X chromosome. Occasionally, a female does inherit a sex-linked condition. For this to happen, the father must have a "bad" copy, and the mother must also be a carrier or herself have the condition.



Children with Turner syndrome are always girls. Because so little information is carried on the Y chromosome, an embryo with only a Y chromosome and no X chromosome is not viable. Alternatively, an embryo with an X chromosome, but no Y, often is.

Chromosomal Abnormalities Chromosomal abnormalities typically occur because of errors in cell division, resulting in an extra or missing chromosome. For example, Klinefelter syndrome is caused by an extra female sex chromosome (shown by the pattern XXY). Turner syndrome results from a missing sex chromosome (XO). The likelihood of errors increase in offspring of women age 35 or older. Characteristics of the most common sex chromosome disorders are shown in Table 2.

Down syndrome, the most common chromosomal abnormality, accounts for about 40 percent of all cases of moderate-to-severe mental retardation (Pennington, Moon, Edgin, Stedron, & Nadel, 2003). The condition is also called trisomy-21 because it is characterized in more than 90 percent of cases by an extra 21st chromosome.

Down syndrome
Chromosomal disorder characterized by moderate-to-severe mental retardation and by such physical signs as a downward-sloping skin fold at the inner corners of the eyes. Also called *trisomy-21.*

Approximately 1 in every 792 babies born alive has Down syndrome (de Graaf, Buckley, & Skotko, 2015). Although the risk of having a child with Down syndrome rises with age, because of the higher birthrates of younger women, more young mothers have children with Down syndrome (National Institute of Child Health and Development, 2008). Between 1979 and 2003, an increased tendency to delay child rearing and thus a greater number of older mothers resulted in a corresponding increase in the number of children born with Down syndrome (Shin et al., 2009). However, this trend was offset by the development of noninvasive prenatal screening tests in 2011, which allowed pregnant women to test for genetic disorders without risk of miscarriage. Estimates are that approximately 30 percent of pregnancies in which Down syndrome was diagnosed were electively terminated (de Graaf et al., 2015).



Another common sign of Down syndrome involves the lines that palm readers use to tell your fortune. In children with Down syndrome, there is a single horizontal line across the palm.

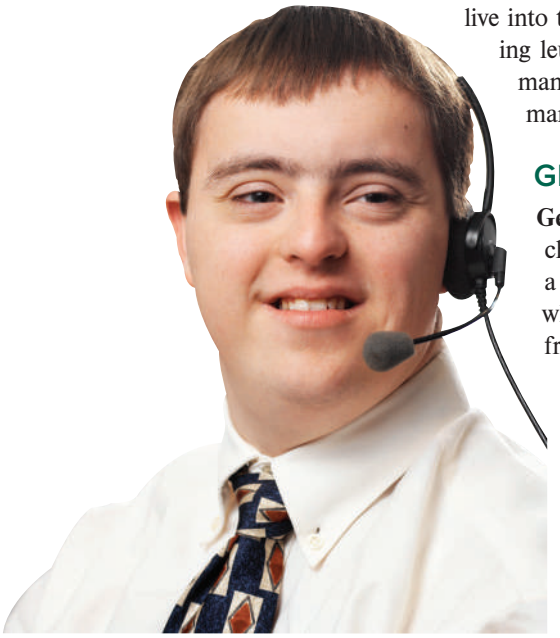
The brains of children with Down syndrome appear nearly normal at birth but shrink in volume by young adulthood, particularly in the hippocampal area and prefrontal cortex, resulting in cognitive dysfunction, and in the cerebellum, leading to problems with motor coordination and balance (Davis, 2008; Pennington et al., 2003). With early intervention, the prognosis for these children is brighter than was once thought. Children with Down syndrome, like other children with disabilities, tend to benefit cognitively, socially, and emotionally when placed in regular classrooms rather than in special schools (Davis, 2008) and when provided with regular, intensive therapies designed to help them achieve important skills. As adults, many live in small group homes and support themselves; they tend to do well in structured job situations. More than 70 percent of people with Down syndrome

TABLE 2 Sex Chromosome Abnormalities

Pattern/Name	Typical Characteristics*	Incidence	Treatment
XYY	Male; tall stature; tendency toward low IQ, especially verbal.	1 in 1,000 male births	No special treatment.
XXX (triple X)	Female; normal appearance, menstrual irregularities, learning disorders, mental retardation.	1 in 1,000 female births	Special education.
XXY (Klinefelter)	Male; sterility, underdeveloped secondary sex characteristics, small testes, learning disorders.	1 in 1,000 male births	Hormone therapy, special education.
XO (Turner)	Female; short stature, webbed neck, impaired spatial abilities, no menstruation, infertility, underdeveloped sex organs.	1 in 1,500 to 2,500 female births	Hormone therapy, special education.
Fragile X	Minor-to-severe mental retardation; more severe in males; delayed speech and motor development, hyperactivity; the most common *inherited* form of mental retardation.	1 in 1,200 male births; 1 in 2,000 female births	Educational and behavioral therapies when needed.

*Not every affected person has every characteristic.

live into their sixties. While they are at risk of early death from various causes, including leukemia, cancer, Alzheimer's disease, and cardiovascular disease, with proper management and health care, they can live relatively long and healthy lives (Zigman, 2013; Irving & Chaudhari, 2012).



Although Down syndrome is a major cause of mental retardation, people with this chromosomal abnormality can live productive lives.
George Doyle/Stockbyte/Veer

GENETIC COUNSELING AND TESTING

Genetic counseling can help prospective parents assess their risk of bearing children with genetic or chromosomal defects. People who have already had a child with a genetic defect, who have a family history of hereditary illness, who suffer from conditions known or suspected to be inherited, or who come from ethnic groups at higher risk of passing on genes for certain diseases can get information about the likelihood their children being affected.

Geneticists have made great contributions to avoidance of birth defects. For example, genetic testing has virtually eliminated Tay-Sachs disease in the Jewish population. Similarly, screening and counseling of women of childbearing age from Mediterranean countries, where beta thalassemia (refer to Table 1) is common, has brought a decline in births of affected babies and greater knowledge of the risks of being a carrier (Cao & Kan, 2013).

A genetic counselor takes a family history and gives the prospective parents and any biological children physical examinations. Laboratory investigations of blood, skin, urine, or fingerprints may be performed. Chromosomes from body tissues may be analyzed and photographed, and the photographs enlarged and arranged according to size and structure on a chart called a *karyotype*. This chart can show chromosomal abnormalities and can indicate whether a person might transmit genetic defects to a child (Figure 6). The counselor tries to help clients understand the mathematical risk of a particular condition, explains its implications, and presents information about alternative courses of action.

genetic counseling
Clinical service that advises prospective parents of their probable risk of having children with hereditary defects.

checkpoint can you . . .

- Explain the operation of dominant inheritance, recessive inheritance, incomplete dominance, sex-linked inheritance, and mutations in transmission of birth defects?
- Tell three ways chromosomal disorders occur?
- Explain the purposes of genetic counseling?

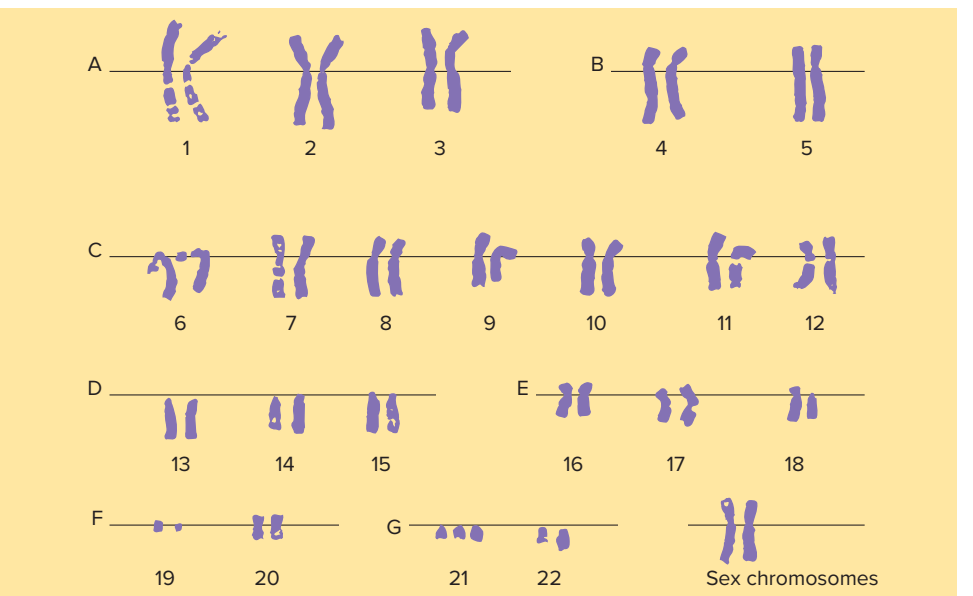


FIGURE 6
Karyotype of a Female with Down Syndrome

A karyotype is a photograph that shows the chromosomes when they are separated and aligned for cell division. We know that this is a karyotype of a person with Down syndrome because there are three chromosomes instead of the usual two on pair 21. Because pair 23 consists of two Xs, we know that this is the karyotype of a female.

Source: Babu and Hirschhorn, 1992; March of Dimes Birth Defects Foundation, 1987.

Today researchers are rapidly identifying genes that contribute to many serious diseases and disorders, as well as those that influence normal traits.

Nature and Nurture: Influences of Heredity and Environment

The relative importance of heredity and environment was a major issue among early psychologists and the general public. Today it has become clear that, although certain rare physical disorders are virtually 100 percent inherited, phenotypes for most normal traits, such as those having to do with intelligence and personality, are subject to a complex array of hereditary and environmental forces. Let's see how scientists study and explain the influences of heredity and environment and how these two forces work together.

STUDYING HEREDITY AND ENVIRONMENT

One approach to the study of heredity and environment is quantitative: It seeks to measure *how much* heredity and environment influence particular traits. This is the traditional goal of the science of **behavioral genetics**.

behavioral genetics
Quantitative study of relative hereditary and environmental influences on behavior.

heritability
Statistical estimate of contribution of heredity to individual differences in a specific trait within a given population.

concordant
Term describing tendency of twins to share the same trait or disorder.

Measuring Heritability Behavioral geneticists have developed a means of estimating how much of a trait is due to genetics and how much is the result of environmental influences by using a concept known as **heritability.** Every trait is a consequence of genes and environment. By looking at groups of people with known genetic relationships, and assessing whether or not they are **concordant,** meaning *the same,* on a given trait, behavioral geneticists can estimate the relative influence of genes and environment.

Heritability cannot be measured directly. Thus, researchers in behavioral genetics have developed indirect methods for assessing the relationship between the expression of traits and the genetic and environmental factors influencing them. Although there are variations in the details, the underlying logic of the approaches in these types of studies is the same.

If two people are unrelated, we know they are not likely to share any genes. If two people are identical twins, we know they share all their genes. If two people are fraternal twins, siblings, or parent and child, they share roughly 50 percent of their genes with each other. And, if we know, on average, how many genes people share, then we can measure how similar they are on traits (that is, their concordance rate) and work backward to determine the relative environmental influences. Therefore, if heredity has a large influence on a particular trait, identical twins should be more alike on that trait than fraternal twins, and adopted children should be more like their biological parents than their adoptive parents. Note that this can be carried out to more distant genetic relatives as well. For traits with strong genetic influences, for example, siblings should be more similar than cousins on that trait.

We can also use the environment to estimate influences. If the environment exerts a large influence on a trait, people who live together should be more similar than those that live apart, and shared genes should matter less. For example, in this situation, we might compare adopted children to their biological and adoptive parents. If adopted children are more similar to their adoptive parents than their biological parents on a trait, then that trait is likely influenced strongly by the environment.

Essentially, this approach boils down to comparisons of shared genes, the same or different environments, and concordance rates. Using these three variables allows researchers to make an estimate of the relative influence of genes and environment on a trait.



Keep in mind that a high heritability estimate does not mean that a trait cannot be influenced by environment. If the environment changes, the heritability estimate may change as well.



Monozygotic twins separated at birth are sought by researchers who want to study the impact of genes on personality. These twins, adopted by different families and not reunited until age 31, both became firefighters. Was this a coincidence, or did it reflect the influence of heredity?
Thomas Wanstall/The Image Works

checkpoint can **you** . . .

- **State the basic assumption underlying studies of behavioral genetics and how it applies to family studies, twin studies, and adoption studies?**

Heritability is expressed as a percentage ranging from 0.0 to 1.0: the higher the number, the greater the heritability of a trait. A heritability estimate of 1.0 indicates that genes are 100 percent responsible for variances in the trait within the population. A heritability estimate of 0.0 percent would indicate the environment shaped a trait exclusively. Note that heritability does not refer to the influences that shaped any one particular person because those influences are virtually impossible to separate. Nor does heritability tell us how traits develop. It merely indicates the statistical extent to which genes contribute to a trait at a certain time within a given population.

HOW HEREDITY AND ENVIRONMENT WORK TOGETHER

Today many developmental scientists have come to regard a solely quantitative approach to the study of heredity and environment as simplistic. They see these two forces as fundamentally intertwined. Instead of looking at genes and experience as operating directly on an organism, they see both as part of a complex *developmental system* (Gottlieb, 1991, 1997; Lickliter & Honeycutt, 2003). From conception on, throughout life, a combination of constitutional factors (related to biological and psychological makeup) and social, economic, and cultural factors help shape development.

Reaction Range Many characteristics vary, within limits, under varying hereditary or environmental conditions. The concept of *reaction range* can help us visualize how this happens.

reaction range
Potential variability, depending on environmental conditions, in the expression of a hereditary trait.

Reaction range refers to a range of potential expressions of a hereditary trait. Body size, for example, depends largely on biological processes, which are genetically regulated. Even so, a range of sizes is possible, depending on environmental opportunities and constraints and a person's behavior. In societies in which nutrition has dramatically improved, an entire generation has grown up to tower over the generation before. The better-fed children share their parents' genes but have responded to a healthier world. Once a society's average diet becomes adequate for more than one generation, however, children tend to grow to heights similar to their parents'. Ultimately, height has genetic limits; we don't see people who are only 1 foot tall or who are 10 feet tall.

Heredity can influence whether a reaction range is wide or narrow. For example, a child born with a defect producing mild cognitive limitations is more able to respond to a favorable environment than a child born with more severe limitations. Likewise, a child with greater native intelligence is likely to benefit more from an enriched home and school environment than a child with a more typical level of intelligence (Figure 7).

Canalization Some traits have an extremely narrow range of reaction. The metaphor of **canalization** illustrates how heredity restricts the range of development for some traits. After a heavy storm, the rainwater that has fallen on a pavement has to go somewhere. If the street has potholes, the water will fill them. If deep canals have been dug along the edges of the street, the water will flow into the canals.

Highly canalized traits, such as eye color, are analogous to the deep canals. They are strongly programmed by genes, and there is little opportunity for variance in their expression. Because of the deep, genetically dug channel, it would take an extreme change in environment to alter their course. The canal is too deep for the water to easily slosh over.

In the ancestral past, an inability to walk or talk would have had profound adaptive consequences. A human who could not do these things would have been unlikely to survive. Because they are so important, natural selection has designed them to develop in a predictable and reliable way within a variety of environments. They are too important to be left to chance. Thus, traits such as these tend to be highly canalized. With respect to motor development, typical babies follow a predictable sequence: crawling or scooting, walking, and then running, in that order, at certain approximate ages. This sequence is said to be canalized, in that children will follow this same blueprint irrespective of many variations in the environment. A similar process occurs for language. Despite differences in linguistic environments, babies the world over reach language milestones at approximately the same time and in the same order.

Cognition and personality, however, are not highly canalized. They are more subject to variations in experience. Consider reading. We are not wired to read—natural selection has not designed us to naturally develop this skill. The environment plays a large part. Parents who play letter and word games and who read to their children are likely to have children who learn to read earlier than if these skills are not encouraged or reinforced. Children who are not taught to read do not learn to do so spontaneously.

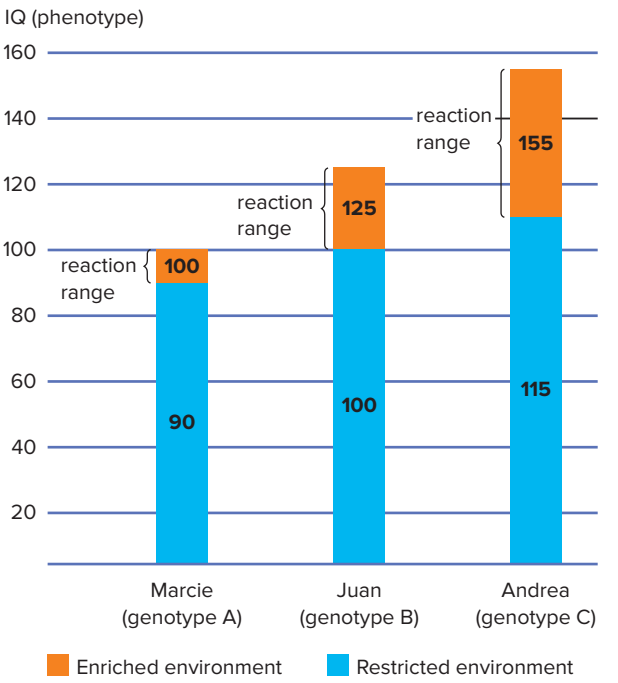


FIGURE 7
Intelligence and Reaction Range

Children with different genotypes for intelligence will show varying reaction ranges when exposed to a restricted (blue portion of bar) or enriched (entire bar) environment.

In humans, walking and talking are canalized traits. Can you think of other human physical or behavioral characteristics that might be highly canalized?

canalization
Limitation on variance of expression of certain inherited characteristics.

Genotype-Environment Interaction **Genotype-environment interaction** usually refers to the effects of similar environmental conditions on genetically different individuals, and a discussion of these interactions is a way to conceptualize and talk about the different ways nature and nurture interact. To take a familiar example, many children are exposed to pollen and dust, but those with a genetic predisposition are more likely to develop allergic reactions. Interactions can work the other way as well: Genetically similar children often develop differently depending on their home environments (Collins et al., 2000). A child born with a difficult temperament may develop adjustment problems in one family and thrive in another, depending largely on parental handling. Thus it is the interaction of hereditary and environmental factors, not just one or the other, that produces certain outcomes.

One environmental factor that has been identified as protective against severe allergies in children is early exposure to animals.

Wegienka et al., 2011

genotype-environment interaction
The portion of phenotypic variation that results from the reactions of genetically different individuals to similar environmental conditions.

Genotype-Environment Correlation Because genes influence a person's exposure to particular environments, the environment often reinforces genetic

genotype-environment correlation
Tendency of certain genetic and environmental influences to reinforce each other; may be passive, reactive (evocative), or active. Also called *genotype-environment covariance.*

differences (Rutter, 2012). This is called **genotype-environment correlation,** or *genotype-environment covariance,* and it works in three ways to strengthen the phenotypic expression of a genotypic tendency (Bergeman & Plomin, 1989; Scarr, 1992; Scarr & McCartney, 1983). The first two ways are common among younger children, the third among older children, adolescents, and adults.

- *Passive correlations:* Parents, who provide the genes that predispose a child toward a trait, also tend to provide an environment that encourages the development of that trait. For example, a musical parent is likely to create a home environment in which music is heard regularly, to give a child music lessons, and to take the child to musical events. If the child inherited the parent's musical talent, the child's musicality will reflect a combination of genetic and environmental influences. This type of correlation is called *passive* because the child does not control it. The child has inherited the environment, as well as genes that might make that child particularly well-suited to respond to those particular environmental influences. Passive correlations are most applicable to young children, whose parents have a great deal of control over their early experiences. Additionally, passive correlations function only when a child is living with a biologically related parent.

The easiest way to remember what passive correlations are is to recall that, when you are living with your biological parents, you are inheriting both genes and environments from them. Sometimes those two complement each other precisely because they came from the same source.

- *Reactive, or evocative, correlations:* Children with differing genetic makeups evoke different reactions from others. For example, parents who are not musically inclined may make a special effort to provide musical experiences for a child who shows interest and ability in music. This response, in turn, strengthens the child's genetic inclination toward music. This type of correlation is called *reactive* because the other people react to the child's genetic makeup.

Another way to think of evocative correlations is to remember that children evoke, or pull out, certain responses from others.

- *Active correlations:* As children get older and have more freedom to choose their own activities and environments, they *actively* select or create experiences consistent with their genetic tendencies. An adolescent with a talent for music will probably seek out musical friends, take music classes, and go to concerts if such opportunities are available. This tendency to seek out environments compatible with one's genotype is called **niche-picking;** it helps explain why identical twins reared apart tend to have similar characteristics.

niche-picking
Tendency of a person, especially after early childhood, to seek out environments compatible with his or her genotype.

nonshared environmental effects
The unique environment in which each child grows up, consisting of distinctive influences or influences that affect one child differently than another.

What Makes Siblings So Different? The Nonshared Environment

Although two children in the same family may bear a striking physical resemblance, siblings can differ greatly in intellect and especially in personality (Plomin & Daniels, 2011). One reason may be genetic differences, which lead children to need different kinds of stimulation or to respond differently to a similar home environment. For example, one child may be more affected by family discord than another (Horowitz et al., 2010). In addition, studies in behavioral genetics suggest that many of the experiences that strongly affect development vary for different children in a family (McGuffin, Riley, & Plomin, 2001; Plomin & DeFries, 1999). Children may live in the same family, but that does not mean that their experiences are identical.



An adolescent with musical abilities may seek out musical friends and might even start a band. This is an example of niche-picking.
Hero Images/Getty Images

These **nonshared environmental effects** result from the unique environment in which each child in a family grows up. Children in a family have a shared environment–the home they live in, the people in it, and the activities family members jointly engage in–but they also, even if they are twins, have experiences that are not shared by their brothers and sisters. Parents and siblings may treat each child differently. Certain events, such as illnesses and accidents, and experiences outside the home affect one child and not another. For example, if you are the oldest child in a family, one of your early influences was the ability to have your parents' undivided attention. A secondborn or later child is not born into that same environment. Later siblings must share their parents' attention. Therefore, despite being in the same family, the influences are not identical. Indeed, some behavioral geneticists have

concluded that although heredity accounts for most of the similarity between siblings, the nonshared environment accounts for most of the difference (Hetherington, Reiss, & Plomin, 2013).

We can also extend the conversation about genotype-environment correlations to explain some of the effects of the nonshared environment on siblings' experiences. Children's genetic differences may lead parents to react to them differently and treat them differently. One child may be shy and elicit more gentle behavior from parents; another may be bold and be given greater freedom and encouragement to explore. Children also mold their environments by the choices they make—what they do and with whom—and their genetic makeup influences these choices. A child who loves to read may spend hours in solitude; an athletic and sociable child may prefer to be outside playing with others. Thus, not only will the child's talents (such as reading or athleticism) develop differently, but their social life will be different as well. These differences tend to be accentuated as children grow older and have more experiences outside the family (Plomin, 1996; Scarr, 1992).

checkpoint can you . . .

- Explain and give at least one example of reaction range canalization, and each of the three genotype-environment correlations.
- Differentiate the three types of genotype-environment correlation?
- List three kinds of influences that contribute to nonshared environmental effects?

SOME CHARACTERISTICS INFLUENCED BY HEREDITY AND ENVIRONMENT

Keeping in mind the complexity of unraveling the influences of heredity and environment, let's look at what is known about their roles in producing certain characteristics.

Obesity **Obesity** is measured by body mass index, or BMI (comparison of weight to height). Children between the 85th and 95th percentiles are classified as overweight, and those above the 95th percentile as obese (Ogden, Carroll, Curtin, Lamb, & Flegal, 2010). The risk of obesity is 2 to 3 times higher for a child with a family history of obesity, especially severe obesity (Nirmala, Reddy, & Reddy, 2008). Therefore, we might reasonably conclude that obesity involves genetic contributions.

obesity
Extreme overweight in relation to age, sex, height, and body type as defined by having a body mass index at or above the 95th percentile.

In fact, there is not "a" gene for obesity; rather it is a multifactorial condition. Twin studies, adoption studies, and other research suggest that 40 to 70 percent of the risk is genetic (Willyard, 2014). More than 430 genes or chromosome regions are associated with obesity (Nirmala et al., 2008; Snyder et al., 2004). There are also small subsets of obese people who have a genetic profile making them particularly prone to obesity; for instance, one such subset includes obese adults suffering from a deletion of approximately 30 genes (Bochukova et al., 2009).

However, this increased risk is not solely genetic. Environmental experiences also contribute to obesity (Willyard, 2014). The kind and amount of food eaten in a particular home and the amount of exercise that is encouraged can increase or decrease the likelihood that a child will become obese. Moreover, the wider social context is at play as well. Obesity rates rise in countries with rapid socioeconomic growth and increases in gross domestic product (Min, Chiu, & Wang, 2013). In Western countries, obesity likely stems from the interaction of a genetic predisposition with overeating, supersized portions, and inadequate exercise (Arner, 2000).

Intelligence Heredity exerts a strong influence on general intelligence, as measured by intelligence tests, and a moderate effect on specific abilities such as memory, verbal ability, and spatial ability (Plomin & Spinath, 2004). While specific genes might contribute to intelligence (Posthuma & de Geus, 2006), intelligence is best described as shaped by large numbers of genes working together.

Indirect evidence of the role of heredity in intelligence comes from adoption and twin studies. Adopted children's scores on standardized intelligence tests are consistently closer to the scores of their biological mothers than to those of their adoptive parents and siblings; monozygotic twins are more alike in intelligence than dizygotic twins (Petrill et al., 2004; Plomin & DeFries, 1999).

Intelligence also depends in part on brain size and structure, which are under strong genetic control (Savage et al., 2018; Toga & Thompson, 2005). Experience



This shy 3-year-old boy may "just be in a phase," or his shyness may be an inborn aspect of his temperament.
Digital Vision/Getty Images

counts, too. An enriched or impoverished environment can substantially affect the development and expression of innate ability (Ceci & Gilstrap, 2000). Environmental influence is greater, and heritability lower, among poor families than among more economically privileged families (Nisbett et al., 2012).

The influence of genes increases sharply with age (Plomin & Dreary, 2015). This increase is probably a result of niche-picking. The shared family environment has a strong influence on young children but little influence on adolescents, who are more apt to find their own niche by actively selecting environments compatible with their hereditary abilities and related interests (Bouchard, 2013).

Temperament and Personality When babies are exposed to a new experience, say riding on a train or playing with a new noisy toy, some infants respond with interest and excitement, and others with apprehension and withdrawal. Some babies are active, others less so. Some babies sleep and eat at the same time every day, others have difficulty settling into a consistent schedule. Right from the beginning, infants are unique.

temperament
Characteristic disposition, or style of approaching and reacting to situations.

Psychologists call babies' unique and characteristic ways of approaching and reacting to environmental stimuli **temperament**. Temperament is largely inborn and is relatively consistent over the years, although it may respond to special experiences or parental handling (Thomas & Chess, 1984; Thomas, Chess, & Birch, 1968). In support of the role of genes, siblings–both twins and singletons–tend to be similar in temperament on such traits as positive affect, activity level (Saudino & Micalizzi, 2015), and behavioral regulation (Gagne & Saudino, 2010).

Temperament underlies adult personality. Given the genetic contributions found for temperament, one would predict personality research should also illustrate hereditary influences. This is indeed the case. Scientists have identified genes directly linked with specific aspects of personality such as neuroticism and extraversion (Vinkhuyzen et al., 2012). Overall, the heritability of personality traits appears to be around 40 percent (Vukasovic & Bratko, 2015), and there is little evidence of shared environmental influence (Plomin, 2011). As with intelligence, genetic influences on personality appear to become more important with age (Briley & Tucker-Drob, 2014) and are shaped in part by active niche-picking (Kandler & Zapko-Willmes, 2017).



Another trait influenced by genetics is religiosity. Behavioral genetics research suggests that the tendency to believe strongly in a religion is moderately heritable; that is, at about the same level as intelligence.

Waller et al., 1990

Schizophrenia Schizophrenia illustrates the interaction of heredity and genetics. **Schizophrenia** is a neurological disorder that affects about 1 percent of the U.S. population each year (Society for Neuroscience, 2008). It is characterized by loss of contact with reality; hallucinations and delusions; loss of coherent, logical thought; and inappropriate emotionality. Estimates of heritability range from 60 to 80 percent (Schwab & Wildenauer, 2013). A wide array of rare gene mutations, some of which involve missing or duplicated segments of DNA, may increase susceptibility to schizophrenia (Chen et al., 2009; Vrijenhoek et al., 2008; Walsh et al., 2008). However, monozygotic twins are not always concordant for schizophrenia, perhaps due to epigenetic processes (Bönsch et al., 2012).

schizophrenia
Mental disorder marked by loss of contact with reality; symptoms include hallucinations and delusions.

Researchers also have looked at possible nongenetic influences, such as a series of neurological insults in fetal life (Debnath, Venkatasubramanian, & Berk, 2015) or exposure to influenza or rubella (Brown, 2012). Infants born in urban areas or those whose mothers experienced obstetric complications or who were poor or severely deprived as a result of war or famine are at higher risk (Rapoport, Giedd, & Gogtay, 2012), as are infants born during the winter months (Martinez-Ortega et al., 2011). Advanced paternal age is also a risk factor for schizophrenia (Janecka et al., 2017; Sharma et al., 2015), and there are indications that, at least for boys, having very young fathers may put children at elevated risk as well (Miller et al., 2010).

checkpoint can you . . .

- Assess the evidence for genetic and environmental influences on physical and physiological traits, intelligence, temperament, and schizophrenia?

Prenatal Development

gestation
Period of development between conception and birth.

gestational age
Age of an unborn baby, usually dated from the first day of an expectant mother's last menstrual cycle.

cephalocaudal principle
The upper parts of the body develop before the lower parts of the trunk.

For many women, the first clear (though not necessarily reliable) sign of pregnancy is a missed menstrual period. But even before that first missed period, a pregnant woman's body undergoes subtle but noticeable changes. Table 3 lists early signs and symptoms of pregnancy.

During **gestation,** the period between conception and birth, an unborn child undergoes dramatic processes of development. The normal range of gestation is between 37 and 41 weeks (Martin, Hamilton, et al., 2009). **Gestational age** is usually dated from the first day of an expectant mother's last menstrual cycle.

In this section we trace the course of gestation, or prenatal development, and discuss environmental factors that can affect the developing person-to-be. In the next section, we assess techniques for determining whether development is proceeding normally and explain the importance of prenatal care.



Pregnancy tests identify the presence of human chorionic gonadotropin, which, under normal circumstances, is produced only by embroyos and fetuses. So there are no false positives. A pregnancy might not be viable, but a positive pregnancy test tells a women a conception has occurred.

STAGES OF PRENATAL DEVELOPMENT

Prenatal development takes place in three stages: *germinal, embryonic,* and *fetal*. (Table 4 gives a month-by-month description.) During these three stages of gestation, the original single-celled zygote grows into an *embryo* and then a *fetus*.

Both before and after birth, development proceeds according to two fundamental principles: Growth and motor development occur from the top down and from the center of the body outward. The **cephalocaudal principle**, from Latin, meaning "head to tail," dictates that development proceeds from the head to the lower part of the trunk.

TABLE 3 Early Signs and Symptoms of Pregnancy

Physical Change	Causes and Timing
Tender, swollen breasts or nipples	Increased production of the female hormones estrogen and progesterone stimulates breast growth to prepare for producing milk (most noticeable in a first pregnancy).
Fatigue; need to take extra naps	Woman's heart is pumping harder and faster to produce extra blood to carry nutrients to the fetus. Stepped-up production of hormones takes extra effort. Progesterone depresses central nervous system and may cause sleepiness. Concerns about pregnancy may sap energy.
Slight bleeding or cramping	*Implantation bleeding* may occur about 10 to 14 days after fertilization when fertilized ovum attaches to lining of uterus. Many women also have cramps (similar to menstrual cramps) as the uterus begins to enlarge.
Food cravings	Hormonal changes may alter food preferences, especially during first trimester, when hormones have greatest impact.
Nausea with or without vomiting	Rising levels of estrogen produced by placenta and fetus cause stomach to empty more slowly. Also, heightened sense of smell may trigger nausea in response to certain odors, such as coffee, meat, dairy products, or spicy foods. *Morning sickness* may begin as early as 2 weeks after conception, but usually around 4 to 8 weeks, and may occur at any time of day.
Frequent urination	Enlarging uterus during first trimester exerts pressure on the bladder.
Frequent, mild headaches	Increased blood circulation caused by hormonal changes may bring these on.
Constipation	Increase in progesterone may slow digestion, so food passes more slowly through intestinal tract.
Mood swings	Flood of hormones early in pregnancy can produce emotional highs and lows.
Faintness and dizziness	Lightheaded feeling may be triggered by blood vessel dilation and low blood pressure or by low blood sugar.
Raised basal body temperature	Basal body temperature (taken first thing in the morning) normally rises soon after ovulation each month and then drops during menstruation. When menstruation ceases, temperature remains elevated.

Source: Mayo Clinic, 2005.

TABLE 4 Prenatal Development

Month	Description
 *1 month* Petit Format/Nestle/Science Source	During the first month, growth is more rapid than at any other time during life; the embryo reaches a size 10,000 times greater than the zygote. By the end of the first month, it measures about ½ inch in length. Blood flows through its veins and arteries. It has a minuscule heart, beating 65 times a minute. It has the beginning of a brain, kidneys, liver, and digestive tract. The umbilical cord is working. By looking closely through a microscope, it is possible to see the swellings on the head that will eventually become eyes, ears, mouth, and nose. Its sex cannot yet be detected.
 *7 weeks* Claude Edelmann/Science Source	By the end of the second month, the embryo becomes a fetus. It is less than 1 inch long and weighs only ⅓ ounce. Its head is half its total body length. Facial parts are developed, with tongue and teeth buds. The arms have hands, fingers, and thumbs, and the legs have knees, ankles, feet, and toes. The fetus has a thin covering of skin. Brain impulses coordinate the function of the organ system. Sex organs are developing; the heartbeat is steady. The stomach produces digestive juices; the liver, blood cells. The kidneys remove uric acid from the blood. The skin is now sensitive enough to react to tactile stimulation.
 *3 months* Science Pictures Ltd./Science Source	By the end of the third month, the fetus weighs about 1 ounce and measures about 3 inches in length. It has fingernails, toenails, eyelids (still closed), vocal cords, lips, and a nose. Its head is still large—about one-third its total length—and its forehead is high. Sex is detectable. The organ systems are functioning, but not at full capacity. Its ribs and vertebrae have turned into cartilage. The fetus can now move its legs, feet, thumbs, and head; its mouth can open and close and swallow. If its palm is touched, it makes a partial fist; if its lip is touched, it will suck; and if the sole of the foot is stroked, the toes will fan out. These reflexes will be present at birth but will disappear during the first months of life.
 *4 months* Tissuepix/Science Source	The head is now only one-fourth the total body length, the same proportion it will be at birth. The fetus now measures 8 to 10 inches and weighs about 6 ounces. The placenta is now fully developed. The mother may be able to feel the fetus kicking, a movement known as *quickening*. The reflex activities that appeared in the third month are now brisker because of increased muscular development.
 *5 months* James Stevenson/Science Source	The fetus, now weighing about 12 ounces to 1 pound and measuring about 1 foot, has definite sleep-wake patterns, a favorite position in the uterus (called its *lie*), and becomes more active—kicking, stretching, squirming, and even hiccuping. The sweat and sebaceous glands are functioning. The respiratory system is not yet adequate to sustain life outside the womb; a baby born at this time does not usually survive. Coarse hair has begun to grow for eyebrows and eyelashes, fine hair is on the head, and a woolly hair called *lanugo* covers the body.

Month	Description
 *6 months* Anatomical Travelogue/Science Source	The rate of fetal growth has slowed a little—by the end of the sixth month, the fetus is about 14 inches long and weighs 1¼ pounds. It has fat pads under the skin; the eyes open, close, and look in all directions. It can hear, and it can make a fist with a strong grip. A fetus born early in the sixth month has only a slight chance of survival because the breathing apparatus has not matured. However, medical advances have made survival increasingly likely.
 *7 months* Petit Format/Nestle/Science Source	By the end of the seventh month, the fetus, about 16 inches long and weighing 3 to 5 pounds, now has fully developed reflex patterns. It cries, breathes, and swallows, and it may suck its thumb. The lanugo may disappear at about this time, or it may remain until shortly after birth. Head hair may continue to grow. The chances that a fetus weighing at least 3½ pounds will survive are fairly good, provided it receives intensive medical attention.
 *8 months* Petit Format/Nestle/Science Source	The 8-month-old fetus is 18 to 20 inches long and weighs between 5 and 7 pounds. Its living quarters are becoming cramped, and so its movements are curtailed. During this month and the next, a layer of fat is developing over the fetus's entire body, which will enable it to adjust to varying temperatures outside the womb.
 *9 months–newborn* Luke Schmidt/Shutterstock	About a week before birth, the fetus stops growing, having reached an average weight of about 7½ pounds and a length of about 20 inches, with boys tending to be slightly longer. Fat pads continue to form, the organ systems are operating more efficiently, the heart rate increases, and more wastes are expelled through the umbilical cord. The reddish color of the skin is fading. At birth, the fetus will have been in the womb for about 266 days, though gestational age is usually estimated at 280 days because most doctors date the pregnancy from the mother's last menstrual period.

Note: Even in these early stages, individuals differ. The figures and descriptions given here represent averages.

An embryo's head, brain, and eyes develop earliest and are disproportionately large until the other parts catch up. According to the **proximodistal principle**, from Latin, meaning "near to far," development proceeds from parts near the center of the body to outer ones. The embryo's head and trunk develop before the limbs, and the arms and legs before the fingers and toes.

proximodistal principle
The parts of the body near the center develop before the extremities.

Germinal Stage (Fertilization to 2 Weeks) During the **germinal stage,** from fertilization to about 2 weeks of gestational age, the zygote divides, becomes more complex, and is implanted in the wall of the uterus.

germinal stage
First 2 weeks of prenatal development, characterized by rapid cell division, blastocyst formation, and implantation in the wall of the uterus.

Within 36 hours after fertilization, the zygote enters a period of rapid cell division and duplication (mitosis). Seventy-two hours after fertilization, it has divided first into 16 and then into 32 cells; a day later it has 64 cells. While the fertilized ovum is dividing, it is also making its way through the fallopian tube to the uterus, a journey of 3 or 4 days. Its form changes into a *blastocyst,* a fluid-filled sphere, which floats freely in the uterus until the sixth day after fertilization, when it begins to implant itself in the uterine wall. Only about 10 to 20 percent of fertilized ova complete the task of **implantation** and continue to develop. Where the egg implants will determine the placement of the placenta.

implantation
The attachment of the blastocyst to the uterine wall, occurring at about day 6.

Before implantation, as cell differentiation begins, some cells around the edge of the blastocyst cluster on one side to form the *embryonic disk,* a thickened cell mass from which the embryo begins to develop. This mass will differentiate into three layers. The *ectoderm,* the upper layer, will become the outer layer of skin, the nails, hair, teeth, sensory organs, and the nervous system, including the brain and spinal cord. The *endoderm,* the inner layer, will become the digestive system, liver, pancreas, salivary glands, and respiratory system. The *mesoderm,* the middle layer, will develop and differentiate into the inner layer of skin, muscles, skeleton, and excretory and circulatory systems.

Other parts of the blastocyst begin to develop into organs that will nurture and protect development in the womb: the *amniotic cavity,* or *amniotic sac,* with its outer layers, the *amnion* and *chorion;* the *placenta;* and the *umbilical cord*. The *amniotic sac* is a fluid-filled membrane that encases the developing embryo, protecting it and giving it room to move and grow. The *placenta* allows oxygen, nourishment, and wastes to pass between mother and embryo. It is connected to the embryo by the *umbilical cord*. Nutrients from the mother pass from her blood to the embryonic blood vessels, which carry them, via the umbilical cord, to the embryo. In turn, embryonic blood vessels in the umbilical cord carry embryonic wastes to the placenta, where they can be eliminated by maternal blood vessels. The mother's and embryo's circulatory systems are not directly linked; instead, this exchange occurs by diffusion across the blood vessel walls. The placenta also helps to combat internal infection and gives the unborn child immunity to various diseases. It produces the hormones that support pregnancy, prepare the mother's breasts for lactation, and eventually stimulate the uterine contractions that will expel the baby from the mother's body.

embryonic stage
Second stage of gestation (2 to 8 weeks), characterized by rapid growth and development of major body systems and organs.

Embryonic Stage (2 to 8 Weeks) During the **embryonic stage,** from about 2 to 8 weeks, the organs and major body systems—respiratory, digestive, and nervous—develop rapidly. This process is known as *organogenesis.* This is a critical period, when the embryo is most vulnerable to destructive influences in the prenatal environment (Figure 8). Any organ system or structure that is still developing at the time of exposure is most likely to be affected. Because of this, defects that occur later in pregnancy are likely to be less serious as the major organ systems and physical structures of the body are complete. Brain growth and development begins during the embryonic stage and continues after birth and beyond.

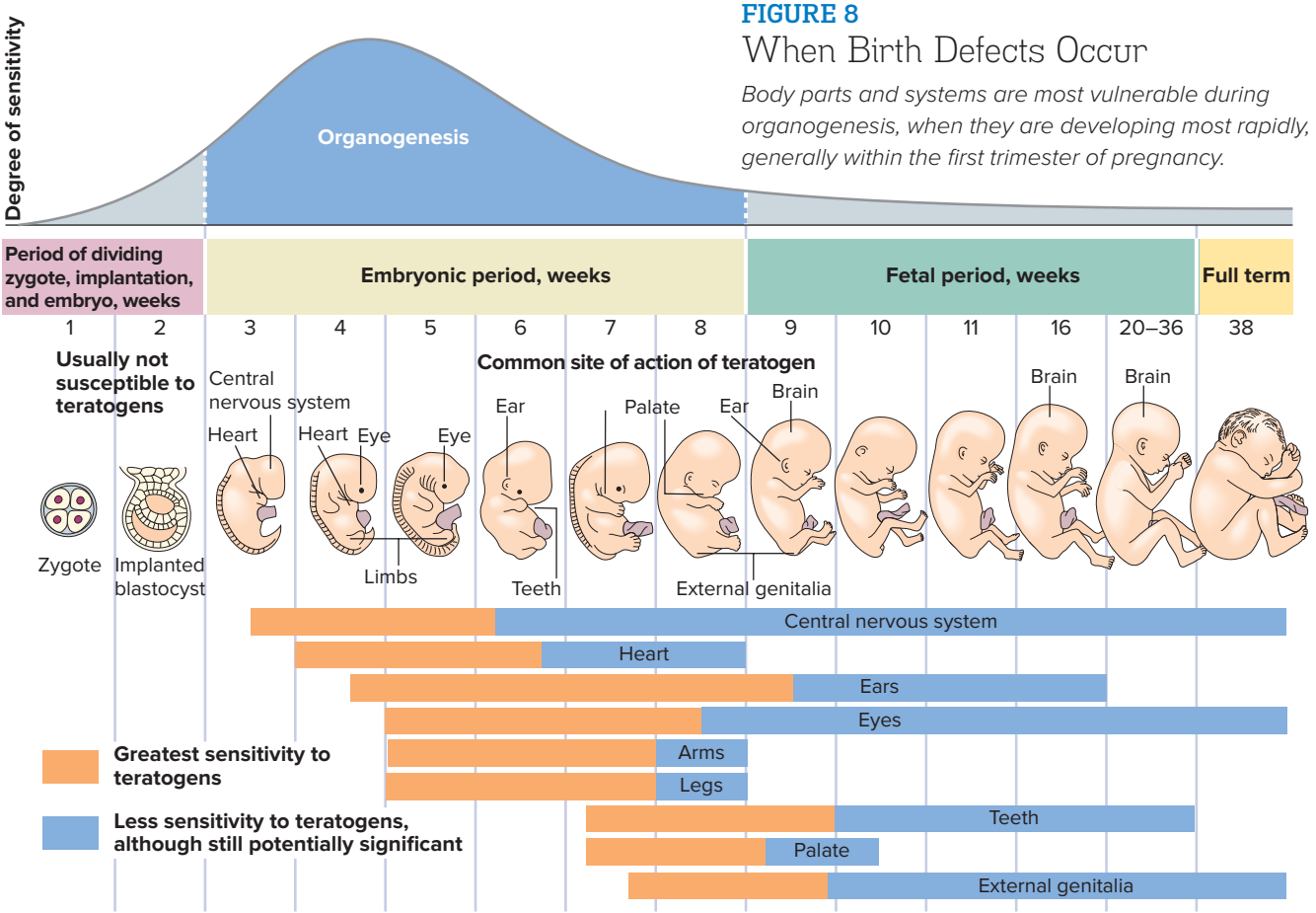
spontaneous abortion
Natural expulsion from the uterus of an embryo that cannot survive outside the womb; also called *miscarriage*.

The most severely defective embryos usually do not survive beyond the first *trimester,* or 3-month period, of pregnancy. A **spontaneous abortion,** commonly called a *miscarriage,* is the expulsion from the uterus of an embryo or fetus that is unable to survive outside the womb. A miscarriage that occurs after 20 weeks of gestation is generally characterized as a stillbirth. As many as 1 in 4 recognized pregnancies end in miscarriage, and the actual figure may be as high as 1 in 2 because many spontaneous abortions take place before the woman realizes she is pregnant. Estimates are that this results in approximately 1 million fetal deaths each year in the United States alone (MacDorman & Kirmeyer, 2009). Most miscarriages occur during the first trimester (American College of Obstetrics and Gynecologists, 2015), and 50 to 70 percent involve chromosomal abnormalities (Hogge, 2003). Smoking, drinking alcohol, and drug use increase the risk of miscarriage, especially later in the pregnancy. Miscarriages are more common in African American, Native American, and Alaskan native women, in both young and older (greater than 35 years of age) mothers, and more

FIGURE 8

When Birth Defects Occur

Body parts and systems are most vulnerable during organogenesis, when they are developing most rapidly, generally within the first trimester of pregnancy.



Note: Intervals of time are not all equal.

Source: Brody, 1995; data from March of Dimes.

likely to occur in pregnancies involving twins or higher order multiples (MacDorman & Kirmeyer, 2009).

Males are more likely than females to be spontaneously aborted or to be *stillborn* (dead at or after the 20th week of gestation). Thus, although about 125 males are conceived for every 100 females—a fact that has been attributed to the greater mobility of sperm carrying the smaller Y chromosome—only about 105 boys are born for every 100 girls. Males' greater vulnerability continues after birth: More die early in life, and at every age they are more susceptible to many disorders. As a result, there are only about 96 males for every 100 females in the United States (Martin, Hamilton, et al., 2009; Spraggins, 2003).

Fetal Stage (8 Weeks to Birth) The appearance of the first bone cells at about 8 weeks signals the beginning of the **fetal stage,** the final stage of gestation. During this period, the fetus grows rapidly to about 20 times its previous length, and organs and body systems become more complex. Right up to birth, "finishing touches" such as fingernails, toenails, and eyelids continue to develop.

Fetuses are not passive passengers in their mothers' wombs. They breathe, kick, turn, flex their bodies, do somersaults, squint, swallow, make fists, hiccup, and suck their thumbs. The flexible membranes of the uterine walls and amniotic sac, which surround the protective buffer of amniotic fluid, permit and stimulate limited movement. While fetuses do sometimes move in response to touch or pressure, it is highly unlikely they can feel pain before the third trimester. This is because many of the relevant structures, most notably the cortex (where consciousness is believed to reside), are immature at this point (Bellieni & Buonocore, 2012). For example, the thalamocortical pathways responsible for pain perception do not appear to be functional until 29 to 30 weeks of gestation (Kostović & Judaš, 2010).

checkpoint can you . . .

Describe how a zygote becomes and embryo, and explain why defects and miscarriages most often occur during the embryonic stage?

fetal stage
Final stage of gestation (from 8 weeks to birth), characterized by increased differentiation of body parts and greatly enlarged body size.

ultrasound
Prenatal medical procedure using high-frequency sound waves to detect the outline of a fetus and its movements, so as to determine whether a pregnancy is progressing normally.



Obesity can affect the quality of an ultrasound. Normally, the sound waves bounce off the fetus floating in the amnion, a process that is disrupted in the presence of high levels of abdominal body fat.

Moreover, facial expressions of pain at 24 weeks of gestation are almost absent (5 percent of facial events) but appear more frequently (21.2 percent of facial events) at 36 weeks of gestation (Reissland, Francis, & Mason, 2013).

Scientists can observe fetal movement through **ultrasound,** the use of high-frequency sound waves to detect the outline of the fetus. Other instruments can monitor heart rate, changes in activity level, states of sleep and wakefulness, and cardiac reactivity.

The movements and activity level of fetuses show marked individual differences, and their heart rates vary in regularity and speed. Male fetuses, regardless of size, are more active and tend to move more vigorously than female fetuses throughout gestation (Almli, Ball, & Wheeler, 2001). Thus infant boys' tendency to be more active than girls may be at least partly inborn (DiPietro, Hodgson, Costigan, Hilton, & Johnson, 1996; DiPietro et al., 2002).

Beginning about the 12th week of gestation, the fetus swallows and inhales some of the amniotic fluid in which it floats. Because the amniotic fluid contains substances that cross the placenta from the mother's bloodstream, swallowing it may stimulate the budding senses of taste and smell (Mennella & Beauchamp, 1996). Mature taste cells appear about 14 weeks of gestation. The olfactory system, which controls the sense of smell, also is well developed before birth (Savage, Fisher, & Birch, 2007). While most children seem to have innate taste preferences for sweet foods, preferences for bitter or specific tastes (e.g., garlic) are more variable. Exposure to such flavors repeatedly during pregnancy, as may happen if pregnant women's diets contain high levels of such foods, have been shown later to lead to higher acceptance of them in children's diets (De Cosmi, Scaglioni, & Agostoni, 2017; Nehring, Kostka, von Kries, & Rehfuess, 2015).

Fetuses respond to the mother's voice and heartbeat and the vibrations of her body, suggesting they can hear and feel. Responses to sound and vibration seem to begin at 26 weeks of gestation, increase, and then reach a plateau at about 32 weeks (Kisilevsky & Hains, 2010; Kisilevsky, Muir, & Low, 1992). Voices, especially women's voices and particularly those of the mother, seem to be relevant for fetuses. For example, heart rate data indicate that fetuses recognize their mother's voice and prefer it to that of other women (Jardri et al., 2012; Voegtline, Costigan, Pater, & DiPietro, 2013) and their father (Lee & Kisilevsky, 2014). Fetuses, starting at approximately 33 weeks of gestation, orient toward and attend to music (Kisilevsky, Hains, Jacquest, Granier-Deferre, & Lecanuet, 2004). Some research suggests that near-term fetuses exposed to either music or speech



Ultrasound, the procedure this woman is undergoing, is a diagnostic tool that presents an immediate image of the fetus in the womb. High-frequency sound waves directed at the woman's abdomen reveal the fetus's outline and movements. Ultrasound is widely used to monitor fetal development and to detect abnormalities.
Monkey Business Images/Getty Images

show heart rate changes consistent with more focused attention toward and increased processing for music over speech (Granier-Deferre, Ribiero, Jacquet, & Bassareau, 2011). Once born, neonates prefer female voices to male voices and their mother's native language to other languages (Pino, 2016), as illustrated by their willingness to suck longer on a modified pacifier rigged to play a tape as long they suck on it. Hungry infants, no matter on which side they are held, turn toward the breast in the direction from which they hear the mother's voice (Noirot & Alegria, 1983), perhaps as a means by which to locate the source of food.

Fetuses learn and remember as they near the end of the pregnancy. Heart rate data indicate that fetuses have some ability to remember auditory material for short periods of time (Pino, 2016). Current estimates suggest that fetal memory begins to function at approximately 30 weeks of gestational age, when fetuses are able to hold information in memory for 10 minutes. By 34 weeks, they are able to remember information for a period of 1 month (Dirix, Nijhuis, Jongsma, & Hornstra, 2009). Moreover, fetuses not only remember and recognize voices, but they also have some limited ability to reproduce them. In one study, newborn infants used distinctly different intonation patterns in their cries that mirrored aspects of their mothers' native language (Mampe, Friederici, Christophe, & Wermke, 2009).

checkpoint
can you . . .

- **List several changes that occur during the fetal stage?**
- **Discuss findings about fetal activity, sensory development, and memory?**

ENVIRONMENTAL INFLUENCES: MATERNAL FACTORS

Because the prenatal environment is the mother's body, virtually everything that influences her well-being, from her diet to her moods, may alter her unborn child's environment and affect its growth.

A **teratogen** is an environmental agent, such as a virus, a drug, or radiation, that can interfere with normal prenatal development. However, not all environmental hazards are equally risky for all fetuses. An event, substance, or process may be teratogenic for some fetuses but have little or no effect on others. Sometimes vulnerability may depend on a gene either in the fetus or in the mother. For example, fetuses with a particular variant of a growth gene, called *transforming growth factor alpha,* have greater risk than other fetuses of developing a cleft palate if the mother smokes while pregnant (Zeiger, Beaty, & Liang, 2005). The timing of exposure, dose, duration, and interaction with other teratogenic factors also may make a difference.

teratogen
Environmental agent, such as a virus, a drug, or radiation, that can interfere with normal prenatal development and cause developmental abnormalities.

Nutrition and Maternal Weight Pregnant women typically need 300 to 500 additional calories a day, including extra protein. Women of normal weight and body build who gain 16 to 40 pounds are less likely to have birth complications or to bear babies whose weight at birth is dangerously low or overly high. Yet about one-third of U.S. mothers gain more or less than the recommended amount (Martin et al., 2009). Either too much or too little weight gain can be risky. If a woman does not gain enough, her baby may suffer growth retardation in the womb, be born prematurely, experience distress during labor and delivery, or die at or near birth. Some research has shown that maternal calorie restriction during pregnancy might put children at risk for later obesity, perhaps by setting their metabolism to be thrifty (Caballero, 2006). A woman who gains too much weight risks having a large baby that needs to be delivered by induced labor or cesarean section (Chu et al., 2008; Martin, Hamilton et al., 2009).

Desirable weight gain depends on body mass index (BMI) before pregnancy. Women who are overweight or obese before becoming pregnant or in the early months of pregnancy tend to have longer deliveries, need more health care services, are more likely to have preeclampsia, gestational diabetes, cesarean delivery, bear infants with birth defects, congenital abnormalities, postpartum hemorrhage, or perinatal death (Marchi, Berg, Dencker, Olander, & Begley, 2015; Schummers, Hutcheon, Bodnar, Lieberman, & Himes, 2015). Additionally, those who are obese or gain excessive weight early in the pregnancy put their child at risk of developing later weight or cardiometabolic risk factors (Catalano, 2015; Gaillard, Steegers, Franco, Hofman, & Jaddoe, 2015). Current recommendations are that women who are underweight should gain 28 to 40 pounds, normal-weight

women should gain 25 to 35 pounds, overweight women should gain 15 to 25 pounds, and obese women should gain only 11 to 20 pounds (American College of Obstetricians and Gynecologists, 2013).

While appropriate weight gain is an important factor in the health of a pregnancy, it is not the only factor. What an expectant mother eats is also important. For example, an omega-E fatty acid, docosahexaenoic acid (DHA) found in certain fish, such as Atlantic salmon and tuna, has been found to impact a variety of outcomes. DHA is found in the central nervous system and the retina of the eye, and it is believed to be important to the development of these areas (Bradbury, 2011). For example, newborns whose mothers consumed DHA showed more mature sleep patterns, a sign of advanced development, than infants whose mothers' blood had lower levels of DHA (Cheruku, Montgomery-Downs, Farkas, Thoman, & Lammie-Keefe, 2002), and were more attentive at 12 and 18 months (Colombo et al., 2004). There are also effects on the health of the pregnancy. Mothers who consume higher levels of DHA are more likely to have heavier babies (a sign of good health) and longer gestational periods, and they are at decreased risk of preterm birth (Carlson et al., 2013; Salvig & Lamont, 2011).

Folic acid, or folate (a B vitamin), found in leafy vegetables and in fortified cereals, is critical in a pregnant woman's diet. Inadequate levels of folic acid can leave babies at risk of developing a neurological defect such as anencephaly, a condition in which the brain is formed incompletely or improperly, or spina bifida, a condition in which the baby's spinal cord is not fully enclosed. Addition of folic acid to enriched grain products has been mandatory in the United States since 1998, reducing the incidence of these defects by approximately 1,300 children a year (Williams et al., 2015). Milder folic acid deficiencies in pregnant mothers can result in less severe but still troubling problems. For example, low folate levels during pregnancy have been associated with later attention-deficit/hyperactivity in 7- to 9-year-old children (Schlotz et al., 2009).

Women of childbearing age are urged to eat plentiful fresh fruits and vegetables or take a folate supplement even before getting pregnant as damage can occur during the early weeks of gestation (American Academy of Pediatrics [AAP] Committee on Genetics, 1999). It is estimated that if all women took 5 milligrams of folic acid each day before pregnancy and during the first trimester, an estimated 85 percent of neural-tube defects could be prevented (Wald, 2004).

Malnutrition Malnutrition is a global problem driven by factors such as poverty, conflict, and climate change (World Health Organization, 2018c). Worldwide, approximately 821 million people suffer from calorie deficiency (Food and Agricultural Organization of the United Nations, 2018). While there are gaps in the data, estimates are that approximately 2 billion people suffer from chronic micronutrient deficiencies (World Health Organization, 2018c). Micronutrients are vitamins or minerals that are needed in small quantities but have a profound negative effect if absent. Either form of malnutrition during pregnancy is an urgent issue as it not only can hurt the expectant mother and her child, but also exert effects across generations (Martorell & Zongrone, 2012). For example, children who are malnourished in early childhood can be stunted, and this stunting, in women, is associated with a higher risk of birth complications (Black et al., 2008) and the birth of smaller babies (Victora et al., 2008).

Some expectant mothers suffer from a calorie deficit. This can result in fetal growth restriction and low birth weight. Additionally, babies born to mothers who do not consume sufficient calories have a higher risk of death, and surviving babies may be stunted (Black et al., 2013), an effect that can persist across generations (DeOnis & Branca, 2016). Expectant mothers can also suffer from micronutrient deficiencies in vitamins or minerals. For example, vitamin A and zinc deficiencies result in a higher risk of death for both child and mother (Black et al., 2013), and babies born to mothers with a vitamin D deficiency may suffer from weak or soft bones (Anastasiou, Karras, Bais, Grant, Kotsa, & Goulis, 2017).

Fetal undernutrition has also been associated with a number of increased risks for disease in adulthood. For example, several studies have identified a link between famine

experienced during pregnancy and the later occurrence of schizophrenia in children born during that time period (Rapoport, Giedd, & Gogtay, 2012; Lumey, Stein, & Susser, 2011). Similar findings have emerged for an increased risk of diabetes (Wang et al., 2017) and overweight/obesity in adulthood (Lumey et al, 2011).

It is important to identify malnutrition early in pregnancy so that it can be treated. Malnourished women who take caloric dietary supplements while pregnant tend to have bigger, healthier, more active, and more visually alert infants (Brown, 1987; Vuori et al., 1979; Imdad & Bhutta, 2011). Similarly, micronutrient supplementation for malnourished expectant mothers results in larger babies and fewer stillbirths (Haider & Bhutta, 2017).



Thalidomide, which causes severe birth defects, had been tested for safety in rats, and that research did not suggest there would be problems. Although animal research can be a useful tool, it must be interpreted carefully because results may not generalize across species.

Physical Activity and Work Moderate exercise any time during pregnancy does not seem to endanger the fetuses of healthy women. Regular exercise prevents constipation and reduces back pain, and it may reduce the risk of complications such as gestational diabetes, preeclampsia, or cesarean delivery. The American College of Obstetricians and Gynecologists (2017) recommends that women in low-risk pregnancies get at least 150 minutes of moderate to intense aerobic exercise a week, making sure to drink plenty of water and to avoid becoming overheated. Contact sports or activities that might result in a fall should be avoided. Employment during pregnancy generally entails no special hazards. However, strenuous working conditions, occupational fatigue, and long working hours may be associated with a greater risk of premature birth (Bell, Zimmerman, & Diehr, 2008).

Drug Intake Practically everything an expectant mother takes in makes its way to the uterus. Drugs may cross the placenta, just as oxygen, carbon dioxide, and water do. Vulnerability is greatest in the first few months of gestation, when development is most rapid.

Medical Drugs It once was thought that the placenta protected the fetus against drugs the mother took during pregnancy—until the early 1960s, when a tranquilizer called *thalidomide* was banned after it was found to have caused stunted or missing limbs, severe facial deformities, and defective organs in some 12,000 babies. The thalidomide disaster sensitized medical professionals and the public to the potential dangers of taking drugs while pregnant.

Among the medical drugs that may be harmful during pregnancy are the antibiotic tetracycline; certain barbiturates, opiates, and other central nervous system depressants; several hormones, including diethylstilbestrol (DES) and androgens; certain anticancer drugs, such as methotrexate; Accutane, a drug often prescribed for severe acne; drugs used to treat epilepsy; and several antipsychotic drugs (Briggs, Freeman, & Yaffe, 2012; Einarson & Boskovic, 2009; Koren, Pastuszak, & Ito, 1998). Angiotensin-converting enzyme (ACE) inhibitors and nonsteroidal anti-inflammatory drugs (NSAIDs), such as naproxen and ibuprofen, have been linked to birth defects when taken anytime from the first trimester on (Cooper et al., 2006; Ofori, Oraichi, Blais, Rey, & Berard, 2006). In addition, certain antipsychotic drugs used to manage severe psychiatric disorders may have serious potential effects on the fetus, including withdrawal symptoms at birth (Hudak & Tan, 2012). The American Academy of Pediatrics (AAP) Committee on Drugs (2001) recommends that no medication be taken by a pregnant or breast-feeding woman unless it is essential for her health or her child's (Koren et al., 1998) and that care be taken in choosing the safest drug available.

Opioids In recent years, the number of pregnant women abusing legal and illegal opioids has risen (Martin, Longinaker, & Terplan, 2015; Kocherlakota, 2014). While opioid use has not been implicated in birth defects, it is associated with small babies, fetal death, preterm labor, and aspiration of meconium (Center for Substance Abuse Treatment, 2008). Moreover, babies born to drug-addicted mothers are often addicted themselves and go through withdrawal once they are born and no longer receiving the drug. This results in neonate abstinence syndrome, a condition in which newborns may show sleep disturbances, tremors, difficulty regulating their bodies, irritability and



A mother who drinks during pregnancy risks having a child born with fetal alcohol syndrome.
PhotoMediaGroup/Shutterstock

fetal alcohol syndrome (FAS)
Combination of mental, motor, and developmental abnormalities affecting the offspring of some women who drink heavily during pregnancy.

Because it would be unethical to conduct the kind of randomized, experimental research that would answer the question, we cannot determine what "safe" levels of drinking are.

crying, diarrhea, fever, and feeding difficulties (Jansoon & Velez, 2012). In the last decade, the prevalence of this condition has increased fivefold from 1 to 5.8 per 1,000 hospital births (Reddy, Davis, Ren, & Greene, 2017). Long-term effects include deficiencies in growth as well as attentional, memory, and perceptual problems. However, studies on cognitive outcomes are conflicting, and results may be due to other variables (such as socioeconomic status or other drug use) that are correlated with opioid use (Behnke, Smith, & Committee on Substance Abuse, 2013). Punitive measures such as jailing pregnant women who use these drugs have been shown to be ineffective. This has led to calls to address the opioid crisis in pregnant women as a public health problem rather than a law enforcement issue (Patrick & Schiff, 2017).

Alcohol Prenatal alcohol exposure is the most common cause of intellectual disability and the leading preventable cause of birth defects in the United States (Sacks, Gonzalez, Bouchery, Tomedi, & Brewer, 2015). **Fetal alcohol syndrome (FAS)** is characterized by a combination of retarded growth, face and body malformations, and disorders of the central nervous system.

Even small amounts of social drinking may harm a fetus (Sokol, Delaney-Black, & Nordstrom, 2003), and the more the mother drinks, the greater the effect. Moderate or heavy drinking during pregnancy seems to disturb an infant's neurological and behavioral functioning, and this may affect early social interaction with the mother, which is vital to emotional development (Hannigan & Armant, 2000; Nugent, Lester, Greene, Wieczorek-Deering, & Mahony, 1996). Heavy drinkers who continue to drink after becoming pregnant are likely to have babies with reduced skull and brain growth as compared with babies of nondrinking women or expectant mothers who stop drinking (Handmaker et al., 2006).

FAS-related problems can include, in infancy, reduced responsiveness to stimuli, slow reaction time, and reduced visual acuity (sharpness of vision) (Carter et al., 2005; Sokol et al., 2003) and, throughout childhood, short attention span, distractibility, restlessness, hyperactivity, learning disabilities, memory deficits, and mood disorders (Sokol et al., 2003) as well as aggressiveness and problem behavior (Sood et al., 2001). Prenatal alcohol exposure is a risk factor for development of drinking problems and alcohol disorders in young adulthood (Alati et al., 2006; Baer, Sampson, Barr, Connor, & Streissguth, 2003).

Some FAS problems recede after birth, but others, such as retardation, behavioral and learning problems, and hyperactivity, tend to persist. Enriching these children's education or general environment does not always enhance their cognitive development (Kerns, Don, Mateer, & Streissguth, 1997; Spohr, Willms, & Steinhausen, 1993; Streissguth et al., 1991; Strömland & Hellström, 1996), but recent interventions targeted at cognitive skills in children with FAS are showing promise (Paley & O'Connor, 2011). Children with FAS may be less likely to develop behavioral and mental health problems if they are diagnosed early and are reared in stable, nurturing environments (Streissguth et al., 2004).

Nicotine Maternal smoking during pregnancy has been identified as the single most important factor in low birth weight in developed countries (DiFranza, Aligne, & Weitzman, 2004). Women who smoke during pregnancy are more than 1½ times as likely as nonsmokers to bear low-birth-weight babies (weighing less than 5½ pounds at birth). While even light smoking (fewer than five cigarettes a day) is associated with a greater risk of low birth weight (Martin, Hamilton et al., 2007), the effect is dose dependent. Thus, mothers who smoke more than 20 cigarettes a day have the smallest babies (Ko et al., 2014).

Tobacco use during pregnancy also brings increased risks of miscarriage; growth retardation; stillbirth; small head circumference; sudden infant death; colic (uncontrollable, extended crying for no apparent reason) in early infancy; long-term respiratory, neurological, and behavioral problems; and later obesity and cardiovascular disease (Froehlich et al., 2009; Linnet et al., 2005; Shah, Sullivan, & Carter, 2006; Smith et al., 2006; Han et al, 2015;

Banderali et al., 2015; Rayfield & Plugge, 2017). The effects of prenatal exposure to secondhand smoke on development tend to be worse when children also experience socioeconomic hardship during the first 2 years of life (Rauh et al., 2004), when they are exposed to additional teratogens such as lead (Froehlich et al., 2009) or deprived of necessary nutrients such as folic acid (Mook-Kanamori et al., 2010) at the same time.

Caffeine Can the caffeine a pregnant woman consumes in coffee, tea, cola, or chocolate cause trouble for her fetus? Several large-scale reviews have indicated that caffeine intake under 300 milligrams a day is not associated with an increased risk of miscarriage, stillbirth, or birth defects (Peck, Leviton, & Coman, 2010; Wikoff et al., 2017). However, other reviews have found a slightly increased risk of miscarriage, stillbirth, and low birth weight in mothers who consume caffeine while pregnant (Greenwood et al., 2014), and there are suggestions that risk may increase with dosage (Chen et al., 2014). Thus, current recommendations on limiting caffeine to 200 milligrams or less (about one cup of coffee) are still in place.

Marijuana, Cocaine, and Methamphetamine Marijuana is the most commonly used recreational drug during pregnancy, and rates of women who report using marijuana while pregnant have risen sharply (Martin, Longinaker, Mark, Chisholm, & Terplan, 2015), perhaps as a result of more liberal usage laws in many states. Research on marijuana is difficult. For example, many pregnant women who smoke marijuana also smoke cigarettes or consume alcohol, and socioeconomic factors also seem to be important (Metz & Stickrath, 2015).

Marijuana exposure during pregnancy is not associated with birth defects (Viteri et al., 2015), and it does not appear to be consistently associated with any particular pattern of cognitive or behavioral outcomes in early infancy, although some infants may show minor signs of irritability or altered sleeping patterns (Huizink, 2014). Moreover, it is not associated with low birth weight, preterm delivery (Mark, Desai, & Terplan, 2016), or decreases in general intelligence (Behnke, Smith, & Committee on Substance Abuse, 2013). However, it has been implicated in subtle deficits in problem-solving skills (Viteri et al., 2015), and it may alter patterns of cerebral blood flow (Smith et al., 2016). This may help explain why marijuana exposure during the prenatal period is also associated with decreases in academic achievement (Goldschmidt, Richardson, Cornelius, & Day, 2004).

Cocaine use during pregnancy has been associated with spontaneous abortion, delayed growth, premature labor, low birth weight, small head size, birth defects, and impaired neurological development (Chiriboga, Brust, Bateman, & Hauser, 1999; March of Dimes Birth Defects Foundation, 2004a; Shankaran et al., 2004). In some studies, cocaine-exposed newborns show acute withdrawal symptoms and sleep disturbances (O'Brien & Jeffery, 2002). It appears that cocaine may preferentially affect areas of the brain involved in attention and executive functioning (Behnke & Smith, 2013). Other studies, however, have found no specific connection between prenatal cocaine exposure and physical, motor, cognitive, emotional, or behavioral deficits that could not also be attributed to other risk factors, such as low birth weight; exposure to tobacco, alcohol, or marijuana; or a poor home environment (Messinger et al., 2004; Singer et al., 2004).

Prenatal methamphetamine exposure is associated with preterm delivery and low birth weight (Wright, Schuetter, Tellei, & Sauvage, 2015). Additionally, prenatal exposure to methamphetamines has been implicated in fetal brain damage to areas of the brain involved in learning, memory, and control (Roussotte et al., 2011). Methamphetamine-exposed children also have less white matter in their brains, a finding that has implications for the developmental delays commonly found in such children (Cloak, Ernst, Hedemark, & Chang, 2009).

Maternal Illnesses Both prospective parents should try to prevent all infections—common colds, flu, urinary tract and vaginal infections, as well as sexually transmitted diseases. If the mother does contract an infection, she should have it treated promptly.

Acquired immune deficiency syndrome (AIDS) is a disease caused by the human immunodeficiency virus (HIV), which undermines functioning of the immune system. If an expectant mother has the virus in her blood, *perinatal transmission* may occur: the



The drug Accutane is most commonly used for severe acne, although it has multiple other applications, including treatment of some cancers. Accutane is highly teratogenic and can cause a variety of severe birth defects, including mental retardation, facial abnormalities, and hearing and vision problems. Should the use of Accutane be permitted for women of childbearing age? What safeguards should be required?



Another way of saying this is that many of the effects of prenatal cocaine exposure are indirect rather than direct consequences. This is similar to the fact that maternal heroin addiction is related to greater risk of being HIV positive. It's not that the heroin directly causes HIV infection, it's that heroin is related to lifestyle issues that can cause infection.



Does society's interest in protecting unborn children justify coercive measure against pregnant women who ingest harmful substances?

acquired immune deficiency syndrome (AIDS)
Viral disease that undermines effective functioning of the immune system.

virus may cross over to the fetus's bloodstream through the placenta during pregnancy, labor, or delivery or, after birth, through breast milk.

The biggest risk factor for perinatal HIV transmission is a mother who is unaware she has HIV. In the United States, new pediatric AIDS cases have declined steadily since 1992 due to routine testing and treatment of pregnant women and newborn babies and to advances in the prevention, detection, and treatment of HIV infection in infants. The risk of perinatal HIV infection can be as low as 1 percent when an infected mother takes HIV medicine daily throughout her pregnancy, labor, and delivery, gives HIV medicine to her baby for 4 to 6 weeks after delivery, opts for a cesarean section if her viral load is not sufficiently reduced, and avoids breast-feeding or prechewing her infant's food (Centers for Disease Control, 2018b).

Rubella (German measles), if contracted by a woman before her 11th week of pregnancy, is almost certain to cause deafness and heart defects in her baby. Chances of catching rubella during pregnancy have been greatly reduced in Europe and the United States since the late 1960s, when a vaccine was developed that is now routinely administered to infants and children. Efforts in less developed countries to provide rubella vaccinations resulted in a decrease of reported rubella cases of more than 80 percent from 2000 to 2009 (Reef et al., 2011). In the United States, there have been recent outbreaks of measles driven primarily by the importation of the disease from international travel. In 2018, a total of 372 cases of measles were reported for the year. As of July 3, 2019, 1109 cases across 28 states had been reported to the Centers for Disease Control and the outbreak is ongoing (Centers for Disease Control, 2019a). Most of the people who were infected were not vaccinated (Centers for Disease Control, 2019a).

An infection called *toxoplasmosis,* caused by a parasite harbored in the bodies of cattle, sheep, and pigs and in the intestinal tracts of cats, typically produces either no symptoms or symptoms like those of the common cold. In an expectant woman, however, especially in the second and third trimesters of pregnancy, it can cause fetal brain damage, severely impaired eyesight or blindness, seizures, miscarriage, stillbirth, or death of the baby. If the baby survives, there may be later problems, including eye infections, hearing loss, and learning disabilities. Treatment with antiparasitic drugs during the first year of life can reduce brain and eye damage (McLeod et al., 2006). To avoid infection, expectant mothers should not eat raw or very rare meat, should wash hands and all work surfaces after touching raw meat, should peel or thoroughly wash raw fruits and vegetables, and should not dig in a garden where cat feces may be buried. Women who have a cat should have it checked for the disease, should not feed it raw meat, and, if possible, should have someone else empty the litter box (March of Dimes Foundation, 2012).

Your veterinarian can run an easy blood test on your cat to scan for the presence of the parasite. Alternatively, your blood can be tested for antibodies to toxoplasmosis. If you were previously exposed, you are in the clear.

Offspring of mothers with diabetes are 3 to 4 times more likely than offspring of other women to develop a wide range of birth defects (Correa et al., 2008), although heart and neural tube defects are the most common (Ornoy, Reece, Pavlinkova, Kappen, & Miller, 2015). Women with diabetes need to be sure their blood glucose levels are under control before becoming pregnant (Li, Chase, Jung, Smith, & Loeken, 2005), and they should retain tight control of their blood glucose during the course of the pregnancy as well (American Diabetes Association, 2016). Use of multivitamin supplements during the 3 months before conception and the first 3 months of pregnancy can help reduce the risk of diabetes-associated birth defects (Correa, Botto, Liu, Mulinare, & Erickson, 2003).

Maternal Anxiety, Stress, and Depression Some tension and worry during pregnancy are normal and do not necessarily increase risks of birth complications, such as low birth weight (Littleton, Breitkopf, & Berenson, 2006). Moderate maternal anxiety may even spur organization of the developing brain. In one study, newborns whose mothers experienced moderate levels of both positive and negative stress showed signs of accelerated neurological development (DiPietro et al., 2010), and these gains may persist over time. In a series of studies, 2-year-olds whose mothers had shown moderate anxiety midway through pregnancy scored higher on measures of motor and mental development

than did age-mates whose mothers had not shown anxiety during pregnancy (DiPietro, 2004; DiPietro, Novak, Costigan, Atella, & Reusing, 2006).

On the other hand, a mother's self-reported **stress** and anxiety during pregnancy has been associated with more active and irritable temperament in newborns (DiPietro et al., 2010), inattentiveness during a developmental assessment in 8-month-olds (Huizink, Robles de Medina, Mulder, Visser, & Buitelaar, 2002), and negative emotionality or behavioral disorders in early childhood (Martin, Noyes, Wisenbaker, & Huttunen, 2000; O'Connor, Heron, Golding, Beveridge, & Glover, 2002). Additionally, chronic stress can result in preterm delivery, perhaps through the action of elevated levels of stress hormones (which are implicated in the onset of labor) or the resulting dampened immune functioning, which makes women more vulnerable to inflammatory diseases and infection that can also trigger labor (Schetter, 2009).

stress
Physical or psychological demands on a person or organism.

Depression may have also have negative effects on development. Children of mothers who were depressed during pregnancy were more likely to be born premature (Grigoriadis et al., 2013), be developmentally delayed as toddlers (Deave, Heron, Evants, & Emond, 2008), and show elevated levels of violent and antisocial behaviors in adolescence (Hay, Pawlby, Water, Perra, & Sharp, 2010).

Maternal Age Birthrates of U.S. women in their thirties and forties (Figure 9) are at their highest levels since the 1960s, in part due to fertility treatments—an example of a history-graded influence (Martin et al., 2010). From 2000 to 2014, there was a 23 percent increase in first births for women over the age of 35 years, for all ethnic and racial groups, and in all states (Mathews & Hamilton, 2016), and they continued to rise through 2016 for all age groups through to women age 45 and over (Martin, Hamilton, Osterman, Driscoll, & Drake, 2018).

The chance of miscarriage or stillbirth rises with maternal age. Women 30 to 35 are more likely to suffer complications due to diabetes, high blood pressure, or severe bleeding. There is also higher risk of premature delivery, retarded fetal growth, birth defects, and chromosomal abnormalities, such as Down syndrome. However, due to widespread screening and elective termination of affected pregnancies among older expectant mothers, the number of affected children in many countries has remained relatively stable over time, although this varies by region (Loane et al., 2013). For example, live births of children with Down syndrome in the United States have risen slightly over time, although approximately 30 percent of affected pregnancies are terminated (de Graaf, Buckley, & Skotko, 2015).

Adolescent mothers tend to have premature or underweight babies—perhaps because a young girl's still-growing body consumes vital nutrients the fetus needs (Martin, Hamilton et al., 2007) or, more likely, because of inadequate or missing prenatal care (Malabarey, Balayla, Klam, Shrim, & Abenhaim, 2012). These newborns are at heightened risk of death in the first month, disabilities, or health problems. While teen birthrates in the United States have been in a steady decline and reached an all-time low of 18.8 percent in 2017 (Martin, Hamilton, & Osterman, 2018), they are still among the highest of industrialized nations (Hamilton & Ventura, 2012).

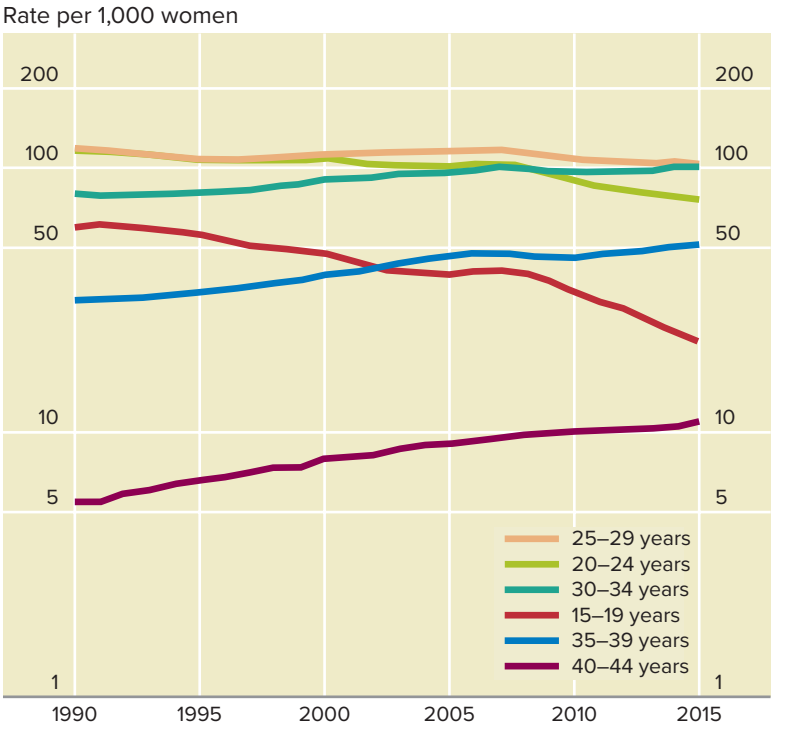


FIGURE 9
U.S. Birthrates, by Age of Mother, 1990-2015

Source: Martin, Hamilton, Osterman, Driscoll, and Mathews, 2017.

Outside Environmental Hazards Prenatal development can also be affected by air pollution,

chemicals, radiation, extremes of heat and humidity, and other environmental hazards. Pregnant women who regularly breathe air that contains high levels of fine combustion-related particles such as gas fumes and smoke are more likely to bear infants who are premature or undersized (Parker, Woodruff, Basu, & Shoendorf, 2005; Pedersen et al., 2013) or have chromosomal abnormalities (Bocskay et al., 2005). Exposure to high concentrations of disinfection by-products is associated with low birth weight and congenital abnormalities (Nieuwenhuijsen, Dadvand, Grellier, Martinez, & Vrijheid, 2013). Two insecticides, chlorpyrifos and diazinon, are associated with stunted prenatal growth (Whyatt et al., 2004).

Fetal exposure to low levels of environmental toxins, such as lead, mercury, and dioxin, as well as nicotine and ethanol, may help explain the sharp rise in asthma, allergies, and autoimmune disorders such as lupus (Dietert, 2005). Both maternal exposure to the hydrocarbons and the children's asthma symptoms were associated with epigenetic changes in the gene ACSL3, which affects the lungs (Perera et al., 2009). Childhood cancers, including leukemia, have been linked to pregnant mothers' drinking chemically contaminated groundwater (Boyles, 2002) and use of home pesticides (Menegaux et al., 2006). Infants exposed prenatally even to low levels of lead are born smaller and shorter than unexposed babies (Xie et al., 2013) and tend to show IQ deficits during childhood (Schnaas et al., 2006)

Women who have routine dental X-rays during pregnancy triple their risk of having full-term, low-birth-weight babies (Hujoel, Bollen, Noonan, & del Aguila, 2004). In utero exposure to radiation has been linked to miscarriage, mental retardation, small head size, increased cancer risk, and lowered IQ (Groen, Bay, & Lim, 2012). The risk of problems from the single use of medical diagnostic procedures is low. However, in nuclear disasters such as the Chernobyl or Fukushima Daiichi nuclear plant accidents in 1996 and 2011, respectively, where radiation exposure is high, pregnant women are likely to be at extremely elevated risk for adverse pregnancy outcomes (Groen et al., 2012).



From the 1920s to the 1970s, a shoe-fitting machine that enabled customers to view their X-rayed feet within shoes was a common gimmick in shoe stores. Now that we know how damaging X-rays are for both adults and children, these machines are no longer in use.

ENVIRONMENTAL INFLUENCES: PATERNAL FACTORS

A man's exposure to lead, marijuana or tobacco smoke, large amounts of alcohol or radiation, DES, pesticides, or high ozone levels may result in abnormal or poor-quality sperm (Sokol et al., 2006; Swan et al., 2003). Offspring of men at a nuclear processing plant were at elevated risk of stillbirth (Parker, Pearce, Dickinson, Aitkin, & Craft, 1999) and those born to men stationed on military vessels were at elevated risk of infant mortality and their mothers were at risk for dangerously high blood pressure during pregnancy (Baste et al., 2012). Babies whose fathers had diagnostic X-rays within the year prior to conception or had high lead exposure at work tended to have low birth weight and slowed fetal growth (Chen & Wang, 2006; Lin, Hwang, Marshall, & Marion, 1998; Shea, Little, & the ALSPAC Study Team, 1997).

Men who smoke have an increased likelihood of transmitting genetic abnormalities (AAP Committee on Substance Abuse, 2001) and heart defects (Deng et al., 2013). A pregnant woman's exposure to the father's secondhand smoke has been linked with asthma (Simons, To, Moneiddin, Stieb, & Dell, 2014), attentional problems (Langley, Heron, Smith, & Thapar, 2012), low birth weight (Rubin, Krasilnikoff, Leventhal, Weile, & Berget, 1986), and cancer in childhood and adulthood (Ji et al., 1997).

Older fathers may be a significant source of birth defects due to damaged or deteriorated sperm. Birthrates for fathers ages 30 to 49 have risen substantially since 1980 (Martin, Hamilton et al., 2009). Advanced paternal age is associated with increases in the risk of several rare conditions, including dwarfism (Wyrobek et al., 2006). Having an older father is a risk factor for schizophrenia (Janecka et al., 2017; Sharma et al., 2015), as is having, at least for male children, a young father (Miller et al., 2010). Advanced age of the father also may be a factor in bipolar disorder, and autism and related disorders (Andersen & Urhoj, 2017; Malaspina, Gilman, & Kranz, 2015).

checkpoint can you . . .

- **Summarize recommendations for an expectant mother's diet?**
- **Discuss effects on the developing fetus of a parent's use of medical drugs, alcohol, tobacco, caffeine, marijuana, cocaine, and methamphetamine?**
- **Assess the risks of maternal illnesses, anxiety, stress, and advanced age on pregnancy?**

Monitoring and Promoting Prenatal Development

Not long ago, almost the only decision parents had to make about their babies before birth was the decision to conceive; most of what happened in the intervening months was beyond their control. Now scientists have developed an array of tools to assess an unborn baby's progress and well-being and even to intervene to correct some abnormal conditions (Table 5).

Progress is being made in the use of noninvasive procedures, such as ultrasound and blood tests, to detect chromosomal abnormalities. In one study, a combination of three noninvasive tests conducted at 11 weeks of gestation predicted the presence of Down syndrome with 87 percent accuracy. When the 11-week tests were followed by further noninvasive testing early in the second trimester, accuracy reached 96 percent (Malone et al., 2005). Other assessment techniques include *prenatal cell-free DNA scans*, in which fetal DNA is extracted from the mother's blood and tested. These tests have been shown to be useful for early detection of genetic problems (Sparks, Struble, Wang, Song, & Oliphant, 2012; Mazloom et al., 2013), although they are not definitive (Goldwater & Klugman, 2018).

Other, more invasive assessment techniques are also available. *Amniocentesis* is a procedure in which a sample of amniotic fluid is withdrawn for analysis. In *chorionic villus sampling*, tissue from the membrane surrounding the fetus is removed and analyzed. Both procedures provide definitive evidence of a genetic issue. Contrary to previous findings, amniocentesis and chorionic villus sampling, which can be used earlier in pregnancy, carry only a slightly higher miscarriage risk than other noninvasive procedures such as ultrasound or blood tests (Caughey, Hopkins, & Norton, 2006; Eddleman, 2006). *Embryoscopy*, the insertion of a tiny viewing scope into the mother's uterus through the abdominal wall for a direct look at the embryo, can help diagnose nonchromosomal disorders, and *umbilical cord sampling* allows direct access to fetal DNA in the blood vessels of the umbilical cord for diagnosis.

Screening for defects and diseases is only one important reason for early prenatal care. Early, high-quality prenatal care, which includes educational, social, and nutritional services, can help prevent maternal or infant death and other birth complications (see Window on the World). The amount of prenatal care received by a woman is related linearly to positive outcomes (Partridge, Balayla, Holcroft, & Abenhaim, 2012).

DISPARITIES IN PRENATAL CARE

In the United States, prenatal care is widespread but not universal as in many European countries; and it lacks uniform national standards and guaranteed financial coverage. Use of early prenatal care (during the first 3 months of pregnancy) rose modestly between 1990 and 2003 but then plateaued and declined slightly in 2006, possibly due to changes in welfare and Medicaid policies (Martin et al., 2010). In 2014, 6 percent of expectant mothers received late or no prenatal care during their pregnancies (Child Trends Databank, 2015a).

Historically, rates of low birth weight and premature birth continue to rise. Why? One answer is the increasing number of multiple births, which often are early births, with heightened risk of death within the first year. However, new data suggest that this increase may have finally peaked, as rates of premature delivery have decreased, particularly for triplets and higher order multiples (Martin, Hamilton, Osterman, Driscoll, & Mathews, 2017).



Can you suggest ways to induce more pregnant women to seek early prenatal or preconception care?

A second answer is that the benefits of prenatal care are not evenly distributed. Although usage of prenatal care has grown, especially among ethnic groups that have tended not to receive early care, the women most at risk of bearing low-birth-weight babies—teenage and unmarried women, those with little education, and some minority

TABLE 5 Prenatal Assessment Techniques

Technique	Description	Uses and Advantages	Risks and Notes
Ultrasound (sonogram), sonoembryology	High-frequency sound waves directed at the mother's abdomen produce a picture of fetus in uterus. Sonoembryology uses high-frequency transvaginal probes and digital image processing to produce a picture of embryo in uterus.	Monitor fetal growth, movement, position, and form; assess amniotic fluid volume; judge gestational age; detect multiple pregnancies. Detect major structural abnormalities or death of a fetus. Guide amniocentesis and chorionic villus sampling. Help diagnose sex-linked disorders. Sonoembryology can detect unusual defects during embryonic stage.	Done routinely in many places. Can be used for sex-screening of unborn babies.
Embryoscopy, fetoscopy	Tiny viewing scope is inserted in woman's abdomen to view embryo or fetus. Can assist in diagnosis of non-chromosomal genetic disorders.	Can guide fetal blood transfusions and bone marrow transplants.	Riskier than other prenatal diagnostic procedures.
Amniocentesis	Sample of amniotic fluid is withdrawn under guidance of ultrasound and analyzed. Most commonly used procedure to obtain fetal cells for testing.	Can detect chromosomal disorders and certain genetic or multifactorial defects; more than 99 percent accuracy rate. Usually performed in women ages 35 and over; recommended if prospective parents are known carriers of Tay-Sachs disease or sickle-cell anemia or have family history of Down syndrome, spina bifida, or muscular dystrophy. Can help diagnose sex-linked disorders.	Normally not performed before 15 weeks' gestation. Results usually take 1 to 2 weeks. Small (0.5–1%) added risk of fetal loss or injury; early amniocentesis (at 11 to 13 weeks' gestation) is riskier and not recommended. Can be used for sex-screening of unborn babies.
Chorionic villus sampling (CVS)	Tissues from hairlike chorionic villi (projections of membrane surrounding fetus) are removed from placenta and analyzed.	Early diagnosis of birth defects and disorders. Can be performed between 10 and 12 weeks' gestation; yields highly accurate results within a week.	Should not be performed before 10 weeks' gestation. Some studies suggest 1–4% more risk of fetal loss than with amniocentesis.
Preimplantation genetic diagnosis	After in vitro fertilization, a sample cell is removed from the blastocyst and analyzed.	Can avoid transmission of genetic defects or predispositions known to run in the family; a defective blastocyst is *not* implanted in uterus.	No known risks.
Umbilical cord sampling (cordocentesis, or fetal blood sampling)	Needle guided by ultrasound is inserted into blood vessels of umbilical cord.	Allows direct access to fetal DNA for diagnostic measures, including assessment of blood disorders and infections, and therapeutic measures such as blood transfusions.	Fetal loss or miscarriage is reported in 1–2% of cases; increases risk of bleeding from umbilical cord and fetal distress.
Maternal blood test (including prenatal cell-free DNA scans)	A sample of the prospective mother's blood is tested for alpha fetoprotein or for fetal DNA.	May indicate defects in formation of brain or spinal cord (anencephaly or spina bifida); also can predict Down syndrome and other abnormalities. Permits monitoring of pregnancies at risk for low birth weight or stillbirth.	No known risks, but false negatives are possible. Ultrasound and/or amniocentesis needed to confirm suspected conditions.

Sources: Chodirker et al., 2001; Cicero, Curcio, Papageorghiou, Sonek, and Nicolaides, 2001; Cunniff and the Committee on Genetics, 2004; Kurjak, Kupesic, Matijevic, Kos, and Marton, 1999; Verlinsky et al., 2002.

window on the world

PRENATAL CARE AROUND THE WORLD

The United Nations (2018) estimates that approximately 130 million babies are born worldwide each year. About 830 women die each day from childbirth-related complications, with 99 percent of these deaths occurring in low-resource areas (World Health Organization, 2016a). Hemorrhage, hypertensive disorders, and infection are responsible for more than half of all maternal deaths; most of these deaths could have been prevented with proper education and prenatal care (UNICEF Millennium Development Goals, 2015).

Proper prenatal care is vital to the survival of pregnant women and their babies. The World Health Organization (WHO) recommends a minimum of four, and preferably eight, prenatal visits to a skilled health care provider. At the minimum, prenatal services should include education about proper nutrition, activity levels, and substance use. Additionally, medical services should include a tetanus vaccination and vitamin supplements of at least folic acid and iron (March of Dimes, 2014).

Standards of prenatal care are not equal worldwide. In developed countries, pregnant women receive this standard of care routinely. In low-income/developing countries, only 40 percent of women receive the minimum WHO standard of four visits (World Health Organization, 2016b). Poverty often limits both access and availability of services. Women living in remote areas have limited access to health care; sometimes the distance to facilities is too great, or there are not enough skilled workers to serve the population. Skilled care at birth leads to a 54 percent reduction of maternal mortality (World Health Organization, 2016a).

Nearly half of all births worldwide happen at home. In developing countries many of these births are either unattended, or attended by a family member or traditional birth attendant (TBA). Many TBAs have little formal training. TBAs are often older women who learned their skills through experience. TBAs often give advice on what to eat, herbal remedies for pain, abdominal massages, support, and assistance with the delivery of the baby. TBAs' limited access to equipment or medical facilities put mother and child at higher risk if complications occur (Garces et al., 2011).

The maternal/infant mortality rate has been declining over the past 20 years but is still too high. An estimated 2.6 million babies were stillborn and another 2.6 million died within the first month of life in 2016 (UNICEF, 2018c). Childbirth is still the leading cause of death among adolescent girls in developing countries (Patton et al., 2009). Globalized efforts by the WHO, the Centers for Disease Control, Save the Children, Doctors without Borders, Care, UNICEF, and many others are helping to make a difference. All women need access to prenatal care, education, family planning, and support during pregnancy and the weeks following childbirth.

what's your view

The United States has one of the worst maternal mortality rates of the developed countries. In 2015, it was 14 deaths per 100,000 live births (Central Intelligence Agency, 2015). What factors contribute to this? Why do we do so poorly compared to other developed nations?

women—are still least likely to receive it (Partridge, Balayla, Holcroft, & Abelhaim, 2012; Martin et al., 2006).

A related concern is an ethnic disparity in fetal and postbirth mortality. After adjusting for such risk factors as socioeconomic status, overweight, smoking, hypertension, and diabetes, the chances of perinatal death (death between 20 weeks of gestation and 1 week after birth) remain 3.4 times higher for blacks, 1.5 times higher for Hispanics, and 1.9 times higher for other minorities than for whites (Healy et al., 2006).

Good prenatal care can give every child the best possible chance for entering the world in good condition to meet the challenges of life outside the womb—challenges we discuss in the next chapter.

checkpoint can you . . .

- **Describe seven techniques for identifying defects or disorders prenatally?**
- **Discuss possible reasons for disparities in utilization of prenatal care?**
- **Tell why early, high-quality prenatal care is important and why preconception care is needed?**

summary and key terms

Conceiving New Life

- Fertilization, the union of an ovum and a sperm, results in the formation of a one-celled zygote, which then duplicates itself by cell division.
- Multiple births can occur either by the fertilization of two ova (or one ovum that has split) or by the splitting of one fertilized ovum. Higher multiple births result from either one of these processes or a combination of the two.
- Dizygotic (fraternal) twins have different genetic makeups and may be of different sexes. Although monozygotic (identical) twins typically have much the same genetic makeup, they may differ in temperament or other respects.

fertilization (*49*)
zygote (*49*)
dizygotic twins (*49*)
monozygotic twins (*50*)

Mechanisms of Heredity

- The basic functional units of heredity are the genes, which are made of deoxyribonucleic acid (DNA). DNA carries the biochemical instructions, or genetic code, that governs the development of cell functions. Each gene is located by function in a definite position on a particular chromosome. The complete sequence of genes in the human body is called the *human genome*.

deoxyribonucleic acid (DNA) (*50*)
genetic code (*50*)
chromosomes (*50*)
genes (*51*)
human genome (*51*)
mutations (*51*)

- At conception, each normal human being receives 23 chromosomes from the mother and 23 from the father. These form 23 pairs of chromosomes—22 pairs of autosomes and 1 pair of sex chromosomes. A child who receives an X chromosome from each parent is genetically female. A child who receives a Y chromosome from the father is genetically male.
- The simplest patterns of genetic transmission are dominant and recessive inheritance. When a pair of alleles are the same, a person is homozygous for the trait; when they are different, the person is heterozygous.

autosomes (*51*)
sex chromosomes (*51*)
alleles (*53*)
homozygous (*53*)
heterozygous (*53*)
dominant inheritance (*53*)
recessive inheritance (*53*)

- Most normal human characteristics are the result of polygenic or multifactorial transmission. Except for most monozygotic twins, each child inherits a unique genotype. Dominant inheritance and multifactorial transmission explain why a person's phenotype does not always express the underlying genotype.

polygenic inheritance (*53*)

- The epigenetic framework controls the functions of particular genes; it can be affected by environmental factors.

phenotype (*53*)
genotype (*53*)
multifactorial transmission (*54*)
epigenesis (*54*)

- Birth defects and diseases may result from simple dominant, recessive, or sex-linked inheritance, from mutations, or from genome imprinting. Chromosomal abnormalities also can cause birth defects.
- Through genetic counseling, prospective parents can receive information about the mathematical odds of bearing children with certain defects.
- Genetic testing involves risks as well as benefits.

incomplete dominance (*58*)
sex-linked inheritance (*58*)
Down syndrome (*59*)
genetic counseling (*60*)

Nature and Nurture: Influences of Heredity and Environment

- Research in behavioral genetics is based on the assumption that the relative influences of heredity and environment within a population can be measured statistically. If heredity is an important influence on a trait, genetically closer persons will be more similar in that trait. Family studies, adoption studies, and studies of twins enable researchers to measure the heritability of specific traits.
- The concepts of reaction range, canalization, genotype-environment interaction, genotype-environment correlation (or covariance), and niche-picking describe ways in which heredity and environment work together.
- Siblings tend to be more different than alike in intelligence and personality. According to some behavioral geneticists, heredity accounts for most of the similarity, and nonshared environmental effects account for most of the difference.

behavioral genetics (*61*)
heritability (*61*)
concordant (*61*)
reaction range (*62*)
canalization (*63*)
genotype-environment interaction (*63*)

genotype-environment correlation (*64*)
niche-picking (*64*)
nonshared environmental effects (*64*)

- Obesity, longevity, intelligence, temperament, and other aspects of personality are influenced by both heredity and environment.
- Schizophrenia is a highly heritable neurological disorder that also is environmentally influenced.

obesity (*65*)
temperament (*66*)
schizophrenia (*66*)

Prenatal Development

- Prenatal development occurs in three stages of gestation: the germinal, embryonic, and fetal stages.
- Severely defective embryos often are spontaneously aborted during the first trimester of pregnancy.
- As fetuses grow, they move less, but more vigorously. Swallowing amniotic fluid, which contains substances from the mother's body, stimulates taste and smell. Fetuses seem able to hear, exercise sensory discrimination, learn, and remember.

gestation (*67*)
gestational age (*67*)
cephalocaudal principle *67*)
proximodistal principle (*69*)
germinal stage (*69*)
implantation (*70*)
embryonic stage (*70*)
spontaneous abortion (*70*)
fetal stage (*71*)
ultrasound (*72*)

- The developing organism can be greatly affected by its prenatal environment. The likelihood of a birth defect may depend on the timing and intensity of an environmental event and its interaction with genetic factors.
- Important environmental influences involving the mother include nutrition, smoking, intake of alcohol or other drugs, transmission of maternal illnesses or infections, maternal stress, anxiety, or depression, maternal age and physical activity, and external environmental hazards, such as chemicals and radiation. External influences also may affect the father's sperm.

teratogen (*73*)
fetal alcohol syndrome (FAS) (*76*)
acquired immune deficiency syndrome (AIDS) (*77*)
stress (*79*)

Monitoring and Promoting Prenatal Development

- Ultrasound, sonoembryology amniocentesis, chorionic villus sampling, fetoscopy, preimplantation genetic diagnosis, umbilical cord sampling, and maternal blood tests can be used to determine whether an unborn baby is developing normally.
- Early, high-quality prenatal care is essential for healthy development. It can lead to detection of defects and disorders and, especially if begun early and targeted to the needs of at-risk women, may help reduce maternal and infant death, low birth weight, and other birth complications.
- Racial/ethnic disparities in prenatal care may be a factor in disparities in low birth weight and perinatal death.

Design elements: (Butterfly Icon): Stockbyte/Getty Images; (World Icon): janrysavy/Getty Images

chapter 4

Birth and Physical Development during the First Three Years

outline

Childbirth and Culture: How Birthing Has Changed

The Birth Process

The Newborn Baby

Complications of Childbirth

Survival and Health

Early Physical Development

Motor Development

learning objectives

Specify how childbirth has changed in developed countries.

Describe the birth process.

Describe the adjustment of a healthy newborn and the techniques for assessing its health.

Explain potential complications of childbirth and the prospects for infants with complicated births.

Identify factors affecting infants' chances for survival and health.

Discuss the patterns of physical growth and development in infancy.

Describe infants' motor development.



Rosemarie Gearhart/Getty Images

did you know?

- The cesarean rate in the United States is among the highest in the world.
- In the industrialized world, smoking during pregnancy is the leading factor in low birth weight.
- The first 1,000 days of life are a critical time period for healthy physical, cognitive, and social development.

In this chapter we describe how babies come into the world, how newborn babies look, and how their body systems work. We discuss ways to safeguard their life and health and observe their rapid early physical development. We see how infants become busy, active toddlers and how caregivers can foster healthy growth and development.

A 2-year-old is kind of like having a blender, but without a top on it.

—Jerry Seinfeld

Childbirth and Culture: How Birthing Has Changed

Customs surrounding childbirth reflect a culture's beliefs, values, and resources. A Mayan woman in Yucatan gives birth in the hammock she sleeps in every night; both the father-to-be and a midwife are expected to be present. To evade evil spirits, mother and child remain at home for a week (Jordan, 1993). By contrast, among the Ngoni in East Africa, men are excluded from the birth experience. And in rural Thailand, a new mother generally resumes normal activity within a few hours of giving birth (Gardiner & Kozmitzki, 2005).

Historically, childbirth has often been "a struggle with death" (Fontanel & d'Harcourt, 1997) for both mother and baby. In seventeenth and eighteenth century France, a woman had a 1 in 10 chance of dying while or shortly after giving birth. Thousands of babies were stillborn, and 1 out of 4 born alive died during the 1st year. At the end of the nineteenth century in England and Wales, an expectant mother was almost 50 times more likely to die in childbirth than a woman giving birth in modern times (Saunders, 1997). Childbirth in Europe and the United States followed similar patterns in the late 1800s (Fontanel & d'Harcourt, 1997).

At the start of the twentieth century, childbirth began to be professionalized in the United States, at least in urban settings. The growing use of maternity hospitals led to safer, more antiseptic conditions for childbirth, which reduced mortality for women (Figure 1). In 1900, only 5 percent of U.S. deliveries occurred in hospitals; by 1920, in some cities 65 percent did (Scholten, 1985). A similar trend took place in Europe. Now in the United States, 98.5 percent of babies are born in hospitals and 84 percent of births are attended by physicians (Martin, Hamilton, Osterman, Driscoll, & Mathews, 2017).

The dramatic reductions in risks surrounding pregnancy and childbirth in industrialized countries are largely due to the availability of antibiotics, blood transfusions, safe anesthesia, improved hygiene, and drugs for inducing labor. In addition, improvements in prenatal assessment and care make it far more likely that a baby will be born healthy. In 1940, there were 47.0 infant (from birth to 1 year of age) deaths per 1,000 live births (Figure 2); by 2016, this rate had decreased to 5.87 infant deaths per 1,000 live births. Postneonatal (from 28 days to 1 year of age) survival rates have also increased. In 1940, the postneonatal death rate was 18.3 infant deaths per 1,000 live births, a number that fell to 2.0 deaths in 2016 (Xu, Murphy, Kochanek, Bastian, & Arias, 2018).

Still, childbirth is not risk-free. Among the nearly 4 million U.S. women who gave birth in 2014, approximately 14.4 out of every 1,000 women experienced complications. This number has risen steadily since the mid-1990s. The increase—almost 200 percent from 1993 to 2014—is likely due to a variety of factors, including increases in maternal age, prepregnancy obesity, preexisting medical conditions, and cesarean delivery. Black women, obese women, those with difficult medical histories, those who had previous cesarean deliveries, and those who had several children are at elevated risk of cardiovascular events, infection, sepsis, hemorrhage, and other dangerous complications (Centers for Disease Control, 2018c; 2019b).

Childbirth is still a dangerous endeavor in many developing countries, especially sub-Saharan Africa and South Asia (World Health Organization, 2018a). There, 60 million women deliver at home each year without the benefit of skilled care, and until recently, more than 500,000 women and 4 million newborns died in or shortly after



The Guinness Book of World Records *reports that the record for the highest number of births from one woman is held by a Russian woman who, from 1725 to 1765, gave birth to 16 sets of twins, 7 sets of triplets, and 4 sets of quadruplets over the course of 27 pregnancies.*

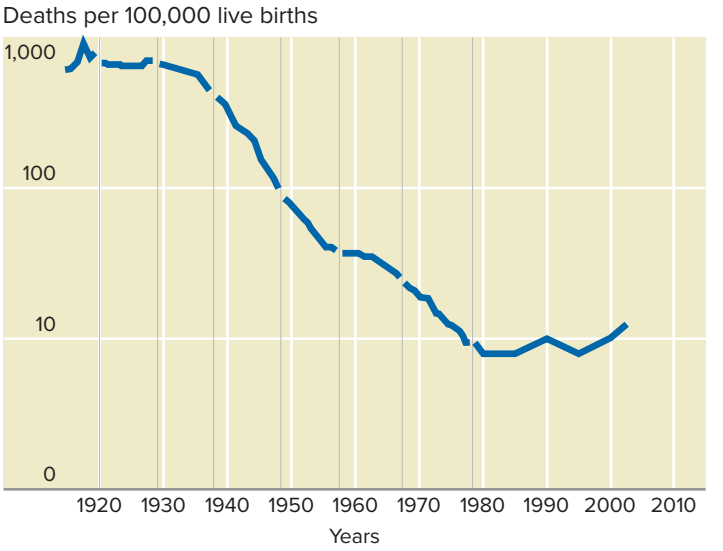
FIGURE 1

U.S. Maternal Mortality Rates

Since 1915 the maternal mortality rate in the United States has dropped from 607.9 deaths per 100,000 live births for the birth registration area to 12.1 deaths per 100,000 live births in 2003.

Prior to 1933, data for birth registration states only. Line breaks are shown between successive *International Classification of Diseases* revisions. The National Center for Health Statistics has not published information on maternal mortality statistics since 2007.

Source: National Center for Health Statistics, 2007; Clark, S. L., 2012.



childbirth (Sines, Syed, Wall, & Worley, 2007). However, there are promising trends. Estimates suggest that about 303,000 women died during and following pregnancy and childbirth in 2015, a number that, while high, nonetheless represents a decline of almost 44 percent since 1990 (Alkema et al., 2016).

While childbirth is undoubtedly safer with the advances of modern medicine, the medicalization of childbirth has nonetheless had social and emotional costs that some women are rejecting. Today a small but growing percentage of women in developed countries are going back to the intimate, personal experience of home birth. Home births are usually attended by a trained nurse-midwife, ideally with the resources of medical science close at hand. Arrangements may be made with a physician and a nearby hospital in case an emergency arises. Some studies suggest that for low-risk deliveries attended by skilled, certified midwives or nurse-midwives, planned home births with speedy transfer to a hospital in case of need can be as safe as hospital births (American College of Nurse-Midwives, 2016). However, the American College of Obstetricians and Gynecologists (ACOG, 2017) and the American Medical Association (AMA House of Delegates, 2008) argue that complications can arise suddenly and hospitals are best equipped to respond to such emergencies.

Today hospitals are finding ways to humanize childbirth. Labor and delivery may take place in a comfortable birthing room. Rooming-in policies allow a baby to stay in the mother's room much or all of the time. These changes allow hospitals to allay concerns about an overly medicalized experience while still providing a safe environment in the event of complications.

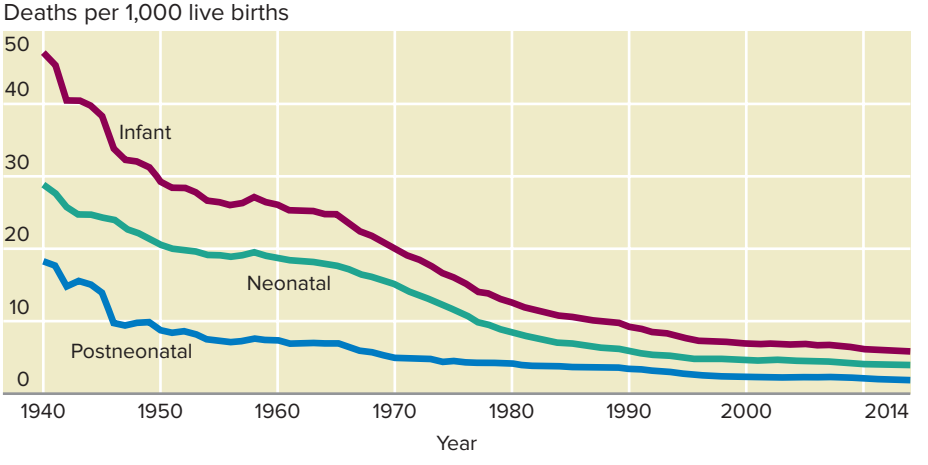
checkpoint can you . . .

- Identify two ways childbirth has changed in developed countries and tell why it is less risky than it once was?
- Compare advantages of various settings for childbirth?

FIGURE 2

U.S. Infant Mortality Rates, 1940–2014

The U.S. infant mortality rate has decreased from 47.0 infant deaths per 1,000 live births in 1940 to 5.8 in 2014. During the same period, the neonatal rate decreased 85 percent, from 28.8 to 3.94 deaths per 1,000 live births, and the postneonatal rate decreased 88 percent from 18.3 to 1.88 deaths per 1,000 live births.



Source: Kochanek, Murphy, Xu, and Tejada-Vera, 2016.

The Birth Process

Labor is an apt term for the process of giving birth. Birth is hard work for both mother and baby. What brings on labor is a series of uterine, cervical, and other changes called **parturition.** Parturition is the act or process of giving birth, and it typically begins about 2 weeks before delivery.

parturition
The act or process of giving birth.

The uterine contractions that expel the fetus begin—typically about 266 days after conception—as a tightening of the uterus. A woman may have felt false contractions (known as *Braxton-Hicks contractions*) at times during the final months of pregnancy, or even as early as the second trimester, when the muscles of the uterus tighten for up to 2 minutes. In comparison with the relatively mild and irregular Braxton-Hicks contractions, real labor contractions are more frequent, rhythmic, and painful, and they increase in frequency and intensity.

STAGES OF CHILDBIRTH

Labor takes place in three overlapping stages (Figure 3).

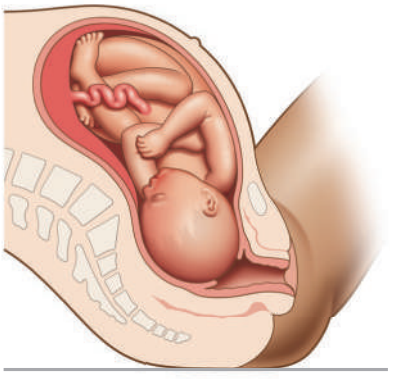
Stage 1: Dilation of the Cervix The first stage, dilation of the cervix, is the longest, typically lasting 12 to 14 hours for a woman having her first child. In subsequent births, the first stage tends to be shorter. During this stage, regular and increasingly frequent uterine contractions—15 to 20 minutes apart at first—cause the cervix to shorten and dilate, or widen, in preparation for delivery. Toward the end of the first stage, contractions occur every 2 to 5 minutes. This stage lasts until the cervix is fully open (10 centimeters, or about 4 inches) so the baby can descend into the birth canal.

Stage 2: Descent and Emergence of the Baby The second stage, descent and emergence of the baby, typically lasts up to an hour or two. It begins when the baby's head begins to move through the cervix into the vaginal canal, and it ends when the baby emerges completely from the mother's body. At the end of this stage, the baby is born but is still attached to the placenta in the mother's body by the umbilical cord, which must be cut and clamped.

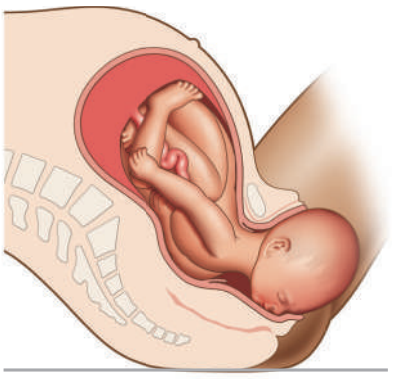
Stage 3: Expulsion of the Placenta The third stage, expulsion of the placenta, lasts between 10 minutes and 1 hour. During this stage, the placenta and the remainder of the umbilical cord are expelled from the mother.

FIGURE 3
The Three Stages of Childbirth

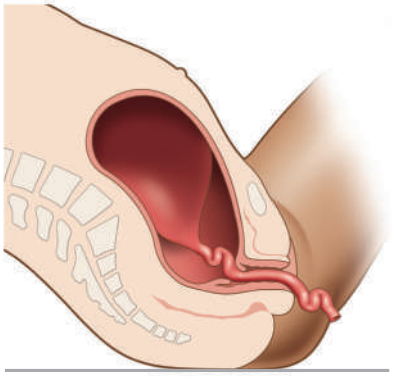
(a) During the first stage of labor, a series of increasingly stronger contractions dilates the cervix, the opening to the mother's womb. (b) During the second stage, the baby's head moves down the birth canal and emerges from the vagina. (c) During the brief third stage, the placenta and umbilical cord are expelled from the womb. Then the cord is cut.



Stage one: Baby positions itself



Stage two: Baby begins to emerge



Stage three: Placenta is expelled

ELECTRONIC FETAL MONITORING

electronic fetal monitoring
Mechanical monitoring of fetal heartbeat during labor and delivery.

Most births have a happy outcome, but labor and delivery are nonetheless risky. To lessen these risks, technologies have been developed to monitor the fetus prior to delivery. **Electronic fetal monitoring** can be used to track the fetus's heartbeat during labor and delivery and to indicate how the fetal heart is responding to the stress of uterine contractions. Monitoring is most commonly done with the use of sensors attached to the woman's midsection and held in place with an electric belt. The sensors monitor heart rate and alert medical personnel of potentially problematic changes. The procedure was used in 89 percent of live births in the United States in 2004 (Chen, Chauhan, Ananth, Vintzileos, & Abuhamad, 2013).

Electronic fetal monitoring can provide valuable information in high-risk deliveries. However, monitoring can have drawbacks if it is used routinely in low-risk pregnancies. It is costly; it restricts the mother's movements during labor; and, most important, it has an extremely high false-positive rate, suggesting that fetuses are in trouble when they are not. Such warnings may prompt doctors to deliver by the riskier cesarean method rather than vaginally (Banta & Thacker, 2001; Nelson, Dambrosia, Ting, & Grether, 1996).

VAGINAL VERSUS CESAREAN DELIVERY

cesarean delivery
Delivery of a baby by surgical removal from the uterus.

The usual method of childbirth, previously described, is *vaginal delivery*. Alternatively, **cesarean delivery** can be used to surgically remove the baby from the uterus through an incision in the mother's abdomen. In 2008, a record-high 32.2 percent of U.S. births were by cesarean delivery, a 56 percent increase since 1996 (Martin, Hamilton, et al., 2010). Use of this procedure also increased in European countries during the 1990s (Gibbons et al., 2010). In the United States, cesarean birthrates peaked in 2009 at 32.9 percent. The rate in 2017 was 32 percent, a slight increase after four years of decline (Hamilton, Martin, Osterman, Driscoll, & Rossen, 2018).

A cesarean is commonly performed when labor progresses too slowly, when the fetus seems to be in trouble, or when the mother is bleeding vaginally. The use of forceps—an instrument shaped like a large pair of salad tongs used to grasp and pull the head—is increasingly rare, occurring in less than 1 percent of births (Martin, Hamilton, Osterman, Driscoll, & Mathews, 2017). Often a cesarean is needed when the fetus is in the breech position (feet or buttocks first) or in the transverse position (lying crosswise in the uterus) or when the head is too big to pass through the mother's pelvis.

The increase in cesarean rates is attributed largely to rising proportions of older first-time mothers, who tend to have multiple births, and of very premature infants (Martin, Hamilton, et al., 2010) for whom cesarean delivery significantly reduces the risk of dying during the 1st month of life (Malloy, 2008). Physicians' fear of malpractice suits and women's preferences also may play a part in the choice of cesarean deliveries (Ecker & Frigoletto, 2007; Martin, Hamilton, et al., 2009), as may the increased revenue hospitals generate when a woman has a cesarean rather than a vaginal birth.

Cesarean deliveries carry risks of serious complications for the mother, such as bleeding, infection, damage to pelvic organs, and postoperative pain, and heighten risks of problems in future pregnancies (Ecker & Frigoletto, 2007). They also deprive the baby of important benefits of normal birth: the surge of hormones that clear the lungs of excess fluid, mobilize stored fuel to nourish cells, and send blood to the heart and brain (Lagercrantz & Slotkin, 1986). Cesarean delivery also may negatively affect breast-feeding, which can influence bonding (Zanardo et al., 2010). Vaginal delivery also stimulates the release of oxytocin, a hormone involved in uterine contractions that stimulates maternal behavior in animals. There are indications that oxytocin may have similar effects in humans (Swain et al., 2008).

In 2010, the American College of Obstetrics and Gynecology issued guidelines supporting an attempted trial of labor for vaginal birth after cesarean (VBAC) for women who had a previous low transverse uterine incision and who were low risk otherwise (Grady, 2010). While a VBAC is associated with a greater (though still low) risk of complications, including uterine rupture and infant death (Landon et al., 2004; Smith, Pell, Cameron & Dobbie, 2002), a repeat cesarean is also associated with greater risk.



Oxytocin is involved in a variety of positive social interactions outside of the maternal relationship as well. For example, nasal sprays of oxytocin can help people who are low in social competence accurately read the emotions of others.

Bartz, 2010

These risks include hemorrhage, blood clots, infection, postpartum endometriosis (a painful condition in which uterine cells are found outside the uterus), complications related to anesthesia, hysterectomy, increased maternal mortality or morbidity, and a longer recovery period (ACOG, 2017; Fong et al., 2016). Thus, for some women, a VBAC may be a reasonable option. Overall, women who attempt a trial of labor following one or two cesarean deliveries are successful 60 to 80 percent of the time (ACOG, 2017) and represented 12.4 percent of total births in 2016 (Martin, Hamilton, Osterman, Driscoll, & Drake, 2018). VBAC is not recommended for home births or women who have conditions that make it less likely to be successful, such as advanced age, high body mass index, a very large baby, or a previous cesarean that was the result of a failure of the cervix to dilate (ACOG, 2017).

MEDICATED VERSUS NONMEDICATED DELIVERY

For centuries, pain was considered an unavoidable part of giving birth. Then, in the mid-nineteenth century, sedation with ether or chloroform became common practice as more births took place in hospitals (Fontanel & d'Harcourt, 1997).

During the twentieth century, several alternative methods of **natural childbirth** or **prepared childbirth** were developed. These methods minimize or eliminate the use of drugs that may pose risks for babies and enable both parents to participate fully in a natural, empowering experience.

natural childbirth
Method of childbirth that seeks to prevent pain by eliminating the mother's fear through education about the physiology of reproduction and training in breathing and relaxation during delivery.

prepared childbirth
Method of childbirth that uses instruction, breathing exercises, and social support to induce controlled physical responses to uterine contractions and reduce fear and pain.

The Lamaze method, introduced by the French obstetrician Fernand Lamaze in the late 1950s, acknowledges that labor is painful and teaches expectant mothers to work actively with their bodies through controlled breathing. The woman learns to relax her muscles as a conditioned response to the voice of her coach (usually the prospective father or a friend), who attends classes with her, takes part in the delivery, and helps with the exercises. Using the LeBoyer method, introduced in the 1970s, a woman gives birth in a quiet room under low lights to reduce stress, and the newborn is gently massaged to ease crying. Another technique, developed by the French physician Michael Odent, is submersion of the laboring mother in a soothing pool of water. Other methods use mental imagery, massage, gentle pushing, and deep breathing. Perhaps most extreme is the Bradley method, which rejects all obstetrical procedures and other medical interventions.

Today, improvements in medicated delivery have led many mothers to choose pain relief, sometimes along with natural methods. A woman may be given local (vaginal) anesthesia, also called a *pudendal block,* usually during the second stage of labor. Or she can receive an *analgesic* (painkiller), which reduces the perception of pain by depressing the activity of the central nervous system. However, analgesics may slow labor, cause maternal complications, and make the baby less alert after birth.



In 1914, President Woodrow Wilson proclaimed Mother's Day a national holiday.

Another form of pain relief is regional anesthesia, or an *epidural*, which can be injected into a space in the spinal cord between the vertebrae in the lumbar (lower) region. This blocks the nerve pathways that would otherwise carry the sensation of pain to the brain. Approximately 71 percent of women receive epidurals or other spinal anesthesia during labor, an increase of 10 percent since 2008 (Butwick, Wong, & Guo, 2018). While previous researchers believed epidurals given early in labor could block pain and even shorten labor with no added risk of cesarean (Wong et al., 2005), newer data suggest that the use of epidurals significantly slows the second stage of labor and can lead to unnecessary interventions (Cheng, Shaffer, Nicholson, & Caughey, 2014).

With any of these forms of anesthesia, a woman can see and participate in the birth process and can hold her newborn immediately afterward. All of these drugs, however, pass through the placenta and enter the fetal blood supply and tissues and thus may pose some danger to the baby.

In many traditional cultures, childbearing women are attended by a **doula,** an experienced mentor, coach, and helper who can furnish emotional support and information and can stay at a woman's bedside throughout labor. There is growing evidence that offering women such support is associated with better outcomes. For example, in one study, expectant mothers who participated in prenatal education classes with a doula were less

doula
An experienced mentor who furnishes emotional support and information for a woman during labor.

checkpoint can you . . .

- Describe the three stages of vaginal childbirth?
- Discuss reasons for the sharp increase in cesarean births?
- Compare medicated delivery with alternative methods of childbirth?



A doula, or experienced helper, stays at a woman's bedside throughout labor and provides emotional support. Research has found that women attended by doulas tend to have shorter labor and easier deliveries.
Andersen Ross/Brand X Pictures/Jupiterimages

neonatal period
First 4 weeks of life, a time of transition from intrauterine dependency to independent existence.

neonate
Newborn baby, up to 4 weeks old

Gifted children tend to weigh more at birth.

likely to have a low-birth-weight baby or complications and more likely to successfully initiate breast-feeding than expectant mothers who participated in the same classes, but without the support of a doula (Gruber, Cupito, & Dobson, 2013). Other studies have found that women who give birth with the assistance of a doula are almost 41 percent less likely to have a cesarean delivery than women who give birth without a doula (Kozhimannil, Hardeman, Attanasio, Blauer-Peterson, & O'Brien, 2013).

Doulas also provide an economic benefit. Infants born before 37 weeks of gestation—currently 1 in 9 in the United States—incur medical costs that average approximately 10 times what the costs are for a full-term infant. Additionally, cesarean deliveries are double the cost of vaginal births. Thus, the use of doulas is a cost-effective strategy and, if funded by insurance, would result in significant overall savings (Kozhimmanil et al., 2016). Unfortunately, doulas are often not covered by insurance, and cost is the largest barrier most women face in securing the support of a doula (Strauss, Giessler, & McAllister, 2015).

The Newborn Baby

The **neonatal period,** the first 4 weeks of life, is a time of transition from the uterus, where a fetus is supported entirely by the mother, to an independent existence. What are the physical characteristics of newborn babies, and how are they equipped for this crucial transition?

SIZE AND APPEARANCE

An average **neonate,** or newborn, in the United States is about 20 inches long and weighs about 7½ pounds. Boys tend to be slightly longer and heavier than girls, and a firstborn child is likely to weigh less at birth than laterborns. In their first few days, neonates lose as much as 10 percent of their body weight, primarily because of a loss of fluids. They begin to gain weight again at about the 5th day and are generally back to birth weight by the 10th to the 14th day.

New babies have distinctive features, including a large head (one-fourth the body length) and a receding chin (which makes it easier to nurse). Newborn infants also have areas on their heads known as *fontanels* where the bones of the skull do not meet. Fontanels are covered by a tough membrane that allows for flexibility in shape, which eases the passage of the neonate through the vaginal canal. In the first 18 months of life, the plates of the skull gradually fuse together.

Many newborns have a pinkish cast; their skin is so thin that it barely covers the capillaries through which blood flows. During the first few days, some neonates are very hairy because some of the *lanugo,* a fuzzy prenatal hair, has not yet fallen off. Almost all new babies are covered with *vernix caseosa* ("cheesy varnish"), an oily protection against infection that dries within the first few days.

"Witch's milk," a secretion that sometimes leaks from the swollen breasts of newborn boys and girls around the 3rd day of life, was believed during the Middle Ages to have special healing powers. Like the whitish or blood-tinged vaginal discharge of some newborn girls, this fluid emission results from high levels of the hormone estrogen, which is secreted by the placenta just before birth and goes away within a few days or weeks. A newborn, especially if premature, also may have swollen genitals.

BODY SYSTEMS

Before birth, blood circulation, respiration, nourishment, elimination of waste, and temperature regulation are accomplished through the mother's body. All these systems, with the exception of the lungs, are functioning to some degree by the time a full-term birth occurs, but the mother's own body systems are still involved and the fetus is not yet an

independent entity. After birth, all of the baby's systems and functions must operate on their own. Most of the work of this transition occurs during the first 4 to 6 hours after delivery (Ferber & Makhoul, 2004).

During pregnancy, the fetus and mother have separate circulatory systems and heartbeats. The fetus gets oxygen through the umbilical cord, which carries used blood to the placenta and returns a fresh supply. Once born, a neonate must take over this function fully. Moreover, a newborn needs more oxygen than before. Most babies start to breathe as soon as they are exposed to air. The heartbeat at first is fast and irregular, and blood pressure does not stabilize until about 10 days after birth. If a neonate does not begin breathing within about 5 minutes, the baby may suffer permanent brain injury caused by **anoxia,** lack of oxygen, or *hypoxia,* a reduced oxygen supply. Because infants' lungs have only one-tenth as many air sacs as adults' do, infants (especially those born prematurely) are susceptible to respiratory problems. Anoxia or hypoxia may occur during delivery (though rarely so) as a result of repeated compression of the placenta and umbilical cord with each contraction. This form of *birth trauma* can leave permanent brain damage, causing mental retardation, behavior problems, or even death.

anoxia
Lack of oxygen, which may cause brain damage.

In the uterus, the fetus relies on the umbilical cord to bring food from the mother and to carry fetal body wastes away. At birth, babies instinctively suck to take in milk, and their own gastrointestinal secretions digest it. During the first few days infants secrete *meconium,* a stringy, greenish-black waste matter formed in the fetal intestinal tract. When the bowels and bladder are full, the sphincter muscles open automatically; a baby will not be able to control these muscles for many months.

The layers of fat that develop during the last 2 months of fetal life help healthy full-term infants to keep their body temperature constant after birth despite changes in air temperature. Newborn babies also maintain body temperature by increasing their activity when air temperature drops.

Three or four days after birth, about half of all babies (and a larger proportion of babies born prematurely) develop **neonatal jaundice:** their skin and eyeballs look yellow. This kind of jaundice is caused by the immaturity of the liver. Usually it is not serious, does not need treatment, and has no long-term effects. However, severe jaundice that is not monitored and treated promptly may result in brain damage.

neonatal jaundice
Condition, in many newborn babies, caused by immaturity of liver and evidenced by yellowish appearance; can cause brain damage if not treated promptly.

checkpoint can **you** . . .

- Describe the normal size and appearance of a newborn, and list several changes that occur within the first few days?
- Compare five fetal and neonatal body systems?
- Identify two dangerous conditions that can appear soon after birth?

MEDICAL AND BEHAVIORAL ASSESSMENT

The first few minutes, days, and weeks after birth are crucial for development. It is important to know as soon as possible whether a baby has any problem that needs special care.

The Apgar Scale One minute after delivery, and then again 5 minutes after birth, most babies are assessed using the **Apgar scale** (Table 1). Its name, after its developer, Dr. Virginia Apgar (1953), helps us remember its five subtests: *a*ppearance (color), *p*ulse (heart rate), *g*rimace (reflex irritability), *a*ctivity (muscle tone), and *r*espiration (breathing). The newborn is rated 0, 1, or 2 on each measure, for a maximum score of 10. A 5-minute score of 7 to 10—achieved by 98.4 percent of babies born in the United States—indicates that the baby is in good to excellent condition (Martin, Hamilton, et al., 2009). A score below 5–7 means the baby needs help to establish breathing; a score below 4 means the baby needs immediate lifesaving treatment. If resuscitation is successful, bringing the baby's score to 4 or more at 10 minutes, no long-term damage is likely to result. Scores of 0 to 3 at 10, 15, and 20 minutes after birth are increasingly associated with cerebral palsy (muscular impairment due to brain damage prenatally or during birth) or other neurological problems (American College of Obstetricians and Gynecologists, 2015).

Apgar scale
Standard measurement of a newborn's condition; it assesses appearance, pulse, grimace, activity, and respiration.



The Apgar scale is popular because it's easy to remember and requires no fancy medical equipment, making it useful to quickly assess the health of a newborn.

Assessing Neurological Status: The Brazelton Scale The **Brazelton Neonatal Behavioral Assessment Scale (NBAS)** is a neurological and behavioral test to measure a

Brazelton Neonatal Behavioral Assessment Scale (NBAS)
Neurological and behavioral test to measure neonate's responses to the environment.

TABLE 1 Apgar Scale

Sign*	0	1	2
Appearance (color)	Blue, pale	Body pink, extremities blue	Entirely pink
Pulse (heart rate)	Absent	Slow (below 100)	Rapid (over 100)
Grimace (reflex irritability)	No response	Grimace	Coughing, sneezing, crying
Activity (muscle tone)	Limp	Weak, inactive	Strong, active
Respiration (breathing)	Absent	Irregular, slow	Good, crying

*Each sign is rated in terms of absence or presence from 0 to 2; highest overall score is 10.

Source: Adapted from Apgar, 1953.

neonate's responses to the environment. It is used to help parents, health care providers, and researchers assess neonates' responsiveness to their physical and social environment, to identify strengths and possible vulnerabilities in neurological functioning, and to predict future development. The test, suitable for infants up to 2 months old, is named for its designer, Dr. T. Berry Brazelton (1973, 1984; Brazelton & Nugent, 1995, 2011). It assesses *motor organization,* as shown by such behaviors as activity level and the ability to bring a hand to the mouth; *reflexes; state changes,* such as irritability, excitability, and ability to quiet down after being upset; *attention and interactive capacities,* as shown by general alertness and response to visual and auditory stimuli; and indications of *central nervous system instability,* such as tremors and changes in skin color. The NBAS takes about 30 minutes, and scores are based on a baby's best performance.

Neonatal Screening for Medical Conditions Children who inherit the enzyme disorder phenylketonuria, or PKU,will develop permanent intellectual disability unless they are fed a special diet beginning in the first 3 to 6 weeks of life (National Institute of Child Health and Human Development, 2017). Screening tests administered soon after birth often can discover this and other defects.

Routine screening of all newborn babies for such rare conditions as PKU (1 case in 15,000 births), congenital hypothyroidism (1 in 3,600 to 5,000), galactosemia (1 in 60,000 to 80,000), and other, even rarer, disorders is expensive. Yet the cost of testing thousands of newborns to detect one case of a rare disease may be less than the cost of caring for one mentally retarded person for a lifetime. The Recommended Uniform Screening Panel, developed by the U.S. government in conjunction with professionals in the field, includes 34 core conditions and 26 secondary conditions for which it recommends screening all newborns. However, states vary with respect to which conditions they include (U.S. Department of Health and Human Services, 2017).

checkpoint can **you** . . .

- Discuss the uses of the Apgar scale and the Brazelton scale?
- Weigh arguments for and against routine screening for rare disorders?

STATES OF AROUSAL

state of arousal
An infant's physiological and behavioral status at a given moment in the periodic daily cycle of wakefulness, sleep, and activity.

Are you an early bird or a night owl? Do you work most effectively in the morning or in the afternoon? When do you get hungry? We all have internal biological clocks that regulate our **states of arousal** and activity over the course of a day. Babies also have an internal clock that regulates their daily cycles of eating, sleeping, elimination, and even their moods. These periodic cycles of wakefulness, sleep, and activity, which govern an infant's state of arousal, or degree of alertness (Table 2), seem to be inborn and highly individual. Changes in state are coordinated by multiple areas of the brain (Tokariev, Videman, Palva, & Vanhatalo, 2016) and are accompanied by changes in

TABLE 2 States of Arousal in Infancy

State	Eyes	Breathing	Movements	Responsiveness
Regular sleep	Closed; no eye movement	Regular and slow	None, except for sudden, generalized startles	Cannot be aroused by mild stimuli.
Irregular sleep	Closed; occasional rapid eye movements	Irregular	Muscles twitch, but no major movements	Sounds or light bring smiles or grimaces in sleep.
Drowsiness	Open or closed	Irregular	Somewhat active	May smile, startle, suck, or have erections in response to stimuli.
Alert inactivity	Open	Even	Quiet; may move head, limbs, and trunk while looking around	An interesting environment (with people or things to watch) may initiate or maintain this state.
Waking activity and crying	Open	Irregular	Much activity	External stimuli (such as hunger, cold, pain, being restrained, or being laid down) bring about more activity, perhaps starting with soft whimpering and gentle movements and turning into a rhythmic crescendo of crying or kicking.

Source: Adapted from Information in Prechtl and Beintema, 1964; Wolff, 1966.

the functioning of virtually all body systems (Scher, Epstein, & Tirosh, 2004). The establishment of "stable and distinct" states of arousal is associated with newborn health and positive outcomes because they are a marker of neurological organization. For example, preterm infants who show more organized sleep patterns early in life have better outcomes at 5 years of age (Weisman, Magori-Cohen, Louzoun, Eidelman, & Feldman, 2011).

Youngest babies sleep the most and wake up the most frequently. Parents report that from 0 to 2 months of age, infants sleep about 14.5 hours a day and wake 1.7 times per night (Galland, Taylor, Elder, & Herbison, 2012). In the daytime, infants from 0 to 5 months will generally nap about 3 hours a day. Newborns' sleep alternates between quiet (regular) and active (irregular) sleep. Active sleep is the equivalent of rapid eye movement (REM) sleep, which in adults is associated with dreaming. Active sleep appears rhythmically in cycles of about 1 hour and accounts for up to 50 percent of a newborn's total sleep time (Hoban, 2004).

At 2 months of age, the average baby's longest nightly sleep period will be 5.7 hours long, a number that rises to 8.3 hours at 6 to 24 months of age. By a year, most babies will sleep 12.6 hours a night total with 0.7 wakings each evening. With respect to daytime napping, a similar developmental trend emerges. By 1 to 2 years of age, most children are napping only about an hour a day (Galland, Taylor, Elder, & Herbison, 2012). A 2-year-old typically sleeps about 13 hours a day, including naps. The amount of REM sleep also decreases. By age 3, REM sleep declines to less than 30 percent of daily sleep time, and this number continues to decrease steadily throughout life (Hoban, 2004).

Babies' sleep schedules vary across cultures. Among the Micronesian Truk, babies and children have no regular sleep schedules; they fall asleep whenever they feel tired



In addition to daily sleep cycles, our bodies experience other ones. For example, we experience regular nasal dominance cycles: one nostril is dominant, and this switches on a regular basis over the course of the day.

Eccles, 1978

checkpoint can you . . .

- Explain how states of arousal reflect neurological status, and discuss variations in newborns' states?
- Tell how sleep patterns change, and how cultural practices can affect these patterns?

(Broude, 1995). When there is a bedtime, it may differ widely by country; the average bedtime in Australia and New Zealand is 7:43 PM, while in India, the average bedtime is 10:26 PM (Mindell, Sadeh, Kwon, & Goh, 2013). Mothers in rural Kenya allow their babies to nurse as they please, and their 4-month-olds continue to sleep only 4 hours at a stretch (Broude, 1995). In many predominantly Asian countries, bedtimes are later and total sleep time is shorter than in predominantly Caucasian countries (Mindell, Sadeh, Wiegand, How, & Goh, 2010; Galland, Taylor, Elder, & Herbison, 2010).

In the United States, many parents spend a great deal of energy trying, often unsuccessfully, to sooth fussy infants to sleep. This is common; across different cultures, parents are likely to report sleeping problems. However, despite different sleep patterns, over the course of a 24-hour day, young children get roughly equivalent amounts of sleep, often making up lost nighttime sleep with daytime naps (Mindell et al., 2013). Still, sleep problems are an important issue to address; low-quality or insufficient infant sleep has been associated with later attention and behavioral problems (Sadeh et al., 2015).

Complications of Childbirth

Although the great majority of births result in normal, healthy babies, some, sadly, do not. Some are born prematurely or very small, some remain in the womb too long, and some are born dead or die soon after birth. Let's look at these potential complications of birth and how they can be avoided or treated so as to maximize the chances of favorable outcomes.

LOW BIRTH WEIGHT

low-birth-weight babies
Weight of less than 5½ pounds (2,500 grams) at birth because of prematurity or being small-for-date.

preterm (premature) infants
Infants born before completing the 37th week of gestation.

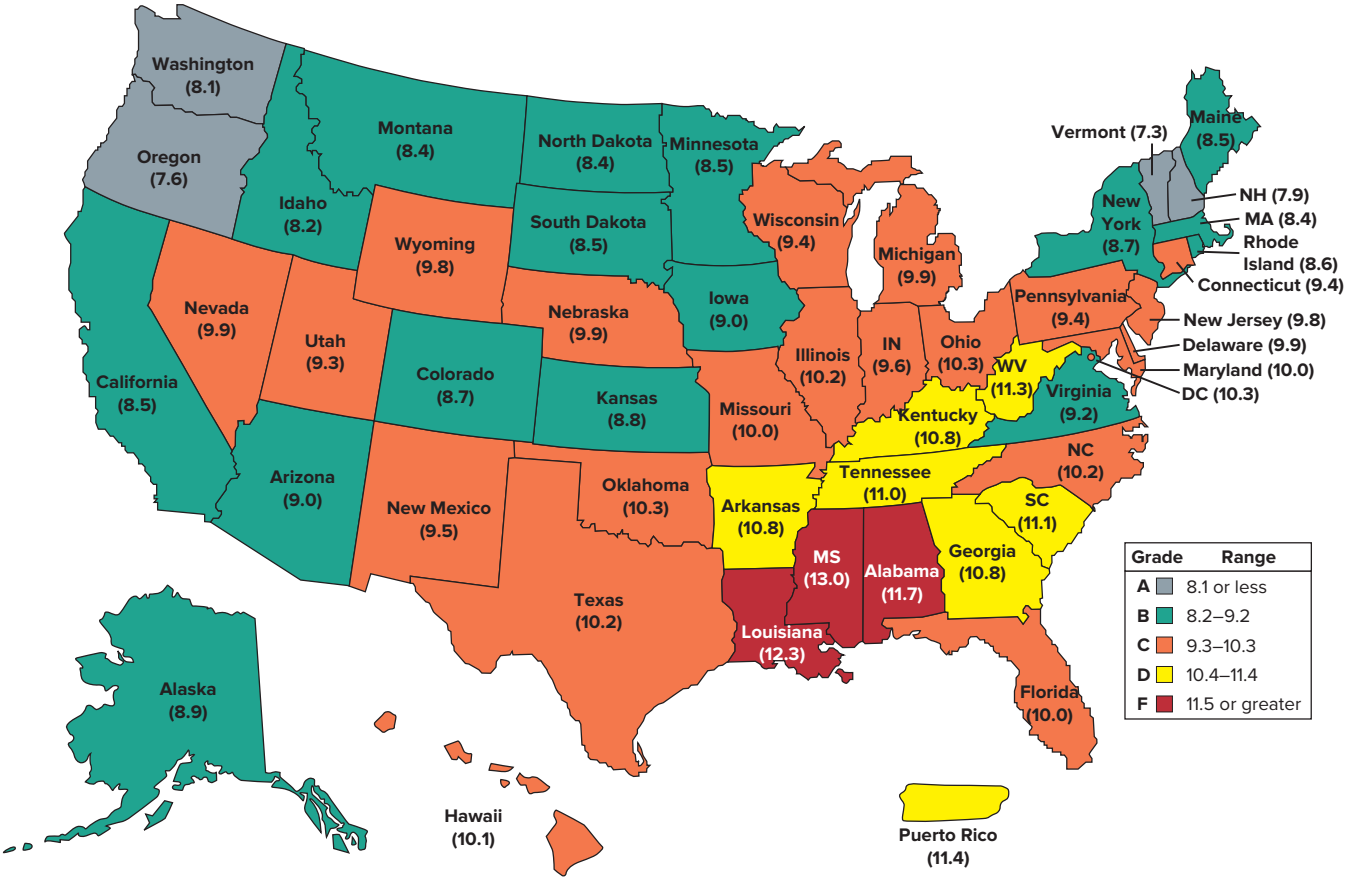
small-for-date (small-for-gestational-age) infants
Infants whose birth weight is less than that of 90 percent of babies of the same gestational age, as a result of slow fetal growth.

Low-birth-weight babies (LBW) are those neonates born weighing less than 2,500 grams (5 pounds) at birth. There are two types of LBW babies: those born early and those born small. Typical gestation is 40 weeks, and babies born before the 37th week of gestation are known as **preterm (premature) infants.** Being born early is closely associated, as might be expected, with being smaller than a full-term infant (Figure 4). More than 43 percent of preterm infants are of low birth weight, as compared with only about 3 percent of full-term infants (Martin et al., 2009). Some babies, known as **small-for-date (small-for-gestational-age) infants,** are born at or around their due dates, but are smaller than would be expected. These babies weigh less than 90 percent of babies of the same gestational age. They are small, not because they were born early and did not have a chance to finish putting on weight, but for other reasons, most commonly inadequate prenatal nutrition, which slows fetal growth.

An estimated 15 percent of all infants worldwide are born with low birth weight, and the percentages are far greater in less economically developed countries. The true extent of low birth weight may be much higher because nearly half of the newborns in the developing world are not weighed at birth (UNICEF, 2013). Low birth weight in developing regions stems primarily from the mother's poor health and nutrition. In the industrialized world, smoking during pregnancy is the leading factor in low birth weight (UNICEF & WHO, 2004).

In the United States, 8.27 percent of infants born in 2017 were low-birth-weight babies. In the same year, 9.93 percent of U.S. infants were preterm. Both of these numbers represent a third consecutive yearly increase (Hamilton et al., 2018). Much of the incidence of low birth weight and preterm births is due to delayed childbearing, multiple births, and use of fertility drugs and induced and cesarean deliveries. The risk of both preterm delivery and low birth weight increases rapidly with the number of babies being carried, approaching 100 percent for quadruplets (Martin et al., 2017).

The rise in the overall preterm delivery rate from 2016 to 2017 was entirely due to a rise in the late preterm birthrate from 7.09 percent to 7.17 percent (Hamilton et al.,



Source: March of Dimes, 2016.

FIGURE 4
Preterm Birthrates and Grades by State

2018). Late preterm infants, delivered between 34 and 36 weeks of gestation, tend to weigh more and to fare better than those born earlier in gestation, but in comparison with full-term babies, they too are at greater risk of early death or adverse effects such as respiratory distress, hospitalization, and brain injuries (Martin, Hamilton et al., 2009). Girls tend to be hardier than boys (Glass et al., 2015).

Birth weight and length of gestation are the two most important predictors of an infant's survival and health (Mathews & MacDorman, 2008). Together they constitute the second leading cause of death in infancy in the United States after birth defects (Kochanek, Murphy, Xu, & Tejada-Vera, 2016). Preterm birth is involved in nearly half of neurological birth defects, such as cerebral palsy, and more than one-third of infant deaths. Altogether, low-birth-weight infants account for more than two-thirds of infant deaths. Internationally, low birth weight is an underlying factor in 60 to 80 percent of neonatal deaths worldwide (UNICEF, 2008). The United States has been more successful than any other country in saving low-birth-weight babies, but the rate of such births to U.S. women remains higher than in some European and Asian nations (MacDorman & Mathews, 2009).

Preventing preterm births would greatly increase the number of babies who survive the first year of life. In the last decade, some countries have halved deaths attributed to preterm delivery, most notably with training and the provision of equipment and supplies. For example, even low-tech changes such as ensuring appropriate warmth, support for breast-feeding, and training in basic care for infections and breathing problems can reduce mortality rates.



A girl under age 17 who smokes while pregnant has two risk factors for bearing a low-birth-weight baby.
PhotoAlto/Sigrid Olsson/Getty Images

Risk Factors for Low Birth Weight Factors increasing the likelihood that a woman will have an underweight baby include (1) *demographic and socioeconomic factors,* such as being African American, under age 17 or over 40, poor, unmarried, or undereducated, and being born in certain regions, such as the southern and plains states (Thompson, Goodman, Chang, & Stukel, 2005); (2) *medical factors predating the pregnancy,* such as having no children or more than four, being short or thin, having had previous low-birth-weight infants or multiple miscarriages, having had low birth weight oneself, having particular genetic variants associated with higher risk (National Institutes of Health, 2010a), or having genital or urinary abnormalities or chronic hypertension; (3) *prenatal behavioral and environmental factors,* such as poor nutrition, inadequate prenatal care, smoking, use of alcohol or other drugs, or exposure to stress, high altitude, or toxic substances; and (4) *medical conditions associated with the pregnancy,* such as vaginal bleeding, infections, high or low blood pressure, anemia, depression, and too little weight gain (Arias, MacDorman, Strobino, & Guyer, 2003; Chomitz, Cheung, & Lieberman, 1995; Nathanielsz, 1995; Shiono & Behrman, 1995; Yonkers, quoted in Bernstein, 2003), and having last given birth fewer than 6 months or more than 5 years before (Conde-Agudelo, Rosas-Bermúdez, & Kafury-Goeta, 2006).

The high proportion (13.88 percent) of low-birth-weight babies in the non- Hispanic black population—almost double that of white (7 percent) and Hispanic (7.42) babies (Hamilton et al., 2018)—is a major factor in the high mortality rates of black babies (Martin, Hamilton, et al., 2007; MacDorman & Mathews, 2008). Reasons for the greater prevalence of low birth weight, preterm births, and infant mortality among African American babies include (1) health behaviors and SES; (2) higher levels of stress in African American women; (3) greater susceptibility to stress; (4) the impact of racism, which may contribute to or exacerbate stress; and (5) ethnic differences in stress-related body processes, such as blood pressure and immune reactions (Giscombé & Lobel, 2005).

Immediate Treatment and Outcomes The most pressing fear regarding very small babies is that they will die in infancy, given the multitude of challenges they face. Because their immune systems are not fully developed and because they must often be subjected to multiple invasive medical procedures, they are especially vulnerable to infection. Moreover, their nervous systems may be too immature for them to perform functions basic to survival, such as sucking, often making it necessary for them to be fed intravenously. Additionally, as they do not have enough fat to insulate them and to generate heat, it is difficult for them to stay warm. These early experiences are stressful, which further erode their early coping capacities.



The antiseptic, temperature-controlled crib, or isolette, in which this premature baby lies has holes through which the infant can be examined, touched, and massaged. Frequent human contact helps low-birth-weight infants thrive.
Kristina Bessolova/Shutterstock

One particularly difficult condition commonly faced by preterm babies is respiratory distress syndrome. Babies born early lack an adequate amount of an essential lung-coating substance called surfactant, which keeps air sacs from collapsing. These babies may breathe irregularly or stop breathing altogether. Administering surfactant to high-risk preterm newborns has dramatically increased survival rates since the late 1990s (Glass et al., 2015).

A low-birth-weight or at-risk preterm baby may be placed in an isolette (an antiseptic, temperature-controlled crib) and fed through tubes. To counteract the sensory impoverishment of life

in an isolette, hospital workers and parents are encouraged to give these small babies special handling. Gentle massage may foster growth, weight gain, motor activity, alertness, and behavioral organization (Field, Diego, & Hernandez-Reif, 2007), although results have been inconsistent and more research is needed (Badr, Abdallah, & Kahale, 2015).

Kangaroo care (KC), an intervention involving extended skin-to-skin contact, has been theorized to help preemies—and full-term infants—make the adjustment from fetal life to the jumble of sensory stimuli in the outside world. This soothing contact seems to reduce stress on the central nervous system and help with self-regulation of sleep and activity. A recent meta-analysis demonstrated that the use of KC was associated with a 36 percent decrease in mortality risk when compared with conventional care. Moreover, KC was associated with a greater likelihood of exclusive breast-feeding up to 4 months of age; decreased risk of neonatal sepsis (a life-threatening response to infection), hypothermia (low body temperature), and hypoglycemia (low blood sugar); lower likelihood of hospital readmission; improved vital signs; greater head circumference growth; and lower pain scores. These findings are particularly applicable for developing countries where technologies such as incubators and isolettes may not be available, as KC is both low-cost and highly effective (Boundy et al., 2016).

kangaroo care
Method of skin-to-skin contact in which a newborn is laid face down between the mother's breasts for an hour or so at a time after birth.

Long-Term Outcomes Even if low-birth-weight babies survive the dangerous early days, their trials may not be over. While most survivors of prematurity, even when born very young and small, live productive and happy lives, they are at greater risk for a host of adverse health outcomes when compared to adults who were born full term (Doyle & Anderson, 2010). For example, preterm infants are at higher risk of high blood pressure (Parkinson, Hyde, Gale, Santhakumaran, & Modi, 2013) and metabolic syndrome (Markopoulou et al., 2019), both preterm and small-for-date infants are at increased risk of adult-onset diabetes, and small-for-date infants appear to be at increased risk of cardiovascular disease (Crump, Sundquist, Sundquist, & Winkleby, 2011; Sperling, 2004). In addition, preterm birth is associated with a heightened risk of death throughout childhood, diminished reproductive rates in adulthood, and, for women, increased risk of bearing preterm infants themselves (Swamy, Ostbye, & Skjaerven, 2008). Generally, the shorter the period of gestation, the greater the likelihood of cerebral palsy, mental retardation, and low educational and job-related income levels (Johnson & Marlow, 2017).

In longitudinal studies of extremely low-birth-weight infants (about 1 to 2 pounds at birth) and infants born before 26 weeks of gestation, the survivors tend to be smaller than full-term children and are more likely to have neurological, sensory, cognitive, educational, and behavioral problems (Hutchinson, De Luca, Doyle, Roberts, Anderson, & the Victorian Infant Collaborative Study Group, 2013; Johnson & Marlow, 2017). Cognitive deficits, especially in memory and information-processing speed, have been noted among very low-birth-weight babies (those weighing less than 1,500 grams or 3.5 pounds at birth) by age 5 or 6 months, continuing throughout childhood (Rose, Feldman, & Jankowski, 2002), adolescence (Litt et al., 2012), and persisting into adulthood (Johnson & Marlow, 2017). Very-low-birthweight children and adolescents also tend to have more behavioral and mental health problems than those born at normal weight (Johnson & Marlow, 2014), as well as impaired motor development in young adulthood (Husby et al., 2016)

However, environmental factors can make a difference. Factors such as maternal education, two-parent family structure, and higher SES are associated with positive developmental outcomes for preterm infants (Voss, Jungmann, Wachtendorf, & Neubauer, 2012; Saigal et al., 2006). Parenting matters as well. When parents are low in anger and criticism, or when mothers are high in sensitivity or low in anxiety, preterm babies have better outcomes (Poehlmann-Tynan et al., 2015; Faure et al., 2017; Zelkowitz, Na, Wang, Bardin, & Papagerorgiou, 2011). Babies are highly resilient, and a high-quality postnatal environment can do much to moderate the potential effects of being born small.



Thanks to their own resilience, many children who live in less than ideal circumstances, such as this child in war-torn Afghanistan, can develop into self-confident, successful adults.
Source: U.S. Air Force photo by Staff Sgt. Marcus McDonald

POSTMATURITY

When people think about birth complications, they generally think about issues related to being born too early or too small. However, babies can also be negatively affected by staying too long in the womb. The incidence of postterm pregnancy in the United States is approximately 5.5 percent (Martin, Hamilton, Osterman, Curtin, & Mathews, 2013).

postmature
A fetus not yet born as of 2 weeks after the due date or 42 weeks after the mother's last menstrual period.

Postmature babies tend to be long and thin because they have kept growing in the womb but have had an insufficient blood supply toward the end of gestation. Possibly because the placenta has aged and become less efficient, it may provide less oxygen. The baby's greater size also complicates labor; the mother has to deliver a baby the size of a normal 1-month-old. This puts the mother at higher risk of a cesarean delivery, perineal tears, and postpartum hemorrhage, and the neonate at greater risk of shoulder dystocia (a condition in which the baby's shoulders become stuck behind the mother's pelvic bone during delivery), meconium aspiration, low Apgar scores, brain damage, and death (American College of Obstetricians and Gynecologists, 2014). The American College of Obstetricians and Gynecologists (2014) advises that labor induction can be considered at 41 weeks of gestation and is recommended at 42 weeks; however, there are some indications that earlier inductions may result in better outcomes (Bleicher et al., 2017).

STILLBIRTH

stillbirth
Death of a fetus at or after the 20th week of gestation.

Stillbirth, the sudden death of a fetus at or after the 20th week of gestation, is a tragic union of opposites—birth and death. Sometimes fetal death is diagnosed prenatally; in other cases, the baby's death is discovered during labor or delivery.

In the United States, the incidence of stillbirth declined by a third from 1990 to 2011 and then remained stable for three years. In 2014, the National Center for Health Statistics changed the standard for measuring gestational age, making a direct comparison to previous years problematic. The new standard used for stillbirth was late fetal death at 28 weeks or more. By this metric, perinatal mortality remained essentially flat from 2014 to 2016 at an average of 2.85 percent. Rates were highest for women aged 40 and older (9.86 percent in 2016). Additionally, they varied by ethnicity, with more than double the risk found in non-Hispanic black women (10.66 percent) than in non-Hispanic white women (4.98 percent) in 2016 (Gregory, Drake, & Martin, 2018). Boys, twins, and higher multiples are more likely to be stillborn than singletons (MacDorman & Gregory, 2015).

Although the cause of stillbirth is often not clear, many stillborn fetuses are small for gestational age, indicating malnourishment in the womb (MacDorman & Gregory, 2015). Fetuses believed to have problems can have prenatal surgery in the womb to correct congenital problems or be delivered prematurely (Goldenberg, Kirby, & Culhane, 2004). Interventions such as these could prevent a large proportion of stillbirths (Bhutta et al., 2011).

checkpoint can you . . .

- Discuss the risk factors, treatment, and outcomes for low-birth-weight babies?
- Explain the risks attending postmaturity?
- Discuss trends and risk factors for stillbirth?

Survival and Health

Infancy and toddlerhood are risky times of life. How many babies die during the first year, and why? What can be done to prevent dangerous or debilitating childhood diseases? How can we ensure that infants and toddlers live, grow, and develop as they should?

INFANT MORTALITY

Great strides have been made in protecting the lives of new babies, but these advances are not evenly distributed. In 2017, there were 5.4 million worldwide deaths of children 5 years of age and younger (World Health Organization, 2018b). Of those deaths, 2.5 million were infants 28 days or younger in age (UNICEF, 2018a). The vast majority of these early deaths are in developing countries (Figure 5), especially in South Asia and West and Central Africa (World Health Organization, 2013).

The chief causes of neonatal death worldwide are preterm birth complications (35 percent), childbirth complications (24 percent), and sepsis (15 percent). Many of these

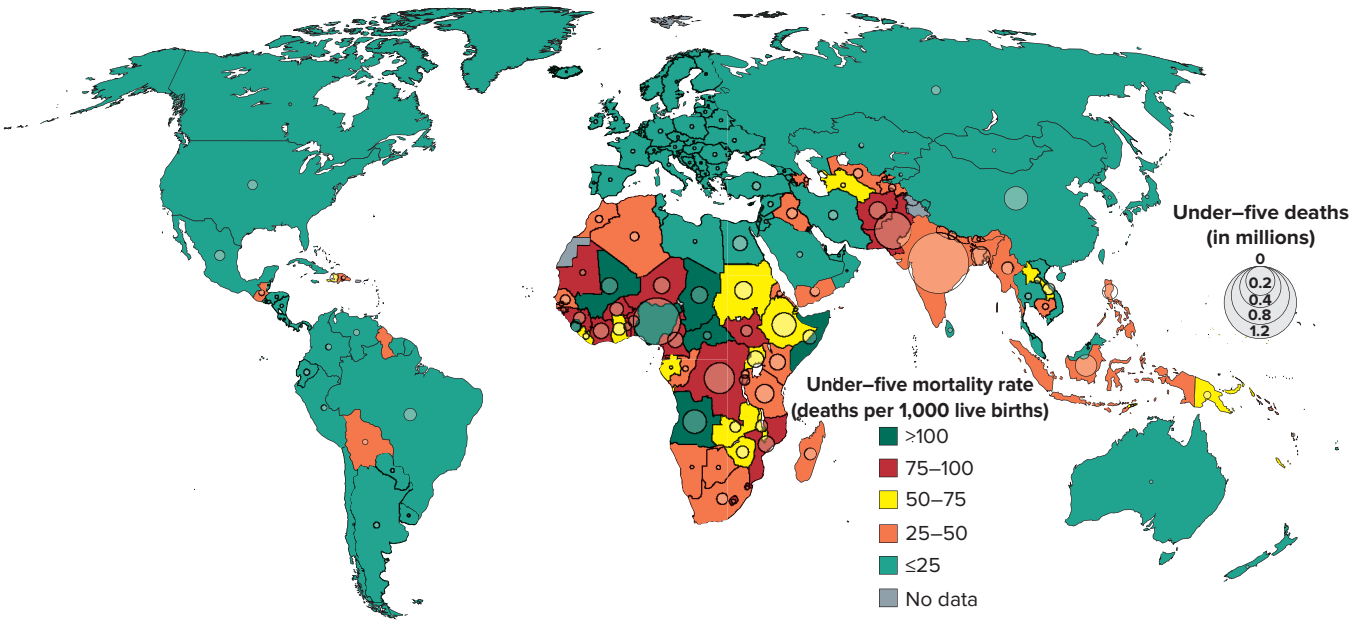


FIGURE 5
Under-Five Mortality Rate, 2015

Most neonatal deaths occur in sub-Saharan Africa and Asia.

Source: UNICEF, 2016.

deaths are preventable, resulting from a combination of poverty, poor maternal health and nutrition, infection, and inadequate medical care (UNICEF, 2015). Although maternal mortality declined 44 percent from 1990 to 2015, the number of women and girls who die in childbirth is still about 303,000 a year. Most of these deaths (27 percent) are due to hemorrhage, with preexisting medical conditions, eclampsia, embolisms, and complications of unsafe abortions also playing a role (UNICEF, 2017). About two-thirds of maternal deaths occur during the immediate postnatal period, and infants whose mothers have died are more likely to die than infants whose mothers remain alive (Sines, Syed, Wall, & Worley, 2007). As with neonatal deaths, many of these deaths are preventable.

In the United States, the **infant mortality rate**—the proportion of babies who die within the 1st year—has fallen almost continuously since the beginning of the twentieth century, when 100 infants died for every 1,000 born alive. In 2017, the infant mortality rate was 5.87 per 1,000 live births (Xu et al., 2018). More than half of U.S. infant deaths take place in the first week of life, and about two-thirds occur during the neonatal period (Heron et al., 2009).

infant mortality rate
Proportion of babies born alive who die within the 1st year.

Birth defects and genetic abnormalities are the leading cause of infant deaths in the United States, followed by disorders related to prematurity or low birth weight, sudden infant death syndrome (SIDS), maternal complications of pregnancy, accidents, and complications of the placenta, umbilical cord, and membranes (Xu et al., 2018).

The overall improvement in U.S. infant mortality rates since 1990 is attributable largely to prevention of SIDS (discussed in the next section) as well as to effective treatment for respiratory distress and medical advances in keeping very small babies alive (Arias, MacDorman, Strobino, & Guyer, 2003). Still, mainly because of the prevalence of preterm births and low birth weight, U.S. babies have less chance of reaching their 1st birthday than do babies in many other developed countries (MacDorman & Mathews, 2009). The U.S. infant mortality rate in 2008 (Figure 6) was higher than in 44 countries worldwide (Kaiser Family Foundation, 2017).

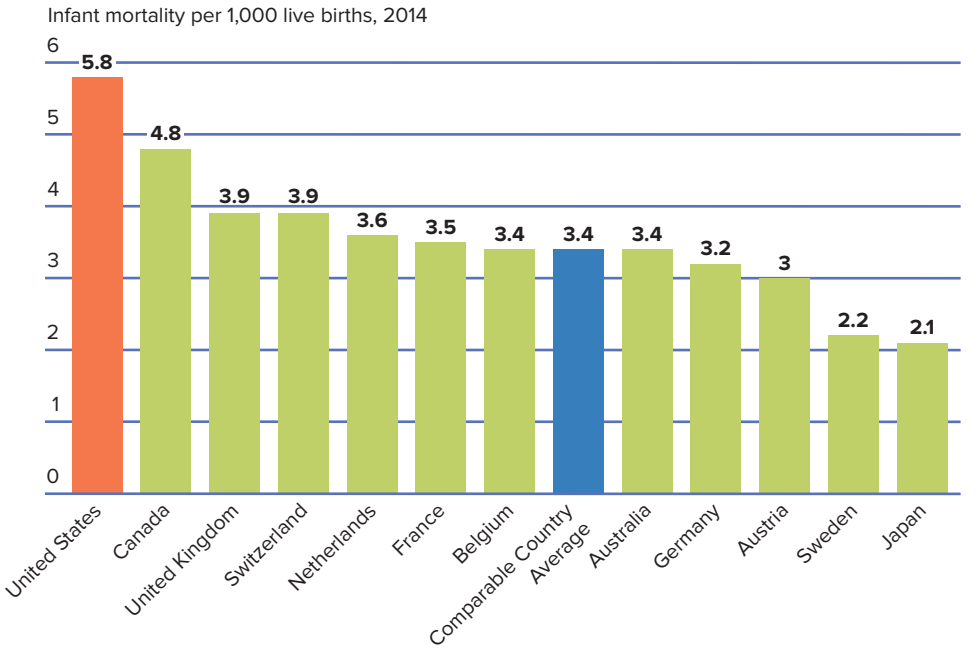
Racial/Ethnic Disparities in Infant Mortality Infant mortality in the United States has declined from 47 percent in 1940 to 5.87 percent in 2017. While this decline exists for all races and ethnic groups, large disparities remain (Figure 7). The infant mortality rate of black babies (11.76 percent) is more than twice as large as that of white (4.8 percent) and Hispanic (5.24 percent) babies (Xu et al., 2018). This disparity has been attributed to the greater prevalence of low birth weight and SIDS among African

FIGURE 6

Infant Mortality Rates in Comparable Countries

Despite dramatic improvements, the United States has a higher infant mortality rate than that of comparable nations.

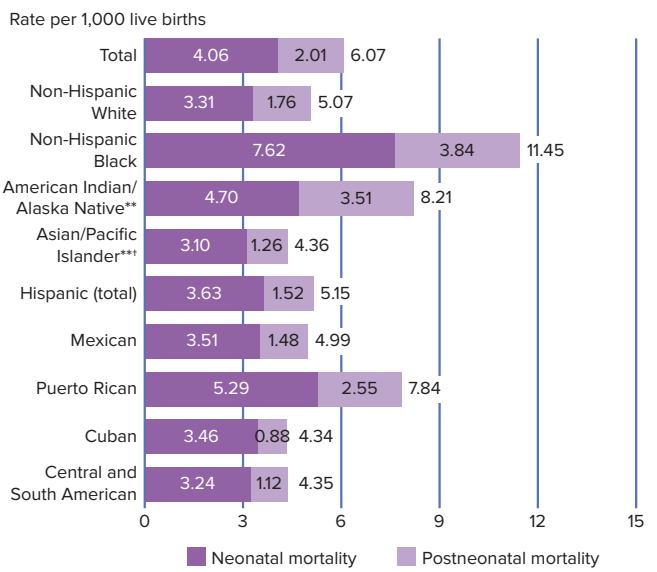
Source: Kaiser Family Foundation, 2017.



Countries are defined as those with above median GDP and above median GDP per capita in at least one of the past 10 years. Canada data estimated from 2012.

Americans. Similarly, infant mortality among Native Americans and Alaska Natives is about 1½ times that found in white babies, in this case due to SIDS and fetal alcohol syndrome (American Public Health Association, 2004; Mathews & MacDorman, 2008).

Preexisting conditions such as obesity and cardiovascular disease can increase the risk associated with pregnancy, and prevalence of these conditions varies across different racial and ethnic groups. For example, in 2016, 47 percent of Hispanic adults, 46.8 percent of black adults, and 37.9 percent of non-Hispanic white adults were obese, while only 12.7 percent of Asian adults met the same criteria (Hales, Carroll, Fryar, & Ogden, 2017). For decades, the medical community has known that African Americans are at higher risk for high blood pressure than are white patients (Lackland, 2014). Thus, some of the disparities in infant mortality rates may be attributable to factors such as these (Creanga, Syverson, Seed, & Callaghan, 2017). Behavioral factors may also play a role. For example, smoking, and alcohol consumption contribute to poor outcomes of pregnancy, and some research has shown that Native Americans and Alaska Natives tend to be heavy smokers and drinkers (National Center for Health Statistics, 2006). Last, there are clear disparities in access to and quality of health care for racial and ethnic minorities, with Hispanic and Latino adults least likely to have health insurance (Berchick, Hood, & Barnett, 2018)). Because risk factors for infant mortality vary among ethnic groups, efforts to further reduce infant deaths need to focus on factors specific to each group (Hesso & Fuentes, 2005; De Jongh, Paul, Hoffman, & Locke, 2014).



*Infant deaths are of those less than 1 year old; neonatal deaths are of those less than 28 days old; postneonatal deaths are of those at least 28 days old and less than 1 year old. **May include Hispanics. †Separate data for Asians, native Hawaiians, and other Pacific Islanders are not available.*

FIGURE 7

Infant Mortality Rates by Maternal Race/Ethnicity, United States

Ethnicity influences mortality, and African American babies have the highest death rates.

Source: U.S. Department of Health and Human Services, Health Resources and Services Administration, Maternal and Child Health Bureau, 2015.

Sudden Infant Death Syndrome (SIDS) **Sudden infant death syndrome (SIDS)**, sometimes called crib death, is the sudden death of an infant under age 1 in which the cause of death remains unexplained after a thorough investigation that includes an

autopsy. SIDS accounts for 6.5 percent of infant mortality rates (Heron, 2018). It peaks between 2 and 4 months and is most common among African Americans, low-birth-weight babies, preterm babies, twins or triplets, and babies whose mothers are young, have previously had three or more children, have high blood pressure during pregnancy, or receive late or no prenatal care (Hakeem, Oddy, Holcroft, & Abenhaim, 2015). Exposure to smoke, either during pregnancy or after birth, is a key risk factor (Zhang & Wang, 2013).

sudden infant death syndrome (SIDS) Sudden and unexplained death of an apparently healthy infant.

The search for what causes SIDS has been framed by the "triple risk" model. Within this framework, SIDS is the result of three overlapping factors. First, there is an infant that is vulnerable in some way. Second, there is a critical period during which an infant is at risk. Third, there is an exogenous stressor. SIDS will occur only if a vulnerable infant is exposed to a stressor during the critical period—all three factors must co-occur (Filiano & Kinney, 1994). Thus, a great deal of research has been devoted to investigating what factors might make infants vulnerable and the environmental triggers that can result in that vulnerability being expressed.

In some cases, an underlying biological defect may make some infants vulnerable. For approximately 14 percent of SIDS cases, there appear to be genetic mutations affecting the heart that in triggering circumstances can lead to death (Baruteau, Tester, Kapplinger, Ackerman, & Behr, 2017). More commonly, some infants appear to be born with delays or defects in the brain stem, which regulates breathing, heartbeat, body temperature, and arousal (Machaalani & Waters, 2014). These defects may prevent SIDS babies who are sleeping face down or on their sides from waking or turning their heads when they breathe stale air containing carbon dioxide trapped under their blankets (Panigrahy et al., 2000). Similarly, babies who have low levels of serotonin may not awaken under conditions of oxygen deprivation and carbon dioxide buildup and are thus at greater risk as well (Duncan et al., 2010).

Thus, the environmental trigger for these vulnerable babies is sleeping on their stomachs during the critical first year of age, and research strongly supports a relationship between this and SIDS. SIDS rates declined in the United States by more than 50 percent in the 10 years following the "Back-to-Sleep" campaign advocating that healthy babies be laid down to sleep on their backs (Trachtenberg, Haas, Kinner, Stanley, & Krous, 2012).

The American Academy of Pediatrics (Moon & Fu, 2012) also recommends that infants *not* sleep on soft surfaces, such as pillows, quilts, or sheepskin, or under loose covers, which, especially when the infant is face down, may increase the risk of overheating or rebreathing (breathing the infant's own exhaled carbon dioxide). Current recommendations for risk reduction also include sleeping in the parent's room, but on a separate surface; avoiding tobacco smoke and the use of breathing monitors; and using a pacifier as a strategy to reduce the risk of SIDS. Breast-feeding and immunizations appear to offer some protection as well (Moon & Hauck, 2016).



The Back-to-Sleep campaign is a great example of a successful public health campaign. However, it comes with unexpected consequences. Because babies spend less time trying to push up on their arms to see the world, several motor milestones (such as rolling over) are now delayed relative to where they used to be.

Davis, Moon, Sachs, & Ottolini, 1998

Deaths from Injuries Unintentional injuries are the fifth leading cause of death in infancy in the United States (Xu et al., 2018). Infants have the second highest death rate from unintentional injuries among children and adolescents, exceeded only by 15- to 19-year-olds. About two-thirds of injury deaths in the 1st year of life are by suffocation. Among children ages 1 to 4, traffic accidents are the leading cause of unintentional injury deaths, followed by drowning and burns. Falls are by far the major cause of nonfatal injuries in both infancy (52 percent) and toddlerhood (43 percent). Boys of all ages are more likely to be injured and to die from their injuries than girls (Borse et al., 2008). African American, American Indian, and Alaskan Native infants are 2 to 3 times more likely than white infants and 4 to 6 times more likely than Asian, Pacific Islander, and Hispanic infants to die of accidental injuries (Hauck, Tanabe, & Moon, 2011). These statistics speak to the important of baby-proofing the environment because many accidents are avoidable.

About 90 percent of all injury deaths in infancy are due to one of four causes: suffocation, motor vehicle traffic, drowning, and residential fires or burns (Pressley et al., 2007). Many of these accidental injuries occur at home. Some injuries reported as accidental may actually be inflicted by caregivers unable to cope with a crying baby.

checkpoint can **you** . . .

- Summarize trends in infant mortality and injury deaths, and give reasons for racial/ethnic disparities?
- Discuss risk factors for, causes of, and prevention of sudden infant death syndrome?



The rates of infectious diseases have plummeted in the United States thanks to widespread immunization, but many children in low-income urban areas are not properly immunized.
Ian Hooton/Science Photo Library/Science Source

IMMUNIZATION FOR BETTER HEALTH

Such once-familiar and sometimes fatal childhood illnesses as measles, pertussis (whooping cough), and polio are now largely preventable, thanks to the development of vaccines that mobilize the body's natural defenses. Unfortunately, many children still are not adequately protected.

Worldwide, 85 percent of children—123 million—received routine vaccinations during their 1st year in 2017. Estimates are that this averts 2 million to 3 million deaths every year. Unfortunately, more than 20 million children under the age of 1 year did not receive any immunizations, in many cases because they lived in conflict-ridden countries where health services are disrupted (UNICEF, 2018b).

In the United States, thanks to a nationwide immunization initiative, over 90 percent of 19- to 35-month-olds had completed a recommended series of childhood vaccinations, including measles, mumps, rubella, hepatitis B, and chicken pox. Still, many children, especially poor or African American children, lack one or more of the required shots and there are regional differences in coverage (Centers for Disease Control and Prevention, 2018).

Some parents hesitate to immunize their children because of speculation that certain vaccines—particularly the diphtheria-pertussis-tetanus (DPT) and measles-mumps-rubella (MMR) vaccines—may cause autism or other neurodevelopmental disorders. However, there is no empirical evidence that this link exists. A recent meta-analysis representing data from more than 1.26 million children showed no link between autism, autism-spectrum disorders, mental retardation, and vaccines (Taylor, Swerdfeger, & Eslick, 2014). Despite this data, however, many parents elect not to vaccinate their children or vaccinate them incompletely or on a delayed schedule. This, as well as imported disease from international travel, has resulted in a resurgence of some diseases (Ventola, 2016). For example, as of mid-July 2019, the Centers for Disease Control logged almost 1,200 cases of measles across 30 states, the largest outbreak reported in the United States since 1944 (Centers for Disease Control, 2019a). Currently, exemptions for religious or philosophical reasons are allowed in many states, and in some areas, the exemption rate is as high as 20 percent (Ventola, 2016).

Another parental worry is that infants receive too many vaccines for their immune system to handle safely. Actually, the opposite is true. Multiple vaccines fortify the immune system against a variety of bacteria and viruses and reduce related infections (Offit et al., 2002).

The 1998 article by Dr. Andrew Wakefield that first linked autism and vaccines was retracted in February of 2010 by The Lancet *amid allegations of bias and unethical conduct by Dr. Wakefield.*

checkpoint
can **you** . . .

- Explain why full immunization of all infants and preschoolers is important?

Early Physical Development

Fortunately, most infants survive, develop normally, and grow up healthy. What principles govern their development? What are the typical growth patterns of body and brain? How do babies' needs for nourishment and sleep change? How do their sensory and motor abilities develop?

PRINCIPLES OF DEVELOPMENT

As before birth, physical growth and development follow the *cephalocaudal principle* and the *proximodistal principle*.

According to the cephalocaudal principle, growth occurs from the top down. Because the brain grows rapidly before birth, a newborn baby's head is disproportionately large. The head becomes proportionately smaller as the child grows in height and the lower parts of the body develop (Figure 8). Sensory and motor development proceed according to the same principle: Infants learn to use the upper parts of the body before the lower parts. So, for example, a baby learns to use her arms for grasping

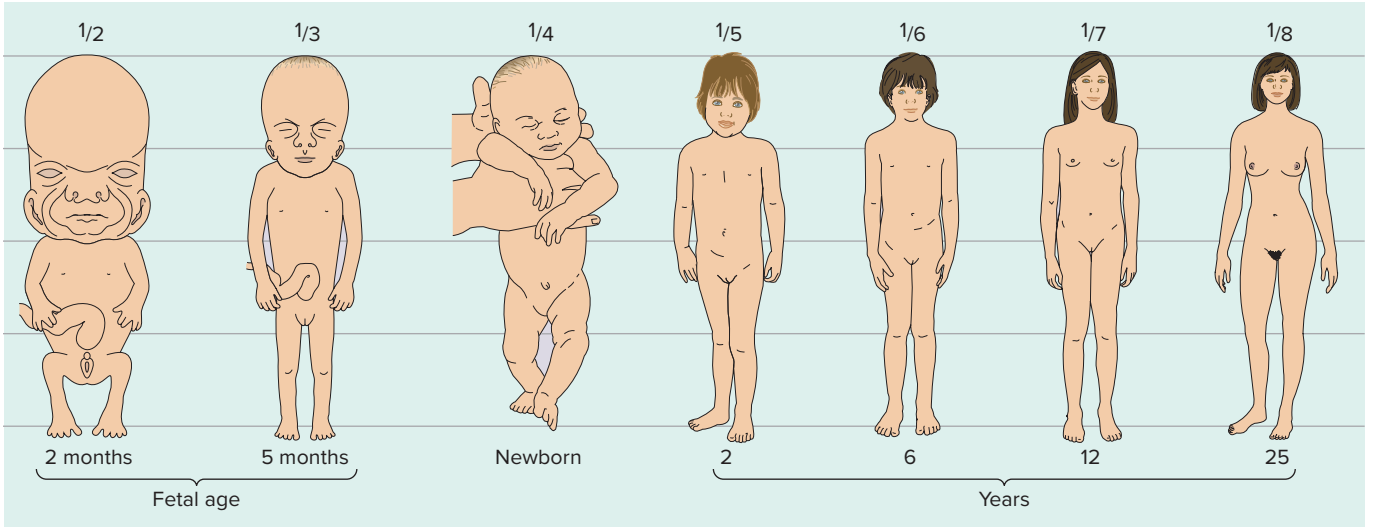


FIGURE 8

Changes in Proportions of the Human Body during Growth

The most striking change is that the head becomes smaller relative to the rest of the body. The fractions indicate head size as a proportion of total body length at several ages. More subtle is the stability of the trunk proportion (from neck to crotch). The increasing leg proportion is almost exactly the reverse of the decreasing head proportion.

prior to learning to use her legs for walking, and holds her head up before she can sit unaided.

According to the proximodistal principle (inner to outer), growth and motor development proceed from the center of the body outward. In the womb, the head and trunk develop before the arms and legs, then the hands and feet, and then the fingers and toes. During infancy and early childhood, the limbs continue to grow faster than the hands and feet. Babies learn to use the parts of their bodies closest to the center of their body before they learn to use the outermost parts. For example, babies first learn to control their arms when reaching, then use their hands in a scooping motion, then finally learn to use their thumb and pointer finger in a pincer grip.

GROWTH PATTERNS

Children grow faster during the first 3 years, especially during the first few months, than they ever will again (Figure 9). By 5 months, the average U.S. baby boy's birth weight has doubled to nearly 16 pounds, and, by 1 year, has more than tripled to exceed 25 pounds. This rapid growth rate tapers off during the 2nd and 3rd years. A boy typically gains about 5½ pounds by his second birthday and 3 more pounds by his third, when he tips the scales at almost 34 pounds. A boy's height typically increases by 10 inches during the 1st year (making the average 1-year-old boy about 30 inches tall), by 5 inches during the 2nd year (so that the average 2-year-old boy is about 3 feet tall), and by 2½ inches during the 3rd year (to approach 39 inches). Girls follow a similar pattern but are slightly smaller at most ages (Kuczmarski et al., 2000; McDowell et al., 2008). As a baby grows into a toddler, body shape and proportions change too; a 3-year-old typically is slender compared with a chubby, potbellied 1-year-old.

The genes an infant inherits have a strong influence on whether the child will be tall or short, thin or stocky, or somewhere in between. This

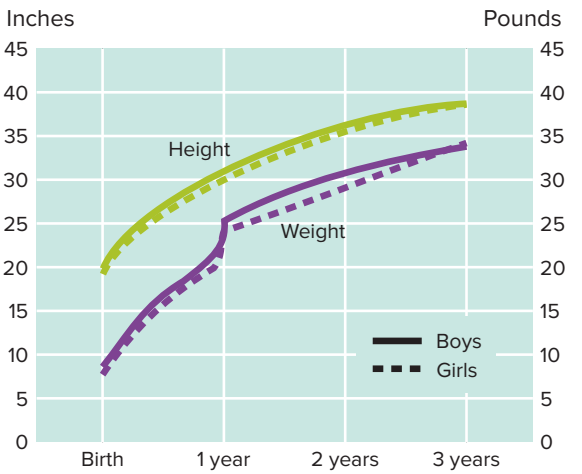


FIGURE 9

Growth in Height and Weight during Infancy and Toddlerhood

Babies grow most rapidly in both height and weight during the first few months of life and then taper off somewhat by age 3. Baby boys are slightly larger, on average, than baby girls.

Note: Curves shown are for the 50th percentiles for each sex.

checkpoint
can **you** . . .

- Summarize typical patterns of physical growth and change during the first 3 years?
- Identify factors that affect growth?

genetic influence interacts with such environmental influences as nutrition and living conditions. Today children in many developed countries are growing taller and maturing at an earlier age than children did a century ago, probably because of better nutrition, improved sanitation and medical care, and the decrease in child labor.

Teething usually begins around 3 or 4 months, when infants begin grabbing almost everything in sight to put into their mouths, but the first tooth may not actually arrive until sometime between 5 and 9 months, or even later. By the 1st birthday, babies generally have 6 to 8 teeth; by age 2½, they have a mouthful of 20.

NUTRITION

Proper nutrition is essential to healthy growth. Feeding needs change rapidly during the first 3 years of life.



Breast milk can be called the "ultimate health food" because it offers so many benefits to babies—physical, cognitive, and emotional.
Westend61/Getty Images

Breast or Bottle? With regard to nutrition, breast-feeding is almost always best for infants (Table 3). It should begin immediately after birth and ideally continue for at least 1 year, longer if the mother and baby wish (Eidelman et al., 2012). The American Academy of Pediatrics (AAP) Section on Breastfeeding (2005) recommends that babies be exclusively breast-fed for 6 months. Breast-feeding has economic as well as health benefits. If 90 percent of the U.S. mothers in the study complied with the AAP's recommendation to breast-feed for 6 months, potentially 911 infant deaths could be prevented and the United States could save $13 billion annually (Bartick & Reinhold, 2010).

A variety of social factors can make it difficult for women to follow this initiative. Such factors as a short or absent postpartum maternity leave, lack of flexible scheduling, an inability to take relatively frequent and extended breaks at work to pump milk, and a lack of privacy make it difficult to sustain breast-feeding (Guendelman et al., 2009). Thus, many women, even if they desire to breast-feed, are unable to do so and must use formula.

TABLE 3 Benefits of Breast-Feeding over Formula-Feeding

BREAST-FED BABIES . . .
• Are less likely to contract infectious illnesses such as diarrhea, respiratory infections, otitis media (an infection of the middle ear), and staphylococcal, bacterial, and urinary tract infections.
• Have a lower risk of SIDS and of postneonatal death.
• Have less risk of inflammatory bowel disease.
• Have better visual acuity, neurological development, and long-term cardiovascular health, including cholesterol levels.
• Are less likely to develop obesity, asthma, eczema, diabetes, lymphoma, childhood leukemia, and Hodgkin's disease.
• Are less likely to show language and motor delays.
• Score higher on cognitive tests at school age and into young adulthood.
• Have fewer cavities and are less likely to need braces.
BREAST-FEEDING MOTHERS . . .
• Enjoy quicker recovery from childbirth with less risk of postpartum bleeding.
• Are more likely to return to their prepregnancy weight and less likely to develop long-term obesity.
• Have reduced risk of anemia and lowered risk of repeat pregnancy while breast-feeding.
• Report feeling more confident and less anxious.
• Are less likely to develop osteoporosis or ovarian and premenopausal breast cancer.

Sources: AAP Section on Breastfeeding, 2005; Black, Morris, and Bryce, 2003; Chen and Rogan, 2004; Dee Li, Lee, and Grummer-Strawn, 2007; Kramer et al., 2008; Lanting, Fidler, Huisman, Touwen, Boersma, 1994; Mortensen, Michaelsen, Sanders, and Reinisch, 2002; Owen, Whincup, Odoki, Gilg, and Cook, 2002; Singhal, Cole, Fewtrell, and Lucas, 2004; United States Breastfeeding Committee, 2002.

The only acceptable alternative to breast milk is an iron-fortified formula that is based on either cow's milk or soy protein and contains supplemental vitamins and minerals. Infants weaned during the 1st year should receive iron-fortified formula. At 1 year, babies can switch to cow's milk.

Breast-feeding is inadvisable if a mother is infected with the acquired immune deficiency syndrome (AIDS) virus or any other infectious illness, if she has untreated active tuberculosis, if she has been exposed to radiation, or if she is taking any drug that would not be safe for the baby (AAP Section on Breastfeeding, 2005). The risk of transmitting human immunodeficiency virus (HIV) infection to an infant continues as long as an infected mother breast-feeds (Breastfeeding and HIV International Transmission Study Group, 2004), although this risk can be reduced via the use of zidovudine and/or nevirapine during the first 14 weeks of life (Kumwenda et al., 2008).

Other Nutritional Concerns Healthy babies should consume *nothing* but breast milk or iron-fortified formula for the first 6 months. Pediatric experts recommend that iron-enriched solid foods—usually beginning with cereals—be introduced gradually during the second half of the 1st year. Water may be introduced at this time (American Academy of Pediatrics, 2018).

Unfortunately, while there have been improvements in what young children eat in the past decade, many parents do not follow recommendations. According to random telephone interviews with parents and caregivers of more than 3,000 U.S. infants and toddlers, 17 percent of infants are given solid food before 4 months, 5.5 percent drink juice before 6 months, and 17 percent drink cow's milk before 12 months. Moreover, most young children do not eat enough fruits or vegetables, or a sufficient variety of vegetables, and, as they age into toddlerhood, many consume increasing amounts of sugar-sweetened beverages (Roess et al., 2018).



A child under age 3 with an obese parent is likely to become obese as an adult, regardless of the child's own weight.
Dennis MacDonald/PhotoEdit

Obesity, defined in infants as having a weight for height in the 95th percentile, has increased in infancy as it has in all age groups in the United States. In 2011–2012, the prevalence of obesity in children from birth to age 2 was 8.1 percent (Ogden, Carroll, Kit, & Flegal, 2014), with the highest rates found in American Indians or Alaska Natives (20.7 percent) and Latinos (17.9 percent) (Polhamus, Dalenius, Mackintosh, Smith, & Grummer-Strawn, 2011).

A recent review including data from 282 studies identified a variety of risk factors found in infants and toddlers from 0 to 2 years of age that are associated with later risk of obesity in children. Children born to mothers who had a higher prepregnancy body mass index (BMI) or who gained a great deal of weight during the pregnancy were at higher risk, as were infants who weighed a great deal at birth or gained weight quickly as infants. Additionally, prenatal tobacco exposure was also implicated. Other factors were associated, but not as strongly. These included a maternal diagnosis of gestational diabetes, enrollment in child care, inappropriate bottle use, being introduced to solid food before the age of 4 months, and the use of antibiotics for the infant (Baidal et al., 2016). Generally, data support the finding that efforts to prevent obesity in children are most likely to be successful if they begin earlier in life (Cheung, Cunningham, Narayan, & Kramer, 2016).

While infants and toddlers in the United States may eat too much, in many low-income communities around the world, they may not eat enough. The accompanying Window on the World addresses the effects of malnutrition and the efforts to study it.

On average, an ounce of breast milk has about 22 calories in it.

Kellymom Breast Feeding and Parenting, 2006

checkpoint can you . . .

- Summarize pediatric recommendations regarding early feeding and the introduction of cow's milk, solid foods, and fruit juices?
- Cite factors that contribute to obesity in later life?

THE BRAIN AND REFLEX BEHAVIOR

What makes newborns respond to a nipple? What tells them to start the sucking movements that allow them to control their intake of fluids? These are functions of the **central nervous system**—the brain and *spinal cord* (a bundle of nerves running through the backbone)—and of a growing peripheral network of nerves extending to every part of the body. Through this network, sensory messages travel to the brain, and motor commands travel back.

central nervous system
Brain and spinal cord.

window on the world

MALNUTRITION: THE FIRST 1,000 DAYS

In many low-income communities around the world, malnutrition in early life is widespread—and often fatal. Chronic malnutrition is caused by factors such as poverty, low-quality foods, poor dietary patterns, contaminated water, unsanitary conditions, insufficient hygiene, inadequate health care, and diarrheal diseases and other infections.

Approximately 3.1 million children around the world die each year from chronic malnutrition, accounting for 45 percent of all deaths of children under 5 (UNICEF, 2017, May). Worldwide, 25 percent of children under 5 are malnourished; most of these children live in West/Central Africa, Southeast Asia, Latin America, and the Caribbean (Lake, 2015). Malnutrition is not confined to developing countries. In North America, 13.1 million children in the United States, 1.1 million in Canada, and 2.5 million in Mexico are undernourished (Patterson, 2017).

Conducting research on malnutrition is a challenging proposition, given both ethical and practical considerations. However, the Institute of Nutrition of Central America and Panama (INCAP) successfully conducted a longitudinal quasi-experiment to address this issue. In this study, two large (900 people) and two small (500 people) Guatemalan villages were identified. The villages were matched on variables known to be important to development, such as overall health and socioeconomic status. Children under the age of 7 in both villages were given a vitamin and mineral supplement twice a day and closely monitored. In one village of each size, the supplement also contained additional protein.

This research showed that early protein supplementation resulted in substantial improvements in cognitive skills, physical development, and economic productivity. The children who received the protein supplementation were taller, had better performance on a wide variety of cognitive tasks, and had greater fat-free mass. As adults, they were at lower risk of living in poverty and (in men) showed greater work capacity. Additional follow-up work on susceptibility to chronic diseases of adulthood is being conducted on these children, who are now 39 to 53 years of age. Early results indicate that the supplementation had a positive result here as well (Martorell, 2016).

There is a caveat here, however. The positive effects of supplementation occurred only for those children who participated in the study before the age of 3 years. Supplementation did not have the same effect for older children. Why would this be?

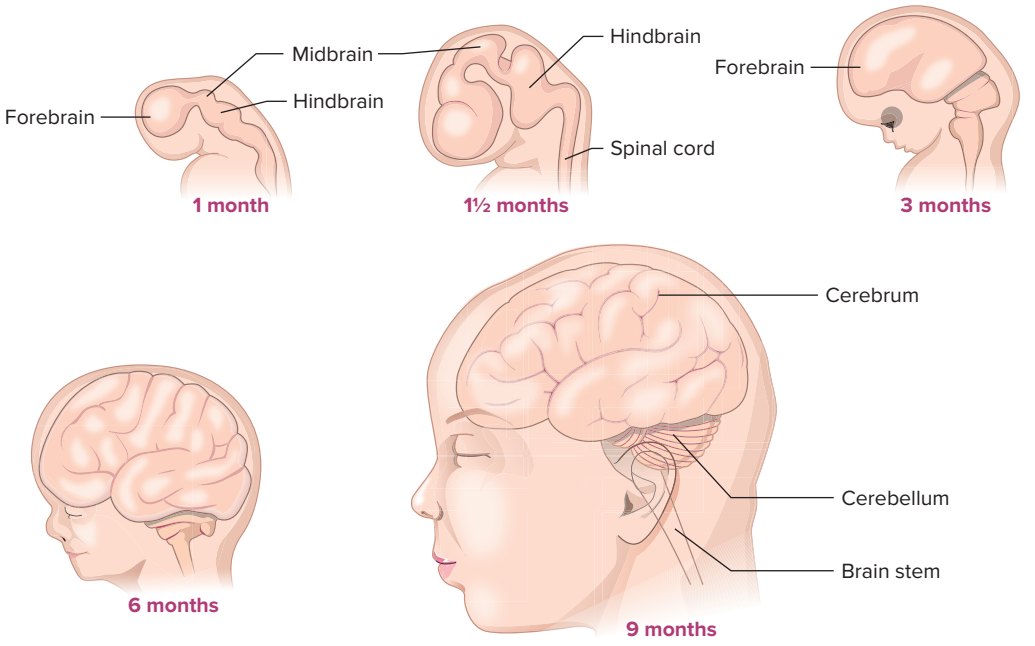
The author of the study argues that the first 1,000 days are a critical time period for healthy physical and cognitive development. But why? First, this is a time of exceedingly rapid physical growth and brain development. Thus, any deficiencies encountered during this time period are likely to have a stronger effect. This rapid growth also implies increased caloric requirements relative to body size, making younger children even more vulnerable to deprivation. Second, young children have greater susceptibility to infections, such as diarrheal diseases, that can impact their ability to successfully digest nutrients. Last, younger children are more dependent upon others to take care of their needs and thus are less able to take compensatory action (Martorell, 2016).

This research along with numerous other lines of inquiry has led the United Nations Children's Fund (UNICEF) to implement initiatives designed to assess the nutritional and health needs of affected people, educate and support breast-feeding women, provide essential vitamins and nutrients, and provide food and clean water for malnourished children (UNICEF, 2015). Dozens of other organizations have joined in the fight to decrease world hunger. The World Hunger Education Service reports a 42 percent decrease in the prevalence of malnourished people in developing nations between 1990 and 2014.

Although 13.5 percent of the overall population in developing nations remains chronically undernourished, this is a decline from 23.4 percent in 1990 (Hunger Notes, 2016). Progress is being made in the fight against world hunger, but it cannot be solved overnight.



What do you think some of the ethical considerations are when conducting research with malnourished children? What responsibility do wealthy nations have toward developing nations?



Source: 1979. Cowan

FIGURE 10
Brain Development during Gestation

Fetal nervous system development begins at about 3 weeks. At 1 month, major regions of the brain appear: the forebrain, midbrain, and hindbrain. As the brain grows, the front part expands to form the cerebrum, the seat of conscious brain activity. The cerebellum grows most rapidly during the 1st year of life.

Building the Brain The growth of the brain is a lifelong process fundamental to physical, cognitive, and emotional development. Through various brain imaging tools, researchers are gaining a clearer picture of how brain growth occurs.

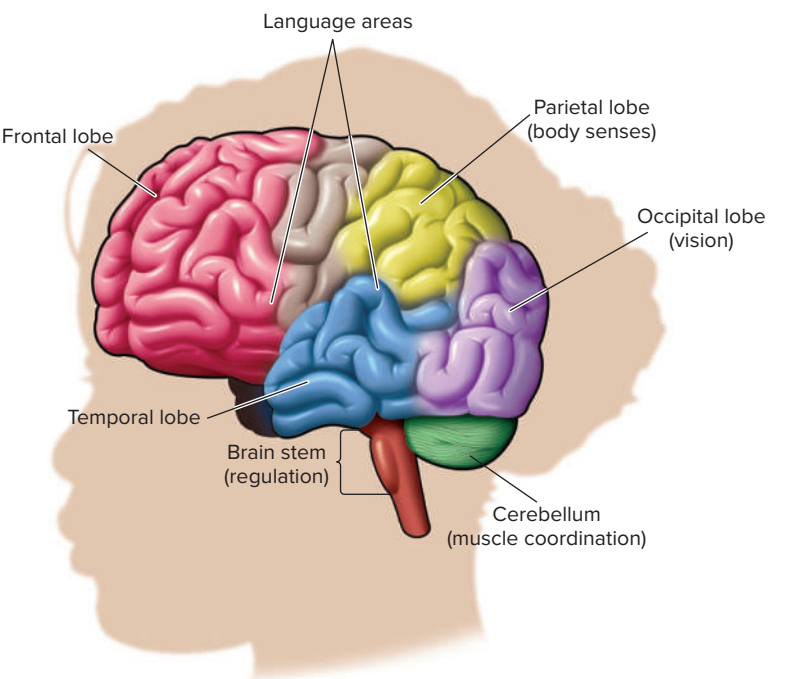
The brain at birth is only about one-fourth to one-third of its eventual adult volume (Toga, Thompson, & Sowell, 2006). By age 6, it is almost adult size, but specific parts of the brain continue to grow and develop functionally into adulthood. The brain's growth occurs in fits and starts called *brain growth spurts*. Different parts of the brain grow more rapidly at different times.

lateralization
Tendency of each of the brain's hemispheres to have specialized functions.

Major Parts of the Brain Beginning about 3 weeks after conception, the brain gradually develops from a long hollow tube into a spherical mass of cells (Figure 10). By birth, the growth spurt of the spinal cord and *brain stem* (the part of the brain responsible for such basic bodily functions as breathing, heart rate, body temperature, and the sleep-wake cycle) has nearly run its course. The *cerebellum* (the part of the brain that maintains balance and motor coordination) grows fastest during the 1st year of life (Casaer, 1993; Knickmeyer et al., 2008).

The *cerebrum,* the largest part of the brain, is divided into right and left halves, or hemispheres, each with specialized functions. This specialization of the hemispheres is called **lateralization.** The left hemisphere is mainly concerned with language and logical thinking, the right hemisphere with visual and spatial functions such as map reading and drawing. Joining the two hemispheres is a tough band of tissue called the *corpus callosum,* which allows them to share information and coordinate commands. The corpus callosum grows dramatically during childhood, reaching adult size by about age 10. Each cerebral hemisphere has four lobes or sections, which control different functions. They include the *occipital, parietal, temporal,* and *frontal lobes* (Figure 11). The

FIGURE 11
The Human Brain



occipital lobe is the smallest of the four lobes and is primarily concerned with visual processing. The parietal lobe is involved with integrating sensory information from the body. It helps us move our bodies through space and manipulate objects in our world. The temporal lobe helps us interpret smells and sounds and is involved in memory. The frontal lobes, the newest region of the brain, are involved with a variety of higher-order processes, such as goal setting, inhibition, reasoning, planning, and problem solving. The regions of the *cerebral cortex* (the outer surface of the cerebrum) that govern vision, hearing, and other sensory information grow rapidly in the first few months after birth and are mature by age 6 months, but the areas of the frontal cortex responsible for abstract thought, mental associations, remembering, and deliberate motor responses grow very little during this period and remain immature for several years (Gilmore et al., 2007).

The brain growth spurt that begins at about the third trimester of gestation and continues until at least the 4th year of life is important to the development of neurological functioning. Smiling, babbling, crawling, walking, and talking—all the major sensory, motor, and cognitive milestones of infancy and toddlerhood—reflect the rapid development of the brain, particularly the cerebral cortex. (Research in Action discusses autism, a disorder related to abnormal brain growth.)

neurons
Nerve cells.

Brain Cells The brain is composed of *neurons* and *glial cells*. **Neurons,** or nerve cells, send and receive information. *Glia,* or glial cells, nourish and protect the neurons. They are the support system for our neurons.



As an analogy, think of this as a sports team. Integration *involves all members of the team learning to work together in a coordinated fashion.* Differentiation *involves each team member taking on a specific position to play.*

Beginning in the 2nd month of gestation, an estimated 250,000 immature neurons are produced every minute through cell division (mitosis). At birth, most of the more than 100 billion neurons in a mature brain are already formed but are not yet fully developed. The number of neurons increases most rapidly between the 25th week of gestation and the first few months after birth. This cell proliferation is accompanied by a dramatic growth in cell size.

Originally the neurons are simply cell bodies with a nucleus, or center, composed of deoxyribonucleic acid (DNA), which contains the cell's genetic programming. As the brain grows, these rudimentary cells migrate to various parts of the brain (Bystron, Rakic, Molnar, & Blakemore, 2006). Most of the neurons in the cortex are in place by 20 weeks of gestation, and its structure becomes fairly well-defined during the next 12 weeks.

Once in place, the neurons sprout *axons* and *dendrites*—narrow, branching, fiberlike extensions. Axons send signals to other neurons, and dendrites receive incoming messages from them, through *synapses,* tiny gaps, which are bridged with the help of chemicals called *neurotransmitters* that are released by the neurons. Eventually, a particular neuron may have anywhere from 5,000 to 100,000 synaptic connections.

The multiplication of dendrites and synaptic connections, especially during the last 2½ months of gestation and the first 6 months to 2 years of life, accounts for much of the brain's growth and permits the emergence of new perceptual, cognitive, and motor abilities. As the neurons multiply, migrate to their assigned locations, and develop connections, they undergo the complementary processes of *integration* and *differentiation*. Through **integration,** the neurons that control various groups of muscles coordinate their activities. Through **differentiation,** each neuron takes on a specific, specialized structure and function.

integration
Process by which neurons coordinate the activities of muscle groups.

differentiation
Process by which cells acquire specialized structures and functions.

cell death
In brain development, normal elimination of excess brain cells to achieve more efficient functioning.

At first the brain produces many more neurons and synapses than it needs. The large number of excess neurons provided by this early proliferation give the brain flexibility—with more connections available than will ever be needed, many potential paths are open for the growing brain. As early experience shapes the brain, the paths are selected, and unused paths are pruned away. This process involves **cell death,** which may sound negative but is a way to calibrate the developing brain to the local environment and help it work more efficiently. This process begins during the prenatal period and continues after birth.

Only about half the neurons originally produced survive and function in adulthood (Society for Neuroscience, 2008). Yet, even as unneeded neurons die out, others may continue to

AUTISM

Autism spectrum disorders (ASD) are characterized by deficits in social communication and language, difficulties with social interaction, and restrictive, repetitive patterns of behavior, interests, or activities (American Psychiatric Association, 2013). Recent figures show 1 in 68 children diagnosed with ASD (Centers for Disease Control, 2016), an apparent increase from previous years. To what might we attribute this increase, and what can research tell us about what is going on?

One factor theorized to be important centers on the diagnostic criteria. The DSM-5 now collapses several disorders into the single diagnosis of ASD. Severe *autistic disorder* as well as *Asperger's syndrome* are now classified as falling on the autism spectrum (Zylstra, Prater, Walthour, & Aponte, 2014), where they were not before. Thus, many children and adults who were not previously diagnosed as having ASD now qualify as such. Changes in ASD rates can also be explained by increased public awareness, referrals by doctors and schools, and more sensitive diagnostic tools (Zylstra et al., 2014). However, the rise in rates cannot be fully explained by changes in diagnosis (Hansen, Schendel, & Parner, 2015).

Research has indicated that ASD has a strong genetic basis. Siblings of children with ASD are at increased risk (Ozonoff et al., 2011), and behavioral genetics studies confirm that increased risk is associated with genetic relatedness (Sandin et al., 2014). However, genes are not fully deterministic, and proposed key genetic variations are also found in individuals without ASD (Nardone & Elliot, 2016). Moreover, the rise in prevalence rates is unlikely to be attributable solely to genetics, as it has occurred too rapidly to reflect significant genomic change.

What other factors have been investigated? Ng and others (2017) conducted a meta-analysis of 315 international studies, noting a "vast literature riddled with inconsistent findings." Nevertheless, several key factors emerged. These include physiological factors such as advanced parental age, preterm birth, low birth weight, and clustering of pregnancy complications. Other culprits include pesticides, leads, heavy metals, traffic-related air pollutants, chemicals found in everyday household products (Boggess, Faber, Kern, & Kingston, 2016; Wong, Wais, & Crawford, 2015), and other substances that might be able to cross the placental barrier and affect brain development (Kalkbrenner, Schmidt, & Penlesky, 2014; Nardone & Elliot, 2016). No conclusive evidence has been found yet.

The environmental factor that has received the most attention is the purported link between vaccines and autism. Anti-vaccine activists have argued that vaccines trigger autism in certain individuals. This theory has been repeatedly debunked (Taylor, Swerdfeger, & Eslick, 2014). However, anti-vaccination attitudes proliferate and are spread via websites, forums, and social media (Basch, Zybert, Reeves, & Basch, 2017; Venkatraman, Garg, & Kumar, 2015). Thimerosal, an antibacterial preservative composed of a mercury compound, has at times been the center of controversy, despite being "much less toxic" than mercury found in fish or other sources (Roy, Aggarwal, Dhangar, & Aneja, 2016). Meta-analyses have failed to substantiate claims of links between thimerosal and ASD (Ng, De Montigny, Ofner, & Do, 2017; Roy et al., 2016). Nonetheless, it has been largely removed from vaccines in response to the public debate. Vaccines are safe for almost all children and far less risky than failing to immunize against potentially life-threatening diseases (Roy et al., 2016).

More research is needed to lay claim to definitive causes of ASD. A complex interplay of genetics and environmental factors is responsible for brain and behavioral changes associated with ASD. The relevant research questions to explore are daunting, in consideration of critical windows of exposure, ASD subtypes, gender variations, and individual genetic susceptibility (Kalkbrenner et al., 2014). Science can give us answers, but not all of them, and not right away.



Do you support the view that autism rates are indeed on the rise? Given what you know today, how would you respond to claims that vaccinations are linked to autism?

form during adult life (Deng, Aimone, & Gage, 2010). Meanwhile, connections among cortical cells continue to strengthen and to become more reliable and precise, enabling more flexible and more advanced motor and cognitive functioning (Society for Neuroscience, 2008).

Myelination Much of the credit for efficiency of neural communication goes to the glia that coat the neural pathways with a fatty substance called myelin. This process of **myelination** enables signals to travel faster and more smoothly. Myelination begins about halfway through gestation, peaks during the 1st year of life, continues into adolescence (Dubois et al., 2014) and persists through the third decade of life (Bartzokis et al., 2010).

myelination
Process of coating neural pathways with a fatty substance called myelin, which enables faster communication between cells.

In the fetus, myelin development progresses from the center out. Sensory pathways, including the somatosensory, visual, and auditory pathways, are generally myelinized before motor pathways, and the occipital pole (the posterior end of the occipital lobe) is myelinized before the temporal and frontal poles. Last, projection fibers (nerve tracts that connect the cortex with lower parts of the brain and spinal cord) are myelinized prior to association fibers (nerve tracts that connect cortical areas within the cerebral hemisphere) (Qui, Mori, & Miller, 2015). It has been argued that this sequence exists because before higher cortical areas can use information, they must be able to access stable inputs. Therefore, the primary cortical areas are myelinated first (Guillery, 2005).



Myelin is made primarily of fat. As breast milk is designed to be ideal for a baby's nutrition, it contains relatively high but healthy levels of this essential ingredient.

Myelination continues to occur rapidly throughout infancy, accelerating at 12 to 16 months, and then slowing again from 2 to 5 years of age (Deoni, Dean, O'muircheartaigh, Dirks, & Jerskey, 2012). At 5 years of age, the myelinated white matter volume in the brain is approximately 80 percent of that found in adults (Deoni et al., 2011).

Early Reflexes When your pupils contract as you turn toward a bright light, they are acting involuntarily. Such an automatic, innate response to stimulation is called a **reflex behavior.** Reflex behaviors are controlled by the lower brain centers that govern other involuntary processes, such as breathing and heart rate.

reflex behaviors
Automatic, involuntary, innate responses to stimulation.

Human infants have an estimated 27 major reflexes (Table 4), many of which are present at birth or soon after (Noble & Boyd, 2012). *Primitive reflexes,* such as sucking, rooting for the nipple, and the Moro reflex (a response to being startled or beginning to fall), are related to instinctive needs for survival and protection or may support the early connection to the caregiver. Some primitive reflexes may be part of humanity's evolutionary legacy. One example is the grasping reflex, which enables infant monkeys to hold on to their mothers' fur. Human infants show a similar reflex wherein they tightly grasp any object placed in their palm, a holdover from our ancestral past.

As the higher brain centers become active during the first 2 to 4 months, infants begin to show *postural reflexes:* reactions to changes in position or balance. For example, infants who are tilted downward extend their arms in the parachute reflex, an instinctive attempt to break a fall. *Locomotor reflexes,* such as the walking and swimming reflexes, resemble voluntary movements that do not appear until months after the reflexes have disappeared.

Most of the early reflexes disappear during the first 6 to 12 months. Reflexes that continue to serve protective functions—such as blinking, yawning, coughing, gagging, sneezing, shivering, and dilation of the pupils in the dark—remain. Disappearance of unneeded reflexes on schedule is a sign that motor pathways in the cortex have been partially myelinated, enabling a shift to voluntary behavior. Thus, we can evaluate a baby's neurological development by seeing whether certain reflexes are present or absent.

checkpoint can you . . .

- Describe early brain development?
- Explain the functions of reflex behaviors and why some drop out?

Brain Plasticity Although the brain's early development is genetically directed, it is continually modified by environmental experience. The physical architecture of our brain is a reflection of the experiences we have had throughout our life. Our brains are not static; rather, they are living, changeable organs that respond to environmental influences. The technical term for this malleability of the brain is **plasticity.** Plasticity may be an evolutionary mechanism to enable adaptation to environmental change (Gomez-Robles, Hopkins, & Sherwood, 2013).

plasticity
Modifiability, or "molding," of the brain through experience.

TABLE 4 Early Human Reflexes

Reflex	Stimulation	Baby's Behavior	Typical Age of Appearance	Typical Age of Disappearance
Moro	Baby is dropped or hears loud noise.	Extends legs, arms, and fingers, arches back, draws back head.	7th month of gestation	3 months
Darwinian (grasping)	Palm of baby's hand is stroked.	Makes strong fist; can be raised to standing position if both fists are closed around a stick.	7th month of gestation	4 months
Tonic neck	Baby is laid down on back.	Turns head to one side, assumes fencer position, extends arm and leg on preferred side, flexes opposite limbs.	7th month of gestation	5 months
Babkin	Both of baby's palms are stroked at once.	Mouth opens, eyes close, neck flexes, head tilts forward.	Birth	3 months
Babinski	Sole of baby's foot is stroked.	Toes fan out; foot twists in.	Birth	4 months
Rooting	Baby's cheek or lower lip is stroked with finger or nipple.	Head turns; mouth opens; sucking movements begin.	Birth	9 months
Walking	Baby is held under arms, with bare feet touching flat surface.	Makes steplike motions that look like well-coordinated walking.	1 month	4 months
Swimming	Baby is put into water face down.	Makes well-coordinated swimming movements.	1 month	4 months



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Moro reflex



Phanie/Alamy Stock Photo

Darwinian reflex



Custom Medical Stock Photo/ Alamy Stock Photo

Tonic neck reflex



Custom Medical Stock Photo/Alamy Stock Photo

Babinski reflex



Science Photo Library/Shutterstock

Rooting reflex



BSIP/UIG/Getty Images

Walking reflex

Plasticity enables learning. Individual differences in intelligence may reflect differences in the brain's ability to develop neural connections in response to experience (Brant et al., 2013; Garlick, 2003). Early experience can have lasting effects on the capacity of the central nervous system to learn and store information (Society for Neuroscience, 2008).

There are two sides to every coin: Just as plasticity allows learning in response to appropriate environmental input, it can also lead to damage in the case of harmful input. During the formative period of early life when the brain is most plastic, the brain is especially vulnerable. Exposure to hazardous drugs, environmental toxins, or maternal stress before or after birth can threaten the developing brain, and malnutrition can interfere with normal cognitive growth. Early abuse or sensory impoverishment can leave an imprint on the brain as it adapts to the environment in which the developing child must live, delaying neural development or affecting brain structure (AAP, Stirling, and the Committee on Child Abuse and Neglect and Section on Adoption and Foster Care; American Academy of Child and Adolescent Psychiatry, Amaya-Jackson; & National Center for Child Traumatic Stress, Amaya-Jackson, 2008). Other research suggests that lack of environmental input may inhibit the normal process of cell death and the streamlining of neural connections, resulting in smaller head size and reduced brain activity (C. A. Nelson, 2008).

By the same token, enriched experience can spur brain development (Society for Neuroscience, 2008) and even make up for past deprivation (J. E. Black, 1998). Animals raised in toy-filled cages sprout more axons, dendrites, and synapses than animals raised in bare cages (Society for Neuroscience, 2008). Plasticity continues throughout life as neurons change in size and shape in response to environmental experience (Rutter, 2002). Such findings have sparked successful efforts to stimulate the brain development of premature infants (Als et al., 2004) and children with Down syndrome and to help victims of brain damage recover function.

Ethical constraints prevent controlled experiments on the effects of environmental deprivation on human infants. However, the discovery of thousands of infants and young children raised in overcrowded Romanian orphanages offered a natural experiment (Becket, et al., 2006). These abandoned children had spent much of their time lying quietly in their cribs or beds with nothing to look at. Most of the 2- and 3-year-olds did not walk or talk, and the older children played aimlessly. PET scans of their brains showed extreme inactivity in the temporal lobes, which regulate emotion and receive sensory input.

Some of these children were placed in adoptive homes in Canada or the United Kingdom. In one longitudinal study, Romanian children who had been removed from institutions *before* age 6 months and adopted by English families showed no cognitive impairment by age 11 as compared with a control group of English children adopted within the United Kingdom. By contrast, the average IQs of Romanian children adopted into English families *after* age 6 months were 15 points lower. At ages 6 and 11, the latest-placed adoptees were the most cognitively impaired, though this group did show modest progress (Beckett et al., 2006). These findings suggest that high-quality foster care may partly overcome the adverse effects of early institutionalization on the processing of socioemotional information (Moulson, Fox, Zeanah, & Nelson, 2009). Similarly, a high-quality adoptive home, especially if an adoption occurs earlier than 4 months of age, can mitigate early institutionalization (Audet & Le Mare, 2011).

checkpoint can **you** . . .

- Discuss how early experience can affect brain growth and development both positively and negatively, and give examples?

EARLY SENSORY CAPACITIES

The rearward regions of the developing brain, which control sensory information, grow rapidly during the first few months of life, enabling newborn infants to make fairly good sense of what they touch, see, smell, taste, and hear (Gilmore et al., 2007).

Touch and Pain Anytime you have comforted a crying baby by cuddling her or tickled a drowsy child to wake him up, you have made use of perhaps the most important sense in infancy: touch. Touch is the first sense to develop; for the first several months, it is the

most mature sensory system. By 32 weeks of gestation, all body parts are sensitive to touch, and this sensitivity increases during the first 5 days of life (Haith, 1986; Field, 2010).

In the past, physicians performing surgery on newborn babies, such as circumcision, often used no anesthesia in the mistaken belief that neonates could not feel pain, felt it only briefly, or did not have the memory capacity to remember and thus be affected by it. However, newborns can and do feel pain, and they become more sensitive to it during their first few days. Anesthesia is dangerous for young infants, however, so when possible, alternative methods of pain management are used for minor procedures such as circumcision, a heel stick, or vaccines. For example, infants show a decreased pain response when they are held or cuddled, especially with skin-to-skin contact, and either breast-fed or given a sweet solution to suck on (Riddell et al., 2015; Campbell-Yeo, Fernandes, & Johnston, 2011).

Smell and Taste The senses of smell and taste begin to develop in the womb. Flavors from food the mother has consumed are found in amniotic fluid (Cooke & Fildes, 2011), thus a preference for certain tastes and smells can be developed in utero. Moreover, flavors from the foods that the mother eats are also transmitted via breast milk (Ventura & Worobey, 2013). Therefore, exposure to the flavors of healthy foods through breastfeeding may improve acceptance of healthy foods after weaning and later in life (Mennella, 2014). The taste preferences developed in infancy may last into early childhood; children offered different flavors in early infancy later have less restricted food preferences (Trabulsi & Mennella, 2012).

Certain taste preferences seem to be largely innate and appear to reflect an adaptive preference for signals for high-calorie, high-protein foods and an aversion toward a food that may be poisonous or toxic (Mennella & Bobowski, 2015; Ventura & Worobey, 2013). Newborns much prefer sweet tastes, such as breast milk, to sour, bitter, or salty tastes (Mennella, 2014; Ventura & Mennella, 2011). Newborns also strongly dislike bitter flavors, likely a survival mechanism given the toxic nature of many bitter substances (Beauchamp & Mennella, 2009).

Hearing Auditory discrimination develops rapidly after birth. Infants as young as 2 days old are able to recognize a word they heard up to a day earlier (Swain, Zelano, & Clitfon, 1993). At 1 month, babies can distinguish sounds as close as *ba* and *pa* (Eimas, Siqueland, Jusczyk, & Vigorito, 1971). By 11 to 17 weeks, infants are able to both recognize and remember entire sentences after a brief delay (Dehaene-Lambertz et al., 2006). By 4 months, infants' brains are showing lateralization for language, as occurs in adults. By this age, the left side of infants' brains responds preferentially to speech, especially that of their native language, over other sounds (Minagawa-Kawai et al., 2010). There are even indications that infants can recognize music that is typical of their culture from a young age (Virtala, Huotilainen, Partanen, Fellman, & Tervaniemi, 2013) and by 4 months of age prefer music typical of their cultural experiences (Soley & Hannon, 2010).

Because hearing is a key to language development, hearing impairments should be identified as early as possible. Hearing loss occurs in 1 to 3 of 1,000 live births (Gaffney, Gamble, Costa, Holstrum, & Boyle, 2003).

Sight Vision is the least developed sense at birth, perhaps because there is so little to see in the womb. Visual perception and the ability to use visual information—identifying caregivers, finding food, and avoiding dangers—become more important as infants become more alert and active (Rakison, 2005).

The eyes of newborns are smaller than those of adults, the retinal structures are incomplete, and the optic nerve is underdeveloped. A neonate's eyes focus best from about 1 foot away—just about the typical distance from the face of a person holding a newborn. Newborns blink at bright lights. Their field of peripheral vision is very narrow; it more than doubles between 2 and 10 weeks and is well developed by 3 months (Maurer & Lewis, 1979; E. Tronick, 1972). The ability to follow a moving target also develops rapidly in the first months, as does color perception (Haith, 1986). The development of these abilities is tied closely to cortical maturation (Braddick & Atkinson, 2011).

Visual acuity at birth is approximately 20/400 but improves rapidly, reaching the 20/20 level by about 8 months (Kellman & Arterberry, 1998; Kellman & Banks, 1998). *Binocular vision*—the use of both eyes to focus, enabling perception of depth and distance—usually does not develop until 4 or 5 months (Bushnell & Boudreau, 1993).

Infants show a special affinity for faces. From the very beginning, infants prefer to look at human faces more than almost any other stimuli (Pascalis & Kelly, 2009), and they are able to discriminate between individual faces within hours after birth (Sugden & Marquis, 2017). Infants also prefer to look at their own mother's face and the faces of attractive strangers more than unattractive strangers (Pascalis & Kelly, 2009). Within a few months after birth, infants begin to pay close attention to human eyes over other features (Dupierrix et al., 2014). Between about 4 to 8 months of age, when learning language, infants pay particular attention to the mouth. Then, at approximately a year of age, as they begin to master some of the basics of language, their attention shifts back to the eyes (Lewkowicz & Hansen-Tift, 2012). Infants also show some ability to categorize racial groups on the basis of facial data. At 3 months, infants look longer at own-race faces. By 9 months, they look longer at other race faces and seem to process own-race faces more efficiently (Liu et al., 2015), paying more attention to their eyes (Xiao, Xiao, Quinn, Anzures, & Lee, 2013). Generally, infants seem to show privileged attention to faces, a tendency which is likely the result of a dedicated neural system for the processing of facial stimuli.

Early screening is essential to detect problems that interfere with vision. Infants should be examined by 6 months for visual fixation preference, ocular alignment, and signs of eye disease. Formal vision screening should begin by age 3 (American Optometric Association, 2018). Doctors' offices have modified eye charts for toddlers specifically for this purpose; in place of letters are shapes easily recognized by most toddlers such as stars, hearts, and circles.

checkpoint can you . . .

- Give evidence for early development of the senses?
- Tell how breast-feeding plays a part in the development of smell and taste?
- List three ways in which newborns' vision is underdeveloped?

Motor Development

Babies do not have to be taught such basic motor skills as grasping, crawling, and walking. They just need room to move and freedom to see what they can do. When the central nervous system, muscles, and bones are ready and the environment offers the right opportunities for exploration and practice, babies keep surprising the adults around them with new abilities.

MILESTONES OF MOTOR DEVELOPMENT

Motor development is marked by a series of milestones: achievements that develop systematically, each newly mastered ability preparing a baby to tackle the next. Babies first learn simple skills and then combine them into increasingly complex **systems of action,** which permit a wider or more precise range of movement and more effective control of the environment. In developing the precision grip, for example, an infant first tries to pick things up with the whole hand, fingers closing against the palm. Later the baby masters the *pincer grasp,* in which thumb and index finger meet at the tips to form a circle, making it possible to pick up tiny objects. In learning to walk, an infant gains control of separate movements of the arms, legs, and feet before putting these movements together to take that momentous first step.

systems of action
Increasingly complex combinations of motor skills, which permit a wider or more precise range of movement and more control of the environment.

The **Denver Developmental Screening Test** (Frankenburg, Dodds, Fandal, Kazuk, & Cohrs, 1975) is used to chart progress between ages 1 month and 6 years and to identify children who are not developing normally. The test measures **gross motor skills** (those using large muscles), such as rolling over and catching a ball, and **fine motor skills** (using small muscles), such as grasping a rattle and copying a circle. It also assesses language development (for example, knowing the definitions of words) and personality and social development (such as smiling spontaneously and dressing without help). The newest edition, the Denver II Scale (Frankenburg et al., 1992), includes revised norms. Table 5 provides some examples.

Denver Developmental Screening Test
Screening test given to children 1 month to 6 years old to determine whether they are developing normally.

gross motor skills
Physical skills that involve the large muscles.

fine motor skills
Physical skills that involve the small muscles and eye-hand coordination.



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Lifting and holding up the head from a prone position, crawling along the floor to reach something enticing, such as an enticing toy, and walking well enough to push a wagon full of blocks are important early milestones of motor development.

When we talk about what the "average" baby can do, we refer to the 50 percent Denver norms, but normality covers a wide range: About half of babies master these skills before the ages given, and about half afterward. Also, the Denver norms were developed with reference to a Western population and are not necessarily valid when assessing children from other cultures.

As we trace typical progress in head control, hand control, and locomotion, notice how these developments follow the cephalocaudal (head to tail) and proximodistal (inner to outer) principles outlined earlier.

TABLE 5 Milestones of Motor Development

Skill	50 Percent	90 Percent
Rolling over	3.2 months	5.4 months
Grasping rattle	3.3 months	3.9 months
Sitting without support	5.9 months	6.8 months
Standing while holding on	7.2 months	8.5 months
Grasping with thumb and finger	8.2 months	10.2 months
Standing alone well	11.5 months	13.7 months
Walking well	12.3 months	14.9 months
Building tower of two cubes	14.8 months	20.6 months
Walking up steps	16.6 months	21.6 months
Jumping in place	23.8 months	2.4 years
Copying circle	3.4 years	4.0 years

Note: This table shows the approximate ages when 50 percent and 90 percent of children can perform each skill, according to the Denver Training Manual II.

Source: Adapted from Frankenburg et al., 1992.

For the first 6 months of life, babies show a slight preference for turning their heads to the right rather than the left. Researchers have suggested that our adult propensity to kiss with our heads tilted to the right—as approximately 64 percent of adults do—is a reemergence of this early bias.

Gunturkun, 2003

Although we tend to think of crawling as a milestone of development, it is not universal. Some babies move directly from sitting or scooting to walking, and bypass crawling altogether.

Head Control At birth, most infants can turn their heads from side to side while lying on their backs. When lying chest down, many can lift their heads enough to turn them. Within the first 2 to 3 months, they lift their heads higher and higher—sometimes to the point where they lose their balance and roll over on their backs. By 4 months, almost all infants can keep their heads erect while being held or supported in a sitting position.

Hand Control Babies are born with a grasping reflex. If the palm of an infant's hand is stroked, the hand closes tightly. At about 3½ months, most infants can grasp an object of moderate size, such as a rattle, but have trouble holding a small object. Next, they begin to grasp objects with one hand and transfer them to the other, and then to hold (but not pick up) small objects. Sometime between 7 and 11 months, their hands become coordinated enough to pick up a tiny object, such as a pea, using the pincer grasp. By 15 months, the average baby can build a tower of two cubes. A few months after the 3rd birthday, the average toddler can copy a circle fairly well.

Locomotion After 3 months, the average infant begins to roll over deliberately (rather than accidentally, as before)—first from front to back and then from back to front. The average baby can sit without support by 6 months and can assume a sitting position without help by about 8½ months.

Between 6 and 10 months, most babies begin to get around under their own power by means of creeping or crawling. This new achievement of *self-locomotion* has striking cognitive and psychosocial ramifications (Bertenthal & Campos, 1987; Bertenthal, Campos, & Barrett, 1984; Bertenthal, Campos, & Kermoian, 1994; J. Campos, Bertenthal, & Benson, 1980; Karasik, Tamis-LeMonda, & Adolph, 2011). Crawling infants become more sensitive to where objects are, how big they are, whether they can be moved, and how they look. Crawling helps babies learn to judge distances and perceive depth. They learn to look to caregivers for clues as to whether a situation is secure or frightening—a skill known as *social referencing* (Campos, Sorce, Emde, & Svejda, 2013).

By holding onto a helping hand or a piece of furniture, the average baby can stand at a little past age 7 months. The average baby can let go and stand alone well at about 11½ months.

All these developments lead up to the major motor achievement of infancy: walking. Humans begin to walk later than other species, possibly because babies' heavy heads and short legs make balance difficult. For some months before they can stand without support, babies practice cruising while holding onto furniture. Soon after they can stand alone well most infants take their first unaided steps. Within a few weeks, shortly after the first birthday, the average child is walking fairly well and thus achieves the status of toddler.

During the 2nd year, children begin to climb stairs one at a time, putting one foot after another on the same step; later they will alternate feet. Walking down stairs comes later. Also in their 2nd year, toddlers run and jump. By age 3½, most children can balance briefly on one foot and begin to hop.

MOTOR DEVELOPMENT AND PERCEPTION

Sensory perception enables infants to learn about themselves and their environment so they can make better judgments about how to navigate in it. Motor experience, together with awareness of their changing bodies, sharpens and modifies their perceptual understanding of what is likely to happen if they move in a certain way. This bidirectional connection between perception and action, mediated by the developing brain, gives infants much useful information about themselves and their world (Adolph & Eppler, 2002).

Infants begin reaching for objects at about 4 to 5 months, but initially they are not very good at it. Their reaching trajectory contains multiple corrections and changes in direction before they are able to successfully grasp an object. For many years, researchers believed

that this process depended on **visual guidance**, the use of the eyes to guide the movement of the hands (or other parts of the body) (White, Castle, & Held, 1964; McDonnell, 1975; Bushnell, 1985). However, as researchers investigated further, they began to doubt this assertion. For example, they realized that young infants could locate unseen objects by sound and could locate objects in the dark and by using their memory of the object's location, even if the object were moving (McCall & Clifton, 1999; McCarty, Clifton, Ashmead, Lee, & Goubet, 2001; Robin, Berthier, & Clifton, 1996). Indeed, at 6 months of age, infants could successfully reach for objects in the dark faster than they could in the light (Berthier & Carrico, 2010).

visual guidance
Use of the eyes to guide movements of the hands or other parts of the body.

More recently, researchers have realized that in younger infants, clumsy corrective movements are more likely to be illustrating immature cerebellar development. The immature cerebellum is only able to provide a rough guideline of movements used in reaching, which must be then corrected in order to be successful (Berthier, 2011). Younger infants are more likely to correct their reaching movements using proprioceptive feedback from their muscles and joints and haptic (relating to touch) information rather than vision (Berthier & Carrico, 2010; Corbetta, Thurman, Weiner, Guan, & Williams, 2014). Rather than use their eyes to correct their movements, infants reach first, then the eyes follow (Corbetta, et al., 2014).

Depth perception, the ability to perceive objects and surfaces in three dimensions, depends on several kinds of cues that affect the image of an object on the retina of the eye. These cues involve not only binocular coordination but also motor control (Bushnell & Boudreau, 1993). *Kinetic cues* are produced by movement of the object or the observer, or both. To find out whether an object is moving, a baby might hold his or her head still for a moment, an ability that is well established by about 3 months.

depth perception
Ability to perceive objects and surfaces three-dimensionally.

Haptic perception involves the ability to acquire information by handling objects rather than just looking at them. This includes putting objects in the mouth—a common means of exploration in infancy. The tongue's multiple receptors are capable of fine-grained discrimination and can provide a wealth of information.

haptic perception
Ability to acquire information about properties of objects, such as size, weight, and texture, by handling them.

Infants appear capable of using haptic information even prenatally. Babies who were born as early as 28 weeks of gestation were able to recognize and remember features of objects that were placed in their hands (Marcus, Lejeune, Berne-Audéoud, Gentaz, & Debillon, 2012). However, infants are limited by their motor development. It is only after babies develop enough hand-eye coordination to reach for objects and grasp them, generally about 5 to 7 months, that they can use their sense of touch effectively to explore the objects within their reach (Bushnell & Bondreau, 1993).

ELEANOR AND JAMES GIBSON'S ECOLOGICAL THEORY OF PERCEPTION

Depth perception has implications when it comes to the development of self-propelled motion, which for most children involves learning how to crawl. In a classic experiment by Richard Walk and Eleanor Gibson (1961), 6-month-old babies were seated on top of a plexiglass tabletop laid over two ledges. Between the ledges was an apparent drop. This illusory drop was made more prominent by using both low light to minimize any reflection from the plexiglass and a bright checkerboard patterned cloth. From the far side of the table, the infants' mothers then beckoned their children. To the babies, it appeared that their mothers were asking them to crawl over a **visual cliff**—a steep drop down to the floor. Walk and Gibson wanted to know if babies would willingly crawl over the deep end of the visual cliff when urged to do so by their mothers.

visual cliff
Apparatus designed to give an illusion of depth and used to assess depth perception in infants.

Walk and Gibson were investigating the factors that helped babies decide whether to move across a ledge or slope, and experiments such as these were pivotal in the development of Eleanor Gibson and James J. Gibson's **ecological theory of perception** (E. J. Gibson, 1969; J. J. Gibson, 1979; Gibson & Pick, 2000). In this approach, locomotor development depends on infants' increasing sensitivity to the interaction between their changing physical characteristics and new and varied characteristics of their

ecological theory of perception
Theory developed by Eleanor and James Gibson, which describes developing motor and perceptual abilities as interdependent parts of a functional system that guides behavior in varying contexts.



No matter how enticing a mother's arms are, this baby is staying away from them. As young as she is, she can perceive depth and wants to avoid falling off what looks like a cliff.
Mark Richard/PhotoEdit

environment. Babies' bodies continually change with age—their weight, center of gravity, muscular strength, and abilities. And each new environment provides a new challenge for babies to master. For example, sometimes a baby might have to make her way down a slight incline, and other times might have to navigate stairs. Instead of relying on solutions that previously worked, with experience babies learn to continually gauge their abilities and adjust their movements to meet the demands of their current environment.

This process of "learning to learn" (Adolph, 2008, p. 214) is an outcome of both perception and action. It involves visual and manual exploration, testing alternatives, and flexible problem solving. What worked at one time may not work now, and what worked in one environment may not work well in another. For example, when faced with steep downward slopes, infants who have just begun to crawl or walk seem unaware of the limits of their abilities and are more likely to plunge recklessly down steep slopes. Infants who have been crawling for some time are better at judging slopes and know how far they can push their limits without losing their balance. They also explore the slope before attempting it (Adolph, 2000, 2008; Adolph & Eppler, 2002; Adolph, Vereijken, & Shrout, 2003). For example, they may gauge the steepness with their hands first, or turn around to go down backward as if they are going down stairs. They have learned how to learn about the slope through their everyday experiences.

This is not a stage approach, and thus does not imply that locomotion develops in functionally related, universal stages. Rather, the baby is somewhat like a small scientist testing out new ideas in each situation. According to Gibson, "each problem space has its own set of information-generating behaviors and its own learning curve" (Adolph, 2008, p. 214). So, for example, babies who learn how far they can reach for a toy across a gap while in a sitting position without tumbling over must acquire this knowledge anew for situations involving crawling. Likewise, when crawling babies who have mastered slopes begin to walk, they have to learn to cope with slopes all over again (Adolph & Eppler, 2002).

HOW MOTOR DEVELOPMENT OCCURS: THELEN'S DYNAMIC SYSTEMS THEORY

Traditionally, motor development was thought to be genetically determined and largely automatic. Presumably, the maturing brain would produce a predetermined set of motor abilities at the appropriate point in development. Today many developmental psychologists consider this view too simplistic. Instead, motor development is considered to be a continuous process of interaction between the baby and the environment (Thelen, 1995; Smith & Thelen, 2003).

dynamic systems theory (DST)
Esther Thelen's theory, which holds that motor development is a dynamic process of active coordination of multiple systems within the infant in relation to the environment.

Ester Thelen, in her influential **dynamic systems theory (DST),** argued that "behavior emerges in the moment from the self-organization of multiple components" (Spencer et al., 2006, p. 1523). Infant and environment form an interconnected, dynamic system. Opportunities and constraints presented by the infant's physical characteristics, motivation, energy level, motor strength, and position in the environment at a particular moment in time affect whether and how an infant achieves a goal. Ultimately, a solution emerges as the baby explores various combinations of movements and assembles

those that most efficiently contribute to that end. Furthermore, the solution must be flexible and subject to modification in changing circumstances. Rather than being solely in charge of it, the maturing brain is but one component of a dynamic process. Indeed, no one factor determines the pace of development, and no predetermined timetable specifies when a particular skill will emerge. Rather, neurotypical babies tend to develop the same skills in the same order because they are built approximately the same way and have similar challenges and needs. However, because these factors can vary from baby to baby, this approach also allows for variability in the timeline of individual development.

Thelen used the walking reflex to illustrate her approach. When neonates are held upright with their feet touching a surface, they spontaneously make coordinated stepping movements. This behavior usually disappears by the 4th month. Not until the latter part of the 1st year, when a baby is getting ready to walk, do the movements appear again. The traditional explanation focused on cortical control, and the belief was that an older baby's deliberate walking was a new skill masterminded by the developing brain. However, this explanation did not make sense to Thelen. She wondered why the stepping reflex—which used the same series of movements that would become walking—should stop, particularly as other early behaviors, such as kicking, persisted. The answer, she suggested, might be found by considering other relevant variables that could affect movement. For example, babies' legs become thicker and heavier during the early months of life, but the large leg muscles used to control movements are not yet strong enough to handle the increased weight (Thelen & Fisher, 1982, 1983). In support of this hypothesis, when infants who had stopped stepping were held in warm water, stepping reappeared. Presumably, the water helped support their legs and lessened the pull of gravity on their muscles, allowing them to once again demonstrate the skill. Their ability to produce the movement had not changed—only the physical and environmental conditions that inhibited or promoted it. Maturation alone cannot explain such an observation, said Thelen. These same systems of dynamic influences affect all motor movements, from reaching for a rattle to sitting independently to learning to walk.



Some observers have suggested that babies from the Yucatan develop motor skills later than American babies because they are swaddled. However, Navajo babies, like this one, are also swaddled for most of the day, and they begin to walk at about the same time as other American babies, suggesting a maturational explanation.
Sue Bennett/Alamy Stock Photo

CULTURAL INFLUENCES ON MOTOR DEVELOPMENT

Although motor development follows a virtually universal sequence, its *pace* does respond to certain cultural factors. According to some research, African babies tend to be more advanced than U.S. and European infants in sitting, walking, and running. In Uganda, for example, babies typically walk at 10 months, as compared with 12 months in the United States and 15 months in France. Such differences may, in part, be related to ethnic differences in temperament (H. Kaplan & Dove, 1987) or may reflect a culture's child-rearing practices (Gardiner & Kosmitzki, 2005).

Some cultures actively encourage early development of motor skills. In many African and West Indian cultures in which infants show advanced motor development, adults use special *handling routines*, such as bouncing and stepping exercises, to strengthen babies' muscles. In one study, Jamaican infants, whose mothers used such handling routines daily, sat, crawled, and walked earlier than English infants, whose mothers gave them no such special handling (Hopkins & Westra, 1988, 1990).

On the other hand, some cultures discourage early motor development. Children of the Ache in eastern Paraguay do not begin to walk until age 18 to 20 months (H. Kaplan & Dove, 1987). Ache mothers pull their babies back to their laps when the infants begin to crawl away. The Ache mothers closely supervise their babies to protect them from the hazards of nomadic life. Yet, as 8- to 10-year-olds, Ache children climb tall trees, chop branches, and play in ways that enhance their motor skills (H. Kaplan & Dove, 1987). Normal development, then, need not follow the same timetable to reach the same destination.

checkpoint can you . . .

- Trace a typical infant's progress in head control, hand control, and locomotion, according to the Denver norms?
- Discuss how maturation, perception, and cultural influences relate to early motor development?
- Compare the Gibsons' ecological theory of perception and Thelen's dynamic systems theory?

summary and key terms

Childbirth and Culture: How Birthing Has Changed

- In Europe and the United States, childbirth before the twentieth century was not much different from childbirth in some developing countries today. Birth was a female ritual that occurred at home and was attended by a midwife. Pain relief was minimal, and risks for mother and baby were high.
- The development of the science of obstetrics professionalized childbirth. Births took place in hospitals and were attended by physicians. Medical advances dramatically improved safety.
- Today, delivery at home or in birth centers attended by midwives can be a relatively safe alternative to physician-attended hospital delivery for women with normal, low-risk pregnancies.

The Birth Process

- Birth normally occurs after a preparatory period of parturition.
- The birth process consists of three stages: (1) dilation of the cervix, (2) descent and emergence of the baby, and (3) expulsion of the umbilical cord and the placenta.
- Electronic fetal monitoring can detect signs of fetal distress, especially in high-risk births.
- About 32 percent of births in the United States are by cesarean delivery.
- Alternative methods of childbirth can minimize the need for painkilling drugs and maximize parents' active involvement.
- Modern epidurals can give effective pain relief with smaller doses of medication than in the past.
- The presence of a doula can provide physical benefits as well as emotional support.

parturition (*89*)
electronic fetal monitoring (*90*)
cesarean delivery (*90*)
natural childbirth (*91*)
prepared childbirth (*91*)
doula (*91*)

The Newborn Baby

- The neonatal period is a time of transition from intrauterine to extrauterine life.
- At birth, the circulatory, respiratory, digestive, elimination, and temperature regulation systems become independent of the mother's. If a newborn cannot start breathing within about 5 minutes, brain injury may occur.
- Newborns have a strong sucking reflex and secrete meconium from the intestinal tract. They are sometimes subject to neonatal jaundice due to immaturity of the liver.
- At 1 minute and 5 minutes after birth, a neonate's Apgar score can indicate how well he or she is adjusting to extrauterine life. The Brazelton Neonatal Behavioral Assessment Scale can assess responses to the environment and predict future development.
- Neonatal screening is done for certain rare conditions, such as PKU and congenital hypothyroidism.
- A newborn's state of arousal is governed by periodic cycles of wakefulness, sleep, and activity. Sleep takes up the major, but a diminishing, amount of a neonate's time. By about 6 months babies do most of their sleeping at night.
- Cultural customs affect sleep patterns.

neonatal period (*92*)
neonate (*92*)
anoxia (*93*)
neonatal jaundice (*93*)
Apgar scale (*93*)
Brazelton Neonatal Behavioral Assessment Scale (NBAS) (*93*)
state of arousal (*94*)

Complications of Childbirth

- Complications of childbirth include low birth weight, postmature birth, and stillbirth.
- Low-birth-weight babies may be either preterm (premature) or small-for-gestational-age. Low birth weight is a major factor in infant mortality and can cause long-term physical and cognitive problems. Very-low-birth-weight babies have a less promising prognosis than those who weigh more.

low-birth-weight babies (*96*)
preterm (premature) infants (*96*)
small-for-date (small-for-gestational-age) infants (*96*)
kangaroo care (*99*)
postmature (*100*)
stillbirth (*100*)

Survival and Health

- The vast majority of infant deaths occur in developing countries. Postnatal care can reduce infant mortality.
- Although infant mortality has diminished in the United States, it is still disturbingly high, especially among African American babies. Birth defects are the leading cause of death in infancy, followed by disorders related to prematurity and low birth weight, sudden infant death syndrome (SIDS), maternal complications of pregnancy, and complications of the placenta, umbilical cord, and membranes.
- Sudden infant death syndrome (SIDS) is the leading cause of postneonatal death in the United States. SIDS rates have declined markedly following recommendations to lay babies on their backs to sleep.
- Vaccine-preventable diseases have declined as rates of immunization have improved, but many preschoolers are not fully protected.

infant mortality rate (*101*)

sudden infant death syndrome (SIDS) (*103*)

Early Physical Development

- Normal physical growth and sensory and motor development proceed according to the cephalocaudal and proximodistal principles.
- A child's body grows most dramatically during the 1st year of life; growth proceeds at a rapid but diminishing rate throughout the first 3 years.
- Breast-feeding offers many health advantages and sensory and cognitive benefits and, if possible, should be done exclusively for at least the first 6 months.
- The central nervous system controls sensorimotor activity. Lateralization enables each hemisphere of the brain to specialize in different functions.
- The brain grows most rapidly during the months before and immediately after birth as neurons migrate to their assigned locations, form synaptic connections, and undergo integration and differentiation. Cell death and myelination improve the efficiency of the nervous system.
- Reflex behaviors—primitive, locomotor, and postural—are indications of neurological status. Most early reflexes drop out during the 1st year as voluntary, cortical control develops.
- Especially during the early period of rapid growth, environmental experience can influence brain development positively or negatively.
- Sensory capacities, present from birth and even in the womb, develop rapidly in the first months of life. Very young infants show pronounced abilities to discriminate between stimuli.
- Touch is the first sense to develop and mature. Newborns are sensitive to pain. Smell, taste, and hearing also begin to develop in the womb.
- Vision is the least well-developed sense at birth. Peripheral vision, color perception, acuteness of focus, binocular vision, and the ability to follow a moving object with the eyes all develop within the first few months.

central nervous system (*107*)

lateralization (*109*)

neurons (*110*)

integration (*110*)

differentiation (*110*)

cell death (*110*)

myelination (*112*)

reflex behaviors (*112*)

plasticity (*112*)

Motor Development

- Motor skills develop in a certain sequence, which may depend largely on maturation but also on context, experience, and motivation. Simple skills combine into increasingly complex systems.
- Self-locomotion brings about changes in all domains of development.
- Perception is intimately related to motor development. Depth perception and haptic perception develop in the first half of the 1st year.
- According to Gibson's ecological theory, sensory perception and motor activity are coordinated from birth, helping infants figure out how to navigate in their environment.
- Thelen's dynamic systems theory holds that infants develop motor skills, not by maturation alone but by active coordination of multiple systems of action within a changing environment.
- Cultural practices may influence the pace of early motor development.

systems of action (*116*)

Denver Developmental Screening Test (*116*)

gross motor skills (*116*)

fine motor skills (*116*)

visual guidance (*119*)

depth perception (*119*)

haptic perception (*119*)

visual cliff (*119*)

ecological theory of perception (*119*)

dynamic systems theory (DST) (*120*)

Design elements: (Butterfly Icon): Stockbyte/Getty Images; (World Icon): janrysavy/Getty Images

chapter 5

Cognitive Development during the First Three Years

outline

Studying Cognitive Development
Behaviorist Approach
Psychometric Approach
Piagetian Approach
Information-Processing Approach
Cognitive Neuroscience Approach
Social-Contextual Approach
Language Development

learning objectives

Identify six approaches to the study of cognitive development.

Describe how infants learn and remember.

Discuss infant assessment measures and the prediction of intelligence.

Summarize and evaluate Piaget's theory of cognitive development.

Explain how infants process information and begin to understand the characteristics of the physical world.

Describe the development of language in infancy.



Ariel Skelley/SuperStock

did you know?

- Brain growth spurts coincide with changes in cognitive behavior.
- Newborns as young as 2 days prefer new sights to familiar sights.
- Infants and toddlers who are read to frequently learn to read earlier.

In this chapter we look at infants' and toddlers' cognitive abilities from a variety of perspectives: behaviorist, psychometric, Piagetian, information processing, cognitive neuroscientific, and social-contextual. We trace the early development of language.

You cannot write for children. They're much too complicated. You can only write books that are of interest to them.

—Maurice Sendak

Studying Cognitive Development

How do babies learn to solve problems? When does memory develop? What accounts for individual differences in cognitive abilities? Can we predict how smart a baby will be in the future? These questions have long intrigued developmental scientists, many of whom have taken one of six approaches to their study:

- The **behaviorist approach** studies the basic *mechanics* of learning. Behaviorists are concerned with how behavior changes in response to experience.
- The **psychometric approach** measures *quantitative differences* in abilities that make up intelligence by using tests that indicate or predict these abilities.
- The **Piagetian approach** looks at changes, or stages, in the *quality* of cognitive functioning. It is concerned with how the mind structures its activities and adapts to the environment.
- The **information-processing approach** focuses on perception, learning, memory, and problem solving. It aims to discover how children process information from the time they encounter it until they use it.
- The **cognitive neuroscience approach** seeks to identify what brain structures are involved in specific aspects of cognition.
- The **social-contextual approach** examines the effects of environmental aspects of the learning process, particularly the role of parents and other caregivers.

behaviorist approach
Approach to the study of cognitive development that is concerned with basic mechanics of learning.

psychometric approach
Approach to the study of cognitive development that seeks to measure intelligence quantitatively.

Piagetian approach
Approach to the study of cognitive development that describes qualitative stages in cognitive functioning.

information-processing approach
Approach to the study of cognitive development that analyzes processes involved in perceiving and handling information.

cognitive neuroscience approach
Approach to the study of cognitive development that links brain processes with cognitive ones.

social-contextual approach
Approach to the study of cognitive development that focuses on environmental influences, particularly parents and other caregivers.

Behaviorist Approach

Babies are born with the ability to see, hear, smell, taste, and touch, and they have some ability to remember what they learn. Learning theorists are interested in mechanisms of learning. Here we examine both *classical* and *operant conditioning*, and then focus on *habituation.*

CLASSICAL AND OPERANT CONDITIONING

Eager to capture Anna's memorable moments, her father took pictures of her smiling, crawling, and showing off her other achievements. Whenever the flash went off, Anna blinked. One evening Anna saw her father hold the camera up to his eye—and she blinked *before* the flash. She had learned to associate the camera with the bright light, so that the sight of the camera alone activated her blinking reflex.

Anna's blinking at the sight of the camera is an example of **classical conditioning,** in which a person learns to make a reflex, or involuntary, response (in this case, blinking) to a stimulus (the camera) that originally did not bring about the response. Classical conditioning enables infants to anticipate an event before it happens. Classically

classical conditioning
Learning based on associating a stimulus that does not ordinarily elicit a response with another stimulus that does elicit the response.



An Indian snake charmer's son plays with a snake his father has trained, suggesting that fear of snakes is often a learned response. Many children learn to fear animals via conditioned associations with unpleasant or frightening experiences.
Rajesh Kumar Singh/AP Images

conditioned learning will become *extinct,* or fade, if it is not reinforced by repeated association. Thus, if Anna frequently saw the camera without the flash, she eventually would stop blinking at the sight of the camera alone.

Whereas classical conditioning focuses on the prediction of events (a flash) based on their associates (a camera), **operant conditioning** focuses on the consequences of behaviors and how they affect the likelihood of that behavior occurring again. Specifically, behaviors may be reinforced and become more likely to occur, or they may be punished and become less likely to occur. For example, a baby may learn that when she babbles her parents respond with smiles and attention, and she may increase this behavior to receive even more smiles and attention. In other words, she has been reinforced for her babbling. By contrast, a baby may see that when she throws her food her parents tend to frown and speak sharply to her. To avoid this punishment, she might learn not to throw her food.

INFANT MEMORY

Can you remember anything that happened to you before you were about 2 years old? Chances are you can't. Part of the reason is that early procedural knowledge (e.g., how to pound a wooden peg into a hole) and perceptual knowledge (e.g., what an apple tastes like) are not the same as the later explicit, language-based memories used by adults (e.g., what you did last Sunday). Infancy is a time of great change, and retention of those early experiences is not likely to be useful for long.

How do we determine what babies know? Infants cannot talk, and they have limited motor control; thus, researchers must be creative if they are to determine what babies know and understand. Fortunately, conditioning paradigms in research allow investigators to ask questions of babies in ways they can answer. For example, in one experiment, researchers operantly conditioned 3-month-old infants to kick to activate a mobile attached to one ankle by a ribbon. Babies were trained at this task in the presence of either a coconut or cherry odor, thus classically conditioning the presence of the odor and the ability to control the mobile with their body movements. Previous research had shown that babies this young forget what they learn 1 week later. However, when the infants were reminded of what they learned about the odor and mobile a day before being tested

operant conditioning
Learning based on association of behavior with its consequences.



Operant conditioning techniques can help us "ask" babies what they remember. Babies 2 to 6 months old who are conditioned to kick to activate a mobile remember this skill even if the mobile is removed for up to 2 weeks. When the mobile is returned, the baby starts kicking as soon as he sees it.
Taweepat/Shutterstock

again, they were able to remember the relationship between their kicking and the mobile's movements. Thus, the babies' responses showed that babies were able to use contextual cues (i.e., the odor) to retrieve memories (Suss, Gaylord, & Fagen, 2012). Similar research has determined that the length of time a conditioned response lasts increases with age. At 2 months of age, the typical infant can remember a conditioned response for 2 days; 18-month-olds can remember it for 13 weeks (Hartshorn et al., 1998; Rovee-Collier, 1999; Rovee-Collier, 1996). However, infant memory is context-dependent and appears to be strongly linked to the original cues encoded during learning. For example, 1-, 6- and 9-month-old infants were not able to recognize a picture in a different room from that in which they first encountered it, but 12- and 18-month-old infants were able to do so (Jones, Pascalis, Eacott, & Herbert, 2011).

checkpoint can you . . .

- **Compare six important approaches to the study of cognitive development and identify their goals?**
- **Give examples of classical and operant conditioning, and discuss what operant conditioning studies have found about infant memory?**

Psychometric Approach

Although there is no clear scientific consensus on a definition of intelligence, most professionals agree on some basic criteria. Intelligence enables people to acquire, remember, and use knowledge; to understand concepts and relationships; and to solve everyday problems. Moreover, **intelligent behavior** is presumed to be goal oriented, meaning it exists for the purposes of attaining a goal. It is also presumed to be adaptive in that it helps an organism adjust to the varying circumstances of life.

intelligent behavior
Behavior that is goal-oriented and adaptive to circumstances and conditions of life.

The modern intelligence testing movement began in the early twentieth century, when school administrators in Paris asked the psychologist Alfred Binet to devise a way to identify children who could not handle academic work and needed special instruction. The test that Binet and his colleague, Theodore Simon, developed was the forerunner of psychometric tests that score intelligence by numbers.

The goals of psychometric testing are to measure quantitatively the factors that are thought to make up intelligence (such as comprehension and reasoning) and, from the results of that measurement, to predict future performance (such as school achievement). **IQ (intelligence quotient) tests** consist of questions or tasks that are supposed to show how much of the measured abilities a person has by comparing that person's performance with norms established by a large group of test-takers who were in the standardization sample.

IQ (intelligence quotient) tests
Psychometric tests that seek to measure intelligence by comparing a test-taker's performance with standardized norms.

For school-age children, intelligence test scores can predict academic performance fairly accurately and reliably. Testing infants and toddlers is another matter. Because babies cannot tell us what they know and how they think, the most obvious way to gauge their intelligence is by assessing what they can do. But if they do not grasp a rattle, it is hard to tell whether they do not know how, do not feel like doing it, do not realize what is expected of them, or have simply lost interest.



Piaget, whom you will read about in a few pages, first became interested in children's cognition while working on this project. Put to work standardizing reasoning tasks for the intelligence tests, he became more interested in the logical errors children made than in their correct answers to the questions.



Only two of the Bayley Scales items correlate to later IQ: speed of habituation (how quickly they get bored by items) and preference for novelty (whether or not they like new stimuli). More on this later.

TESTING INFANTS AND TODDLERS

Although it is virtually impossible to measure infants' intelligence, we can test their functioning with development tests. These tests assess infants' behavior on tasks and compare their performance with norms established on the basis of what large numbers of infants and toddlers can do at particular ages. So, for example, if a child is unable to perform a task that the "average baby" can do by a particular age, that child may be delayed in that area. By contrast, a baby can also be ahead of the curve by performing better than her same-age peers.

The **Bayley Scales of Infant and Toddler Development** (Bayley, 1969, 1993, 2005) is a developmental test designed to assess children from 1 month to 3½ years. Scores on the Bayley-III indicate a child's competencies in each of five developmental areas: *cognitive, language, motor, social-emotional,* and *adaptive behavior.* An optional *behavior rating scale* can be completed by the examiner, in part on the basis of information from the child's caregiver. Separate scores, called *developmental quotients* (DQs), are calculated for each scale. DQs are most commonly used for early detection of emotional disturbances and sensory, neurological, and environmental deficits and can help parents and professionals plan for a child's needs.



The Home Observation for Measurement of the Environment gives positive ratings to parents who praise their children and are attentive to their questions.
Fuse/Getty Images

ASSESSING THE IMPACT OF THE EARLY HOME ENVIRONMENT

Intelligence was once thought to be fixed at birth, but we now know that it is influenced by both inheritance and experience. Early brain stimulation is a key to future cognitive development. What characteristics of the early home environment may influence measured intelligence and other measures of cognitive development?

Using the **Home Observation for Measurement of the Environment (HOME)** (R. H. Bradley, 1989; Caldwell & Bradley, 1984), trained observers interview the primary caregiver and rate on a yes-or-no checklist the intellectual stimulation and support observed in a child's home. HOME scores are significantly correlated with measures of cognitive development (Totsika & Sylva, 2004).

One important factor that HOME assesses is the quality of the home environment. This scale includes six subscales that measure the number of books and appropriate play materials in the home, the parent's involvement with the child, parental emotional and verbal responsiveness, acceptance of the child's behavior, organization of the environment, and opportunities for daily and varied stimulation.

Research has shown home quality to be an important variable. For example, home quality for toddlers is associated with language and early literacy skills in preschool (Pinto, Pessanha, & Aguiar, 2013), and home quality in the first year of preschool predicts numeracy skills in the third year of preschool (Anders et al., 2012). Children's school readiness, verbal ability, and spatial ability scores at 3 and 5 years of age are associated with their home quality scores (Kelly, Sacker, Del Bono, Francesconi, & Marmot, 2011), and when parents change their home behavior as their children prepare to enter school, those children improve in their language development (Son & Morrison, 2010).

Bayley Scales of Infant and Toddler Development
Standardized test of infants' and toddlers' mental and motor development.

Home Observation for Measurement of the Environment (HOME)
Instrument to measure the influence of the home environment on children's cognitive growth.

Researchers have at times focused more closely on particular subscales. For example, the HOME inventory gives credit to the parent of an infant or toddler for caressing or kissing the child during an examiner's visit. Researchers pay particular attention to this because parental responsiveness at 6 months has been positively correlated with IQ, achievement test scores, and classroom behavior at 13 years of age. Other important variables that have been identified with the HOME inventory include the number of books in the home, the presence of playthings that encourage the development of concepts, and parents' involvement in children's play. This is because learning stimulation has been consistently associated with kindergarten achievement scores, language competence, and motor and social development (Bradley, Corwyn, Burchinal, McAdoo, & Coll, 2001). Table 1 lists additional specific items to help babies develop cognitive competence.

EARLY INTERVENTION

early intervention
Systematic process of providing services to help families meet young children's developmental needs.

Early intervention is a systematic process of planning and providing therapeutic and educational services for families that need help in meeting infants', toddlers', and preschool children's developmental needs. Such programs are expensive, and assessment research is typically required to justify continued funding. A large number of research programs have sought to determine the effectiveness of intervention programs. For example, Project CARE (Wasik, Ramey, Bryant, & Sparling, 1990), the Abcedarian (ABC) Project (Ramey, 2018), and Head Start (Lee, Zhai, Brooks-Gunn, Han, & Waldfogel, 2014) have been extensively investigated.

Generally, these programs involve full-day, year-round early childhood education from infancy through the preschool years as well as family-oriented social services, early childhood education, medical care and services, and family education on child development. Control groups vary, but may, for example, consist of children who receive pediatric or social work services but do not participate in day care (Ramey & Ramey, 2003), or children who are cared for at home by parents or attend center-based day care (Lee et al., 2014; Zhai, Brooks-Gunn, & Waldfogel, 2014).

TABLE 1 Fostering Competence

Findings from studies using the HOME scales and from neurological studies and other research suggest the following guidelines for fostering infants' and toddlers' cognitive development:

- In the early months, *provide sensory stimulation* but avoid overstimulation and distracting noises.
- As babies grow older, *create an environment that fosters learning*—one that includes books, interesting objects (which do not have to be expensive toys), and a place to play.
- *Respond to babies' signals.* This establishes a sense of trust that the world is a friendly place and gives babies a sense of control over their lives.
- *Give babies the power to effect changes,* through toys that can be shaken, molded, or moved. Help a baby discover that turning a doorknob opens a door, flicking a light switch turns on a light, and opening a faucet produces running water for a bath.
- *Give babies freedom to explore.* Do not confine them regularly during the day in a crib, jump seat, or small room and only for short periods in a playpen. Baby-proof the environment and let them go!
- *Talk to babies.* They will not pick up language from listening to the radio or television; they need interaction with adults.
- In talking to or playing with babies, *enter into whatever they are interested in* at the moment instead of trying to redirect their attention to something else.
- *Arrange opportunities to learn basic skills,* such as labeling, comparing, and sorting objects (say, by size or color), putting items in sequence, and observing the consequences of actions.
- *Applaud new skills and help babies practice and expand them.* Stay nearby but do not hover.
- *Read to babies in a warm, caring atmosphere from an early age.* Reading aloud and talking about the stories develop preliteracy skills.
- *Use punishment sparingly.* Do not punish or ridicule results of normal trial-and-error exploration.

Sources: Bradley and Caldwell, 1982; Bradley, Caldwell, and Rock, 1988; Bradley, et al., 1989; Ramey and Ramey 1998a, 1998b; Ramey and Ramey, 1992; Staso, quoted in Blakeslee, 1997; Stevens and Bakeman, 1985; White, 1971; White, Kaban, and Attanucci, 1979.

The typical pattern of findings for early intervention programs involves an advantage for children who participated in them over children in control groups. Generally, participants show positive outcomes on cognitive developmental outcomes, including reading and math scores, IQ, and school progress (Lee et al., 2014; Ramey, 2018; Camilli, Vargas, Ryan, & Barnett, 2010). However, the strength of this advantage varies depending on the comparison group. When participants are compared to children who did not attend any form of preschool or day care, they tend to show impressive advantages. However, when they are compared to children who attended *some* form of early childhood education, such as a center-based day care, then the gains, shown by children who participated in early intervention programs are not as compelling (Shager et al., 2013; Lee et al., 2014). Moreover, the gains are strongest initially and fade over time (Lee, Brooks-Gunn, Schnur, & Law, 1990). It appears that without sufficient ongoing environmental support, initial gains diminish.

However, long-term follow-up studies have found that despite the initial fall-off in gains, there are lasting effects of early intervention programs. Children who participate in early intervention programs are less likely to require special education services in grade school and high school, more likely to graduate from high school, more likely to be employed, less likely to be incarcerated, and report higher lifetime earnings (Melhuish et al., 2015). Thus, from an economic standpoint, despite their high cost, early intervention programs are worth the benefits accrued (Ramey, 2018).



Studies have shown that early educational intervention can help offset environmental risks.
Glow Images

checkpoint can you . . .

- Tell why developmental tests are sometimes given to infants and toddlers?
- Identify aspects of the early home environment that may influence cognitive development?
- Discuss the value of early intervention?

sensorimotor stage
Piaget's first stage in cognitive development, in which infants learn through senses and motor activity.

The most effective early interventions are those that (1) start early and continue throughout the preschool years; (2) are highly time-intensive (that is, occupy more hours in a day or more days in a week, month, or year); (3) are center-based, providing direct educational experiences, not just parental training; (4) take a comprehensive approach, including health, family counseling, and social services; and (5) are tailored to individual differences and needs.

Piagetian Approach

The first of Piaget's four stages of cognitive development is the **sensorimotor stage.** During this stage (birth to approximately age 2), infants learn about themselves and their world through their developing sensory and motor activity. Babies change from creatures who respond primarily through reflexes and random behavior into goal-oriented toddlers.

SUBSTAGES OF THE SENSORIMOTOR STAGE

The sensorimotor stage consists of six substages (Table 2) that flow from one to another as a baby's **schemes,** organized patterns of thought and behavior, become more elaborate.

TABLE 2 Substages of Piaget's Sensorimotor Stage of Cognitive Development*

Substage	Ages	Description	Behavior
1. Use of reflexes	Birth to 1 month	Infants exercise their inborn reflexes and gain some control over them. They do not coordinate information from their senses.	Dorri begins sucking when her mother's breast is in her mouth.
2. Primary circular reactions	1 to 4 months	Infants repeat pleasurable behaviors that first occur by chance (such as thumbsucking). Activities focus on the infant's body rather than the effects of the behavior on the environment. Infants develop first acquired adaptations. They begin to coordinate sensory information and grasp objects.	When given a bottle, Dylan, who is usually breast-fed, is able to adjust his sucking to the rubber nipple.
3. Secondary circular reactions	4 to 8 months	Infants become more interested in the environment; they repeat actions that bring interesting results and prolong interesting experiences. Actions are intentional but not initially goal directed.	Alejandro pushes pieces of dry cereal over the edge of his high chair tray and watches each piece as it falls.
4. Coordination of secondary schemes	8 to 12 months	Behavior is more deliberate and purposeful as infants coordinate previously learned schemes and use previously learned behaviors to attain their goals. They can anticipate events.	Anica pushes the button on her musical book, and a song plays. She pushes this button over and over, choosing it instead of buttons for other songs.
5. Tertiary circular reactions	12 to 18 months	Toddlers show curiosity and experimentation; they purposefully vary their actions to see results. They actively explore their world to determine what is novel about an object, event, or situation. They try new activities and use trial and error in solving problems.	Bjorn's first efforts to bring his favorite board book into his crib fail because the book is too wide. Soon, Bjorn turns the book sideways, pulls it in, and hugs it, delighted with his success.
6. Mental combinations	18 to 24 months	Because toddlers can mentally represent events, they can think about events and anticipate their consequences without always resorting to action. Toddlers begin to demonstrate insight. They can use symbols, such as gestures and words, and can pretend.	Jenny plays with her shape box, searching carefully for the right hole for each shape before trying—and succeeding.

*Infants show enormous cognitive growth during Piaget's sensorimotor stage, as they learn about the world through their senses and their motor activities. Note their progress in problem solving and the coordination of sensory information. All ages are approximate.

During the first five substages, babies learn to coordinate input from their senses and organize their activities in relation to their environment. During the sixth substage, they progress to using symbols and concepts to solve simple problems.

Much of this early cognitive growth comes about through **circular reactions,** in which an infant learns to reproduce events originally discovered by chance. Initially, an activity such as sucking produces an enjoyable sensation that the baby wants to repeat. The repetition again produces pleasure, which motivates the baby to do it yet again (Figure 1). The originally chance behavior has been consolidated into a new scheme.

In the *first substage* (birth to about 1 month), neonates practice their reflexes, engaging in a behavior even when its normal stimulus is not present. For example, newborns suck reflexively when their lips are touched. But they soon learn to find the nipple even when they are not touched, and they suck at times when they are not hungry. Infants thus modify and extend the scheme for sucking.

In the *second substage* (about 1 to 4 months), babies learn to repeat purposely a pleasant bodily sensation first achieved by chance (say, sucking their thumbs, as in Figure 1a). Also, they begin to turn toward sounds, showing the ability to coordinate different kinds of sensory information (vision and hearing).

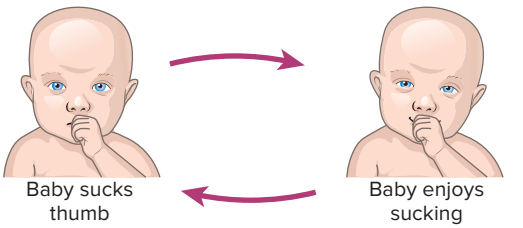
The *third substage* (about 4 to 8 months) coincides with a new interest in manipulating objects and learning about their properties. Babies intentionally repeat an action not merely for its own sake, as in the second substage, but to get results *beyond the infant's own body.* For example, a baby this age might repeatedly shake a rattle to hear the noise.

By the time infants reach the *fourth substage* (about 8 to 12 months), they have learned to generalize from past experience to solve new problems. They modify and coordinate previous schemes, such as the schemes for crawling, pushing, and grabbing, to find one that works. This substage marks the development of complex, goal-directed behavior.

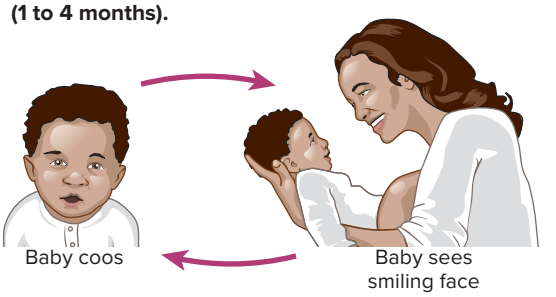
In the *fifth substage* (about 12 to 18 months), babies begin to experiment with new behavior to see what will happen. They now engage in *tertiary circular reactions,* varying an action to get a similar result, rather than merely repeating pleasing behavior they have accidentally discovered. For example, a toddler may squeeze a rubber duck that squeaked when stepped on, to see whether it will squeak again (as shown in Figure 1c). For the first time, children show originality in problem solving. By trial and error, they try behaviors until they find the best way to attain a goal.

The *sixth substage* (about 18 months to 2 years) is a transition to the preoperational stage of early childhood. **Representational ability**—the ability to mentally represent objects and actions in memory, largely through symbols such as words, numbers, and mental pictures—frees toddlers from immediate experience. They can pretend, and their representational ability affects the sophistication of their pretending (Bornstein, Haynes, O'Reilly, & Painter, 1996). They can think about actions before taking them. They no longer have to go through laborious trial and error to solve problems—they can try solutions in their mind.

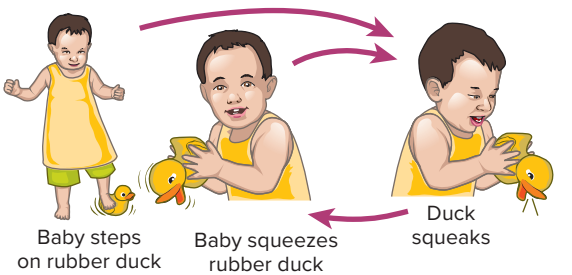
During these six substages, infants develop the abilities to think and remember. They also develop knowledge about aspects of the physical world, such as objects and spatial relationships. Researchers inspired by Piaget have found that some of these developments conform fairly closely to his observations, but other developments,



(a) Primary circular reaction: Action and response both involve infant's own body (1 to 4 months).



(b) Secondary circular reaction: Action gets a response from another person or object, leading to baby's repeating original action (4 to 8 months).



(c) Tertiary circular reaction: Action gets one pleasing result, leading baby to perform similar actions to get similar results (12 to 18 months).

FIGURE 1
Primary, Secondary, and Tertiary Circular Reactions

schemes
Piaget's term for organized patterns of thought and behavior used in particular situations.

circular reactions
Piaget's term for processes by which an infant learns to reproduce desired occurrences originally discovered by chance.

representational ability
Piaget's term for capacity to store mental images or symbols of objects and events.

TABLE 3 Key Developments of the Sensorimotor Stage

Concept or Skill	Piaget's View	More Recent Findings
Imitation	Invisible imitation develops around 9 months; deferred imitation begins after development of mental representations in the sixth substage (18–24 months).	Controversial studies have found invisible imitation of facial expressions in newborns and deferred imitation as early as 6 weeks. Deferred imitation of complex activities seems to exist as early as 6 months.
Object permanence	Develops gradually between the third and sixth substage.	Infants as young as 3½ months (second substage) seem to show object knowledge through their looking behavior.
Symbolic development	Depends on representational thinking, which develops in the sixth substage (18–24 months).	Understanding that pictures stand for something else occurs at about 19 months. Children under 3 tend to have difficulty interpreting scale models.
Categorization	Depends on representational thinking, which develops during the sixth substage (18–24 months).	Infants as young as 3 months seem to recognize perceptual categories; by the end of the first year they can categorize by function.
Causality	Develops slowly between 4–6 months and 1 year, based on an infant's discovery, first of effects of own actions and then of effects of outside forces.	Some evidence suggests early awareness of specific causal events in the physical world, but general understanding of causality may be slower to develop.
Number	Depends on use of symbols, which begins in the sixth substage (18–24 months).	Infants as young as 5 months may recognize and mentally manipulate small numbers, but interpretation of findings is in dispute.

checkpoint can you . . .

- Summarize major developments during the six substages of the sensorimotor stage?
- Explain how primary, secondary, and tertiary circular reactions work?
- Tell why the development of representational ability is important?

including representational ability, may occur earlier than Piaget claimed. (Table 3 compares Piaget's views on these and other topics with more current findings.)

IMITATION

One-year-old Clara watches as her older sister brushes her hair. When her sister puts the brush down, Clara picks it up and tries to brush her own hair.

Imitation becomes increasingly valuable late in the first year of life as babies try new skills (K. Nelson, 2005). Piaget noted this behavior in his own observations and maintained that visible imitation—imitation that uses body parts such as hands or feet that babies can see—develops first and is then followed by invisible imitation—imitation that involves parts of the body that babies cannot see—at 9 months.

Some researchers have argued imitative abilities begin far earlier than this, starting in the newborn period. However, whether or not newborns can imitate is a controversial subject. Initially, studies seemed to indicate that newborns could imitate adults by opening their mouths and sticking out their tongues (Meltzoff & Moore, 1989). Some researchers argued that this early imitative behavior was the basis for later social cognition (Meltzoff, 2007). Others argued that infants have an innate predisposition to imitate human faces that may serve the evolutionary purpose of communication with a caregiver (Rakison, 2005). Finally, some researchers argued that the tongue thrust was not imitation at all and might simply be exploratory behavior triggered by the sight of a narrow, pointed object approaching an infant's mouth (Kagan, 2008). More recent longitudinal research concluded that under more carefully controlled testing conditions, the apparent imitation disappeared (Oostenbroek et al., 2018). However, this finding remains in dispute (Meltzoff et al., 2018).

Piaget believed that children under 18 months could not engage in **deferred imitation**, a more complex ability requiring long-term memory. Deferred imitation is the reproduction of an observed behavior after the passage of time. As the behavior is no longer

deferred imitation
Piaget's term for reproduction of an observed behavior after the passage of time by calling up a stored symbol of it.

happening, deferred imitation requires that a stored representation of the action be recalled. Piaget argued that young children could not engage in deferred imitation because they lacked the ability to retain mental representations.

However, deferred imitation of novel or complex events seems to begin earlier than Piaget thought, by about 6 to 9 months (Bauer, 2002). For example, in one study, 6-month-old German and Cameroonian infants were able to imitate how an adult interacted with a doll after a 10-minute delay (Goertz et al., 2011). The ability to hold material in memory over a longer time span increases with age. For example, by 9 months, more than 40 percent of infants can reproduce two steps, such as dropping a toy car down a vertical chute and then pushing a car with a rod to make it roll to the end of a ramp and turn on a light. Moreover, they can do this after a delay of 1 month (Bauer 2002; Bauer, Wiebe, Carver, Waters, & Nelson, 2003). By 14 months of age, toddlers show preferences about whom they imitate from. For example, they are more likely to imitate from people who speak the same language they do (Buttelmann, Zmyj, Daum, & Carpenter, 2013). At 15 months, they show a bias toward imitating a peer; however, this switches to a bias toward imitating an adult at 24 months (Seehagen & Herbert, 2011). At 4 years of age, they are more likely to imitate from those who are the same gender they are (Grace, David, & Ryan, 2008). In explaining results such as these, some theorists have argued that children's imitation varies depending on their goals. When children are trying to communicate similarity or forge social bonds, they are more likely to imitate from others who are like them, such as other children. When children are trying to learn new things, they are likely to imitate from those whom they think they can learn the most from, such as adults (Zmyj & Seehagen, 2013).

OBJECT CONCEPT

In his close observations of children, Piaget noted that infants under the age of about 8 months act as if an object no longer exists once it is out of their line of sight. This led to his theorizing about the object concept—the understanding that objects have independent existence, characteristics, and locations in space.

object permanence
Piaget's term for the understanding that a person or object still exists when out of sight.

One aspect of the object concept is **object permanence**, the realization that something continues to exist when out of sight. At first, infants appear to have no such concept. If you hide an interesting toy, babies will not show any obvious sign they understand it still exists. However, by 18 to 24 months, almost all babies appear to understand that objects have independent existences and will reliably search for hidden objects. According to Piaget, object permanence develops gradually during the sensorimotor stage as children develop the ability to symbolically represent objects.

But was Piaget correct? Some research suggests that babies may fail to physically search for hidden objects not because they lack the understanding but because they cannot yet carry out a two-step sequence of actions, such as lifting the cover of a box and then grasping the object. Methods based only on infants' looking behavior eliminate the need for coordination with motor activity and thus can be used at very early ages. With this technique, we can get a better assessment of what babies really know.

Over the next few months, this ability continues to develop. For example, infants will continue to look for an object in the place where they first found it after seeing it hidden, even if they were later shown the object being moved to a new location (the A-not-B error). Somewhere between 5 and 8 months, they start *looking* at the correct location where the object was moved but do not reach for it. At about 9 to 10 months, infants will start looking and reaching for the object in the correct location (Cuevas & Bell, 2010). At 12 to 18 months, most infants will reliably search for an object in the last place they saw it hidden. However, they will not search for it in a place where they did not see it hidden. At 18 to 24 months, object permanence is fully achieved; toddlers will look for an object even if they did not see it hidden.



This little girl seems to be showing some concept of object permanence by searching for an object that is partially hidden. The age when object permanence begins to develop is in dispute.
Doug Goodman/Science Source

SYMBOLIC DEVELOPMENT, PICTORIAL COMPETENCE, AND UNDERSTANDING OF SCALE

Much of the knowledge people acquire about their world is gained through symbols, intentional representations of reality. Learning to interpret symbols is an essential task of childhood. One aspect of symbolic development is the growth of pictorial competence, the ability to understand the nature of pictures (DeLoache, Pierroutsakos, & Uttal, 2003). For example, consider how suns are represented in children's books. Generally, they are drawn as yellow circles with radiating spires. A child who understands that this graphic stands in for the ball of light in the sky has attained some degree of pictorial competence.

What do young children understand about pictures? Until about 15 months, infants use their hands to explore pictures as if they were objects—rubbing, patting, or attempting to lift a depicted object off the page. By about 19 months, children are able to point at a picture of an object while saying its name, demonstrating an understanding that a picture is a symbol of something else (DeLoache et al., 2003). By age 2, children understand that a picture is both an object and a symbol (Priessler & Bloom, 2007).

Picture books support children's acquisition of information about the world. However, research suggests that the ability to learn from books is influenced by cultural experiences. Twenty-month-old Tanzanian children who had previously not had experience with books were able to recognize familiar objects in books presented to them by a researcher but were not able to learn a label for a novel object (a gold S-shaped hook) first presented to them in a book and then in real life. By approximately 27 months, they were able to learn the word for the novel object from a picture book and apply it to the real object correctly, and by 34 months, they were able to apply what they learned to a different exemplar of that novel object (a silver S-shaped hook) (Walker, Walker, & Ganea, 2013).

What can be learned from pictures is also affected by the medium in which the information is presented. In one study, children under the age of 2 years did not learn the word for a novel object presented via an e-book, although they easily learned the word presented in a traditional print book. It was not until after 2 years of age that children were able to use e-books in this fashion (Strouse & Ganea, 2017).

What about television? Although toddlers may spend a good deal of time watching television, at first they seem unaware that what they are seeing is a representation of reality (Troseth, Saylor, & Archer, 2006). This makes it difficult for them to use the information presented on television effectively (Barr, 2010). For example, 12- to 18-month-old children were better able to imitate an adult's actions (helping a puppet ring a bell) when they saw an adult performing the action in front of them than when they saw a video of the same thing (Barr, Muentener, & Garcia, 2007). In one series of experiments, 2½-year-olds were able to locate an object hidden in an adjoining room after watching a video of an adult hiding it, but 2-year-olds could not. Yet the younger children were able to find the object if they watched through a window as it was hidden (Troseth & DeLoache, 1998). Apparently, what the 2-year-olds lacked was representational understanding of screen images.

Have you ever seen toddlers try to put on a hat that is too small for their head or sit in a chair much too tiny to hold them? This is known as a scale error—a momentary misperception of the relative sizes of objects (DeLoache, LoBue, Vanderborght, & Chiong, 2013). In one study, 18- to 36-month-olds were first allowed to interact with play objects that fit their body size, such as a toy car to ride in or a plastic slide to slide down. Then the life-size objects were replaced with miniature replicas. The children tried to slide down the tiny slides and squeeze their bodies into the miniature cars. Why would they still treat the objects as if they were full size?

The researchers suggested that these actions might in part be based on a lack of impulse control—the children wanted to play with the objects so badly that they ignored perceptual information about size. However, toddlers might also be exhibiting faulty communication between immature brain systems. One brain system enables the child to recognize and categorize an object ("That's a chair") and to plan what to do with it ("I'm

going to sit in it"). A separate system may be involved in perceiving the size of the object and using visual information to control actions pertaining to it ("It's big enough to sit in"). When communication between these areas breaks down, children momentarily, and amusingly, treat the objects as if they were full size (DeLoache, Uttal, & Rosengren, 2004).

The **dual representation** hypothesis offers yet another proposed explanation for scale errors. An object such as a toy chair has two potential representations. The chair is both an object in its own right, as well as a symbol for a class of things ("chairs"). According to this hypothesis, it is difficult for toddlers to simultaneously mentally represent both the actual object and the symbolic nature of what it stands for. In other words, they can either focus on the particular chair they are faced with ("This is a miniature chair") or the symbol and what it represents ("Chairs are for sitting in"), and so they may confuse the two (DeLoache, 2011).



While children can learn words for novel objects from print books easily by the age of 2, they cannot use e-books in this way until after 2 years of age.
Albert Mollon/Moment/Getty Images

EVALUATING PIAGET'S SENSORIMOTOR STAGE

According to Piaget, the journey from reflex behavior to the beginnings of thought is a long, slow one. For a year and a half or so, babies learn only from their senses and movements; not until the last half of the 2nd year do they make the breakthrough to conceptual thought. However, research using simplified tasks and modern tools suggests that limitations Piaget saw in infants' early cognitive abilities, such as object permanence, may instead have reflected immature linguistic and motor skills. The answers that Piaget received were as much a function of the ways in which he asked the questions as they were a reflection of the actual abilities of young children.

In terms of describing what children do under certain circumstances, and the basic progression of skills, Piaget was correct. However, infants and toddlers are more cognitively competent than Piaget imagined. This does not mean that infants come into the world with minds fully formed. As Piaget observed, immature forms of cognition precede more mature forms. However, Piaget may have been mistaken in his emphasis on motor experience as the primary engine of cognitive growth. Infants' perceptions are far ahead of their motor abilities, and today's methods enable researchers to make observations and inferences about those perceptions, as we discuss it in the next section.

dual representation hypothesis
Proposal that children under age 3 have difficulty grasping spatial relationships because of the need to keep more than one mental representation in mind at the same time.

checkpoint
can **you** . . .

- **Explain why Piaget may have underestimated some of infants' cognitive abilities, and discuss the implications of more recent research?**

Information-Processing Approach

Information-processing researchers analyze the separate parts of a complex task to figure out what abilities are necessary for each part of the task and at what age these abilities develop. Information-processing researchers also measure, and draw inferences from, what infants pay attention to and for how long.

HABITUATION

At about 6 weeks, Stefan lies peacefully in his crib near a window, sucking a pacifier. It is a cloudy day, but suddenly the sun breaks through, and an angular shaft of light appears on the end of the crib. Stefan stops sucking for a few moments, staring at the pattern of light and shade. Then he looks away and starts sucking again.

We don't know what was going on in Stefan's mind when he saw the shaft of light, but we can tell by his sucking and looking behavior at what point he began paying attention and when he stopped. Much information-processing research with infants is based on **habituation,** a type of learning in which repeated or continuous exposure to a stimulus, such as the shaft of light, reduces attention to that stimulus. In other words, familiarity breeds loss of interest.

habituation
Type of learning in which familiarity with a stimulus reduces, slows, or stops a response.

When doing research with babies, researchers need to figure out how to ask questions in ways that babies can answer. Natural behaviors such as those performed by Stefan give researchers a means by which to do this. Habituation is a type of learning in which repeated or continuous exposure to a stimulus (such as a shaft of light) reduces attention to that stimulus (such as looking away). It can be compared to boredom, and the rate of habituation (how quickly infants look away) can be used to ask infants how interesting they think various objects are.

Researchers study habituation in newborns by repeatedly presenting a stimulus such as a sound or visual pattern, and then monitoring responses such as heart rate, sucking, eye movements, and brain activity. A baby who has been sucking typically stops or sucks less vigorously when a stimulus is first presented in order to pay attention to the stimulus. After the stimulus loses its novelty, the infant generally resumes sucking vigorously. This indicates that habituation has occurred. If a new sight or sound is presented, the baby's attention is generally captured once again, and the baby will reorient toward the interesting stimulus and once again sucking slows. This response to a new stimulus is called **dishabituation.**

dishabituation
Increase in responsiveness after presentation of a new stimulus.

Researchers gauge the efficiency of infants' information processing by measuring how quickly babies habituate to familiar stimuli, how fast their attention recovers when they are exposed to new stimuli, and how much time they spend looking at the new and the old. Liking to look at new things and habituating to them quickly correlates with later signs of cognitive development, such as a preference for complexity, rapid exploration of the environment, sophisticated play, quick problem solving, and the ability to match pictures. In fact, as we will see, speed of habituation and other information-processing abilities show promise as predictors of intelligence (Rose, Feldman, Jankowski, & Van Rossem, 2012).

TOOLS OF INFANT RESEARCH

The tendency to spend more time looking at one sight rather than another is known as **visual preference.** Researchers can use this natural tendency to ask babies which of two objects they prefer. For example, if babies given a choice between looking at a curved or straight line spend more time focused on the curved line, the implication is that babies like curved lines more than straight lines. With this technique, researchers have determined that babies less than 2 days old prefer curved lines to straight lines, complex patterns to simple patterns, three-dimensional objects to two-dimensional objects, pictures of faces or facelike configurations, and moving objects to stationary objects. Newborns also prefer faces or facelike configurations to pictures of other things. Last, infants prefer new sights to familiar ones (Rakison, 2005; Turati, Simion, Milani, & Umilta, 2002), which is known as novelty preference.

visual preference
Tendency of infants to spend more time looking at one sight than another.

The finding that babies like to look at new things afforded researchers with yet another tool with which to ask them questions. Babies can be shown a stimulus and be allowed to habituate to it. Then they can be concurrently presented with the familiar stimulus, as well as an additional novel stimulus, and their visual preference can be measured. If the baby spends longer looking at the novel stimulus, that suggests that the baby recognizes the familiar stimulus. In other words, because the novel stimulus is new and babies like new things, it is more interesting and thus warrants a better look than the previously seen, more boring, stimulus. This behavior demonstrates **visual recognition memory,** an ability that depends on the capacity to form and refer to mental representations (P. R. Zelazo, Kearsley, & Stack, 1995).

visual recognition memory
Ability to distinguish a familiar visual stimulus from an unfamiliar one when shown both at the same time.

PERCEPTUAL PROCESSES

Contrary to Piaget's view regarding representational abilities, studies using the visual preference paradigm suggest that a rudimentary form of it exists at birth or very soon after and quickly becomes more efficient. Speed of processing increases rapidly during infants' 1st year (Colombo & Mitchell, 2009). It continues to increase during the 2nd and 3rd years, as toddlers become better able to distinguish new information from

information they have already processed (Rose, Jankowski, & Feldman, 2002; Zelazo et al., 1995). Moreover, there are individual differences in the speed with which infants form and refer to mental images. When shown two sights at the same time, infants who quickly shift attention from one to another tend to have better recognition memory and stronger novelty preference than infants who take longer looks at a single sight (Jankowski, Rose, & Feldman, 2001).

Auditory discrimination studies are also usually based on attentional preference. This ability may emerge prenatally. In one study, fetuses were played recordings of various adults reading a story in either their parents' native language or a novel language. Heart rate data indicated the fetuses paid increased attention to both their mother's voice and stories read in a novel language (Kisilevsky et al., 2009). Newborn infants also have the ability to remember some sounds. Infants who heard a certain speech sound one day after birth remembered that sound 24 hours later, as shown by a reduced tendency to turn their heads toward the sound (Swain, Zelazo, & Clifton, 1993). Brain imaging research mirrors that finding, as right frontal regions of the brain active in adults during word recognition tasks are similarly activated in infants, particularly for vowel sounds (Benavides-Varela, Hochmann, Macagno, Nespor, & Mehler, 2012). However, these memory traces, at least initially, are brief and subject to interference and forgetting (Benavides-Varela et al., 2011). Interestingly, infant memory for words is enhanced after a feeding, although this effect is independent of blood glucose level (Valiante, Barr, Zelazo, Papageorgiou, & Young, 2006).

Piaget held that the senses are unconnected at birth and are only gradually integrated through experience. However, this integration begins almost immediately. The fact that neonates will look at a source of sound shows that at the very least they associate hearing and sight. A more sophisticated ability is **cross-modal transfer**, the ability to use information gained from one sense to guide another—as when a person negotiates a dark room by feeling for the location of familiar objects.

cross-modal transfer
Ability to use information gained by one sense to guide another.

Cross-modal transfer of some, but not all, modalities appears to be available almost from birth. For example, in one study, newborns were able to visually recognize a cylinder or a prism they had previously held but could not use tactile (touch) information to recognize a shape they had previously seen. However, they were able to use textured objects bidirectionally. In other words, if the objects used as stimulus were either smooth or nubby, the infants could transfer vision to touch and touch to vision equally well (Sann & Streri, 2007). Similarly, 1-month-olds can transfer information gained from sucking (touch) to vision (Gibson & Walker, 1984), and 2- to 8-month-old infants expect bouncing objects and their sounds to be synchronous (Lewkowicz, 1996).

Researchers also study how attention develops. From birth to about 2 months, the amount of time infants typically gaze at a new sight increases (Colombo, 2002). Between about 4 and 8 months, looking time shortens, with the fastest decline seen at 4 to 6 months (Colombo et al., 2010). Presumably, this is because infants learn to scan objects more efficiently and thus shift attention more rapidly. Indeed, those infants who look for less time at novel stimuli show better memory for it later (Reynolds, Guy, & Zhang, 2011) and have better executive control in early childhood (Cuevas & Bell, 2014). Later in the 1st year and into the 2nd, when sustaining attention becomes more voluntary and task-oriented, looking time plateaus or increases, especially for more complex stimuli (Colombo et al., 2004).

The capacity for **joint attention**—which is of fundamental importance to social interaction, language acquisition, and the understanding of others' intentions and mental states—develops between 10 and 12 months, when babies follow an adults' gaze by looking or pointing in the same direction (Behne, Liszkowski, Carpenter, & Tomasello, 2012). Young children who follow an adults' gaze at 10 to 11 months have a larger vocabulary at 18 months, 2 years, and 2½ years than those who do not (Brooks & Meltzoff, 2005; 2008; 2015). Also, the use of pointing by children to capture the attention of adults around them has strong positive effects on children's language comprehension and production (Colonnesi, Stams, Koster, & Noom, 2010).

joint attention
A shared attentional focus, typically initiated with eye gaze or pointing.

checkpoint can you . . .

- Summarize the information-processing approach to the study of cognitive development?
- Explain how habituation measures the efficiency of infants' information processing?
- Identify several early perceptual and processing abilities that serve as predictors of intelligence?

By age 4, girls are generally convinced they are smarter than boys; it takes boys approximately 3 to 4 more years to come to the same conclusion.

Shepherd, 2010

Watching television may impede attentional development, although the data are unclear. One widely cited study found that the more hours children spent viewing television at ages 1 and 3, the more likely they were to have attentional problems by age 7 (Christakis, Zimmerman, DiGiuseppe, & McCarty, 2004). However, follow-up work in this area suggested the association between television viewing and attentional problems was only true for those children who watched over 7 hours of television a day, and even that association disappeared when maternal achievement and family income were included in analyses (Foster & Watkins, 2010). The question of whether infants and toddlers watch too much TV is addressed in the accompanying Research in Action.

INFORMATION PROCESSING AS A PREDICTOR OF INTELLIGENCE

Because of weak correlations between infants' scores on developmental tests such as the Bayley scales and their later IQ (Bjorklund & Causey, 2017), many psychologists assumed that the cognitive functioning of infants had little in common with that of older children and adults. However, when cognitive functioning is examined more closely, some aspects of mental development do seem to be fairly continuous from birth (Courage & Howe, 2002).

Four core cognitive domains appear to be associated with later IQ: attention, processing speed, memory, and representational competence (as indexed by cross-modal transfer and the ability to anticipate future events). In one study, performance on these tasks in infancy (7 and 12 months) was related to performance on the same tasks in toddlerhood (24 and 36 months) as well as to performance on IQ tests at 11 years of age (Rose, Feldman, Jankowski, & Van Rossem, 2012). Similar relationships to school performance have been found for the ability to shift attention rapidly (Hitzert, Van Braeckel, Bos, Hunnius, & Geuze, 2014) and the ability to inhibit attention toward irrelevant stimuli (Markant & Amso, 2014). This provides evidence for the continuity of cognitive processes. Essentially, children who, from the start, are efficient at attending to, taking in, and interpreting sensory information score well on later intelligence tests (Colombo, Kapa, & Curtindale, 2010). However, other items, such as performance on motor skills, do not relate well to later IQ.

INFORMATION PROCESSING AND PIAGETIAN ABILITIES

As we discussed earlier in the chapter, there is evidence that several of the cognitive abilities Piaget described as developing toward the end of the sensorimotor stage seem to arise much earlier. Here we consider categorization, causality, object permanence, and number, all of which depend on formation of mental representations (refer to Table 3).

Categorization Adults can understand that plants and animals are both living things. Furthermore, they can understand that some animals are pets, that among those pets are cats and dogs, and that a chihuahua is a type of dog. These nested relationships are known as *categories.* Dividing the world into meaningful categories is vital to thinking about objects or concepts and their relationships. It is the foundation of language, reasoning, problem solving, and memory; without it, the world would seem chaotic and meaningless.

According to Piaget, the ability to group things into categories does not appear until around 18 months. Yet, by looking longer at items in a new category, even 3-month-olds seem to know, for example, that a dog is not a cat (French, Mareschal, Mermillod, & Quinn, 2004). Indeed, brain imaging has found that basic components of the neural structures needed to support categorization are functional within the first 6 months of life (Quinn, Westerlund, & Nelson, 2006). Infants at first seem to categorize on the basis of *perceptual* features, such as shape, color, and pattern, but

INFANTS, TODDLERS, AND TV

Eighteen-month-old Caitlin picks up her LeapPad tablet and presses an icon. Cheerful music plays and she giggles as colorful images flash across the screen. Her mother is preparing dinner and content to let her child play an educational game.

About 90 percent of parents report their children under 2 using electronic media (AAP, 2011). Media technology geared toward young children is expansive, including TV, DVDs, tablets, apps, and streaming video (AAP, 2013). TV outranks other media in consumption (Vittrup, Snider, Rose, & Rippy, 2016), with near constant access possible through the proliferation of mobile media devices (AAP, 2013; Northwestern University Center on Human Development, 2014).

"Baby media" geared toward infants and toddlers directly or indirectly implies early education benefits, and parents perceive its educational value as a jump start to learning. Unlike preschool programming, there is no conclusive evidence that baby media positively impact learning (Wartella, Richert, & Robb, 2010). Attention is drawn toward sights and sounds, but age-related constraints in memory, cognition, and brain development place limitations on early learning. Researchers believe that infants and toddlers are unable to comprehend the meanings of what they are viewing. TV, DVDs, and other educational videos are believed to have little value until about 24 months of age (Courage & Howe, 2010).

The American Academy of Pediatrics (AAP) has renewed recommendations that children under age 2 be discouraged from watching TV (AAP, 2013). The committee echoes expert advice that children learn best through hands-on play and recommends that young children engage in interpersonal activities, such as talking, reading, or playing with toys. Nevertheless, few parents enforce TV viewing limitations with infants (Barr, Daniger, Hilliar, Andolina, & Ruskis, 2010). As children display interest and become more competent, parents tend to encourage media use (Lauricella, Wartella, & Rideout, 2015). Positive attitudes toward "baby media" use are maintained in spite of cautionary messages. Experts question whether parents are unfamiliar with or outright disagree with AAP recommendations (Vittrup et al., 2016).

More research is necessary to determine the long-term effects of early media use. TV and media use results in the displacement effect, whereby time spent, even with educational programming, takes precious time away from more beneficial activities (Christakis, 2014). Preliminary studies have explored background TV use, suggesting near constant TV noise interferes with children's cognitive functioning and social play (Lapierre et al., 2012). Other studies link heavy media use with poor self-regulation in early childhood (Radesky, Silverstein, Zuckerman, & Christakis, 2014). Others question the impact of trends of increasingly private use through mobile media devices (Lauricella et al., 2015), and whether early social interactions are altered in terms of quality communication and time spent with family members (Vittrup et al., 2016).

Parents represent the most influential social partner in their children's lives, modeling media use from birth (Vittrup et al., 2016). Increasingly, it is understood that change in infant and toddler media use requires a family effort, as parents' media use is mirrored in children's use across media types (Lauricella et al., 2015; Northwestern University Center on Human Development, 2014).

what's your view

What restrictions, if any, would you place on infant or toddler TV, video, or mobile media use? Do you believe there are negative consequences as a result of young children's media use?

by 12 to 14 months their categories become *conceptual,* based on real-world knowledge, particularly of function (Mandler, 1998, 2007). In one series of experiments, 10- and 11-month-olds recognized that chairs with zebra-striped upholstery belong in the category of furniture, not animals (Pauen, 2002). As time goes on, these broad concepts become more specific. For example, 2-year-olds recognize particular categories, such as "car" and "airplane," within the overall category of "vehicles" (Mandler, 2007).



Seven-month-old babies appear to understand that an object incapable of self-motion, such as a beanbag or a tennis ball, must be set in motion by a causal agent, such as a hand.
Pixelbliss/Shutterstock

Categorization is not limited to visual stimuli. There is evidence that 3-month-old babies categorize words differently than tones (Ferry, Hespos, & Waxman, 2010) and can even categorize musical chords into dissonant versus consonant and major versus minor dimensions (Virtala, Huotilainen, Partanen, Fellman, & Tervaniemi, 2013). Furthermore, in the 2nd year, language becomes a factor in the ability to categorize. In one study, 14-month-olds who understood more words were more flexible in their categorizing than those with smaller understood vocabularies (Ellis & Oakes, 2006).

Causality Eight-month-old Aviva accidentally squeezes her toy duck and it quacks. Startled, she drops it, and then, staring at it intently, she squeezes it again. Aviva is beginning to understand causality—the principle that one event (squeezing) causes another (quacking). Piaget believed that at about 4 to 6 months, as infants become able to grasp objects, they begin to recognize that they can act on their environment. However, he believed they did not yet know that causes must come before effects and that forces outside of themselves can make things happen. He maintained that this understanding develops slowly during infants' 1st year.

However, information-processing studies suggest that an understanding of causality emerges earlier. In one study, infants as young as 4½ months were able to understand simple causality (a ball knocking another ball out of position). However, only those infants who had practiced playing with a Velcro-covered ball and Velcro mittens—allowing them to easily manipulate the ball despite their immature motor control and therefore practice performing causal actions—were able to do so (Rakinson & Krogh, 2012). By 6 months of age, this ability is more robust and does not require training (Leslie, 1995). Moreover, by 8 months of age, infants make causal attributions for simple events even when they cannot see the actual moment of contact between the two objects (Muetener & Carey, 2010). And by 10 to 12 months old, the types of inferences made by infants become even more sophisticated. For example, 10- to 12-month-old infants looked longer when a hand emerged from the opposite side of a stage onto which a beanbag had been thrown than when the hand emerged from the same side as the beanbag, suggesting the infants understood that the hand had probably thrown the beanbag. The infants did not have the same reaction when a toy train rather than a hand appeared or when the thrown object was a self-propelled puppet (Saxe, Tenenbaum, & Carey, 2005).

It may be that, with age, infants accumulate more information about how objects behave, thus they are better able to see causality as a general principle operating in a variety of situations (Cohen & Amsel, 1998; Cohen, Chaput, & Cashon, 2002). Increasing experience with the environment may also be a factor. For example, 7-month-olds who had begun to crawl recognized self-propulsion of objects, but noncrawling 7-month-olds did not. This finding suggests that infants' ability to identify self-propelled motion is linked to the development of self-locomotion, which gives them new ways of understanding objects in their world (Cicchino & Rakison, 2008). Self-locomotion has also been linked to infants' ability to predict the goal of other people's intentional failed actions (such as trying, but failing, to reach an object) (Brandone, 2015).

Object Permanence When Piaget investigated object permanence, he used infants' motor responses to gauge whether or not infants understood that a hidden object still existed. Their failure to reach for the hidden object was interpreted to mean they did not. However, it was possible that infants understood object permanence but could not demonstrate this knowledge with motor activity. At that time, infant development research methodologies were more limited and a better means of investigation did not exist. However, once researchers developed the basic habituation and visual preference paradigms described earlier, they could ask babies the question in a different way, using what has since become known as the violation-of-expectations paradigm.

violation-of-expectations
Research method in which dishabituation to a stimulus that conflicts with experience is taken as evidence that an infant recognizes the new stimulus as surprising.

Violation-of-expectations begins with a familiarization phase in which infants see an event happen normally. After the infant becomes bored and has habituated to this procedure, the event is changed in a way that conflicts with—or violates—normal expectations.

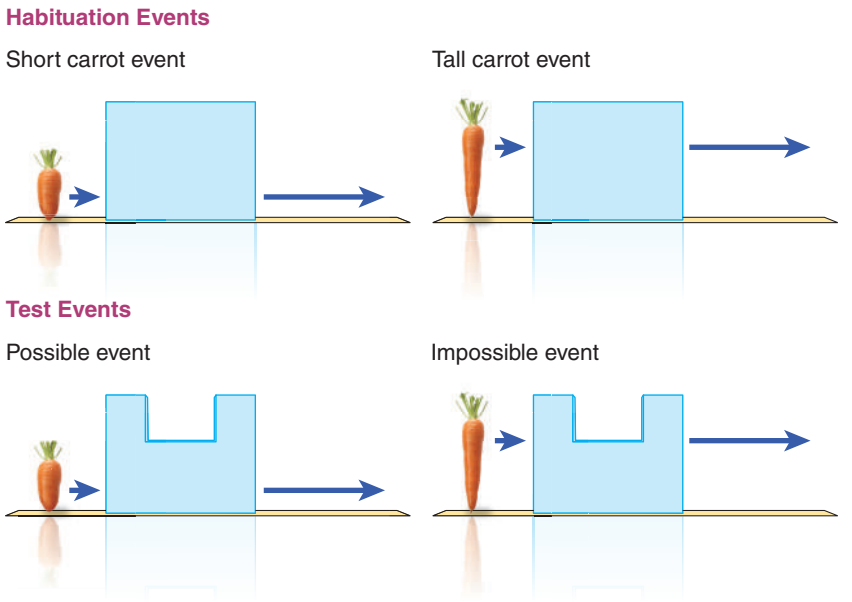


FIGURE 2

How Early Do Infants Show Object Permanence?

In this experiment, 3½-month-olds watched a short carrot and then a tall carrot slide along a track, disappear behind a screen, and then reappear. After they became accustomed to seeing these events, the opaque screen was replaced by a screen with a large notch at the top. The short carrot did not appear in the notch when passing behind the screen; the tall carrot, which should have appeared in the notch, also did not. The babies looked longer at the tall than at the short carrot event, suggesting they were surprised that the tall carrot did not appear in the notch.

Source: Adapted from Baillargeon and DeVos, 1991.

If the baby looks longer at this changed event, researchers assume the additional interest shown by the baby implies that the baby is surprised.

For example, in one experiment, infants as young as 3½ months were first shown an animation of a carrot moving back and forth behind a screen (Hespos & Baillargeon, 2008). The center of the screen was notched, and a tall carrot should have shown momentarily as it moved in front of the notch, as shown in Figure 2. In the "possible" event, the carrot could be seen as it passed in front of the notch. In the "impossible" event, the carrot would appear at one side, never show in the middle, and then emerge out the opposite side. Infants showed surprise by looking longer at the "impossible" event, indicating that the "impossible" event violated their expectations.

This procedure was important to the study of object permanence because for babies to be surprised by the carrot's failure to show, they needed to be able to remember that the carrot continued to exist. Thus, it provided evidence for the development of the ability at much younger ages than Piaget thought possible. Moreover, this methodology has allowed researchers to investigate a wider series of questions about what infants do and do not expect about the world and allowed us to ask these questions at much earlier ages than would otherwise be possible. For example, we now know that infants have object permanence, expect that objects should not appear and disappear randomly, and realize that you should not be able to hide tall objects inside of short objects (Baillargeon, 2004). More generally, it appears infants have a skeletal understanding of physical concepts such as gravity, inertia, and physical continuity. Some researchers have argued that, at some level, infants have innate, naïve expectations about the physical principles of the world around them (Baillargeon & Carey, 2012).

Number The violation-of-expectations paradigm can also be used to ask babies questions about their understanding of numbers. In one classic study, infants watched as Mickey Mouse dolls were placed behind a screen, and a doll was either added or taken away. The screen then was lifted to reveal either the number of dolls that should have been there or a different number of dolls. Babies looked longer at surprising "wrong" answers than at expected "right" ones, suggesting that they had mentally computed the right answers (Wynn, 1992). Subsequent to this study, multiple programs of research supported infants' ability to discriminate between small sets of numbers (Baillargeon & Carey, 2012). Theorists argued that this data suggested babies have an innate rudimentary ability to add and subtract.

Critics argued the infants might simply have been responding perceptually to the puzzling presence or the absence of the doll behind the screen (Cohen & Marks, 2002; Haith, 1998). In other words, they may have merely noticed differences in the overall contours, area, or collective mass of sets of objects rather than compared the number of objects in the sets (Mix, Huttenlocher, & Levine, 2002).

In response to such criticisms, McCrink and Wynn (2004) designed an experiment that used numbers too large for mere perceptual discrimination. Nine-month-old infants saw five abstract objects go behind an opaque square. Five more objects then appeared and went behind the square. The infants looked longer when the screen dropped to reveal five objects than when it revealed 10. This supported an early numerical system rather than a perceptual process. Other research has supported similar conclusions. For example, newborns are able to relate a visual array of 4 or 12 triangles or circles with the auditory presentation of 4 or 12 sounds (such as "tu-tu-tu-tu" or "ra-ra-ra-ra"). This suggests that even at this early age, number is an abstract concept that can be represented across different sensory modalities (Izard, Sann, Spelke, & Streri, 2009). Moreover, in preschool, the ability to estimate approximate numbers is related to later mathematical achievement, suggesting continuity in this process (Bonny & Lourenco, 2013).

Some theorists have suggested that there are two core systems for the representation of number. One system is designed for keeping track of small numbers of individual objects. A second system is designed for representing large numbers of approximate magnitude (Feigenson, Dehaene, & Spelke, 2004). In support of this assertion, brain imaging research conducted on 6- to 7-month-old infants showed that when infants viewed visual arrays of one to three items, areas in the occipital and temporal areas of the brain were more active, while arrays of 8 to 32 objects led to more activity in parietal sites (Hyde & Spelke, 2011).

Babies may use a rudimentary understanding of probability in figuring out other people's preferences. For example, if they see a person pick a blue toy out of a box filled primarily with red toys, they will assume that person likes blue toys. If a person picks a blue toy out of a box filled with equal amounts of red and blue toys, they are less likely to assume there was a preference for blue toys. In a way, they are performing a statistical analysis of the likelihood of each act, and basing their assumptions on that.

Kushnir, Xu, & Wellman, 2010

EVALUATING INFORMATION-PROCESSING RESEARCH

Some theorists argue we must be wary of overestimating infants' cognitive abilities from data that may have simpler explanations (Kagan, 2008). They argue that an infant's visual interest in an impossible condition may reveal a *perceptual* awareness that something unusual has happened rather than a *conceptual* understanding of the way things work. For instance, if an infant looks longer at one scene than another, it may just be because the two scenes look different from each other rather than because of any conceptual processes. (Goubet & Clifton, 1998; Haith, 1998).

However, violation-of-expectations studies and other recent information-processing research with infants raise the possibility that at least rudimentary forms of categorization, causal reasoning, naïve physics, and number sense may be present in the early months of life. One proposal is that infants are born with reasoning abilities—*innate learning mechanisms* that help them make sense of the information they encounter—or that they acquire these abilities very early (Baillargeon, Gertner, & Wu, 2011). Some investigators go further, suggesting that infants at birth may already have intuitive *core knowledge* of basic physical principles in the form of specialized brain modules that help infants organize their perceptions and experience (Spelke, 2017; Baillargeon & Carey, 2012).

checkpoint can you . . .

- **Discuss three areas in which information-processing research challenges Piaget's account of development?**
- **Describe the violation-of-expectations research method, tell how and why it is used, and list some criticisms of it?**

Cognitive Neuroscience Approach



Research suggests that sleep and dreaming help with memory consolidation. And babies, like adults, show better memory for material following a nap.

Konrad, Seehagen, Schneider, & Herbert, 2016

The cognitive neuroscience approach examines the hardware of the central nervous system to identify what brain structures are involved in specific areas of cognition. Current brain research bears out Piaget's assumption that neurological maturation is a major factor in cognitive development. Brain growth spurts (periods of rapid growth and development) coincide with changes in cognitive behavior (Fischer, 2008).

Some researchers have used brain scans to determine which brain structures are tied to cognitive functions and to chart developmental changes. These brain scans provide physical evidence of the location of two separate long-term memory systems–implicit and explicit–that acquire and store different kinds of information and mature at different rates (Bauer, DeBoer, & Lukowski, 2007). **Implicit memory** refers to remembering that occurs without effort or even conscious awareness, for example, knowing how to tie your shoe or throw a ball. It most commonly pertains to habits and skills. Implicit memory seems to develop early and is demonstrated by such actions as an infant's kicking on seeing a familiar mobile (Nelson, 2005). **Explicit memory**, also called declarative memory, is conscious or intentional recollection, usually of facts, names, events, or other things that can be stated or declared. Delayed imitation of complex behaviors is evidence that declarative memory has developed. This is because delayed imitation requires a representation of a behavior to be stored in memory. While infants cannot yet speak, and thus the memory cannot be technically be "declared," this is nonetheless a demonstration of symbolic representation (Bauer et al., 2007).

implicit memory
Unconscious recall, generally of habits and skills; sometimes called *procedural memory.*

explicit memory
Intentional and conscious memory, generally of facts, names, and events.

In early infancy, when the structures responsible for memory storage are not fully formed, memories are relatively fleeting. The rapid growth of the *hippocampus,* a structure deep in the temporal lobes along with the development of cortical structures coordinated by the hippocampal formation make longer-lasting memories possible (Lavenex & Lavenex, 2013; Uematsu et al., 2012).

The *prefrontal cortex* (the large portion of the frontal lobe directly behind the forehead) is believed to control many aspects of cognition. This part of the brain develops more slowly than any other (Teffer & Semendeferi, 2012; Diamond, 2002), making it more sensitive to environmental disruption (Kolb et al., 2012). During the second half of the 1st year, the prefrontal cortex and associated circuitry develop the capacity for **working memory** (Pelphrey et al., 2004). Working memory is short-term storage of information the brain is actively processing, or working on. For example, when you try to estimate how much an item on sale will cost, you are using working memory to make the calculations. Working memory can be overwhelmed, as when someone speaks to you while you try to calculate the sale price.

working memory
Short-term storage of information being actively processed.

Working memory appears relatively late in development and may be responsible for the slow development of object permanence, which seems to be seated in a rearward area of the prefrontal cortex (Bell, 2012; Nelson, 1995). By 12 months, this region may be developed enough to permit an infant to avoid the A-not-B error by controlling the impulse to search in a place where the object previously was found (Bell & Fox, 1992; Diamond, 1991).

Although memory systems continue to develop beyond infancy, the early emergence of the brain's memory structures underlines the importance of environmental stimulation from the first months of life. Social-contextual theorists and researchers pay particular attention to the impact of environmental influences.

checkpoint can **you** . . .

- **Identify the brain structures apparently involved in explicit, implicit, and working memory, and mention a task made possible by each?**

Social-Contextual Approach

Researchers influenced by Vygotsky's sociocultural theory study how cultural context affects early social interactions that may promote cognitive competence. **Guided participation** refers to mutual interactions with adults that help structure children's activities and bridge the gap between a child's understanding and an adult's. This concept was inspired

guided participation
Adult's participation in a child's activity that helps to structure it and bring the child's understanding of it closer to the adult's.

Rogoff points out that despite the varied ways in which children learn, they all learn what they need to learn to be effective adults in that culture. She argues there is no "one best way"; rather, there are multiple, equally valid ways of learning.

by Vygotsky's view of learning as a collaborative process. Guided participation often occurs in shared play and in ordinary, everyday activities in which children informally learn the skills, knowledge, and values important in their culture, much as an apprentice would.

In a series of cross-cultural studies (Göncü, Mistry, & Mosier, 2000; Rogoff, Mistry, Göncü, & Mosier, 1993), researchers visited the homes of 1- to 2-year-old children in four culturally different places: a Mayan town in Guatemala, a tribal village in India, and middle-class urban neighborhoods in Salt Lake City and Turkey. The investigators interviewed caregivers about their child-rearing practices and watched them help the toddlers learn to dress themselves and to play with unfamiliar toys.

In the Guatemalan town and the Indian village, the children customarily played while the mother worked nearby. When children needed to be shown how to do something, such as tie their shoes, the mothers tended to provide an initial demonstration and instruction, and then allow the children to take over while they remained available to help if needed. The instruction was primarily nonverbal. The U.S. toddlers, who had full-time caregivers, interacted with adults in the context of child's play rather than work or social worlds. Caregivers managed and motivated children's learning with praise and excitement. Their instruction was highly verbal in nature, often consisting of "lessons." Turkish families, who were in transition from a rural to an urban way of life, showed a pattern somewhere in between.

The cultural context influences the way caregivers contribute to cognitive development. Direct adult involvement in children's play and learning may be better adapted to a middle-class urban community, in which parents or caregivers have more time, greater verbal skills, and possibly more interest in children's play and learning, than to a rural community in a developing country, in which children frequently observe and participate in adults' work activities (Rogoff et al., 1993). However, despite the different means by which caregivers teach their children valuable life skills, all children learn the things they need to be effective members of society.

The social constructionist approach has been influential in early childhood education. Research has shown that preschool programs that are highly focused on academic skills are not necessarily ideal for young children (Bordrova, 2008; Hirsch-Pasek, 1991). Indeed, such programs may even result in lower academic achievement later in school (Marcon, 2002). However, programs based on Vygotsky's philosophies have been shown to be an effective route for the transmission of academic concepts within the context of classroom routines and play. For example, a geometry lesson in which 4- to 5-year-old children donned detective hats and were guided through solving a "mystery of the shapes" sorting task where they were asked to discover the secret distinguishing "real" shapes from "fake" ones was more effective in teaching shape knowledge than either didactic teaching or free play (Fisher, Hirsh-Pasek, Newcombe, & Golinkoff, 2013). Additionally, social constructionist approaches to early childhood education may have positive effects on other variables important for later academic achievement. For example, when compared to children enrolled in a child-centered preschool and kindergarten, children in a highly academic program did significantly worse on a number of motivational measures. The children in the academically oriented programs rated their own abilities as lower, expected less success in academics, were more dependent on adults, were less proud of their accomplishments, and found school more worrisome (Stipek, Feiler, Daniels, & Milburn, 1995).

checkpoint can you . . .

- Give an example of how cultural patterns affect caregivers' contributions to toddlers' learning?

Language Development

language
Communication system based on words and grammar.

Language is a communication system based on words and grammar. Once children know words, they can use them to represent objects and actions. They can reflect on people, places, and things; and they can communicate their needs, feelings, and ideas in order to exert more control over their lives.

In this section, we look first at a typical sequence of milestones in language development (Table 4) and at some characteristics of early speech. Then we consider how babies

TABLE 4 Language Milestones from Birth to 3 Years

Age in Months	Development
Birth	Can perceive speech, cry, make some response to sound.
1½ to 3	Coos and laughs.
3	Plays with speech sounds.
5 to 6	Recognizes frequently heard sound patterns.
6 to 7	Recognizes all phonemes of native language.
6 to 10	Babbles in strings of consonants and vowels.
9	Uses gestures to communicate and plays gesture games.
9 to 10	Intentionally imitates sounds.
9 to 12	Uses a few social gestures.
10 to 12	No longer can discriminate sounds not in own language.
10 to 14	Says first word (usually a label for something).
10 to 18	Says single words.
12 to 13	Understands symbolic function of naming; passive vocabulary grows.
13	Uses more elaborate gestures.
14	Uses symbolic gesturing.
16 to 24	Learns many new words, expanding expressive vocabulary rapidly from about 50 words to as many as 400; uses verbs and adjectives.
18 to 24	Says first sentence (two words).
20	Uses fewer gestures; names more things.
20 to 22	Has comprehension spurt.
24	Uses many two-word phrases; no longer babbles; wants to talk.
30	Learns new words almost every day; speaks in combinations of three or more words; makes grammatical mistakes.
36	Says up to 1,000 words, 80 percent intelligible; makes some mistakes in syntax.

Source: Bates, O'Connell, Shore, 1987; Capute, Shapiro, and Palmer, 1987; Kuhl, 2004; Lalonde and Werker, 1995; Lenneberg, 1969; Newman, 2005.

acquire language, how brain growth is linked to language development, and how parents and other caregivers contribute to it.

SEQUENCE OF EARLY LANGUAGE DEVELOPMENT

Before babies can use words, they make their needs and feelings known through sounds that progress from crying to cooing and babbling, then to accidental imitation, and then deliberate imitation. These sounds are known as **prelinguistic speech.** Infants also grow in the ability to recognize and understand speech sounds and to use meaningful gestures. Babies typically say their first word around the end of the 1st year, and toddlers begin speaking in sentences about 8 months to a year later.

prelinguistic speech
Forerunner of linguistic speech; utterance of sounds that are not words. Includes crying, cooing, babbling, and accidental and deliberate imitation of sounds without understanding their meaning.

Sometimes making a particular sound results in a tongue position more or less suited toward making another sound. So, for example, "da" is easier to say for a baby than "bi." When you look at the most common kinship terms across cultures, they almost all use some variation of "ba," "pa," "da," and "ma." These are, not coincidentally, the easiest sounds for babies to make.

Early Vocalization *Crying* is a newborn's first means of communication. Different pitches, patterns, and intensities signal hunger, sleepiness, or anger (Lester & Boukydis, 1985). Adults find crying aversive for a reason—it motivates them to find the source of the problem and fix it (Leerkes, Weaver, & O'Brien, 2012). Thus crying has great adaptive value.

Between 6 weeks and 3 months, babies start *cooing* when they are happy—squealing, gurgling, and making vowel sounds like "ahhh." *Babbling*—repeating consonant-vowel strings, such as "ma-ma-ma-ma"—occurs between ages 6 and 10 months and is often mistaken for a baby's first word. Babbling, although initially nonsensical, becomes more wordlike over time.

Imitation is key to early language development. First, infants accidentally imitate language sounds. Generally, they are reinforced by their parents' positive responses, and thus encouraged to produce such sounds more and more over time. Then, at about 9 to 10 months, infants deliberately imitate sounds without understanding them. Once they have a repertoire of sounds, they string them together in prelinguistic speech patterns that sound like language but seem to have no meaning. Finally, after infants become familiar with the sounds of words and phrases, they begin to attach meanings to them (Fernald, Perfors, & Marchman, 2006; Jusczyk & Hohne, 1997).

Perceiving Language Sounds and Structure Imitation of language sounds requires the ability to perceive subtle differences between sounds. Infants' brains seem to be preset to discriminate basic linguistic units, perceive linguistic patterns, and categorize them as similar or different (Kuhl, 2004).

Phonemes are the smallest units of sound in speech. For example, the word *dog* has three phonemes: the *d,* the *o,* and the *g* sound. Every language has its own unique phonology, or system of sounds, that is used in the production of speech. At first, infants can perceive and discriminate the sounds used in any language. In time, however, exposure to a native language commits the brain's neural networks to further learning of the patterns of the infant's native language and constrains future learning of nonnative language patterns (Kuhl & Rivera-Gaxiola, 2008). This exposure can either occur prenatally or postnatally. If a mother speaks two languages regularly during pregnancy, her newborn baby will recognize both languages and be more interested in listening to speakers in the languages he or she was previously exposed to. Even more important, the baby will show differential responses to both languages, suggesting that even newborns have some understanding that two language systems are involved and that they are sensitive not just to the overall sounds but to the patterns and rhythms that distinguish the two languages (Byers-Heinlein, Burns, & Werker, 2010).

By 6 to 7 months, hearing babies have learned to recognize the phonemes used in their native language (Kuhl, Williams, Lacerda, Stevens, & Lindblom, 1992), and by 8 months they begin to lose sensitivity to phonemes that are not used in their native language (Gervain & Mehler, 2010). By the end of the 1st year, babies lose their sensitivity to sounds that are not part of the language or languages they usually hear spoken. This process begins earlier for vowels and later for consonants (Kulh & Rivera-Gaxiola, 2008). The ability to discriminate native-language sounds at this age predicts individual differences in language abilities during the 2nd year (Tsao, Liu, & Kuhl, 2004), whereas nonnative sound discrimination does not (Kuhl, Conboy, Padden, Nelson, & Pruitt, 2005). The increased sensitivity to native sounds helps the child more efficiently acquire language. Interestingly, analogous processes occur in deaf children with gestures (Kuhl & Rivera-Gaxiola, 2008).

One way in which this structure is reflected is in babies' babbling. One-year-olds babble in their native language. In other words, their babbling follows the phonological rules of their language.

How does this change occur? One hypothesis is that infants mentally compute the relative frequency of particular phonetic sequences in their language and learn to ignore sequences they infrequently hear (Werker, Yeung, & Yoshida, 2012; Kuhl, 2004). Another hypothesis is that early language experience modifies neural structures, facilitating detection of word patterns in the native language while suppressing attention to nonnative patterns that would slow native language learning. In support of this, toddlers who at 7½ months had shown better neural discrimination of native phonemes were more advanced in word production and sentence complexity at 24 months and at 30 months

than toddlers who, at 7½ months, had been better able to discriminate phonetic contrasts in nonnative languages (Kuhl & Rivera-Gaxiola, 2008).

In addition to learning what the phonemes in their language are, babies also learn the rules for how they fit together. For example, in English, the sound combination in "kib" is acceptable, although "kib" is not a word. However, the nonsense word "bnik" breaks the phonological rules in English as a "b" and an "n" are not typically found next to each other within the same word. Between 6 and 12 months, babies begin to become aware of the phonological rules of their language. Research with infants supports this and suggests that they may have a mechanism for discerning abstract rules of sentence structure (Saffran, Pollak, Seibel, & Shkolnik, 2007).

Babies also begin to recognize sound patterns they hear frequently, such as their name. Five-month-old infants listen longer to their name than to other names (Newman, 2005). Infants at 8 months discern perceptual cues such as syllables that usually occur together (such as *ba* and *by*) and store these possible word forms (*baby*) in memory. They also notice pronunciation, stress placed on syllables, and changes in pitch. This early auditory learning lays the foundation for later vocabulary growth (Swingley, 2008).



Babies generally start pointing with their entire hand, and then move to using their pointer finger.

Gestures Before babies can speak, they point (Liszkowski, Carpenter, & Tomasello, 2008). At 11 months, Maika pointed to her cup to show she wanted it. By 12 months, Maika learned some conventional social gestures: waving bye-bye and nodding her head to mean yes. By about 13 months, she used more elaborate representational gestures; for example, she would hold an empty cup to her mouth to show she wanted a drink or hold up her arms to show that she wanted to be picked up.

Symbolic gestures, such as blowing to mean hot or sniffing to mean flower, often emerge around the same time as babies say their first words, and they function much like words. By using them, babies show they understand that symbols can refer to specific objects, events, desires, and conditions. Gestures usually appear before children have a vocabulary of 25 words, and they drop out when children learn and can say the word for the idea they were gesturing (Lock, Young, Service, & Chandler, 1990). Girls show a developmental advantage and use gestures at a slightly earlier age than do boys (Özçaliskan & Goldin-Meadow, 2010).

Both hearing and deaf children use gestures in much the same ways (Goldin-Meadow, 2007). The use of gestures seems to help babies learn to talk. Pointing, for example, is positively correlated with later language development (Colonnesi, Stams, Koster, & Noom, 2010), and early gestures in general are a good predictor of later vocabulary size (Goldin-Meadow, 2007). In one study, parents' use of gestures predicted their child's use of gestures at 14 months, which in turn predicted the size of the child's vocabulary at 42 months (Rowe, Özçaliskan, & Goldin-Meadow, 2008). These data, however, refer to the spontaneous use of gestures and may not apply to the deliberate training of gestures to infants. Teaching preverbal children to use sign language has not been shown to accelerate their language development, but it also does not appear to be harmful (Kirk, Howlett, Pine, & Fletcher, 2013; Fitzpatrick, Thibert, Grandpierre, & Johnston, 2014).



This toddler is communicating with his father by pointing at something that catches his eye. Gesturing seems to come naturally to young children and may be an important part of language learning.
Photodisc/Getty Images

First Words Babies understand many words before they can use them. Six-month-olds are more likely to look at a picture of a banana when they hear the word *banana* than when they hear other common nouns (Bergelson & Swingley, 2012). By 13 months, most children understand

that a word stands for a specific thing or event, and they can quickly learn the meaning of a new word (Woodward, Markman, & Fitzsimmons, 1994; Gurteen, Horne, & Erjavec, 2011). Additionally, they may use a simple syllable to mean more than one thing depending on the context in which it is used or the vocal intonation. For example, "Da!" may mean "I want Daddy now!" while "Daddy?" may mean "Where is Daddy?" An entire sentence expressed with one word is known as a **holophrase** (Bruner, 1974).

holophrase
Single word that conveys a complete thought.

Between 10 months and 2 years, there is a shift from simple associations to following social cues. At 10 months, infants tend to assume a new word they hear refers to whatever object they find most interesting, whether or not the name is correct for that object. At 12 months, they begin to pay attention to cues from adults, such as looking or pointing at an object while saying its name. However, they still learn words only for interesting objects and ignore uninteresting ones. By 18 to 24 months, children follow social cues in learning words, regardless of the intrinsic interest of the objects (Golinkoff & Hirsh-Pasek, 2006; Pruden, Hirsh-Pasek, Golinkoff, & Hennon, 2006). At 24 months, children quickly recognize the names of familiar objects in the absence of visual cues (Swingley & Fernald, 2002). Additionally, if presented with a familiar object and novel object, 24-month-old children will assume a novel term refers to the novel object and quickly learn and remember that term (Spiegel & Halberda, 2011).

Receptive vocabulary—what infants understand—continues to grow as verbal comprehension gradually becomes faster and more accurate and efficient (Fernald, Perfors, & Marchman, 2006). Generally, infants have a far greater receptive vocabulary than an expressive—or spoken—vocabulary. By 18 months, 3 out of 4 children can understand 150 words and can say 50 of them (Kuhl, 2004). Children with larger vocabularies and quicker reaction times can recognize spoken words from just the first part of the word. For example, when they hear "daw" or "ki," they will point to a picture of a dog or kitten (Fernald, Swingley, & Pinto, 2001). This early language learning is closely related to later cognitive development. Late talkers who are quick to recognize words at 18 months are more likely to show accelerated vocabulary grown in the next year than those who are slower at word recognition (Fernald & Marchman, 2012), and children's speed of recognition of spoken words and vocabulary size at 25 months predict linguistic and cognitive skills at 8 years (Marchman & Fernald, 2008).

Addition of new words to the *expressive* (spoken) *vocabulary* is slow at first. Then, sometime between 16 and 24 months, a "naming explosion" may occur (Ganger & Brent, 2004). Within a few months, many toddlers go from saying about 50 words to saying several hundred (Samuelson & McMurray, 2017). Rapid gains in spoken vocabulary reflect increases in speed and accuracy of word recognition during the 2nd year (Fernald et al., 2006). Children also use their growing knowledge of syntax to puzzle out word meaning (Fisher, Gertner, & Yuan, 2010) as well as an understanding that things belong in categories (Samuelson & McMurray, 2017).

Nouns seem to be the easiest type of word to learn, perhaps because it is easier to form a mental image of nouns (McDonough, Song, Hirsh-Pasek, Golinkoff, & Lannon, 2011). In a cross-cultural study, Spanish, Dutch, French, Hebrew, Italian, Korean, and U.S. parents all reported that their 20-month-old children knew more nouns than any other class of words (Bornstein et al., 2004). A similar advantage has emerged for nouns in laboratory studies where children have been taught novel nouns and verbs (Imai et al., 2008). Generally, research has shown that across different languages, children are consistently adept at quickly and easily learning nouns. However, when learning novel verbs, children have a more difficult time. Children tend to learn verbs most easily in languages in which surrounding noun phrases are explicitly mentioned ("The girl is petting the dog"), and they have a more difficult time mapping meaning to verbs when the surrounding verb phrases are dropped ("She's petting it")(Waxman, Fu, Arunachalam, Leddon, Geraghty, & Song, 2013; Arunachalam & Waxman, 2011).



If you want to help a toddler learn color words, label the object you are referring to, then name the color.

Dye, 2010

First Sentences The next important linguistic breakthrough comes when a toddler puts two words together to express one idea ("Dolly fall"). Generally, children do this between 18 and 24 months. However, this age range varies greatly. Although prelinguistic

speech (such as babbling) is fairly closely tied to chronological age, linguistic speech is not. Most children who begin talking fairly late catch up eventually.

A child's first sentences typically deal with everyday events, things, people, or activities. Children typically use **telegraphic speech,** consisting of only a few essential words. When Rita says, "Damma deep," she seems to mean, "Grandma is sweeping the floor." Children's use of telegraphic speech, and the form it takes, varies, depending on the language being learned (Slobin, 1983). Word order generally conforms to what a child hears; Rita does not say, "Deep Damma," when she sees her grandmother sweeping.

telegraphic speech
Early form of sentence use consisting of only a few essential words.

Children show their implicit understanding of the fundamental rules for putting sentences together—or **syntax**—with the word order they use. Syntax is why a sentence like "man bites dog" differs from "dog bites man," and it allows us to understand and produce an infinite number of utterances.

syntax
Rules for forming sentences in a particular language.

Between 20 and 30 months, children show increasing competence in syntax. At this age, children also become more comfortable with articles (*a, the*), prepositions (*in, on*), conjunctions (*and, but*), plurals, verb forms, and forms of the verb *to be* (*am, are, is*). They also become increasingly aware of the communicative purpose of speech and of whether their words are being understood (Dunham, Dunham, & O'Keefe, 2000; Shwe & Markman, 1997)—a sign of growing sensitivity to the mental lives of others. By age 3, speech is fluent, longer, and more complex. In the third year of life, the average child's sentence will be approximately three or four words long (Rice et al., 2010).



The term "telegraphic speech" is derived from the fact that telegrams charged by the word. To save money, people would eliminate all but the essential components of speech in much the same way that babies use only the words best able to communicate their intent.

CHARACTERISTICS OF EARLY SPEECH

Early speech has a character all its own, no matter what language a child is speaking (Slobin, 1971, 1990). As we have seen, young children *simplify.* They use telegraphic speech to say just enough to get their meaning across ("No drink milk!").

Young children *understand grammatical relationships they cannot yet express*. For example, Nina understands that a dog is chasing a cat but does not yet produce multiple-word sentences easily, so her sentence comes out as "Puppy chase" rather than "The puppy is chasing the kitty." The order of the words shows she understands the underlying syntactic rules: She does not say "Kitty chase."

Another way children illustrate their growing knowledge of syntax is *overregularization*. Overregularization occurs when children inappropriately apply a syntactical rule. For instance, when children say sentences such as "Daddy goed to the store" or "I drawed that," they are applying the English language rule "add –ed to a verb to make it past tense." It takes a while for children to learn the rule as well as the exceptions to it. For example, children commonly use the exceptions to the rule first. They generally learn these by rote for phrases they commonly hear ("Daddy went to the store"). Then they learn the rule and use that to fill in the blanks when they can't recall the exception ("Daddy goed to the store"). By early school age, as they become more proficient in language, they memorize the exceptions and begin to apply them, once again saying the phrase correctly ("Daddy went to the store").

Children also make categorical mistakes by either *underextending* or *overextending* word meaning. When they underextend word meanings, they use words in too narrow of a category. For example, Lisa knows their family pet is a "doggy." However, she shakes her head no when her mother points out other dogs outside their home. To her, her dog, and only her dog, is a "doggy." Lisa is underextending the word *doggy* by restricting it to only her pet. Alternatively, children also overextend word meanings by using words in too broad of a category. At 14 months, Amir jumped in excitement at the sight of a gray-haired man on the television screen and shouted, "Gampa!" Amir was overgeneralizing, or overextending, a word. He thought that because his grandfather had gray hair, all gray-haired men could be called "Grandpa."

VARIATIONS IN LANGUAGE DEVELOPMENT

Deaf babies seem to learn sign language in much the same fashion and in the same sequence as hearing infants learn speech, providing they are raised in a language-rich

checkpoint can you . . .

- Trace a typical sequence of milestones in early language development?
- Describe five ways in which early speech differs from adult speech?

environment (Lederberg, Schick, & Spencer, 2013). Just as hearing babies of hearing parents imitate vocal utterances, deaf babies of deaf parents seem to imitate the sign language they see their parents using, first stringing together meaningless motions and then repeating them over and over in what has been called hand-babbling. As parents reinforce these gestures, the babies attach meaning to them (Pettito & Marentette, 1991; Petitto, Holowka, Sergio, & Ostry, 2001).

Deaf babies begin hand-babbling between ages 7 and 10 months, about the age when hearing infants begin voice-babbling (Petitto et al., 2001). Deaf babies also begin to use sentences in sign language at about the same time that hearing babies begin to speak in sentences (Meier, 1991). These observations suggest that an inborn language capacity may underlie the acquisition of both spoken and signed language and that advances in both kinds of language are tied to brain maturation (Kuhl, 2010).

In households where more than one language is spoken, babies achieve similar milestones in each language on the same schedule as children who hear only one language (Petitto & Kovelman, 2003). However, children learning two languages tend to have smaller vocabularies in each language than children learning only one language (Hoff, 2006). Although they may have smaller vocabularies, they show advantages in other areas. Bilingual children tend to have more advanced nonverbal executive control skills, theory of mind, and an earlier understanding of syntactical and morphological rules of language (Barac, Bialystok, Castro, & Sanchez, 2014).

code mixing
Use of elements of two languages, sometimes in the same utterance, by young children in households where both languages are spoken.

code switching
Changing one's speech to match the situation, as in people who are bilingual.

Bilingual children often use elements of both languages, sometimes in the same utterance—a phenomenon called **code mixing** (Petitto & Kovelman, 2003). In Montreal, children as young as 2 in dual-language households differentiate between the two languages, using French with a French-speaking parent and English with an English-speaking parent (Genesee, Nicoladis, & Paradis, 1995). This ability to shift from one language to another is called **code switching**.

CLASSIC THEORIES OF LANGUAGE ACQUISITION: THE NATURE-NURTURE DEBATE

Is linguistic ability learned or inborn? In the 1950s, a debate raged between two schools of thought: one led by B. F. Skinner, the foremost proponent of learning theory, the other by the linguist Noam Chomsky.



Is linguistic ability learned or inborn? Though inborn language capacity may underlie this baby's ability to speak, when this mother repeats the sounds her baby makes, she is reinforcing the likelihood the baby will repeat those sounds—highlighting the influences of both nature and nurture.
leolintang/Shutterstock

Skinner (1957) maintained that language learning, like other learning, is based on experience and learned associations. According to classic learning theory, children learn language through the processes of operant conditioning. At first, babies utter sounds at random. Caregivers reinforce the sounds that happen to resemble adult speech. Infants then repeat these reinforced sounds, and language is gradually shaped. Social learning theorists extended this early model to account for imitation. According to social learning theory, babies imitate the sounds they hear adults make and, again, are reinforced for doing so.

For example, Lila, while babbling to herself, inadvertently says "da." Her parents hear her and provide her with smiles, attention, and praise for this sound. Lila is thus reinforced and continues to say "da." Eventually, her parents no longer provide as much reinforcement for the sound. But then Lila happens to say "dada," perhaps by imitating her parents. Now her parents once again reward her lavishly. Again, their praise eventually tapers off, and now the word is only

reinforced when her father is present. Over time, her parents' selective reinforcement of closer and closer approximations to speech in the right context results in the shaping of language.

Observation, imitation, and reinforcement do contribute to language development, but, as Chomsky (1957) persuasively argued, they cannot fully explain it. For one thing, word combinations and nuances are so numerous and so complex that they cannot all be acquired by specific imitation and reinforcement. In addition, caregivers often reinforce utterances that are not strictly grammatical, as long as they make sense ("Gampa go bye-bye"). Adult speech itself is an unreliable model to imitate, as it is often ungrammatical and contains false starts, unfinished sentences, and slips of the tongue. Also, learning theory does not account for children's imaginative ways of saying things they have never heard, such as when 2-year-old Clara said, "I am hayve!" after being told she needed to behave.

Chomsky's view is called **nativism.** Unlike Skinner's learning theory, nativism emphasizes the active role of the learner. Chomsky (1957, 1972, 1995) proposed that the human brain has an innate capacity for acquiring language; babies learn to talk as naturally as they learn to walk. He suggested that an inborn **language acquisition device (LAD)** programs children's brains to analyze the language they hear and to figure out its rules.

Support for the nativist position comes from newborns' ability to differentiate phonemes easily, suggesting that they are born with perceptual "tuning rods" that pick up characteristics of speech. Nativists point out that almost all children master their native language in the same age-related sequence without formal teaching. Furthermore, our brains have structures that have been shown to be directly implicated in language use (Friederici, 2011), which is what would be predicted on the basis of the nativist position. Still, the nativist approach does not tell us why some children acquire language more rapidly and efficiently than others, why children differ in linguistic skill and fluency, or why (as we'll see) speech development appears to depend on having someone to talk with, not merely on hearing spoken language.

Most developmental scientists today maintain that language acquisition, like most other aspects of development, depends on an intertwining of nature and nurture. Children have an inborn capacity to acquire language, which may be activated or constrained by experience.

nativism
Theory that human beings have an inborn capacity for language acquisition.

language acquisition device (LAD)
In Chomsky's terminology, an inborn mechanism that enables children to infer linguistic rules from the language they hear.

checkpoint can you . . .

- Summarize how learning theory and nativism seek to explain language acquisition and point out strengths and weaknesses of each theory?
- Discuss implications of how deaf babies acquire language?

INFLUENCES ON EARLY LANGUAGE DEVELOPMENT

What determines how quickly and how well children learn to understand and use language? Research has focused on both neurological and environmental influences.

Brain Development Brain scans, which measure changes in electrical potential at particular brain sites during cognitive activity, have allowed us a window into the developing brains of toddlers. Our brains have structures that have been shown to be directly implicated in language use (Friederici, 2011). Thus, it is not surprising the tremendous brain growth during the early months and years is closely linked with language development.

The brain stems and pons, the most primitive parts of the brain and the earliest to develop, control a newborn's cries. Repetitive babbling may emerge with the maturation of parts of the motor cortex, which control movements of the face and larynx. A link exists between the brain's phonetic perception and motor systems as early as 6 months—a connection that strengthens by 6 to 12 months (Imada et al., 2006). The development of language actively affects brain networks, committing them to the recognition of native language sounds only (Kuhl, 2010). In other words, language exposure helps shape the developing brain, and then the developing brain helps the infant learn language. In toddlers with large vocabularies, brain activation tends to focus on the left temporal and parietal lobes, whereas in toddlers with smaller vocabularies, brain activation is more scattered (Kuhl & Rivera-Gaxiola, 2008). Cortical regions associated with language continue to develop until at least the late preschool years or beyond—some even until adulthood.

In many ways, the brains of young children, even before they begin to speak, process language similarly to adult brains. For example, both infants and adults process speech sounds in parallel and hierarchical streams. In other words, they process multiple features of speech (e.g., who the speaker is, emotion, intensity, sound, timbre, familiarity) across multiple brain regions. Additionally, frontal brain regions are involved in the processing of speech in infants as they are in adults, although in infants, this process is slower. Last, the processing of linguistic information is localized in the left hemisphere in infants as it is in almost all adults (Dehaene-Lambertz, 2017; Dehaene-Lambertz & Spelke, 2015).

Social Interaction: The Role of Parents and Caregivers Language is a social act. It requires interaction. Language takes not only the necessary biological machinery and cognitive capacity but also interaction with a live communicative partner. Children who grow up without normal social contact do not develop language normally (Fromkin, Krashen, Curtiss, Rigler, & Rigler, 1974). Neither do children who are exposed to language only through television. For example, in one experiment, 9-month-old English-speaking infants learned and retained Mandarin when they played and interacted with adults speaking Mandarin, but not when they merely watched television in Mandarin (Kulh & Rivera-Gaxiola, 2008). A series of experiments on baby vocabulary videos showed that infants and toddlers did not learn new words from videos (DeLoache et al., 2010; Richert, Robb, Fender, & Wartella, 2010), even when researchers made sure the infants were paying attention to the content of the video (Krcmar, 2011). It was not the video that is at fault; rather, it was the lack of contingent social interaction that impeded learning. When infants engage in socially contingent video chats, they are able to learn new words (Roseberry, Hirsh-Pasek, & Golinkoff, 2014).

child-directed speech (CDS)
Form of speech often used in talking to babies or toddlers; includes slow, simplified speech, a high-pitched tone, exaggerated vowel sounds, short words and sentences, and much repetition; also called *parentese* or *motherese*.

At the babbling stage, adults can help an infant advance toward true speech by repeating the sounds the baby makes and rewarding her efforts. Most babies find this engaging and repeat the sounds back. Parents' imitation of babies' sounds affects the amount of infant vocalization (Goldstein, King, & West, 2003) and the pace of language learning (Schmitt, Simpson, & Friend, 2011). It also helps babies experience the social aspect of speech (Kuhl, 2004).

Playing peek-a-boo involves turn-taking, which is what also happens within conversations and most social interactions.

A strong relationship exists between the frequency of specific words in mothers' speech and the order in which children learn these words (Brent & Siskind, 2001) as well as between mothers' talkativeness and the size of toddlers' vocabularies (Schmitt et al., 2011). Mothers with higher socioeconomic status tend to use richer vocabularies and longer utterances, and their 2-year-olds have larger spoken vocabularies (Hoff, 2003; Ramey & Ramey, 2003; Rowe, 2012). By age 3, vocabularies of low-income children vary greatly, depending in large part on the diversity of word types they have heard their mothers use (Pan, Rowe, Singer, & Snow, 2005). Parental sensitivity and responsiveness can act as a buffer, however. Specifically, low-income parents' joint engagement, shared routines, and connectedness with their children at age 2 predict their expressive language at age 3 (Hirsh-Pasek et al., 2015).



Children in bilingual homes often use elements of both languages, but this doesn't mean they confuse the two languages.

Uniquely India/photosindia/Getty Images

Child-Directed Speech If, when you talk to an infant or toddler, you speak slowly in a sing-song, high-pitched voice with exaggerated ups and downs, simplify your speech, exaggerate vowel sounds, and use short words and sentences and much repetition, you are engaging in **child-directed speech (CDS),** sometimes called *parentese, motherese,* or *baby talk.* Most adults and even children do it naturally, and other

babyish stimuli, such as puppies or kittens, also can elicit it. Some investigators challenge the value of CDS, contending that babies speak sooner and better if they are exposed to more complex adult speech (Oshima-Takane, Goodz, & Derevensky, 1996). However, "baby talk" has been documented in many cultures, including the United States, Russia, Sweden, Australia, Thailand, Spain, Syria, England, Italy, France, Germany, and others (Kuhl et al., 1997; Kitamura, Thanavishuth, Burnham, & Luksaneeyanawin, 2001; Cooper & Asling, 1990; Ferguson, 1964). The ubiquity of this language form across cultures suggests it is universal in nature and serves a function.

Many researchers believe that CDS helps infants learn their native language or at least pick it up faster by exaggerating and directing attention to the distinguishing features of speech sounds. Moreover, infants are "captured" attentionally by the sound and find it highly engaging, resulting in more rapid learning (Golinkoff, Can, Soderstrom, & Hirsh-Pasek, 2015; Spinelli, Fasolo, & Mesman, 2017). Data support this view. For example, infants, even before a month of age, clearly prefer to hear CDS (Dunst, Gorman, & Hanby, 2012; Cooper & Aslin, 1990). In one study, infants who experienced more CDS had larger expressive vocabularies at 2 years of age and seemed to be more adept at processing language (Weisleder & Fernald, 2013). Laboratory data also highlight the support that CDS provides. For example, 21-month-old children were able to learn new words only when CDS speech was used. However, 27-month-old children, who were more sophisticated in their language abilities, were able to use adult-directed speech to learn new words (Ma, Golinkoff, Houston, & Hirsh-Pasek, 2011).



By reading aloud to their young children and asking questions about the pictures in the book, parents help their children build language skills and learn how letters look and sound.
Keith Brofsky/Blend Images LLC

When babies hear CDS, their heart rate slows, a physiological state that is consistent with orienting toward and absorbing information.

PREPARING FOR LITERACY: THE BENEFITS OF READING ALOUD

Most babies love to be read to. The frequency with which caregivers read to them can influence how well children speak and eventually how well and how soon they develop **literacy**—the ability to read and write. In a study of 2,581 low-income families, about half of the mothers reported reading daily to their preschool children between 14 months and 3 years. Children who had been read to daily had better cognitive and language skills at age 3 (Raikes et al., 2006). And their emerging language abilities have repercussions for school readiness and later academic achievement. A recent study of almost 700 twin pairs found that those children who developed language sooner were better prepared to enter school. Moreover, early language ability is affected more by home environment than genetics, suggesting that intervention programs targeting variables in the home (like encouraging parents to read to their children) might be highly effective (Forget-Dubois, Dionne, Lemelin, Perusse, Tremblay, & Boivin, 2009).

Social interaction in reading aloud, play, and other daily activities is a key to much of childhood development. Children call forth responses from the people around them and, in turn, react to those responses.

literacy
Ability to read and write.

checkpoint can you . . .

- Name areas of the brain involved in early language development, and tell the function of each?
- Explain the importance of social interaction, and give at least three examples of how parents or caregivers help babies learn to talk?
- Assess the arguments for and against the value of child-directed speech (CDS)?
- Tell why reading aloud to children at an early age is beneficial, and describe an effective way of doing so?

window on the world

LITERACY AND CHILDREN'S BOOKS

Most babies love to be read to. The frequency with which caregivers read to them can influence how well children speak and eventually how well and how soon they develop *literacy*—the ability to read and write. Reading to children improves their language skills and cognitive abilities, encourages creativity, and promotes social, emotional, and moral development (Crippen, 2017). As parents talk, sing, and read aloud to children, their children's brains are stimulated and strengthened. Children's stories teach us about morals, values, justice, social skills, and friendships. They teach us how to laugh, love, and use our imagination. Stories communicate self-acceptance and model coping strategies for children who are learning to deal with their emotions (Bradbery, 2012). Reading at a young age helps to create a nurturing bond with caregivers and begins a lifelong love of reading (O'Keefe, 2014).

Children's emerging language abilities have repercussions for school readiness and later academic achievement, and those who develop language earlier are better prepared to enter school. Moreover, early language ability is affected strongly by home environment, suggesting that intervention programs targeting home variables (such as reading to children) might be highly effective (Forget-Dubois et al., 2009).

Books and stories are the main way we transmit our heritage from one generation to the next (Norton, 2010). Reading is encouraged in most countries around the world, but access to books and ability to read and write can be deterrents. Nearly 250 million children worldwide are unable to read and write (All Children Reading, 2017), and 21 percent of children around the world have fewer than five books at home (World Literacy Foundation, 2018). In 2015, Finland had the highest literacy rate, nearly 100 percent, and South Sudan was at the bottom with 27 percent (CIA, 2015). Regardless of how they are transmitted, stories are important in children's educational and social worlds.

Here are a few 2018 titles from around the world:

Ropotarna, written by Peter Svetina (Slovenia); a collection of fairy tales about people and objects.

Tschipo, written by Franz Hohler (Switzerland); a story about a boy who has a problem with his dreams materializing.

The Duck and the Gun, written by Joy Cowley (New Zealand); a general suspends the war he is about to start until the duck nesting in his only cannon can finish hatching her chicks.

what's your view

What was your favorite children's book? What lessons did you learn from reading this book?

summary and key terms

Studying Cognitive Development

- Six approaches to the study of cognitive development are behaviorist, psychometric, Piagetian, information-processing, cognitive neuroscience, and social-contextual.
- All of these approaches can shed light on how early cognition develops.

behaviorist approach (*125*)
psychometric approach (*125*)
Piagetian approach (*125*)
information-processing approach (*125*)
cognitive neuroscience approach (*125*)
social-contextual approach (*125*)

Behaviorist Approach

- Two simple types of learning that behaviorists study are classical conditioning and operant conditioning.
- Rovee-Collier's research suggests that infants' memory processes are much like those of adults, though this conclusion has been questioned. Infants' memories can be jogged by periodic reminders.

classical conditioning (*125*)
operant conditioning (*126*)

Psychometric Approach

- Psychometric tests measure factors presumed to make up intelligence.
- Developmental tests, such as the Bayley Scales of Infant and Toddler Development, can indicate current functioning but are generally poor predictors of later intelligence.
- The home environment may affect measured intelligence.
- If the home environment does not provide the necessary conditions that pave the way for cognitive competence, early intervention may be needed.

intelligent behavior (*127*)
IQ (intelligence quotient) tests (*127*)
Bayley Scales of Infant and Toddler Development (*128*)
Home Observation for Measurement of the Environment (HOME) (*128*)
early intervention (*128*)

Piagetian Approach

- During Piaget's sensorimotor stage, infants' schemes become more elaborate. They progress from primary to secondary to tertiary circular reactions and finally to the development of representational ability, which makes possible deferred imitation, pretending, and problem solving.
- Object permanence develops gradually, according to Piaget, and is not fully operational until 18 to 24 months.
- Research suggests that a number of abilities, including imitation and object permanence, develop earlier than Piaget described.

sensorimotor stage (*130*)
schemes (*131*)
circular reactions (*131*)
representational ability (*131*)
deferred imitation (*132*)
object permanence (*133*)
dual representation hypothesis (*135*)

Information-Processing Approach

- Information-processing researchers measure mental processes through habituation and other signs of visual and perceptual abilities. Contrary to Piaget's ideas, such research suggests that representational ability is present virtually from birth.
- Indicators of the efficiency of infants' information processing, such as speed of habituation, tend to predict later intelligence.
- Information-processing research techniques such as habituation, novelty preference, and the violation-of-expectations method have yielded evidence that infants as young as 3 to 6 months may have a rudimentary grasp of such Piagetian abilities as categorization, causality, object permanence, a sense of number, and an ability to reason about characteristics of the physical world. Some researchers suggest that infants may have innate learning mechanisms for acquiring such knowledge.

habituation (*135*)
dishabituation (*136*)
visual preference (*136*)
visual recognition memory (*136*)
cross-modal transfer (*137*)
joint attention (*137*)
violation-of-expectations (*140*)

Cognitive Neuroscience Approach

- Explicit memory and implicit memory are located in different brain structures.
- Working memory emerges between 6 and 12 months of age.
- Neurological developments help explain the emergence of Piagetian skills and memory abilities.

implicit memory (*143*)
explicit memory (*143*)
working memory (*143*)

Social-Contextual Approach

- Social interactions with adults contribute to cognitive competence through shared activities that help children learn skills, knowledge, and values important in their culture.

guided participation (*143*)

Language Development

- The acquisition of language is an important aspect of cognitive development.
- Prelinguistic speech includes crying, cooing, babbling, and imitating language sounds. By 6 months, babies have learned the basic sounds of their language and have begun to link sound with meaning. Perception of categories of sounds in the native language may commit the neural circuitry to further learning in that language only.
- Before they say their first word, babies use gestures.
- The first word typically comes sometime between 10 and 14 months, initiating linguistic speech. For many toddlers, a naming explosion occurs sometime between 16 and 24 months.
- The first brief sentences generally come between 18 and 24 months. By age 3, syntax and communicative abilities are fairly well developed.
- Early speech is characterized by oversimplification, underextending and overextending word meanings, and overregularizing rules.
- Deaf children seem to learn sign language similarly to how hearing children learn spoken language.
- Two classic theoretical views about how children acquire language are learning theory and nativism. Today, most developmental scientists hold that an inborn capacity to learn language may be activated or constrained by experience.
- Influences on language development include neural maturation and social interaction.
- Family characteristics, such as socioeconomic status, adult language use, and maternal responsiveness, affect a child's vocabulary development.
- Children who hear two languages at home generally learn both at the same rate as children who hear only one language, and they can use each language in appropriate circumstances.
- Child-directed speech (CDS) seems to have cognitive, emotional, and social benefits, and infants show a preference for it. However, some researchers dispute its value.

language (*144*)
prelinguistic speech (*145*)
holophrase (*148*)
telegraphic speech (*149*)
syntax (*149*)
code mixing (*150*)
code switching (*150*)
nativism (*151*)
language acquisition device (LAD) (*151*)
child-directed speech (CDS) (*152*)
literacy (*153*)

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chapter 6

Psychosocial Development during the First Three Years

outline

Foundations of Psychosocial Development

Developmental Issues in Infancy

Developmental Issues in Toddlerhood

Relationships with Other Children

Children of Working Parents

Maltreatment: Abuse and Neglect

learning objectives

Discuss the development of emotions and personality in infancy.

Describe infants' social relationships with caregivers, including attachment.

Discuss the emerging sense of self, autonomy, and moral development in toddlerhood.

Explain how social contexts influence early development.

Explain child maltreatment and its effects.



kali9/Getty Images

did you know?

- Pride, shame, and guilt are among the last emotions to develop.
- Conflict with siblings or playmates can help toddlers learn to negotiate and resolve disputes.
- The impact of parental employment and early child care is much less than that of family characteristics, such as a mother's sensitivity to her child.

In this chapter, we examine foundations of psychosocial development and consider Erikson's views about the development of trust and autonomy. We look at relationships with caregivers, the emerging sense of self, and the foundations of conscience. We explore relationships with siblings and other children and consider the impact of parental employment and early child care. Finally, we discuss child maltreatment and what can be done to protect children from harm.

Play is the highest form of research.

—Albert Einstein

Foundations of Psychosocial Development

Although babies share common patterns of development, each, from the start, shows a distinct **personality:** the relatively consistent blend of emotions, temperament, thought, and behavior that makes each person unique. Such characteristic ways of feeling, thinking, and acting, which reflect both inborn and environmental influences, affect the way children respond to others and adapt to their world. From infancy on, personality development is intertwined with social relationships; this combination is called *psychosocial development.* See Table 1 for highlights of psychosocial development during the first 3 years.

personality
The relatively consistent blend of emotions, temperament, thought, and behavior that makes a person unique.

In our exploration of psychosocial development, we first look at emotions, which shape responses to the world. Then we focus on temperament, an early building block of personality. Finally, we discuss an infant's earliest social experiences in the family and how parents can influence behavioral differences between girls and boys.

EMOTIONS

Recall the last time you were scared during a horror movie. Your heart was probably racing, and you may have breathed more heavily. It's likely your eyes were fixed on the screen and you were focused closely on the action. If someone were to grab you suddenly, you probably would have been startled. You were feeling the emotion of fear.

TABLE 1 Highlights of Infants' and Toddlers' Psychosocial Development, Birth to 36 Months

Approximate Age, Months	Characteristics
0–3	Infants are open to stimulation. They begin to show interest and curiosity, and they smile readily at people.
3–6	Infants can anticipate what is about to happen and experience disappointment when it does not. They show this by becoming angry or acting warily. They smile, coo, and laugh often. This is a time of social awakening and early reciprocal exchanges between the baby and the caregiver.
6–9	Infants play social games and try to get responses from people. They talk to, touch, and cajole other babies to get them to respond. They express more differentiated emotions, showing joy, fear, anger, and surprise.
9–12	Infants are intensely preoccupied with their principal caregiver, may become afraid of strangers, and act subdued in new situations. By 1 year, they communicate emotions more clearly, showing moods, ambivalence, and gradations of feeling.
12–18	Toddlers explore their environment, using the people they are most attached to as a secure base. As they master the environment, they become more confident and more eager to assert themselves.
18–36	Toddlers sometimes become anxious because they now realize how much they are separating from their caregivers. They work out their awareness of their limitations in fantasy and in play and by identifying with adults.

Source: Adapted from Sroufe, 1979.

emotions
Subjective reactions to experience that are associated with physiological and behavioral changes.

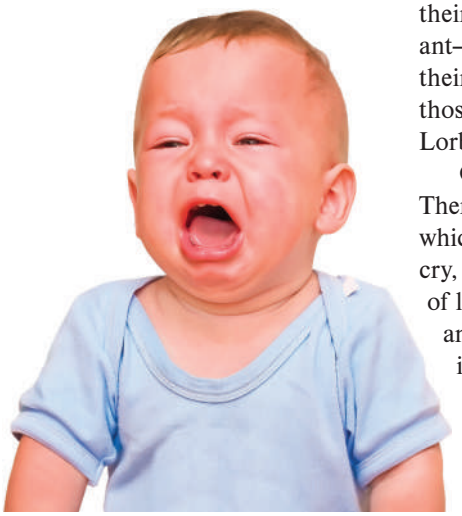
Emotions such as fear are subjective reactions to experience that are associated with physiological and behavioral changes. People differ in how often and how strongly they feel a particular emotion, in the kinds of events that may produce it, in the physical manifestations they show, and in how they act as a result. Culture, too, influences the way people feel about a situation and the way they show their emotions. Some cultures that stress social harmony, including those in Asia, Germany, and Israel, discourage open expressions of anger. When expressions of anger do occur, they seem to draw notice. The opposite is often true in cultures such as the United States and Greece, which stress self-expression, self-assertion, and self-esteem, and where emotions such as sadness garner more attention (Hareli, Kafetsios, & Hess, 2015; Cole, Bruschi, & Tamang, 2002).

First Signs of Emotion

During the 1st month, babies cry when they are unhappy and become quiet at the sound of a human voice or when they are picked up. They may smile when their hands are moved together to play pat-a-cake. As time goes by, infants respond more to people—smiling, cooing, reaching out, and eventually going to them.

These early signals or clues to babies' feelings are important indicators of development. When their messages bring a response, their sense of connection with other people grows. Their sense of control over their world grows, too, as they see that their cries bring help and comfort and that their smiles and laughter elicit smiles and laughter in return.

Crying Newborns plainly show when they are unhappy. They let out piercing cries, flail their arms and legs, and stiffen their bodies. Adults find the sound of crying unpleasant—and therein lies its function. Crying is the primary way in which infants communicate their needs and is considered to be an honest signal of need. Human brains, particularly those of parents, are wired to respond to such sounds with caregiving behaviors (Swain, Lorberbaum, Kose, & Strathearn, 2007; Kim et al., 2011).



Crying is the most powerful way, and sometimes the only way, that babies can communicate their needs. Parents may soon learn to recognize whether their baby is crying because of hunger, anger, frustration, or pain.
Irina Rogova/Shutterstock

Crying is the earliest and most powerful way infants can communicate their needs. There are four patterns of crying (Wolff, 1969): the basic hunger cry (a rhythmic cry, which is not always associated with hunger); the angry cry (a variation of the rhythmic cry, in which excess air is forced through the vocal cords); the pain cry (a sudden onset of loud crying without preliminary moaning, sometimes followed by holding the breath); and the frustration cry (two or three drawn-out cries, with no prolonged breath-holding) (Wood & Gustafson, 2001). Features of infants' cries are related to their physiological state. A higher pitch and a more monotonic vocalization is associated with autonomic system activity during stressful procedures in infants (Stewart et al., 2013) and is more characteristic of the cries of preterm infants, who generally have higher needs, than full-term infants of the equivalent age (Shinya, Kawai, Niwa, & Myowa-Yamakoshi, 2016).

As children age, they begin to realize that crying serves a communicative function. By 5 months of age, babies have learned to monitor their caregivers' expressions and if ignored will first cry harder in an attempt to get attention and then stop crying if their attempt is unsuccessful (Goldstein, Schwade, & Bornstein, 2009). Boys and girls, as infants, show similar patterns of sadness and anger; however, by the toddler years, boys express more anger than girls (Chaplin & Aldao, 2013).

Some parents worry that picking up a crying baby will spoil the infant. However, this is not the case, especially when levels of distress are high. For example, if parents wait, it may become more difficult to soothe the baby, and such a pattern, if experienced repeatedly, may interfere with an infant's developing ability to regulate his or her own emotional state (R. A. Thompson, 2011). Indeed, mothers' rapid and sensitive response to crying is associated with later social competence and positive adjustment, regardless of whether or not babies cry frequently or rarely (Leerkes, Blankson, & O'Brien, 2009).

Smiling and Laughing The earliest faint smiles occur spontaneously soon after birth, apparently as a result of subcortical nervous system activity. These involuntary smiles frequently appear during periods of REM sleep.

These early smiles are sometimes known as "windy grins" because they can occur in response to gas.

Social smiling, when newborn infants gaze and smile at their parents, develops in the 2nd month of life. Babies generally start using a social smile at the same time and in the same way regardless of what culture they are from. However, by 12 weeks of age, infants smile at others more or less frequently depending on the responses of adults around them (Wörmann, Holodynski, Kärtner, & Keller, 2012). Laughter is a smile-linked vocalization that becomes more common between 4 and 12 months, when it may signify the most intense positive emotion (Salkind, 2005).

social smiling
Beginning in the 2nd month, newborn infants gaze at their parents and smile at them, signaling positive participation in the relationship.

Parents often try to elicit smiles and laughs from their young children by clowning. Clowning includes silly, nonverbal behaviors such as odd facial expressions or sounds, actions such as revealing a usually hidden body part (such as a belly button), and imitating another's odd actions. Babies try to join in the humor, most commonly, starting at 3 months of age, by shrieking or making faces (Mireault et al., 2012). Babies' humor gradually becomes more complex with age. A 6-month-old may giggle in response to the mother making unusual sounds or appearing with a towel over her face; a 10-month-old may laughingly try to put the towel back on her face when it falls off. This change reflects cognitive development: By laughing at the unexpected, babies show that they know what to expect; by turning the tables, they show awareness that they can make things happen (Sroufe, 1997).

By 12 to 15 months, infants are intentionally communicating to others about objects. **Anticipatory smiling**—in which infants smile at an object and then gaze at an adult while continuing to smile—rises sharply between 8 and 10 months and seems to be among the first types of communication in which the infant refers to an object or experience.

anticipatory smiling
Infant smiles at an object and then gazes at an adult while still smiling.

Positive affective processes are reciprocal. Mothers low in stress and high in positive emotionality and effortful control tend to have babies who smile and laugh a lot. In turn, babies who smile and laugh a lot elicit fewer negative parenting behaviors (Bridgett, Laake, Gartstein, & Dorn, 2013). Infants who have more positive interactions with their parents at 3 and 6 months are more likely to show secure attachment at 1 year of age (Mireault, Sparrow, Poutre, Perdue, & Macke, 2012).

checkpoint can you . . .

- Explain the significance of patterns of crying, smiling, and laughing?

When Do Emotions Appear?

Emotional development is an orderly process; complex emotions unfold from simpler ones. According to one model (Lewis, 1997; Figure 1), babies show signs of contentment, interest, and distress soon after birth. These are diffuse, reflexive, mostly physiological responses to sensory stimulation or internal processes. During the next 6 months or so, these early emotional states differentiate into true emotions: joy, surprise, sadness, disgust, and then anger and fear—reactions to events that have meaning for the infant. As we discuss in a subsequent section, the emergence of these basic, or primary, emotions is related to neurological maturation.



Self-awareness and an understanding that others can think things that you know are not true is also related to another developmental milestone: lying. Although we do not generally think of it as such, lying is actually a profound developmental achievement.

Self-conscious emotions, such as embarrassment, empathy, and envy, arise only after children have developed **self-awareness:** the cognitive understanding that they have a recognizable identity, separate and different from the rest of their world. This consciousness of self seems to emerge between 15 and 24 months. Self-awareness is necessary before children can be aware of being the focus of attention, identify with what other "selves" are feeling, or wish they had what someone else has.

self-conscious emotions
Emotions, such as embarrassment, empathy, and envy, that depend on self-awareness.

self-awareness
Realization that one's existence and functioning are separate from those of other people and things.

By about age 3, having acquired self-awareness plus a good deal of knowledge about their society's accepted standards, rules, and goals, children become better able to evaluate their own thoughts, plans, desires, and behavior against what is considered socially appropriate. Only then can they demonstrate the **self-evaluative emotions** of pride, guilt, and shame (Lewis, 1995, 1997, 1998, 2007).

self-evaluative emotions
Emotions, such as pride, shame, and guilt, that depend on both self-awareness and knowledge of socially accepted standards of behavior.

Altruistic Helping and Empathy

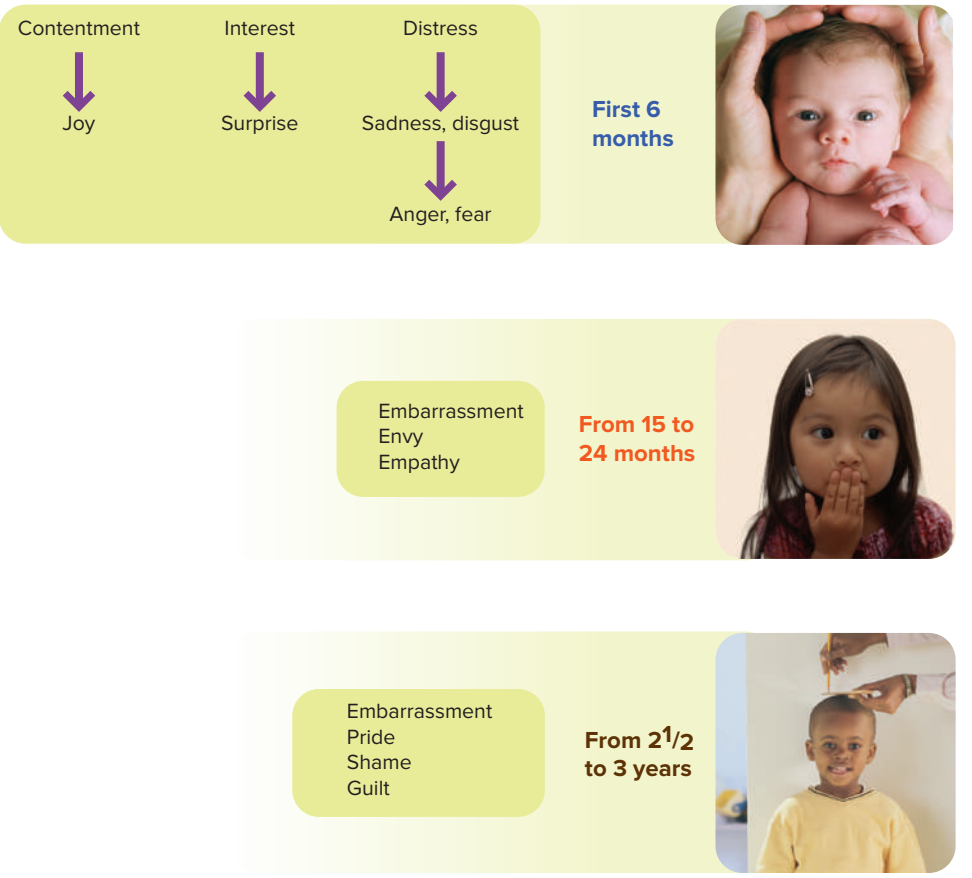
A guest of 18-month-old Alex's father—a person Alex had never seen before—dropped his pen on the floor, and it rolled under a cabinet, where the guest couldn't quite reach it. Alex, being small enough, crawled under the cabinet, retrieved the pen, and gave it to the guest. By acting out of concern for a stranger with no expectation of reward, Alex showed **altruistic behavior** (Warneken & Tomasello, 2006).

altruistic behavior
Activity intended to help another person with no expectation of reward.

The roots of altruism can be seen in early empathic reactions in infancy. For example, infants at 1, 3, 6, and 9 months of age respond to the cries of other infants with cries of

FIGURE 1
Differentiation of Emotions during the First 3 Years

The primary, or basic, emotions emerge during the first 6 months or so; the self-conscious emotions develop beginning in the 2nd year, as a result of the emergence of self-awareness together with accumulation of knowledge about societal standards. Note: There are two kinds of embarrassment. The earlier kind does not involve evaluation of behavior and may simply be a response to being singled out as the object of attention. Evaluative embarrassment, which emerges during the 3rd year, is a mild form of shame.



Source: Adapted from Lewis, 1997.

(Infant): Frare/Davis Photography/Brand X Pictures/Corbis/Getty Images; (Girl): Amos Morgan/Photodisc/Getty Images; (Boy): Comstock Images

empathy
Ability to put oneself in another person's place and feel what the other person feels.



Children who do not live up to behavioral standards may feel guilty. Guilt is thought to develop between ages 2½ and 3.
enterphoto/Shutterstock

their own and facial expressions of distress (Geangu, Benga, Stahl, & Striano, 2010). Infants also form "opinions" about others on the basis of their social behaviors. In one series of experiments (Hamlin & Wynn, 2011), infants watched as a puppet tried to open a box. In one condition, a second "Opener" puppet helped the first puppet open the box, and in another condition, a "Closer" puppet interfered by jumping on the box to slam it shut. When later given the choice, 3-month-old infants preferred to look at and 5-month-old infants preferred to reach for the "Opener" puppet.

Altruistic behavior comes naturally to infants. In one study, infants at 12 months of age spontaneously helped an adult reach or find a fallen toy. By 15 months of age, infants also seemed to have expectations about fairness, as illustrated by their tendency to stare longer at an unfair distribution of goods than at an equal distribution. Moreover, those infants who looked the longest at the unequal sharing were also more likely to themselves share toys later (Sommerville, Schmidt, Yun, & Burns, 2013). Other research has also documented that well before the 2nd birthday, children are likely to help others, share belongings and food, and offer comfort at the distress of others (Dunfield, Kuhlmeier, O'Connell, & Kelley, 2011; Warneken & Tomasello, 2009). Interestingly, the tendency to share, to help, and to comfort seem to be unrelated to each other, presumably reflecting separate developmental trajectories. In other words, a baby who shares may not necessarily tend to comfort or help (Dunfield & Kuhlmeier, 2013). Nonetheless, Zahn-Waxler and colleagues (1992) have concluded that such behavior may collectively reflect **empathy,** the ability to imagine how another person might feel in a particular situation.

Research in neurobiology has identified special brain cells called **mirror neurons,** which may underlie empathy and altruism. Mirror neurons fire when a person does something but also when he or she observes someone else doing the same thing. By "mirroring" the activities and motivations of others, they may help a person to see the world from someone else's point of view (Iacoboni, 2008; Iacoboni & Mazziotta, 2007; Oberman & Ramachandran, 2007). Interestingly, infants also show similar sympathetic nervous system arousal when they help someone directly *and* when they see a third party doing the helping. They do not show the same pattern of arousal if the person is not helped (Hepach, Vaish, & Tomasello, 2012).

mirror neurons
Neurons that fire when a person does something or observes someone else doing the same thing.

Some theorists doubt the conclusions that have been reached about mirror neurons. They point out, for example, that people sometimes feel empathy for others even without the action of mirror neurons. They argue that this theory, while intriguing, lacks direct empirical support (Lamm & Majdandzic, 2015).

Collaborative Activities and Cultural Transmission The motivation to help and share plus the ability to understand others' intentions together contribute to an important development between 9 and 12 months of age—collaboration with caregivers in joint activities, such as a child passing a pair of socks to her mother to help while getting dressed in the morning. Collaborative activities increase during the 2nd year of life as toddlers become more adept at communication. The vocabulary explosion that frequently occurs during the 2nd year enables more complex and flexible collaborative communication with others (Tomasello, 2007).

These types of interactions are quintessentially human. Although many of our closest relatives, such as chimpanzees, are able to communicate and learn from each other in impressive and sophisticated ways, they do not share with us our ability and motivation to engage in socially coordinated actions with shared goals. For example, young children engage in what is known as over-imitation, closely copying all actions they see an adult do, even if some of the actions are clearly irrelevant or impractical. Chimps, by contrast, will skip steps that don't accomplish anything (Nielsen & Tomaselli, 2010). Some researchers have argued that our universal propensity to over-imitate and engage in other similar collaborative activities accounts for our impressive creation of cultural artifacts and institutions. In this view, our biologically shaped transmission of collaborative learning has led to our unique success as a species in this area (Tomasello & Moll, 2010).

checkpoint
can **you** . . .

- Trace a typical sequence of emergence of the basic, self-conscious, and evaluative emotions, and explain its connection with cognitive and neurological development?

TEMPERAMENT

From the very first day of life, all babies are unique. Some babies are fussy; others are happy and placid. Some are active, kicking and squirming restlessly; some lay calmly. Some babies like meeting new people; some shrink from contact.

Psychologists call these early individual differences **temperament.** Temperament can be defined as an early-appearing, biologically based tendency to respond to the environment in predictable ways. Temperament affects how children approach and react to the outside world, as well as how they regulate their mental, emotional, and behavioral functioning (Rothbart, Ahadi, & Evans, 2000). Temperament is closely linked to emotional responses to the environment, and many responses, such as smiles or cries, are emotional in nature. However, unlike emotions such as fear, excitement, and boredom, which come and go, temperament is relatively consistent and enduring. Individual differences in temperament, which derive from a person's basic biological makeup, form the core of the developing personality.

temperament
Characteristic disposition or style of approaching and reacting to situations.

Studying Temperamental Patterns: The New York Longitudinal Study In a pioneering study on temperament, the New York Longitudinal Study (NYLS), researchers followed 133 infants into adulthood. The researchers looked at how active the children were; how regular their hunger, sleep, and bowel habits were; how readily they accepted new people and situations; how they adapted to changes in routine; how sensitive they

were to sensory stimuli; whether their mood tended to be joyful or unhappy; and whether they persisted at tasks (A. Thomas, Chess, & Birch, 1968).

The researchers were able to place most of the children in the study into one of three categories (Table 2).

"easy" children
Children with a generally happy temperament, regular biological rhythms, and a readiness to accept new experiences.

"difficult" children
Children with irritable temperament, irregular biological rhythms, and intense emotional responses.

"slow-to-warm-up" children
Children whose temperament is generally mild but who are hesitant about accepting new experiences.

- Forty percent were **"easy" children**: generally happy, rhythmic in biological functioning, and accepting of new experiences.
- Ten percent were what the researchers called **"difficult" children**: more irritable and harder to please, irregular in biological rhythms, and more intense in expressing emotion.
- Fifteen percent were **"slow-to-warm-up" children**: mild but slow to adapt to new people and situations (A. Thomas & Chess, 1977, 1984).

Some children (including 35 percent of the NYLS sample) do not fit neatly into any of these three categories. A baby may eat and sleep regularly but be afraid of strangers. Another child may warm up slowly to new foods but adapt quickly to new babysitters (A. Thomas & Chess, 1984). A child may laugh intensely but not show intense frustration, and a child with rhythmic toilet habits may show irregular sleeping patterns (Rothbart, Ahadi, & Evans, 2000). All these variations are normal.

The way you ask a question often influences the answers you find. The researchers in this study based their data on parental reports—what the parents said about their children—so it is not surprising that the most salient dimensions that emerged were the relative difficulty or easiness of the children.

Stability of Temperament Despite how babies' abilities change vastly in almost all areas over the first year of life, stability in temperament from 2 to 13 months of age is quite high (Bornstein et al., 2015). Studies using the Infant Behavior Questionnaire (IBQ), a parental report instrument, have found strong links between infant temperament and childhood personality at age 7 (Rothbart, Ahadi, Hershey, & Fisher, 2001). Similarly, researchers investigating positive emotionality, negative emotionality, and constraint (a dimension reflecting the tendency to behave in a controlled fashion) have found stability in these traits from toddlerhood to early childhood and then from early childhood to middle childhood (Neppl et al., 2010). Other research, using temperament types similar to those of the NYLS, found that temperament at age 3 closely predicts aspects of personality at ages 18 and 21 (Caspi, 2000). Thus, a wealth of research suggests temperament is a relatively stable individual difference, perhaps because it is largely inborn and strongly influenced by genetics (Braungart, Plomin, DeFries, & Fulker, 1992; Schmitz,

TABLE 2 Three Temperamental Patterns (according to the New York Longitudinal Study)

"Easy" Child	"Difficult" Child	"Slow-to-Warm-Up" Child
Has moods of mild to moderate intensity, usually positive.	Displays intense and frequently negative moods; cries often and loudly; also laughs loudly.	Has mildly intense reactions, both positive and negative.
Responds well to novelty and change.	Responds poorly to novelty and change.	Responds slowly to novelty and change.
Quickly develops regular sleep and feeding schedules.	Sleeps and eats irregularly.	Sleeps and eats more regularly than the difficult child, less regularly than the easy child.
Takes to new foods easily. Smiles at strangers. Adapts easily to new situations. Accepts most frustrations with little fuss.	Accepts new foods slowly. Is suspicious of strangers. Adapts slowly to new situations. Reacts to frustration with tantrums.	Shows mildly negative initial response to new stimuli (a first encounter with a new food, person, place, or situation).
Adapts quickly to new routines and rules of new games.	Adjusts slowly to new routines.	Gradually develops liking for new stimuli after repeated, unpressured exposures.

Source: Adapted from Thomas and Chess, 1984. Reprinted with permission from the *American Journal of Psychiatry* 141, 1984, pp. 1–9. Copyright © 1984 by the American Psychiatric Association.

Saudino, Plomin, Fulker, & DeFries, 1996). This does not mean, however, that temperament is fully formed at birth.

For example, culturally influenced child-rearing practices may influence temperament. Research has shown that infants from the United States are rated by their parents as higher in activity level, vocalization, frustration, and pleasure than babies from both Italy and Norway, who are rated as more cuddly and easy to soothe (Montirosso, Cozzi, Putnam, Gartstein, & Borgatti, 2011; Cozzi et al., 2013; Sung, Beijer, Gartstein, de Weerth, & Putnam, 2015). Researchers suggest this may be because mothers in the United States foster greater individuality and assertiveness. However, U.S. babies are rated as more cuddly than infants from Ethiopia, who score higher on negative emotionality and fear and are rated as smiling and laughing less than babies from the United States (Gartstein, Bogale, & Meehan, 2016). In another series of studies, Japanese and Russian infants tended to show higher levels of fear, while babies from Poland and the United States showed higher positive affectivity and vocal reactivity (Gartstein, Slobodskaya, Olaf Zylicz, Gozszyla, & Nakagawa, 2010), and Polish babies furthermore showed higher negative affectivity and lower extraversion (Dragan, Kmita, & Fronczyk, 2011). In this case, one proposed influence was the cultural dimension of collectivism and individualism. Other cultural dimensions identified as affecting infant temperament are power distance (how equally distributed power is in a culture), long-term orientation (how focused on the future a culture is), masculinity, and uncertainty avoidance (Putnam & Gartstein, 2017).

Current conceptions of temperament view genetic influences as being strongest early in life, with greater influence wielded by the environment over time (Shiner et al., 2012). Temperament develops as various emotions and self-regulatory capacities appear (Rothbart et al., 2000) and can change in response to parental treatment, culture, and other life experiences (Kagan & Snidman, 2004).



Charlotte's habit of smiling at strangers and playing happily in a shopping cart during trips to the grocery store are a sign of her easy termperament.
Ipatov/Shutterstock

Goodness of Fit Children differ, and their ideal environments differ as well. According to the NYLS, the key to healthy adjustment is **goodness of fit**—the match between a child's temperament and the environmental demands and constraints the child must deal with. If a very active child is expected to sit still for long periods, if a slow-to-warm-up child is constantly pushed into new situations, or if a persistent child is constantly taken away from absorbing projects, tensions may occur. Children also differ in their susceptibility to environmental influences. For example, infants with difficult or inflexible temperaments may be more susceptible to the quality of parenting than easier infants (Stright, Gallagher, & Kelley, 2008). For example, they are at higher risk for both internalizing and externalizing disorders, as well as social and cognitive issues, *but only* when exposed to negative parenting (Slagt, Dubas, Deković, & van Aken, 2016). Some research even suggests that children at risk as a result of temperamental characteristics may even show enhanced outcomes when compared with their lower risk peers, but in this case, only in the presence of optimal parenting (Kochanska, Boldt, Kim, Yoon, & Philibert, 2015; Belsky & Pluess, 2009).

goodness of fit
Appropriateness of environmental demands and constraints to a child's temperament.

Behavioral Inhibition In longitudinal research with about 500 children starting in infancy, Jerome Kagan and his colleagues studied an aspect of temperament called *behavioral inhibition*. Behavioral inhibition has to do with how boldly or cautiously a child approaches unfamiliar objects and situations (Kagan, Reznick, Clarke, Snidman, & Garcia-Coll, 1984).

Behavioral inhibition is most clearly seen when babies are presented with novel stimuli. When babies high in behavioral inhibition are presented with a new stimulus, they became physiologically aroused, pumping their arms and legs vigorously and



There is a relationship between what a parent says a baby will be like before a child is born and what a parent later says about that child as an infant. In particular, the perceptions of a child as difficult precede the birth of that child. What might explain this finding?

Pauli-Pott, Mertesacker, Bade, Haverkock, & Beckmann, 2003

sometimes arching their backs. This feeling of being over-aroused is unpleasant for them, and most start to fuss and cry. Approximately 20 percent of babies respond in this way. However, babies low in behavioral inhibition respond quite differently. When presented with a new stimulus, these babies are relaxed. They show little distress or motor activity, and they often calmly stare at new stimuli, sometimes smiling at it. About 40 percent of babies respond in this manner (Kagan & Snidman, 2004).

These differences between babies are theorized to be the result of an underlying difference in physiology. Inhibited children may be born with an unusually excitable amygdala. The amygdala detects and reacts to unfamiliar events, and, in the case of behaviorally inhibited children, responds vigorously and easily to most novel events (Kagan, 2012). Meta-analyses on brain differences between highly inhibited and uninhibited children have supported this finding and have additionally found greater activation in parts of the brain associated with the processing of novelty, threat, rewards, and inhibitory control. Specifically, this includes regions in the basal ganglia (the globus pallidus, putamen, and caudate) and the prefrontal cortex (the middle frontal gyrus) (Clauss, Avery, & Blackford, 2015). Moreover, children who are highly behaviorally inhibited tend to show greater right frontal EEG (electroencephalographic) asymmetry (Fox, Henderson, Rubin, Calkins, & Schmidt, 2001; Smith & Bell, 2010), a pattern that has been associated more broadly with a tendency toward retreat and withdrawal (Coan & Allen, 2004).

If behavioral inhibition is indeed due to an underlying physiological arousal pattern, then we should expect some consistency in patterns of behavior over time. This is the case. Infants who are identified as inhibited or uninhibited seem to maintain these patterns over time (Kagan, 1997; Kagan & Snidman, 2004). Many highly inhibited infants remain so through the first two years of age (Fox et al., 2001). Inhibited toddlers are likely to turn into shy 7-year-olds (Kagan, Reznick, Snidman, Gibbons, & Johnson, 1988) and behaviorally inhibited 8- to 12-year-old children are less likely as young adults to have a positive, active social life and more likely to live close to their family of origin in adulthood (Gest, 1997). Behavioral inhibition has also been associated with a heightened risk of developing a social anxiety disorder later in life (Clauss & Blackford, 2012). Not surprisingly, their amygdalae continue to respond in a vigorous and sustained fashion into adulthood (Blackford, Avery, Cowan, Shelton, & Zald, 2010).

However, experience can moderate or accentuate early tendencies. Behaviorally inhibited children are more likely to outgrow their inhibition if parents do not completely shield them from new situations and instead provide gentle support and encouragement during anxiety-provoking situations (Kiel, Premo, & Buss, 2016; Park, Belsky, Putnam, & Crnic, 1997), and they are no more likely to suffer from anxiety disorders if their mothers encourage independence but are not overly controlling (Lewis-Morrarty et al., 2012). In other research, when mothers responded neutrally to infants who were behaviorally inhibited and did not provide this same support, their inhibition tended to remain stable or increase (Fox, Hane, & Pine, 2007). Note that these findings illustrate the concept of goodness of fit. Behavioral inhibition can be a risk, but only when paired with overly protective or controlling parenting.

Additionally, children may themselves develop buffering strategies. For example, while behaviorally inhibited toddlers with an attentional bias toward threat are at risk for social withdrawal in childhood and adolescence (Pérez-Edgar et al., 2013; Pérez-Edgar et al., 2010), other research has shown that those toddlers who are better at shifting their attention away from threat or, alternatively, good at shifting their attention toward positive stimuli are protected against later anxiety symptoms. Presumably, this is because they are able to utilize their cognitive processes to regulate their negative reactivity (White et al., 2017). In other words, when you can pull your attention away from scary things or when you remember your favorite things, then you won't feel so bad. Other environmental influences, such as birth order, race/ethnicity, culture, relationships with teachers and peers, and unpredictable events also can reinforce or soften a child's original temperament bias (Kagan & Snidman, 2004).

checkpoint can you . . .

- Describe the three patterns of temperament identified by the New York Longitudinal Study?
- Assess evidence for the stability of temperament?
- Explain the importance of goodness of fit?
- Discuss evidence of biological influences on shyness and boldness?

EARLY SOCIAL EXPERIENCES: THE FAMILY

Infant care practices and patterns of interaction vary greatly around the world. In Bali, infants are believed to be ancestors reborn or gods brought to life in human form and thus must be treated with utmost dignity and respect. The Beng of West Africa think young babies can understand all languages, whereas people in the Micronesian atoll of Ifaluk believe babies cannot understand language at all, and therefore adults do not speak to them (DeLoache & Gottlieb, 2000).

Among the Efe people of central Africa, infants typically receive care from five or more people in a given hour and are routinely breast-fed by other women and the mother (Tronick, Morelli, & Ivey, 1992). Among the Gusii in western Kenya, where infant mortality is high, parents keep their infants close to them, respond quickly when they cry, and feed them on demand (LeVine, 1994). The same is true of Aka hunter-gatherers in central Africa, who move around frequently in small, tightly knit groups marked by extensive sharing, cooperation, and concern about danger. However, Ngandu farmers in the same region, who tend to live farther apart and to stay in one place, are more likely to leave their infants alone and to let them fuss or cry, smile, vocalize, or play (Hewlett, Lamb, Shannon, Leyendecker, & Schölmerich, 1998).

As we discuss patterns of adult-infant interaction, we need to keep in mind that many of these patterns are culture-based. Moreover, it is important to recognize the wide diversity in family systems, even within the United States, where the number of nontraditional families, such as those headed by single parents and gay and lesbian couples, has increased in recent years.

The Mother's Role In a series of pioneering experiments by Harry Harlow and his colleagues, rhesus monkeys were separated from their mothers 6 to 12 hours after birth. The infant monkeys were put into cages with one of two kinds of surrogate "mothers": a plain cylindrical wire-mesh form or a form covered with terry cloth. Some monkeys were fed from bottles connected to the wire mothers; others were fed by the warm, cuddly cloth mothers. When the monkeys were allowed to spend time with either kind of mother, they all spent more time clinging to the cloth surrogates, even if they were being fed only by the wire surrogates. In an unfamiliar room, the babies "raised" by cloth surrogates showed more natural interest in exploring than those "raised" by wire surrogates. None of the monkeys in either group grew up normally (Harlow & Harlow, 1962), and none was able to nurture their own offspring (Suomi & Harlow, 1972).



When infant monkeys could choose whether to go to a wire "mother" or a warm, soft, terry-cloth "mother," they spent more time clinging to the cloth mother, even if their food came from the wire mother.
Harlow Primate Laboratory, University of Wisconsin

It is hardly surprising that a dummy mother would not provide the same kinds of stimulation and opportunities for positive development as a live mother. These experiments brought about a conceptual shift in the understanding of mothers and motherhood. They showed that the previous models of mothering advocated by theorists such as Freud or the behaviorists—that attachment resulted from a learned association with food—was incorrect. These experiments show that feeding is not the only, or even the most important, thing babies get from their mothers. Mothering includes the comfort of close bodily contact and, at least in monkeys, the satisfaction of an innate need to cling.

Human infants also have needs that must be satisfied if they are to grow up normally. One of these needs is for a mother who responds warmly and promptly to the infant. Later in this chapter we discuss how responsiveness contributes to the mutual attachment between infants and mothers that develops during infancy, with far-reaching effects on psychosocial and cognitive development.

The Father's Role The fathering role is in many ways a social construction (Doherty, Kouneski, & Erickson, 1998), having different meanings in different cultures. The role may be taken or shared by someone other

There are suggestions that involved fathers show decreasing testosterone and increasing estradiol over the course of their partner's pregnancy, theorized to be in the service of preparing new dads for parenting and nurturant behaviors.

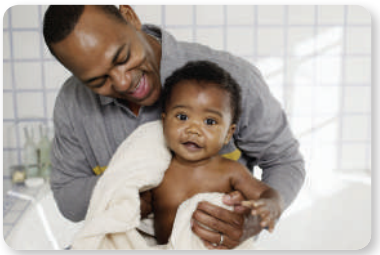
Berg & Wynne-Edwards, 2001

than the biological father: the mother's brother, as in Botswana; or a grandfather, as in Vietnam (Engle & Breaux, 1998; Richardson, 1995; Townsend, 1997). In some societies fathers are more involved in their young children's lives—economically, emotionally, and in time spent—than in others. In many parts of the world, what it means to be a father has changed dramatically and continues to change (Engle & Breaux, 1998).

Among the Huhot of Inner Mongolia, fathers traditionally are responsible for economic support and discipline and mothers for nurturing (Jankowiak, 1992). Men almost never hold infants. Fathers interact more with toddlers but perform child care duties only if the mother is absent. However, urbanization and maternal employment are changing these attitudes. Fathers—especially college-educated fathers—now seek more intimate relationships with children, especially sons (Engle & Breaux, 1998).

Among the Aka of central Africa, in contrast with the Huhot, "fathers provide more direct infant care than fathers in any other known society" (Hewlett, 1992, p. 169). In Aka families, husbands and wives frequently cooperate in subsistence tasks and other activities (Hewlett, 1992). Thus the father's involvement in child care is part and parcel of his overall role in the family.

In the United States, fathers' involvement in caregiving has greatly increased as more mothers have begun to work outside the home and as concepts of fathering have changed (Cabrera et al., 2000; Casper, 1997; Pleck, 1997). A father's frequent and positive involvement with his child, from infancy on, is directly related to the child's well-being and physical, cognitive, and social development (Cabrera et al., 2000; Kelley, Smith, Green, Berndt, & Rogers, 1998; Shannon, Tamis-LeMonda, London, & Cabrera, 2002).



As more mothers work outside the home, fathers in the United States are taking on more child care responsibilities and in some cases are the primary caregivers.

Elyse Lewin/Brand X Pictures/Jupiterimages

GENDER

Identifying as male or female affects how people look, how they move their bodies, and how they work, dress, and play. It influences what they think about themselves and what others think of them. All these characteristics—and more—are included in the word **gender:** what it means to be male or female.

gender
Significance of being male or female.

Gender Differences in Infants and Toddlers Measurable differences between baby boys and baby girls are few, at least in U.S. samples. Boys are a bit longer and heavier and may be slightly stronger and more active, but they are physically more vulnerable from conception on. Girls are less reactive to stress and more likely to survive infancy (Fryar, Gu, Ogden, & Flegal, 2016; Bale & Epperson, 2015; Stevenson et. al., 2000). Boys' brains at birth are about 10 percent larger than girls' brains, a difference that continues into adulthood (Gilmore et al., 2007; Ruigrok et al., 2014). Despite these differences, they achieve the motor milestones of infancy about the same times.

There is some evidence for differences in social behavior between boys and girls. For instance, girls are rated as more cuddly (Benenson, Philippoussis, & Leeb, 1999), are more interested in faces and better at discriminating facial expressions (Connellan, Baron-Cohen, Wheelwright, Batki, & Aluwalia, 2000; McClure, 2000), show fewer externalizing emotions (Chaplin & Aldao, 2013), and are better than boys at regulating their distress during and quicker to recover from still-face procedures than boys (Weinberg, Tronick, Cohn, & Olson, 1999). Still, such differences are relatively small and have not always been found consistently (Alexander & Wilcox, 2012).

However, there are some consistently identified and robust early behavioral difference between boys and girls, including a preference for toys, play activities, and playmates of the same sex. A preference for sex-typed toys, such as trucks for boys and dolls for girls, appears as young as 3 months of age (Alexander, Wilcox, & Woods, 2009). While children at 12, 18, and 24 months of age show little preference for sex-typed colors (indeed, both seem to prefer reds over blues), they do continue to show sex-typed toy preferences (Jadva, Hines, & Golombok, 2010). By the age of 2½ years, girls start to prefer the color pink, and boys start to actively avoid it (LoBue & DeLoache, 2011). By 3 years of age, girls, but not boys, show more interest in novel toys labeled as being for their sex and decorated with masculine or feminine colors (Weisgram, Fulcher, & Dinella, 2014).

Are sex-typed toy preferences innate or the product of socialization processes? Several lines of evidence are germane to this question. First, toy preferences emerge early in development, at 3 months of age, and before infants could have formed an understanding of masculine or feminine conceptual categories. Second, similar sex-typed toy preferences have been found in nonhuman primates (Hassett, Siebert, & Wallen, 2008). For example, in one study, female vervets played longer with dolls and pots, while male vervets spent more time playing with cars and balls (Alexander & Hines, 2002). Third, testosterone levels in infancy predict later sex-typed toy preferences (Lamminmäki et al., 2012). These findings suggest that basic sex-typed toy preferences are to some extent innate and do not result from gender socialization processes. Other factors that emerge later, such as color or shape preferences, may be more subject to social influences.

Toddlers, and to a lesser extent babies, prefer to play with others of the same sex (Campbell, Shirley, Heywood, & Crook, 2000). This may be because boys as young as 17 months tend to play more actively and aggressively than girls (Baillargeon et al., 2007). Very active and aggressive boys and very sensitive girls are the least likely to play with opposite sex peers (Moller & Serbin, 1996). Some theorists have argued that the segregation seen in boys' and girls' play is a result of these differences in play styles. Girls play with girls and boys play with boys, not because they necessarily want to play with someone who is the same sex but because most children enjoy playing with someone who plays like they do (Maccoby, 1990).

Play style is likely to be influenced by prenatal androgen exposure. One clue can be found by looking at girls with congenital adrenal hyperplasia (CAH), a genetic condition involving the overproduction of androgens (such as testosterone) in utero. These girls generally have play styles that are more typical of boys. Additionally, despite identifying as girls, they have a greater preference for male playmates than unaffected girls (Paterski et al., 2011).

Psychologists have found evidence that infants begin to perceive differences between males and females long before their behavior is gender-differentiated and even before they can talk. Habituation studies have found that 6-month-olds respond differently to male and female voices. By 9 to 12 months, infants can tell the difference between male and female faces, apparently on the basis of hair and clothing. At approximately 19 months, children start to use gender labels such as "mommies" and "daddies" to describe people in their social world, and those children who begin to use such labels earlier generally show earlier gender-typed play as well (Zosuls et al., 2009). During the 2nd year, infants begin to associate gender-typical toys such as dolls with a face of the correct gender (Martin, Ruble, & Szkrybalo, 2002).

Parental Influences on Gender Differences Generally, parents use broadly similar parenting styles with their boys and girls. They seem, overall, to be equally warm, sensitive, and responsive to both, and to use relatively similar levels of control (Jennings et al., 2008; Hallers-Haalboom et al., 2014; Endendijk, Groeneveld, Bakersman-Kranenburg, & Mesman, 2016). However, parents in the United States do nonetheless tend to stereotype baby boys and girls. For example, despite no actual differences in pitch, high-pitched infant cries are more frequently attributed to girls and lower-pitched infant cries are more frequently attributed to boys (Reby, Levréro, Gustafsson, & Mathevon, 2016), and despite identical performance, mothers of 11-month-old infants expect sons to crawl more effectively than daughters (Mondschein et al., 2000).

Rather than explicitly telling their children how they should behave with respect to their gender, especially in cultures in which gender equality is valued, parents often unconsciously impart this knowledge through their parenting practices. For example, a mother might respond less negatively to her son's rough play than she would to that of her daughter. A father might draw extra praise and attention to the brave boy in a book and be more likely to label a sad-looking rabbit in the story as a girl. Children also watch their parents' behaviors carefully—who does the housework, what they say, and their interests and hobbies. All of these actions provide implicit messages about gender that children internalize over time (Mesman & Groeneveld, 2018).

Additionally, despite broad commonalities, parents do nonetheless show some gendered differences in their treatment. For example, girls are generally allowed a bit more latitude in the expression of negative emotions (Brown, Craig, & Halberstadt, 2015; Grady, 2018). Fathers, especially, promote **gender-typing**, the process by which children learn behavior their culture considers appropriate for each sex (Chaplin, Cole, & Zahn-Waxler, 2005; Lytton & Romney, 1991). Fathers treat boys and girls more differently than mothers do, even during the 1st year (Snow, Jacklin, & Maccoby, 1983). During the 2nd year, fathers talk more and spend more time with sons than with daughters (Lamb, 1981). Fathers, overall, play with their children more than mothers do (Lewis & Lamb, 2003) and play more roughly with sons and show more sensitivity to daughters (Kelley, Smith, Green, Berndt, & Rogers, 1998; Lindsey, Cremeens, & Caldera, 2010). Mothers talk more, and more supportively, to daughters than to sons (Leaper, Anderson, & Sanders, 1998), and girls at this age tend to be more talkative than boys (Leaper & Smith, 2004).

gender-typing
Socialization process by which children, at an early age, learn appropriate gender roles.

Culture influences these interactions. In the United States, a highly physical style of play is characteristic of many fathers, but Swedish and German fathers usually do not play with their babies this way (Lamb, Frodi, Frodi, & Hwang, 1982). African Aka fathers (Hewlett, 1987) and those in New Delhi, India, also tend to play gently with small children (Roopnarine, Hooper, Ahmeduzzaman, & Pollack, 1993). Both the Efe and Lese foraging fathers of Zaire spend a great deal of time in proximity to their children engaged in direct care and nurturance, although relatively little time is spent in active play (Tronick, Morelli, & Ivey, 1992; Roopnarine & Davidson, 2015). Such cross-cultural variations suggest that while nurturing behaviors on the part of mothers and rough play on the part of fathers may be biologically based gender differences, they are strongly culturally influenced.

checkpoint can you . . .

- Give examples gender differences in infants and toddlers?
- Discuss ways in which parents might unconsciously influence their child's gender development?

Research showed that mothers who took their babies to baby sign-language classes were more stressed than mothers who did not. Given that length of time spent in classes was not related to increased stress, the researchers concluded that the classes did not cause stress. What is an alternative explanation for the finding?

Howlett, Kirk, & Pine, 2010

Developmental Issues in Infancy

How does a dependent newborn, with a limited emotional repertoire and pressing physical needs, become a child with complex feelings and the abilities to understand and control them? Much of this development revolves around relationships with caregivers.

DEVELOPING TRUST

Human babies are dependent on others for food, protection, and nurturance for a far longer period than the young of most mammals. According to Erikson, this extended period results in the first stage of psychosocial development being centered on forming a sense of trust.

Erikson (1950) argued that at each stage in the life span, we are faced with a challenge and a complementary risk. As babies, our first challenge involves forming a **basic sense of trust versus mistrust.** If we are successful, we develop a sense of the reliability of people and objects in our world. We feel safe and loved. The risk, however, is that, instead, we develop a sense of mistrust and feel that those around us cannot be counted on in times of need.

basic sense of trust versus mistrust
Erikson's first stage in psychosocial development, in which infants develop a sense of the reliability of people and objects.

The stage begins in infancy and continues until about 18 months. Ideally, babies develop a balance between trust (which lets them form intimate relationships) and mistrust (which enables them to protect themselves). If trust predominates, as it should, children develop hope and the belief that they can fulfill their needs and obtain their desires (Erikson, 1982). If mistrust predominates, children view the world as unfriendly and unpredictable and have trouble forming quality relationships.

checkpoint can you . . .

- Explain the importance of basic trust and identify the critical element in its development?

DEVELOPING ATTACHMENTS

When Ahmed's mother is near, he looks at her, smiles at her, babbles to her, and crawls after her. When she leaves, he cries; when she comes back, he squeals with joy. When he is frightened or unhappy, he clings to her. Ahmed has formed his first attachment to another person.

Attachment is a reciprocal, enduring emotional tie between an infant and a caregiver, each of whom contributes to the quality of the relationship. From an evolutionary point of view, attachments have adaptive value for babies, ensuring that their psychosocial as well as physical needs will be met. According to ethological theory, infants and parents are biologically predisposed to become attached to each other, and attachment promotes a baby's survival.



Both this father and baby contribute to the attachment relationship by the way they act towards each other. The way the baby molds herself to her father's body shows her trust and reinforces her father's feelings for her, which he displays through sensitivity to her needs.
Noriko Cooper/123RF

Studying Patterns of Attachment

The **Strange Situation** is a classic, laboratory-based technique designed to assess attachment patterns between an infant and an adult. Typically, the adult is the mother (though other adults have taken part as well), and the infant is 10 to 24 months old.

The Strange Situation consists of a sequence of episodes and takes less than half an hour. The episodes are designed to trigger the emergence of attachment-related behaviors. During that time, the mother twice leaves the baby in an unfamiliar room, the first time with a stranger. The second time she leaves the baby alone, and the stranger comes back before the mother does. The mother then encourages the baby to explore and play again and gives comfort if the baby seems to need it (Ainsworth, Blehar, Waters, & Wall, 1978). Of particular concern is the baby's response each time the mother returns.

When Ainsworth and her colleagues observed 1-year-olds in the Strange Situation and at home, they found three main patterns of attachment. These are *secure attachment* (the most common category, into which about 60 to 75 percent of low-risk North American babies fall) and two forms of anxious, or insecure, attachment: *avoidant* (15 to 25 percent) and *ambivalent,* or *resistant* (10 to 15 percent) (Vondra & Barnett, 1999).

Babies with **secure attachment** are flexible and resilient in the face of stress. They sometimes cry when a caregiver leaves, but they quickly obtain the comfort they need once the caregiver returns. Some babies with secure attachment are comfortable being left with a stranger for a short period of time; however, they clearly indicate they prefer the caregiver to the stranger in the reunion episode, often smiling at, greeting, or approaching the caregiver. Babies with **avoidant attachment,** by contrast, are outwardly unaffected by a caregiver leaving or returning. They generally continue to play in the room, and frequently interact with the stranger. However, upon the caregiver's return, they ignore or reject the caregiver, sometimes deliberately turning away. Avoidantly attached babies tend to show little emotion, either positive or negative. Babies who exhibit **ambivalent (resistant) attachment** are generally anxious even before the caregiver leaves, sometimes approaching the caregiver for comfort when the stranger looks at or approaches them for interaction. They are extremely reactive to the caregiver's departure from the room and generally become very upset. Upon the caregiver's return, these babies tend to remain upset for long periods of time, kicking, screaming, refusing to be distracted with toys, and sometimes arching back and away from contact. They show a mix of proximity-seeking and angry behaviors and are very difficult to settle.

Note that in all of these cases what the baby does during the caregiver's absence is not diagnostic of attachment categorization. What is diagnostic is what the babies do when the caregiver *returns.* The important component is the attachment relationship and how the babies use a caregiver to obtain comfort *while* in his or her presence.

These three attachment *patterns* are universal in all cultures in which they have been studied—cultures as different as those in Africa, China, and Israel—though the percentage of infants in each category varies (van IJzendoorn & Kroonenberg, 1988; van IJzendoorn & Sagi, 1999). Generally, however, secure attachment is the largest category (van IJzendoorn & Sagi, 1999).

attachment
Reciprocal, enduring tie between two people—especially between infant and caregiver—each of whom contributes to the quality of the relationship.

Strange Situation
Laboratory technique used to study infant attachment.

secure attachment
Pattern in which an infant is quickly and effectively able to obtain comfort from an attachment figure in the face of distress.

avoidant attachment
Pattern in which an infant rarely cries when separated from the primary caregiver and avoids contact on his or her return.

ambivalent (resistant) attachment
Pattern in which an infant becomes anxious before the primary caregiver leaves, is extremely upset during his or her absence, and both seeks and resists contact on his or her return.

disorganized-disoriented attachment Pattern in which an infant, after separation from the primary caregiver, shows contradictory, repetitious, or misdirected behaviors on his or her return.

Other research (Main & Solomon, 1986) identified a fourth pattern, **disorganized-disoriented attachment.** Babies with the disorganized pattern seem to lack a cohesive strategy to deal with the stress of the Strange Situation. Instead, they show contradictory, repetitive, or misdirected behaviors (such as seeking closeness to the stranger instead of the mother or showing a fear response upon the caregiver's entry). They seem confused and afraid (Carlson, 1998; van IJzendoorn, Schuengel, & Bakermans-Kranenburg, 1999).

Disorganized attachment is thought to occur in at least 10 percent of infants (Vondra & Barnett, 1999). It is most prevalent in babies with mothers who are insensitive, intrusive, or abusive; who are fearful or frightening and thus leave the infant with no one to alleviate the fear the mother arouses; or who have suffered unresolved loss or have unresolved feelings about their childhood attachment to their own parents. The likelihood of disorganized attachment increases in the presence of multiple risk factors, such as maternal insensitivity plus marital discord plus parenting stress. Disorganized attachment is a reliable predictor of later behavioral and adjustment problems (Bernier & Meins, 2008; Carlson, 1998; van IJzendoorn et al., 1999).

A baby's attachment style is best determined by how a mother soothes an upset child rather than by how that child acts when she is not around.

How Attachment Is Established By the time babies are 1 year old, they have established a characteristic style of attachment. According to Bowlby, attachment styles are the result of repeated interactions with a caregiver. For example, if every time a baby cries the mother responds quickly and sensitively to that bid for comfort, over time the baby comes to expect it. By contrast, if a mother responds inconsistently to crying, babies form a very different set of expectations regarding the likely responses of the mother to their cries.

Bowlby called these sets of expectations working models and theorized that these early working models became the blueprint for the dynamics of that relationship. As long as the mother continues to act the same way, the model holds up. If her behavior changes—not just once or twice but repeatedly—the baby may revise the model, and security of attachment may change. Because the working model emerges as a result of interactions between both partners in the relationship, babies can have different working models (and attachment styles) with different people.

A baby's working model of attachment is related to Erikson's concept of basic trust. Secure attachment reflects trust; insecure attachment, mistrust. Securely attached babies have learned to trust not only their caregivers but also their own ability to get what they need. Not surprisingly, mothers of securely attached infants and toddlers tend to be sensitive and responsive (Ainsworth, Blehar, Waters, & Wall, 1978; Braungart-Rieker, Garwood, Powers, & Wang, 2001). A secure base allows children to explore their environment more effectively because they know they can rely on their caregivers to quickly come to the rescue if needed. Equally important are mutual interaction, stimulation, a positive attitude, warmth and acceptance, and emotional support (Wolff & van IJzendoorn, 1997; Lundy, 2003).

Sensitive mothering is related to another important developmental achievement, at least in the eyes of parents. Mothers who respond sensitively to their infants end up with babies who fall asleep faster, sleep longer, and wake less often.

Teti, Bo-Ram, Mayer, & Countermine, 2010

Alternative Methods of Attachment Study Although much research on attachment has been based on the Strange Situation, some investigators have questioned its validity. The Strange Situation *is* strange; it takes place in a laboratory, and adults follow a script rather than behaving naturally. Also, the Strange Situation may be less valid in some non-Western cultures (Miyake, Chen, & Campos, 1985).

To address these concerns, researchers have devised methods to study children in natural settings. The Waters and Deane (1985) Attachment Q-set (AQS) has mothers or other home observers sort a set of descriptive words or phrases ("cries a lot"; "tends to cling") into categories ranging from most to least characteristic of the child and then compare these descriptions with expert descriptions of the prototypical secure child.

In a study using the AQS, mothers in China, Colombia, Germany, Israel, Japan, Norway, and the United States described their children as behaving more like than unlike the "most secure child." Furthermore, the mothers' descriptions of "secure-base" behavior were about as similar across cultures as within a culture. These findings suggest that the tendency to use the mother as a secure base is universal, though it may take somewhat varied forms (Posada et al., 1995).

Neurobiological studies may offer another way to study attachment. Functional MRIs given to Japanese mothers showed that certain areas of a mother's brain were activated at the sight of her own infant smiling or crying but not at the sight of other infants showing similar behaviors, suggesting that attachment may have a neurological basis (Strathearn, 2011; Noriuchi, Kikuchi, & Senoo, 2008.)

The Role of Temperament How much does temperament influence attachment and in what ways? Neurological or physiological conditions may underlie temperamental differences in attachment. For example, variability in an infant's heart rate is associated with irritability, and heart rate seems to vary more in insecurely attached infants (Izard, Porges, Simons, Haynes, & Cohen, 1991).

However, attachment is a relational process—that is, child temperament and parenting interact. For example, in one series of studies 15-day-old infants classified as irritable were much more likely than non-irritable infants to be avoidantly attached at 1 year unless their mothers had been instructed on how to soothe their babies (Van den Boom, 1994). Thus, an infant's irritability may work against the development of secure attachment, but not if the mother has the skills to cope with the baby's temperament (Rothbart et al., 2000). Thus, goodness of fit between parent and child may well be a key to understanding security of attachment. By the same token, however, a poor fit may put a child at elevated risk. For example, another study found infants who were highly behaviorally inhibited were at particularly high risk for resistant attachment when their mothers also reported having high anxiety themselves (Stevenson-Hinde, Shouldice, & Chicot, 2011).

Recently, Ainsworth's Strange Situation procedure has been modified for use in dogs. Dogs can be securely or insecurely attached and use their caregivers as a secure base when under threat, such as a scary stranger in a black coat, hat, and ski mask.

Solomon, Beetz, Schoberl, Gee, & Kotrschal, 2018

stranger anxiety
Wariness of strange people and places, shown by some infants during the second half of the 1st year.

separation anxiety
Distress shown by someone, typically an infant, when a familiar caregiver leaves.

Stranger Anxiety and Separation Anxiety Chloe used to be a friendly baby, smiling at strangers and going to them, continuing to coo happily as long as someone—anyone—was around. Now, at 8 months, she turns away when a new person approaches and howls when her parents try to leave her with a babysitter. Chloe is experiencing both **stranger anxiety,** wariness of a person she does not know, and **separation anxiety,** distress when a familiar caregiver leaves her.

Babies rarely react negatively to strangers before age 6 months but commonly do so by 8 or 9 months (Sroufe, 1997). This change may reflect cognitive development. Chloe's stranger anxiety involves memory for faces, the ability to compare the stranger's appearance with her mother's, and perhaps the recollection of situations in which she has been left with a stranger. If Chloe is allowed to get used to the stranger gradually in a familiar setting, she may react more positively (Lewis, 1997; Sroufe, 1997).

Babies, at least when they are themselves down on the ground, respond more negatively to tall strangers than to short strangers.

Weinraub, 1978

Separation anxiety may be due not so much to the separation itself as to the quality of substitute care. When substitute caregivers are warm and responsive and play with 9-month-olds *before* they cry, the babies cry less than when they are with less responsive caregivers (Gunnar, Larson, Hertsgaard, Harris, & Brodersen, 1992).

Stability of care is also important. Pioneering work by René Spitz (1945, 1946) on institutionalized children emphasizes the need for substitute care to be as close as possible to good mothering. Research has underlined the value of continuity and consistency in caregiving, so children can form early emotional bonds with their caregivers.



Maria's reluctance to allow her mother's friend to hold her is a sign of stranger anxiety.
Christina Kennedy/Alamy Stock Photo

Long-Term Effects of Attachment As attachment theory proposes, security of attachment seems to affect emotional, social, and cognitive competence, presumably through the action of internal working models (Sroufe, Coffino, & Carlson, 2010). Most notably, the more secure a child's attachment to a nurturing adult, the more likely that the child will develop good relationships with others. A recent meta-analysis including over 80 studies and 4,000 children concluded that attachment security in infancy is associated with peer competence across childhood and early

adolescence, while insecurity, regardless of subtype, is associated with lower peer competence (Groh et al., 2014).

Securely attached toddlers tend to have larger, more varied vocabularies than those who are insecurely attached (Meins, 1998), and in preschool, these children use more words reflecting mental states (McQuaid, Bigelow, McLaughlin, & MacLean, 2008). They show less stress in adapting to child care (Ahnert, Gunnar, Lamb, & Barthel, 2004), have more positive interactions with peers, and their friendly overtures are more likely to be accepted (Fagot, 1997). Insecurely attached toddlers tend to show more negative emotions (fear, distress, and anger), whereas securely attached children are more joyful (Kochanska, 2001).

Between ages 3 and 5, securely attached children are likely to be more curious, competent, empathic, resilient, and self-confident; to get along better with other children; and to form closer friendships than children who were insecurely attached as infants (Elicker, Egelund, & Sroufe, 1992; Jacobson & Wille, 1986; Youngblade & Belsky, 1992). They interact more positively with parents, preschool teachers, and peers; are better able to resolve conflicts; and tend to have a more positive self-image (Elicker et al., 1992; Verschueren, Marcoen, & Schoefs, 1996; Sroufe, Egeland, Carlson, & Collins, 2005). In middle childhood and adolescence, securely attached children tend to have the closest, most stable friendships (Schneider, Atkinson, & Tardif, 2001; Sroufe, Carlson, & Shulman, 1993) and to be socially well adjusted (Jaffari-Bimmel, Juffer, van IJzendoorn, Bakersmans-Kranenburg, & Mooijaart, 2006). Secure attachment in infancy also influences the quality of attachment to a romantic partner in young adulthood (Simpson, Collins, Tran, & Haydon, 2007).

Insecurely attached children, in contrast, often are more likely to have inhibitions and negative emotions in toddlerhood, hostility toward other children at age 5, and dependency during the school years (Calkins & Fox, 1992; Fearon, Bakersman-Kranenburg, van IJzendoorn, Lapsley, & Roisman, 2010; Kochanska, 2001; Lyons-Ruth, Alpern, & Repacholi, 1993; Sroufe, Carlson, & Shulman, 1993). They also are more likely to show evidence of externalizing behaviors such as aggression and conduct problems. This appears to be more true for boys, for clinically referred children, and when the attachment assessments are based on observational data (Fearon et al., 2010). Those with disorganized attachment are more likely to have behavior problems at all levels of schooling and psychiatric disorders at age 17 (Carlson, 1998).

Intergenerational Transmission of Attachment Patterns The *Adult Attachment Interview* (AAI) (George, Kaplan, & Main, 1985; Main, 1995; Main, Kaplan, & Cassidy, 1985) asks adults to recall and interpret feelings and experiences related to their childhood attachments. Studies using the AAI have found that the way adults recall early experiences with parents or caregivers is related to their emotional well-being and may influence the way they respond to their own children (Dykas & Cassidy, 2011; Adam, Gunnar, & Tanaka, 2004). A mother who was securely attached to *her* mother or who understands why she was insecurely attached can accurately recognize the baby's attachment behaviors, respond encouragingly, and help the baby form a secure attachment to her (Bretherton, 1990). Mothers who are preoccupied with their past attachment relationships tend to show anger and intrusiveness in interactions with their children. Depressed mothers who dismiss memories of their past attachments tend to be cold and unresponsive to their children (Adam et al., 2004). Parents' attachment history also influences their perceptions of their baby's temperament, and those perceptions may affect the parent-child relationship (Pesonen, Raïkkönen, Keltikangas-Järvinen, Strandberg, & Järvenpää, 2003). Some of these processes may occur outside of awareness at a physiological level. For example, when viewing their own infant's smiling face, mothers who reported a secure attachment style on the AAI showed greater activation in areas of the brain (hypothalamus/pituitary and ventral striatum) associated with reward, as well as release of oxytocin (a neurohormone involved in social processes), while mothers with insecure or dismissing styles did not. The differences while viewing their own infants' sad faces were even more striking. Here, mothers with a secure AAI style

continued to show activation in reward areas, while mothers with insecure/dismissing styles showed activation in areas (ventral striatum) more closely associated with feelings of pain or disgust (Strathearn, Fonagy, Amico, & Montague, 2009). Additional research has found that adults with insecure attachment representations also show greater amygdala activation and respond with greater irritation than do securely attached adults to infant cries (Riem, Bakersmans-Kranenburg, van IJzendoorn, Out, & Rombouts, 2012).

Fortunately, a cycle of insecure attachment can be broken. In one study, 54 first-time Dutch mothers who were classified by the AAI as insecurely attached received home visits in which they either were given video feedback to enhance sensitive parenting or participated in discussions of their childhood experiences in relation to their current caregiving. After the interventions, these mothers were more sensitive than a control group who had not received the visits. Maternal gains in sensitivity to children's needs most strongly affected the security of infants with highly reactive (negatively emotional) temperaments (Klein-Velderman, Bakermans-Kranenburg, Juffer, & van IJzendoorn, 2006).

checkpoint can you . . .

- Describe four patterns of attachment?
- Discuss how attachment is established, including the role of the baby's temperament?
- Discuss factors affecting stranger anxiety and separation anxiety?
- Describe long-term behavioral influences of attachment patterns and intergenerational transmission of attachment?

EMOTIONAL COMMUNICATION WITH CAREGIVERS: MUTUAL REGULATION

At 1 month, Max gazes attentively at his mother's face. At 2 months, when his mother smiles at him and rubs his tummy, he smiles back. By 3 months, Max smiles first, inviting his mother to play (Lavelli & Fogel, 2005).

Infants are communicating beings; they have a strong drive to interact with others. The ability of both infant and caregiver to respond appropriately and sensitively to each other's mental and emotional states is known as **mutual regulation.** Infants take an active part in mutual regulation by sending behavioral signals, like Max's smiles, that influence the way caregivers behave toward them.

mutual regulation
Process by which infant and caregiver communicate emotional states to each other and respond appropriately.

Some of this interactional synchrony may be expressed at a biological level. For example, when mothers and infants are interacting face-to-face in a synchronous fashion, their heart rates become synchronized with lags of less than one second. This process does not occur during asynchronous periods of interaction (Feldman, Magori-Cohen, Galili, Singer, & Louzoun, 2011). Additionally, the release of oxytocin, a hormone related in bonding processes in mammals, has been found to be related to parenting behaviors in humans. In fathers, oxytocin levels are related to playful behaviors. In mothers, oxytocin levels are related to positive affect, affectionate touch, and "baby talk"—all markers of sensitive parenting (Gordon, Zagoory-Sharon, Leckman, & Feldman, 2010). Typically, interaction moves back and forth between well-regulated states and poorly regulated states. For example, when a baby's goals are met, the baby tends to be joyful, or at least interested (Lowe et al., 2012; Tronick, 1989). However, when a mother or caregiver is not synchronous in her interaction with the baby—for example, if an invitation to play is ignored or an adult is overly intrusive—the baby can become frustrated or sad. In fact, even very young infants can perceive emotions expressed by others and vary their behavior accordingly to repair the interaction (Legerstee & Varghese, 2001; Montague & Walker-Andrews, 2001). From this process, babies learn how to send signals and what to do when their signals are not effective. Not surprisingly, there are links to later social behaviors. Children whose mothers were high in interactional synchrony when young are more likely later to be better at regulating their behavior, to comply with parental requests, to have higher IQ, to use more words referencing mental states (such as "think"), and to have fewer behavioral problems (Feldman, 2007). It may be that mutual regulation processes help them learn to read others' behavior and to respond appropriately. The accompanying Research in Action discusses how a mother's depression may contribute to developmental problems in her baby.

SOCIAL REFERENCING

Ann toddles warily toward the new playground and stops at the entrance, staring at the laughing, screaming children scaling the bright structure. Unsure of herself, she

research in action

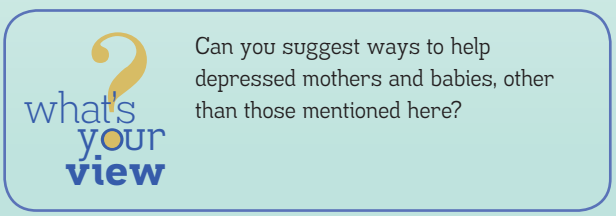
POSTPARTUM DEPRESSION AND EARLY DEVELOPMENT

Much media attention has focused on the issue of postpartum depression. Celebrity moms, including Chrissy Teigen, Hayden Panettiere, and Alyssa Milano, have spoken publicly about their struggles in an effort to raise awareness, decrease stigma, and advocate for new moms to seek treatment.

Postpartum depression (PPD) includes symptoms of major depressive disorder experienced within 4 weeks of giving birth that interfere with maternal functioning (Vliegen, Casalin, & Luyten, 2014). Between 13 and 19 percent of mothers experience this condition, perhaps in part due to dramatic drops in estrogen and progesterone levels (O'Hara & McCabe, 2013). Significant emotional and lifestyle changes after the birth of a baby may also trigger depressive symptoms. First-time mothers may be especially at risk; they are generally less likely to have experience in taking care of a newborn and thus may struggle with parenting (Leahy-Warren, McCarthy, & Corcoran, 2012). Other risk factors include prior history of depression, poor partner relationship, parental stress, financial worries, and recent negative life events (Parsons, Young, Rochat, Kringelbach, & Stein, 2012; Vliegen et al., 2014).

Postpartum depression has profoundly negative effects on mother-infant interactions and is linked to long-term disruption in cognitive and emotional outcomes. Depression itself is associated with poor concentration, lethargy, sleep disturbance, and low mood. These symptoms interfere with the ability to carry out child-care tasks (Parsons et al., 2012). Depressed mothers are also more irritable and less engaged in parenting, and their social interactions with infants are generally less positive (Field, 2010). Mothers with PPD experience difficulty recognizing and responding to infants' signs of interest (Murray, Cooper, & Fearon, 2014). As early as 2 months, infants look at the depressed mother less often, show less engagement with objects, and have lower activity levels (Earls, 2010). PPD can also interfere in the bonding process. Some mothers report little to no emotional connection with the baby, and attachment issues may persist up to a full year (O'Higgins, Roberts, Glover, & Taylor, 2013). Inadequate or inconsistent caregiving practices impact feeding, sleep routines, health care checkups, and safety practices (Field, 2010). In the short term, infants growing up with depressed parents show impaired social interaction and developmental delays (Earls, 2010). Long-term studies highlight emotional and behavioral problems in elementary school (Fihrer, McMahon, & Taylor, 2009; Closa-Monasterolo et al., 2017).

Untreated postpartum depression poses a threat to optimal development, with long-lasting effects that may persist throughout childhood. Early intervention is essential to improve children's cognitive, social, and behavioral outcomes (Earls, 2010). Experts advocate for multipronged interventions, including mental health screening for pregnant and postpartum women, parenting practice education, and increased social support and partner involvement for mothers (Field, 2010; O'Hara &McCabe, 2013).



Can you suggest ways to help depressed mothers and babies, other than those mentioned here?

social referencing
Understanding an ambiguous situation by seeking another person's perception of it.

turns toward her mother and makes eye contact. Her mother smiles at her, and Ann, emboldened by her mother's response, walks in and starts to climb the structure. When babies look at their caregivers on encountering an ambiguous event, they are engaging in **social referencing,** seeking emotional information to guide behavior. In social referencing, one person forms an understanding of how to act in an ambiguous, confusing, or unfamiliar situation by seeking and interpreting another person's perception of it.

Research provides experimental evidence of social referencing at 12 months (Moses, Baldwin, Rosicky, & Tidball, 2001). When exposed to jiggling or vibrating toys fastened to the floor or ceiling, both 12- and 18-month-olds moved closer to or farther from the toys depending on the experimenters' expressed emotional reactions ("Yecch!" or "Nice!"). In one pair of studies, 12-month-olds (but not 10-month-olds) adjusted their behavior toward certain unfamiliar objects according to nonvocal

emotional signals given by an actress on a television screen (Mumme & Fernald, 2003). In another experiment (Hertenstein & Campos, 2004), whether 14-month-olds touched plastic creatures that dropped within their reach was related to the positive or negative emotions they had seen an adult express about the same objects an hour before. As children age, social referencing becomes more complex. For example, it becomes less dependent on facial expression and more dependent on language. Additionally, while younger infants tend to check in with adults regardless of what type of stimulus they encounter, older infants tend to check in only when a stimulus or situation is ambiguous (Kim & Kwak, 2011). Children also become pickier about whom they seek information from. Between the ages of 4 and 5 years, they are more likely to trust information that comes from their mother than from a stranger (Corriveau et al., 2009).

Social referencing, and the ability to retain information gained from it, may play a role in such key developments of toddlerhood as the rise of self-conscious emotions (embarrassment and pride), the development of a sense of self, and the processes of *socialization* and *internalization,* to which we turn in the next section of this chapter.

checkpoint can you . . .

- Describe how mutual regulation works and explain its importance?
- Give examples of how infants seem to use social referencing?

Developmental Issues in Toddlerhood

About halfway between their 1st and 2nd birthdays, babies become toddlers. Let's look at three psychological issues that toddlers—and their caregivers—have to deal with: the emerging *sense of self;* the growth of *autonomy,* or self-determination; and *socialization,* or *internalization of behavioral standards*.

THE EMERGING SENSE OF SELF

The **self-concept** is our image of ourselves—our total picture of our abilities and traits. It describes what we know and feel about ourselves and guides our actions (Harter, 1996).

self-concept
Sense of self; descriptive and evaluative mental picture of one's abilities and traits.

When and how does the self-concept develop? From a jumble of seemingly isolated experiences (say, from one breast-feeding session to another), infants begin to extract consistent patterns that form rudimentary concepts of self and other. Depending on what kind of care the infant receives and how she or he responds, pleasant or unpleasant emotions become connected with experiences that play an important part in the growing concept of the self (Harter, 1998).

By at least 3 months of age, infants pay attention to their mirror image (Courage & Howe, 2002); 4- to 9-month-olds show more interest in images of others than of themselves (Rochat & Striano, 2002). This early *perceptual* discrimination may be the foundation of the *conceptual* self-awareness that develops between 15 and 18 months. Between 4 and 10 months, when infants learn to reach, grasp, and make things happen, they experience a sense of personal *agency,* the realization that they can control external events. At about this time infants develop *self-coherence,* the sense of being a physical whole with boundaries separate from the rest of the world. These developments occur in interaction with caregivers in games such as peekaboo, in which the infant becomes increasingly aware of the difference between self and other.

The emergence of *self-awareness*—conscious knowledge of the self as a distinct, identifiable being—builds on this dawning of perceptual distinction between self and others.



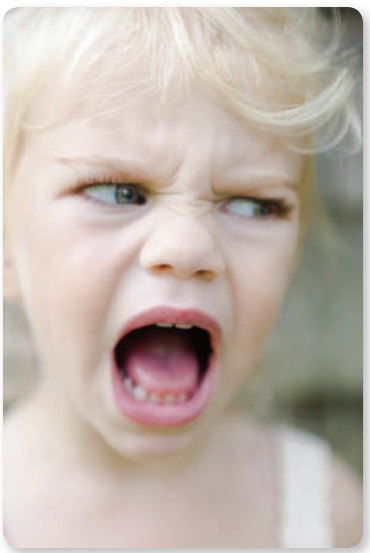
Four- to 9-month-olds show more interest in images of others than in images of themselves.
Zdravinjo/Shutterstock

Dabbing rouge on children's noses is known as the Rouge Task, and research has shown that dolphins, chimpanzees, and elephants also share our ability for self-recognition. Giant pandas, however, do not.

Ma et al. (2015)

Self-awareness can be tested by studying whether an infant recognizes his or her own image. In a classic line of research, investigators dabbed rouge on the noses of 6- to 24-month-olds and sat them in front of a mirror. Three-fourths of 18-month-olds and all 24-month-olds touched their red noses more often than before, whereas babies younger than 15 months never did. This behavior suggests that these older toddlers had self-awareness. They knew they did not normally have red noses and recognized the image in the mirror as their own (Lewis, 1997; Lewis & Brooks, 1974). In a later study, 18- and 24-month-olds were about as likely to touch a sticker on their leg, which was visible only in a mirror, as one on their face (Nielsen, Suddendorf, & Slaughter, 2006). Once children can recognize themselves, they show a preference for looking at their own video image over an image of another child the same age (Nielsen, Dissanayake, & Kashima, 2003).

Pretend play, which typically begins during the last half of the 2nd year, is an early indication of the ability to understand others' mental states as well as the child's own (Lewis & Carmody, 2008). A third measure or sign of self-recognition is the use of first-person pronouns, such as me and mine, usually at 20 to 24 months (Lewis & Carmody, 2008). A positive correlation between the usage of pronouns and mirror self-recognition has been found cross-culturally (Kärtner, Keller, Chaudhary, & Yovsi, 2012). Between 19 and 30 months, children's rapid language development also enables them to think and talk about the self. Children begin to incorporate parents' verbal descriptions ("You're so smart!" "What a big boy!") into their emerging self-images (Stipek, Gralinski, & Kopp, 1990), and those children who attain self-recognition earlier comprehend and label more body parts (Waugh & Brownell, 2015). Similarly, toddlers of this age demonstrate self-understanding through acknowledging objects that belong to them and those that belong to others (Fasig, 2000). Interestingly, those children with older siblings show greater self-awareness and social understanding than those without older siblings (Taumoepeau & Reese, 2014). Culture matters too; children from autonomy-supporting cultural contexts, such as German and Indian urban samples, recognize themselves in a mirror earlier than do children from cultures stressing relatedness and interactional goals, such as Indian and Nso rural samples (Kärtner et al., 2012).



Learning to control your temper is a form of self-control.
Steve Wisbauer/Digital Vision/Getty Images

autonomy versus shame and doubt
Erikson's second stage in psychosocial development, in which children achieve a balance between self-determination and control by others.

DEVELOPMENT OF AUTONOMY

Erikson (1950) identified the period from about 18 months to 3 years as the second stage in personality development, **autonomy versus shame and doubt,** which is marked by a shift from external control to self-control. Having come through infancy with a sense of basic trust in the world and an awakening self-awareness, toddlers begin to substitute their own judgment for their caregivers'. The virtue that emerges during this stage is *will.* Toilet training is an important step toward autonomy and self-control; so is language. As children are better able to make their wishes known, they become more powerful. Because unlimited freedom is neither safe nor healthy, said Erikson, shame and doubt have a necessary place. Toddlers need adults to set appropriate limits, and shame and doubt help them recognize the need for those limits.

In the United States, toddlers often enjoy testing the notions that they are individuals, that they have some control over their world, and that they have new, exciting powers. They are driven to try out their own ideas, exercise their own preferences, and make their own decisions. This drive often shows itself in the form of *negativism,* the tendency to shout, "No!" just for the sake of resisting authority. Almost all U.S. children show negativism to some degree; it usually begins before age 2, tends to peak at about 3½ to 4, and declines by age 6. Caregivers who view children's expressions of self-will as a normal, healthy striving for independence, not as stubbornness, can help them learn self-control, contribute to their sense of competence, and avoid excessive conflict.

Many U.S. parents might be surprised to hear that the terrible twos are not universal. In some developing countries, the transition from infancy to early childhood is relatively smooth and harmonious (Mosier & Rogoff, 2003; see Window on the World).

checkpoint can you . . .

- Trace the early development of the self-concept?
- Describe the conflict of autonomy versus shame and doubt and explain why the terrible twos is considered a normal phenomenon?

window on the world

ARE STRUGGLES WITH TODDLERS NECESSARY?

Are the terrible twos a normal phase in child development? Many Western parents and psychologists think so. Actually, though, the terrible twos do not appear to be universal.

A cross-cultural study compared 16 Mayan families in San Pedro, Guatemala, with 16 American families in Salt Lake City, Utah (Mosier & Rogoff, 2003). Each family had toddlers 14 to 20 months old and older children 3 to 5 years old. Researchers interviewed each mother about her child-raising practices. With the parents and both siblings present, the researchers handed the mother a series of toys (such as a puppet on strings). In the presence of the older sibling, the researchers asked the mother to help the toddler operate the toys. Researchers found striking differences in the way siblings interacted in the two cultures and in the way the mothers viewed and handled sibling conflict.

The older American siblings often tried to take and play with the toys themselves without regard for their younger sibling. By contrast, the older Guatemalan children would often offer to help their younger siblings, or the two children would play with the toys together. When there was a conflict over possession of the toys, the Guatemalan mothers favored the toddlers 94 percent of the time, even taking an object away from the older child if the younger child wanted it. When mothers asked, the older siblings willingly gave the objects to the toddlers or let them have the objects from the start. However, in more than one-third of the American families, the mothers treated both children equally, negotiating with them or suggesting they take turns or share. These observations were consistent with reports of mothers in both cultures as to how they handled such issues at home.

What explains these cultural contrasts? Two differences emerged: the age parents felt children can be held responsible for their actions, and the amount of direct parental supervision children received. Most of the American mothers maintained that by age 1, their toddlers already understood the consequences of their actions. Most Guatemalan mothers placed the age of understanding consequences of actions much later, between 2 and 3 years of age. The American mothers regarded their toddlers as capable of intentional misbehavior and punished them for it; most Guatemalan mothers did not. All of the American children were under direct caregiver supervision. Alternatively, 11 of the 16 Guatemalan children were without supervision much of the time and had more mature household responsibilities.

The researchers suggest that the terrible twos may be a phase specific to societies that place individual freedom before the needs of the group. In societies that place higher value on group needs, freedom of choice exists, but interdependence, responsibility, and expectations of cooperation are more important, research suggests. American parents seem to believe that responsible behavior develops gradually from engaging in fair competition and negotiations. Guatemalan parents seem to believe that responsible behavior develops rapidly when children are old enough to understand the need to respect others' desires as well as their own. Thus, the terrible twos are not universal.

what's your view

Given what you just learned about how Mayan and American adults view toddlers, what might you predict about how much adults in each culture worry when young children are around dangerous objects such as knives or open flames? In which culture might adults be more likely to think young children would understand the dangers at an earlier age?

MORAL DEVELOPMENT: SOCIALIZATION AND INTERNALIZATION

Socialization is the process by which children develop habits, skills, values, and motives that make them responsible, productive members of society. Compliance with parental expectations can be seen as a first step toward compliance with societal standards. Socialization rests on **internalization** of these standards. Children who are successfully socialized no longer obey rules or commands merely to get rewards or avoid punishment; rather,

socialization
Development of habits, skills, values, and motives shared by responsible, productive members of a society.

internalization
During socialization, process by which children accept societal standards of conduct as their own.

they have internalized those standards and made them their own (Grusec & Goodnow, 1994; Kochanska, 2002). They obey societal or parental dictates, not because they are afraid of getting in trouble but because they themselves believe them to be right and true.

Developing Self-Regulation Laticia, age 2, is about to poke her finger into an electric outlet. In her child-proofed apartment, the sockets are covered, but not here in her grandmother's home. When Laticia hears her father shout, "No!" the toddler pulls her arm back. The next time she goes near an outlet, she starts to poke her finger, hesitates, and then says, "No." She has stopped herself from doing something she remembers she is not supposed to do. She is beginning to show **self-regulation:** control of her behavior to conform to a caregiver's demands or expectations of her, even when the caregiver is not present.

self-regulation
A child's independent control of behavior to conform to understood social expectations.

Self-regulation is the foundation of socialization, and it links all domains of development—physical, cognitive, emotional, and social. Until Laticia was physically able to get around on her own, electric outlets posed no hazard. To stop herself from poking her finger into an outlet requires that she consciously remember and understand what her father told her. Cognitive awareness, however, is not enough; restraining herself also requires emotional control. By reading their parents' emotional responses to their behavior, children continually absorb information about what conduct their parents approve of. As children process, store, and act on this information, their desire to please their parents leads them to do as they know their parents want them to, whether or not the parents are there to see. Moreover, the quality of their relationship with their parents affects this emerging skill. Maternal sensitivity, parents' tendency to use mental terms when talking to the child, and support of the child's autonomous behavior are all important influences on self-regulation (Bernier, Carlson, & Whipple, 2010).

Before they can control their own behavior, children may need to be able to regulate, or control, their *attentional processes* and to modulate negative emotions (Eisenberg, 2000; Rueda, Posner, & Rothbart, 2005). Attentional regulation enables children to develop willpower and cope with frustration (Duckworth, Gendler, & Gross, 2014; Sethi, Mischel, Aber, Shoda, & Rodriguez, 2000). For example, control of attentional processes might allow a child to distract herself enough that she manages not to steal the cookies temptingly cooling on the counter.

The growth of self-regulation parallels the development of the self-conscious and evaluative emotions, such as empathy, shame, and guilt (Lewis, 1995, 1997, 1998). It requires the ability to wait for gratification. It is correlated with measures of conscience development, such as resisting temptation and making amends for wrongdoing (Eisenberg, 2000). In most children, the full development of self-regulation takes at least 3 years (Rothbart, Sheese, Rueda, & Posner, 2011).

Committed Compliance Young children cooperate with parental dictates because they know they are supposed to. Although this self-regulation is important, the goal of parenting is internalization of parental mores. Parents want their children to do the right thing because the children truly believe it for themselves. In other words, the eventual goal is development of a **conscience,** which involves both the ability to refrain from certain acts as well as to feel emotional discomfort if they fail to do so.

conscience
Internal standards of behavior, which usually control one's conduct and produce emotional discomfort when violated.

Grazyna Kochanska and her colleagues looked for the origins of conscience in a longitudinal study of 103 children ages 26 to 41 months and their mothers playing together with toys for 2 to 3 hours, both at home and in a homelike laboratory setting (Kochanska & Aksan, 1995). After a free-play period, a mother would give her child 15 minutes to put away the toys. The laboratory had a special shelf with other, unusually attractive toys, such as a bubble gum machine, a walkie-talkie, and a music box. The child was told not to touch anything on that shelf. After about an hour, the experimenter asked the mother to go into an adjoining room, leaving the child alone with the toys. A few minutes later, a woman entered, played with several of the forbidden toys, and then left the child alone again for 8 minutes.

situational compliance
Kochanska's term for obedience of a parent's orders only in the presence of signs of ongoing parental control.

Some children could put the toys away as long as their parents were there to remind them. These children showed what is called **situational compliance.** They needed the

extra assistance provided by their parents' reminder and prompts to complete the task. In a different situation that did not include those reminders, these children might fail to put the toys away. However, other children seemed to have internalized their parents' requests more fully. These children showed **committed compliance**—that is, they were committed to following requests and could do so without their parents' direct intervention (Kochanska, Coy, & Murray, 2001).

committed compliance
Kochanska's term for wholehearted obedience of a parent's orders without reminders or lapses.

The roots of committed compliance go back to infancy. Committed compliers, most typically girls, tend to be those who, at 8 to 10 months, could refrain from touching when told, "No!"(Kochanska, Tjebkes, & Forman, 1998). Mothers of committed compliers, as contrasted with mothers of situational compliers, were more sensitive and responsive with their children as infants (Kochanska et al., 2010) and, once the children were toddlers, tended to rely on gentle guidance rather than force, threats, or other forms of negative control (Eisenberg, 2000; Kochanska, Friesenborg, Lange, & Martel, 2004). Committed compliance tends to increase with age, whereas situational compliance decreases.

Receptive cooperation goes beyond committed compliance. It is a child's eager willingness to cooperate harmoniously with a parent, not only in disciplinary situations, but also in a variety of daily interactions, including routines, chores, hygiene, and play. In a longitudinal study of 101 children, begun at 7 months of age, those who were prone to anger, who received unresponsive parenting, or who were insecurely attached at 15 months also tended to be low in receptive cooperation. Children who were securely attached and whose mothers had been responsive to the child during infancy tended to be high in receptive cooperation (Kochanska, Aksan, & Carlson, 2005).

receptive cooperation
Kochanska's term for eager willingness to cooperate harmoniously with a parent in daily interactions, including routines, chores, hygiene, and play.



One new development in the parenting domain is the influence of instantly and always available technology. Research by Sherry Turkle of the Massachusetts Institute of Technology suggests that young children are increasingly experiencing hurt feelings as a result of competition with computers and smartphones.

Turkle, 2011

Factors in the Success of Socialization The way parents go about the job of socializing a child and the quality of the parent-child relationship may help predict how hard or easy socialization will be. However, not all children respond in the same way. For example, a temperamentally fearful toddler may respond better to gentle reminders than to strong admonitions, whereas a more bold toddler may require more assertive parenting (Kochanska, Aksan, & Joy, 2007).

The opposite is also true; children of similar temperament respond differently to different parenting strategies. For instance, temperamentally bold toddlers whose mothers responded to their approach behaviors in a constructive way (for example, by teaching coping skills) tended to later be reported by their teachers as socially competent and well-behaved, whereas bold toddlers whose mothers responded to their approach behaviors in an unsupportive fashion (for example, with criticism or punishment) tended to later be described as disruptive in a classroom setting (Root & Stifter, 2010).

Secure attachment and a warm, mutually responsive, parent-child relationship seem to foster committed compliance and conscience development (Kochanska et al., 2010). Emotional socialization seems to be important too. Parents who talk to their 18- to 30-month-old children about emotions tend to have toddlers who are quicker to help others (Brownell, Svetlova, Anderson, Nichols, & Drummond, 2013). By reading their parents' emotional responses to their behavior, children continually absorb information about what conduct their parents approve of. The quality of their relationship with their parents affects this emerging skill. Maternal sensitivity, parents' tendency to use mental terms when talking to the child, and support of the child's autonomous behavior are all important influences (Bernier, Carlson, & Whipple, 2010). In one study, researchers observed mothers and children in lengthy, naturalistic interactions: caregiving routines, preparing and eating meals, playing, relaxing, and doing household chores. Children who had mutually responsive relationships with their mothers at the age of 2 tended in early school age to show *moral emotions* such as guilt and empathy; *moral conduct* in the face of strong temptation to break rules; and *moral cognition*, as judged by their response to hypothetical, age-appropriate moral dilemmas (Kochanska, 2002).

Constructive conflict over a child's misbehavior—conflict that involves negotiation, reasoning, and resolution—can help children develop moral understanding by enabling them to see another point of view. In one observational study, 2½-year-olds whose mothers gave clear explanations for their requests, compromised, or bargained with the child

checkpoint can you . . .

- Tell when and how self-regulation develops and how it contributes to socialization?
- Distinguish among committed compliance, situational compliance, and receptive cooperation?
- Discuss how temperament, attachment, and parenting practices affect socialization?

were better able to resist temptation at age 3 than children whose mothers had threatened, teased, insisted, or given in. Discussion of emotions in conflict situations ("How would you feel if . . .") also led to conscience development, probably by fostering the development of moral emotions (Laible & Thompson, 2002).

Relationships with Other Children

Although parents exert a major influence on children's lives, relationships with other children—both in the home and out of it—also are important from infancy on.

SIBLINGS

Sibling relationships begin with the birth of a new baby and continue to develop positively and negatively throughout childhood. Although exasperated adults may not always see it that way, sibling disputes and their settlement are socialization opportunities in which children learn to stand up for principles and negotiate disagreements, in part because the involuntary nature of the relationship ensures that interactions will continue (Howe, Rinaldi, Jennings, & Petrakos, 2002). Another arena for socialization is joint dramatic play. Siblings who frequently play "let's pretend" develop a history of shared understandings that enable them to more easily resolve issues and build on each other's ideas (Howe, Petrakos, Rinaldi, & LeFebvre, 2005).

As babies begin to move around and become more assertive, they inevitably have conflict with siblings—at least in U.S. culture. The earliest, most frequent, and most intense disputes among siblings are over property rights or access to the mother. Sibling conflict increases dramatically after the younger child reaches 18 months (Vandell & Bailey, 1992). During the next few months, younger siblings begin to participate more fully in family interactions. As they do, they become more aware of others' intentions and feelings. They begin to recognize what kind of behavior will upset or annoy an older brother or sister and what behavior is considered naughty or good (Dunn & Munn, 1985; Recchia & Howe, 2009).

Despite the frequency of conflict, sibling rivalry is *not* the main pattern between brothers and sisters early in life. Affection, interest, companionship, and influence are also prevalent in sibling relationships. Indeed, prosocial and play-oriented behaviors are more common than rivalry, hostility, and competition. Older siblings initiate more behavior, both friendly and unfriendly, while younger siblings tend to imitate the older ones. As the children age, they tend to become less physical and more verbal in showing both aggression and care and affection (Abramovitch, Corter, Pepler, & Stanhope, 1986). Because older siblings tend to dominate younger ones, the quality of the relationship is more affected by the emotional and social adjustment of the older child than the younger one (Pike, Coldwell, & Dunn, 2005). Generally, same-sex siblings, particularly girls, are closer and play together more peaceably than boy-girl pairs (Kier & Lewis, 1998).



In many non-Western cultures, it is common to see older siblings caring for younger siblings.
Wigbert Roth/imageBROKER/Shutterstock

Lessons and skills learned from interactions with siblings—such as conflict and cooperation—carry over to relationships outside the home (Brody, 1998; Kim, McHale, Crouter, & Osgood, 2007). A child who is aggressive with siblings is likely to be aggressive with friends as well (Abramovitch et al., 1986). For example, children who victimize their siblings are more likely to be bullied or to bully others, and children who are victimized by their siblings are more likely to be bullied (Tippett & Wolke, 2015). By the same token, siblings who frequently play amicably together tend to develop prosocial behaviors (Pike et al., 2005).

Likewise, friendships can influence sibling relationships. Older siblings who have experienced a good relationship with a friend before the birth of a sibling are likely to treat their younger siblings better and are less likely to develop antisocial behavior in adolescence (Kramer & Kowal, 2005). For a young child at risk for behavioral problems, a positive relationship with *either* a sibling or a friend can buffer the effects of a negative relationship with the other (McElwain & Volling, 2005).

PEERS

Infants and–even more so–toddlers show interest in people outside the home, particularly people their own size. During the first few months, they look, smile, and coo at other babies (T. M. Field, 1978). From about 6 to 12 months, they increasingly smile at, touch, and babble to them (Hay, Pedersen, & Nash, 1982). At about 1 year, when the biggest items on their agenda are learning to walk and to manipulate objects, babies pay less attention to other people (T. M. Field & Roopnarine, 1982). This stage does not last long, though. From about 1½ years to almost 3, children show growing interest in what other children do and an increasing understanding of how to deal with them (Eckerman, Davis, & Didow, 1989).

Toddlers learn by imitating one another. Games such as follow-the-leader help toddlers connect with other children and pave the way for more complex games during the preschool years (Eckerman et al., 1989). Imitation of each other's actions leads to more frequent verbal communication (such as "You go in playhouse," or "Look at me"), which helps peers coordinate joint activity (Eckerman & Didow, 1996). Cooperative activity develops during the 2nd and 3rd years as social understanding grows (Brownell, Ramani, & Zerwas, 2006). As with siblings, conflict also can have a purpose: helping children learn how to negotiate and resolve disputes (Kramer, 2010).

Preschoolers usually like to play with children of the same age, sex, and gender. They also prefer prosocial playmates who can provide them with positive experiences (Hartup & Stevens, 1999; Hart, DeWolf, Wozniak, & Burts, 1992; Fishbein & Imai, 1993) and who are advanced in theory of mind (Slaughter, Imuta, Peterson, & Henry, 2015). Preschoolers reject disruptive, demanding, intrusive, or aggressive children (Ramsey & Lasquade, 1996; Roopnarine & Honig, 1985; Sebanc, 2003). As children become older, their preferences become more sophisticated, and they start focusing less on less on physical traits and more on characteristics such as doing things together, liking and caring for each other, and sharing and helping one another (Furman & Bierman, 1983). Beginning at about 4 years, children will start to conform to peer pressure, and sometimes go along with the group, even when they disagree with an action (Haun & Tomasello, 2011).

Some children, of course, are more sociable than others, reflecting such temperamental traits as their usual mood, readiness to accept new people, and ability to adapt to change. Sociability is also influenced by experience; babies who spend time with other babies, as in child care, become sociable earlier than those who spend almost all their time at home.

checkpoint
can **you** . . .

- Explain how sibling relationships play a part in socialization?
- Describe changes in sibling interactions during toddlerhood?
- Trace changes in sociability during the first 3 years, and state two influences on it?

Children of Working Parents

Parents' work determines more than the family's financial resources. Much of adults' time, effort, and emotional involvement goes into their occupations. How do their work and their child care arrangements affect infants and toddlers? Most research on this subject pertains to mothers' work.

EFFECTS OF MATERNAL EMPLOYMENT

Labor force participation by mothers of children of all ages has increased dramatically in the past four decades. In 1975, fewer than half of all mothers were working or looking for work. In 2017, more than half (58.5 percent) of mothers of infants in their 1st

Although parents may feel guilty about how much time they spend with their children given the conflicting modern demands of work and family, research suggests that they actually spend more time with their kids than previous generations did. How do parents fit it in? Apparently, moms spend less time cooking and cleaning, and dads spend less time at the office.

Ramey & Ramey, 2010

year of life and 65.1 percent of women with children under age 6 were in the labor force (U.S. Bureau of Labor Statistics, 2018; Figure 2).

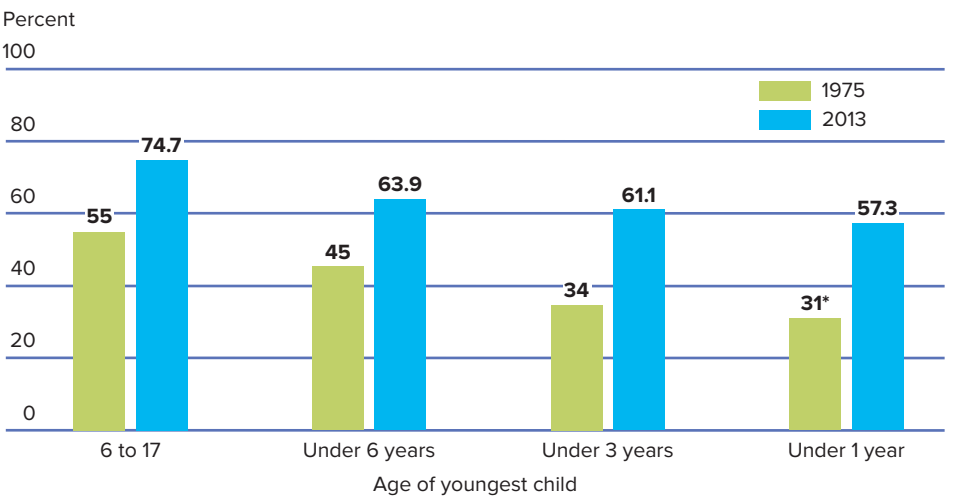
How does early maternal employment affect children? Longitudinal data on 900 European American children from the National Institute of Child Health and Human Development (NICHD) Study of Early Child Care showed negative effects on cognitive development at 15 months to 3 years when mothers worked 30 or more hours a week by a child's 9th month. However, maternal sensitivity, a high-quality home environment, and high-quality child care lessened these negative effects (Brooks-Gunn, Han, & Waldfogel, 2002).

Similarly, among 6,114 children from the National Longitudinal Survey of Youth (NLSY), those whose mothers worked full-time in the 1st year after giving birth were more likely to show negative cognitive and behavioral outcomes at ages 3 to 8 than children whose mothers worked part-time or not at all during their 1st year. However, children in disadvantaged families showed fewer negative cognitive effects than children in more advantaged families (Hill, Waldfogel, Brooks-Gunn, & Han, 2005).

EARLY CHILD CARE

The impact of early child care depends on a variety of factors, including the child's temperament and gender, the quality of care, and characteristics of the caregiver.

Factors Having an Impact on Child Care One factor in the impact of a mother's working outside the home is the type of substitute care a child receives. About 61 percent of children under the age of 5 have some sort of regular child care arrangement. Of those children, 42 percent are cared for by relatives, primarily grandparents and fathers. About a third are regularly cared for by nonrelatives, and approximately 12 percent are cared for by a mix of relatives and nonrelatives. Approximately a quarter are cared for in some form of organized care facility. With nonrelative care averaging $143 a week, affordability and quality of care are pressing issues (Laughlin, 2013).



*Married mothers

FIGURE 2

Labor Force Participation Rates of Mothers with Own Children, 1975 and 2013

Labor force participation by mothers of children of all ages has increased dramatically in the past three decades. In 1975, fewer than half of all mothers were working or looking for work. In 2013, participation rates ranged from almost 60 percent of mothers with infants under a year of age to almost three-fourths of mothers whose youngest child was age 6 to 17.

Sources: Data from Hayghe, 1986; U.S. Bureau of Labor Statistics, 2014.

Temperament and gender of the child make a difference (Crockenberg, 2003). Shy children in child care experience greater stress, as shown by cortisol levels, than sociable children (Watamura, Donzella, Alwin, & Gunnar, 2003), and insecurely attached children experience greater stress than securely attached children when introduced to full-time child care (Ahnert et al., 2004). Boys are more vulnerable to stress, in child care and elsewhere, than are girls (Crockenberg, 2003).

A critical factor in determining the effects of child care is the quality of care a child receives. Quality of care can be measured by *structural characteristics,* such as staff training and the ratio of children to caregivers; and by *process characteristics,* such as the warmth, sensitivity, and responsiveness of caregivers and the developmental appropriateness of activities. Structural quality and process quality may be related; in one study, well-trained caregivers and low child-staff ratios were associated with higher process quality, which, in turn, was associated with better cognitive and social outcomes (Marshall, 2004).

The most important element in quality of care is the caregiver. Stimulating interactions with responsive adults are crucial to early cognitive, linguistic, and psychosocial development. In one study, warm and caring interactions with staff at home-based day care centers was associated with a lower incidence of problem behavior in children. Interestingly, however, warmth was *not* associated with decreases in stress hormone activation (as measured by cortisol, the primary stress hormone). By contrast, intrusive and overcontrolling care did lead to increases in cortisol production. The authors suggested that overly structured day cares with multiple transitions overwhelm the children's abilities and lead to heightened stress over the course of the day. However, this is not necessarily maladaptive. We all need to learn how to manage stress during the course of our lives, so this early practice may not be harmful (Gunnar, Kryzer, Van Ryzin, & Phillips, 2010).

Low staff turnover is another important factor in quality of care. Infants need consistent caregiving in order to develop trust and secure attachments (Burchinal, Roberts, Nabors, & Bryant, 1996; Shonkoff & Phillips, 2000). Stability of care facilitates coordination between parents and child care providers, which may help protect against any negative effects of long hours of care (Ahnert & Lamb, 2003). Table 3 provides guidelines for selecting a high-quality child care facility.

checkpoint can **you** . . .

- Evaluate the impact of a mother's employment on her baby's well-being?
- List at least five criteria for good child care?
- Compare the impact of child care and of family characteristics on emotional, social, and cognitive development?

TABLE 3 Checklist for Choosing a Good Child Care Facility

• Is the facility licensed? Does it meet minimum state standards for health, fire, and safety? (Many centers and home care facilities are not licensed or regulated.)
• Is the facility clean and safe? Does it have adequate indoor and outdoor space?
• Does the facility have small groups, a high adult-to-child ratio, and a stable, competent, highly involved staff?
• Are caregivers trained in child development?
• Are caregivers warm, affectionate, accepting, responsive, and sensitive? Are they authoritative but not too restrictive, and neither too controlling nor merely custodial?
• Does the program promote good health habits?
• Does it provide a balance between structured activities and free play? Are activities age appropriate?
• Do the children have access to educational toys and materials that stimulate mastery of cognitive and communicative skills at a child's own pace?
• Does the program nurture self-confidence, curiosity, creativity, and self-discipline?
• Does it encourage children to ask questions, solve problems, express feelings and opinions, and make decisions?
• Does it foster self-esteem, respect for others, and social skills?
• Does it help parents improve their child-rearing skills?
• Does it promote cooperation with public and private schools and the community?

Sources: American Academy of Pediatrics, 1986; Belsky, 1984; Clarke-Stewart, 1987; NICHD Early Child Care Research Network, 1996; Olds, 1989; Scarr, 1998.

physical abuse
Action taken deliberately to endanger another person, involving potential bodily injury.

neglect
Failure to meet a dependent's basic needs.

sexual abuse
Physically or psychologically harmful sexual activity or any sexual activity involving a child and an older person.

emotional maltreatment
Rejection, terrorization, isolation, exploitation, degradation, ridicule, or failure to provide emotional support, love, and affection; or other action or inaction that may cause behavioral, cognitive, emotional, or mental disorders.

nonorganic failure to thrive
Slowed or arrested physical growth with no known medical cause, accompanied by poor developmental and emotional functioning.

shaken baby syndrome
Form of maltreatment in which shaking an infant or toddler can cause brain damage, paralysis, or death.

Maltreatment: Abuse and Neglect

Although most parents are loving and nurturing, some cannot or will not take proper care of their children, and some deliberately harm them. *Maltreatment,* whether perpetrated by parents or others, is deliberate or avoidable endangerment of a child.

Maltreatment can take several specific forms, and the same child can be a victim of more than one type (USDHHS, Administration on Children, Youth and Families, 2019). These types include the following:

- **Physical abuse,** injury to the body through punching, beating, kicking, or burning.
- **Neglect,** failure to meet a child's basic needs, such as food, clothing, medical care, protection, and supervision.
- **Sexual abuse,** any sexual activity involving a child and an older person.
- **Emotional maltreatment,** including rejection, terrorization, isolation, exploitation, degradation, ridicule, or failure to provide emotional support, love, and affection.

State and local child protective service agencies received an estimated 3.5 million referrals for alleged maltreatment of 6.2 million children in 2017, a 10 percent increase from 2013. About 75 percent of children identified as maltreated were neglected, 18.3 percent were physically abused, and 8.6 percent were sexually abused. Emotional maltreatment was not included in this analysis, however, as it often co-occurs with the other forms of abuse. Younger children, particularly those under the age of 3 years, are more likely to be victims of abuse than older children. An estimated 1,720 children died of maltreatment, and the actual number may well have been considerably higher (USDHHS, Administration for Children and Families, 2019).

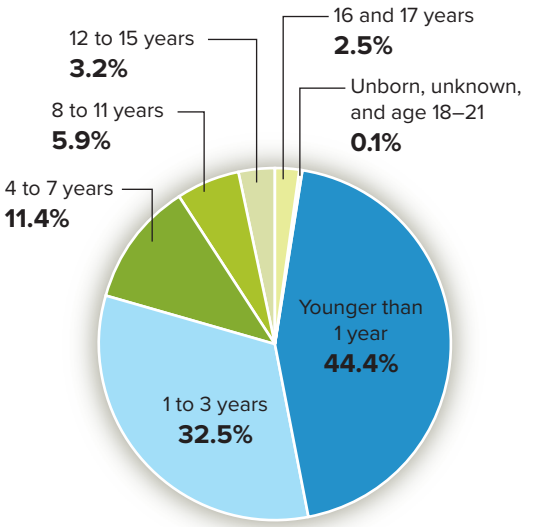


FIGURE 3
Deaths from Maltreatment by Age, 2016

More than three-quarters of fatalities are children younger than age 3.

Source: Child Welfare Information Gateway, 2017.

MALTREATMENT IN INFANCY AND TODDLERHOOD

Children are abused and neglected at all ages, but the highest rates of victimization and of death from maltreatment are for age 3 and younger (Child Welfare Information Gateway, 2019; Figure 3).

Babies need to form attachments to others as much as they need their basic survival needs taken care of. Babies who do not receive nurturance and affection or who are neglected sometimes suffer from **nonorganic failure to thrive,** slowed or arrested physical growth with no known medical cause, accompanied by poor developmental and emotional functioning. Symptoms may include lack of appropriate weight gain, irritability, excessive sleepiness and fatigue, avoidance of eye contact, lack of smiling or vocalizing, and delayed motor development. In short, they neither grow nor develop normally despite a lack of underlying physical or medical causes. Failure to thrive can result from a combination of inadequate nutrition, difficulties in breast-feeding, improper formula preparation or feeding techniques, and disturbed interactions with parents. Poverty is the greatest single risk factor for failure to thrive worldwide. Infants whose mother or primary caregiver is depressed, abuses alcohol or other substances, is under severe stress, or does not show warmth or affection toward the baby also are at heightened risk (Block, Krebs, the Committee on Child Abuse and Neglect, & the Committee on Nutrition, 2005; Lucile Packard Children's Hospital at Stanford, 2009).

Shaken baby syndrome is a form of maltreatment found mainly in children under 2 years old, most often in infants. Because the baby has weak neck muscles and a large, heavy head, shaking makes the brain bounce back and forth inside the skull. This causes bruising, bleeding, and swelling and

can lead to permanent and severe brain damage, paralysis, and even death (AAP, 2000; National Institute of Neurological Disorders and Stroke [NINDS], 2006). The damage is typically worse if the baby is thrown into bed or against a wall. Head trauma is the leading cause of death in child abuse cases in the United States (Dowshen, Crowley, & Palusci, 2004). About 20 percent of shaken babies die within a few days. Survivors may be left with a wide range of disabilities from learning and behavioral disorders to neurological injuries, paralysis or blindness, or a permanent vegetative state (King, McKay, Sirnick, & The Canadian Shaken Baby Study Group, 2003; National Center on Shaken Baby Syndrome, 2000; NINDS, 2006).

CONTRIBUTING FACTORS: AN ECOLOGICAL VIEW

As Bronfenbrenner's bioecological theory would suggest, abuse and neglect are not caused by one thing. The causes of abuse are not in the individual, nor are they in the family, nor are they in the wider social and cultural environment. The causes are in *all* those places, and to understand why it happens, we need to consider *all* the contributing factors.

Characteristics of Abusive and Neglectful Parents and Families Often, abusive adults appear to be just like everyone else; there is no identifying behavior or characteristic that determines who will or will not abuse a child. In 2017, about 78 percent of perpetrators were parents, with slightly over half (54.1 percent) women. About 6.3 percent were a relative other than the parent, and another 4 percent have an "other" relationship to the child. The "other" category includes such people as foster siblings, babysitters, neighbors, family friends, and other nonrelatives. The majority of perpetrators (83.4 percent) were between 18 and 44 years of age and were predominantly white (50.3 percent), African American (20.7 percent), and Hispanic (18.6 percent) (USDHHS, 2019).

Maltreatment by parents is a symptom of extreme disturbance in child rearing, usually aggravated by other family problems, such as poverty, lack of education, alcoholism, depression, or antisocial behavior. A disproportionate number of abused and neglected children are in large, poor, or single-parent families, which tend to be under stress and to have trouble meeting children's needs (Sedlak & Broadhurst, 1996; USDHHS, 2019; Dubowitz et al., 2011). Although many neglect cases occur in very poor families, most low-income parents do not neglect their children.

Abuse may begin when a parent who is already anxious, depressed, or hostile tries to control a child physically but loses self-control and ends up shaking or beating the child. Parents who abuse children tend to have marital problems and to fight physically. Their households are often disorganized, and they experience more stressful events than other families.

Abuse and neglect sometimes occur in the same families (USDHHS, 2019). Substance abuse is a factor in approximately a quarter of cases of abuse and neglect (USDHHS, 2017). Sexual abuse often occurs along with other family disturbances such as physical abuse, emotional maltreatment, substance abuse, and family violence (Kellogg & the Committee on Child Abuse and Neglect, 2005).

Cultural Influences Culture can impact the likelihood of child abuse and neglect. For example, norms regarding child care impact the definition of what neglect is. In some countries, leaving infants and children in the care of young siblings is routine; in countries such as the United States, this would likely be considered neglectful (Korbin & Spilsbury, 1999).

Culture also impacts the likelihood of some types of abuse. Among the cultural values associated with higher rates of child maltreatment are the glorification of violence, rigid gender roles, and beliefs that diminish the status of the child within the

parenting relationship (World Health Organization, 2019). Another particularly important factor is attitudes regarding corporal punishment. Both within individual families in a culture and across different cultures, a belief that corporal punishment is necessary and normative is associated with a greater likelihood of its use and a consequently greater risk of abuse and neglect (Lansford et al., 2015). In the United States, homicide, domestic violence, and rape are common, and many states still permit corporal punishment in schools. While corporal punishment, overall, has been trending down in recent decades, nearly 8 out of 10 parents of preschoolers and nearly half of parents of school-age children still report using physical punishment at home (Zolotor, Theodore, Runyan, Chang, & Laskey, 2011).

HELPING FAMILIES IN TROUBLE

State and local child protective service agencies investigate reports of maltreatment. After making a determination of maltreatment, they determine what steps, if any, need to be taken. Agency staff may try to help the family resolve their problems or arrange for alternative care for children who cannot safely remain at home (USDHHS, Administration on Children, Youth, and Families, 2019). Services for children who have been abused and their parents include shelters, education in parenting skills, and therapy. However, availability of services is often limited (Burns et al., 2004).

When authorities remove children from their homes, the usual alternative is foster care. Foster care removes a child from immediate danger, but it is often unstable, further alienates the child from the family, and may turn out to be another abusive situation. Often a child's basic health and educational needs are not met (David and Lucile Packard Foundation, 2004; National Research Council [NRC], 1993b).

In part because of a scarcity of traditional foster homes and an increasing caseload, a growing proportion of placements are in kinship foster care, under the care of grandparents or other family members (Berrick, 1998; Geen, 2004). Although most foster children who leave the system are reunited with their families, about 28 percent reenter foster care within the next 10 years (Wulczyn, 2004). Children who have been in foster care are more likely than other children to become homeless, to commit crimes, and to become teenage mothers (David and Lucile Packard Foundation, 2004), as well as to suffer mental or physical health problems in adulthood (Zlotnick, Tam, & Soman, 2012).

LONG-TERM EFFECTS OF MALTREATMENT



There are short-term risks as well. Even preschool children can experience episodes of clinical depression, although it may look a bit different than it does in adults. For example, depressed preschool children may have episodes of normal functioning interspersed with periods of sadness or irritation throughout the day.

Consequences of maltreatment may be physical, emotional, cognitive, and social, or a combination. A physical blow to a child's head can cause brain damage resulting in cognitive delays and emotional and social problems. Similarly, severe neglect or unloving parents can have traumatic effects on the developing brain (Fries, Ziegler, Kurian, Jacoris, & Pollak, 2005).

Long-term consequences of maltreatment may include poor physical, mental, and emotional health; impaired brain development (Romano, Babchishin, Marquiz, & Frechette, 2015; Glaser, 2000); cognitive, language, and academic difficulties; problems in attachment and social relationships (National Clearinghouse on Child Abuse and Neglect Information 2004; Child Welfare Information Gateway, 2013; Romano et al., 2015); and, in adolescence, heightened risks of poor academic achievement, delinquency, teenage pregnancy, alcohol and drug use, and suicide (Romano et al., 2015; Dube et al., 2003; Garwood, Gerassi, Jonson-Reid, Plax, & Drake, 2015; Halpern et al., 2018; Gomez et al., 2017). Abuse and neglect in childhood results in an elevated risk that the victims will, when grown, engage in criminal activity or themselves become abusers (Widom, 2017; Child Welfare Information Gateway, 2013). Moreover, adult survivors of child maltreatment report a lower

quality of life (Weber, Jud, & Landolt, 2016) and poorer health as adults, including a higher incidence of heart disease, cancer, chronic lung disease, and liver disease (Chartier, Walker, & Naimark, 2010; Levine, Miller, Lachman, Seeman, & Chen, 2017).

What are the long-term consequences of sexual abuse? In a study that followed 68 sexually abused children for 5 years, these children showed more disturbed behavior, had lower self-esteem, and were more depressed, anxious, or unhappy than a control group (Swanston, Tebbutt, O'Toole, & Oates, 1997). Sexually abused children often become sexually active at an earlier age and tend to have higher numbers of sexual partners than children who were not sexually abused. As adults, they tend to be more anxious, depressed, or suicidal and are more likely to be diagnosed with post-traumatic stress disorder. They are also more likely to abuse drugs and alcohol (Fergusson, McLeod, & Horwood, 2013). Moreover, sexual abuse may also compromise physical health: Sexual abuse survivors are more likely to be obese or suffer from stress-related or autoimmune disorders (Wilson, 2010).

Why do some abused children grow up to become antisocial or abusive, while others do not? Many maltreated children show remarkable resilience. Optimism, self-esteem, intelligence, creativity, humor, and independence are protective factors. Another key factor may be the social support of a caring adult (Levine et al., 2017; NCCANI, 2004). Just as a dysfunctional, abusive relationship may pull a young child's developmental trajectory in a negative direction, a supportive loving relationship from a different adult may buffer that child from the storms of a difficult childhood.

checkpoint can you . . .

- Define four types of child abuse and neglect?
- Discuss the incidence of maltreatment and explain why it is hard to measure?
- Identify contributing factors to maltreatment?
- Cite ways to prevent or stop maltreatment and help its victims?
- Give examples of long-term effects of child abuse and neglect and factors that promote resilience?

summary and key terms

Foundations of Psychosocial Development

- Emotional development is orderly; complex emotions seem to develop from earlier, simpler ones.
- Crying, smiling, and laughing are early signs of emotion. Other indices are facial expressions, motor activity, body language, and physiological changes.
- Brain development is closely linked with emotional development.
- Self-conscious and self-evaluative emotions arise after the development of self-awareness.

  personality (*159*)
  emotions (*160*)
  social smiling (*161*)
  anticipatory smiling (*161*)
  self-conscious emotions (*161*)
  self-awareness (*161*)
  self-evaluative emotions (*161*)
  altruistic behavior (*161*)
  empathy (*162*)
  mirror neurons (*163*)
- Many children seem to fall into one of three categories of temperament: "easy," "difficult," and "slow-to-warm-up."
- Temperamental patterns appear to be largely inborn and to have a biological basis. They are generally stable but can be modified by experience.
- Goodness of fit between a child's temperament and environmental demands aids adjustment.
- Cross-cultural differences in temperament may reflect child-raising practices.

  temperament (*163*)
  "easy" children (*164*)
  "difficult" children (*164*)
  "slow-to-warm-up" children (*164*)
  goodness of fit (*165*)
- Child-raising practices and caregiving roles vary around the world.
- Infants have strong needs for maternal closeness, warmth, and responsiveness as well as physical care.
- Fatherhood is a social construction. Fathering roles differ in various cultures.
- Although significant gender differences typically do not appear until after infancy, U.S. fathers, especially, promote early gender-typing.

  gender (*168*)
  gender-typing (*170*)

Developmental Issues in Infancy

- According to Erikson, infants in the first 18 months are in the first stage of personality development, basic sense of trust versus mistrust. Sensitive, responsive, consistent caregiving is the key to successful resolution of this conflict.
- Research based on the Strange Situation has found four patterns of attachment: secure, avoidant, ambivalent (resistant), and disorganized-disoriented.
- Newer instruments measure attachment in natural settings and in cross-cultural research.
- Attachment patterns may depend on a baby's temperament as well as on the quality of parenting and may have long-term implications for development.
- Stranger anxiety and separation anxiety may arise during the second half of the 1st year and appear to be related to temperament and circumstances.
- A parent's memories of childhood attachment can influence his or her own child's attachment.
- Mutual regulation enables babies to play an active part in regulating their emotional states.
- A mother's depression, especially if severe or chronic, may have serious consequences for her infant's development.
- Social referencing has been observed by 12 months.

basic sense of trust versus mistrust (*170*)
attachment (*171*)
Strange Situation (*171*)
secure attachment (*171*)
avoidant attachment (*171*)
ambivalent (resistant) attachment (*171*)
disorganized-disoriented attachment (*172*)
stranger anxiety (*173*)
separation anxiety (*173*)
mutual regulation (*175*)
social referencing (*176*)

Developmental Issues in Toddlerhood

- The sense of self arises between 4 and 10 months, as infants begin to perceive a difference between self and others and to experience a sense of agency and self-coherence.
- The self-concept builds on this perceptual sense of self and develops between 15 and 24 months with the emergence of self-awareness and self-recognition.
- Erikson's second stage concerns autonomy versus shame and doubt. In U.S. culture, negativism is a normal manifestation of the shift from external control to self-control.
- Socialization, which rests on internalization of societally approved standards, begins with the development of self-regulation.
- A precursor of conscience is committed compliance to a caregiver's demands; toddlers who show committed compliance tend to internalize adult rules more readily than those who show situational compliance. Children who show receptive cooperation can be active partners in their socialization.
- Parenting practices, a child's temperament, the quality of the parent-child relationship, and cultural and socioeconomic factors may affect the ease and success of socialization.

self-concept (*177*)
autonomy versus shame and doubt (*178*)
socialization (*179*)
internalization (*179*)
self-regulation (*180*)
conscience (*180*)
situational compliance (*180*)
committed compliance (*181*)
receptive cooperation (*181*)

Relationships with Other Children

- Sibling relationships play a distinct role in socialization; what children learn from relations with siblings carries over to relationships outside the home.
- Between ages 1½ and 3 years, children tend to show more interest in other children and an increasing understanding of how to deal with them.

Children of Working Parents

- In general, mothers' workforce participation during a child's first 3 years seems to have little impact on development, but cognitive development may suffer when a mother works 30 or more hours a week by her child's 9th month.
- Substitute child care varies in quality. The most important element in quality of care is the caregiver.
- Although quality, quantity, stability, and type of care influence psychosocial and cognitive development, the influence of family characteristics seems greater overall.

Maltreatment: Abuse and Neglect

- Forms of maltreatment are physical abuse, neglect, sexual abuse, and emotional maltreatment.
- Most victims of maltreatment are infants and toddlers. Some die due to failure to thrive. Others are victims of shaken baby syndrome.
- Characteristics of the abuser or neglecter, the family, the community, and the larger culture all contribute to child abuse and neglect.
- Maltreatment can interfere with physical, cognitive, emotional, and social development, and its effects can continue into adulthood. Still, many maltreated children show remarkable resilience.

physical abuse (*186*)

neglect (*186*)

sexual abuse (*186*)

emotional maltreatment (*186*)

nonorganic failure to thrive (*186*)

shaken baby syndrome (*186*)

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part 3
EARLY CHILDHOOD

chapter 7

Physical and Cognitive Development in Early Childhood

outline

PHYSICAL DEVELOPMENT

Aspects of Physical Development

Health and Safety

COGNITIVE DEVELOPMENT

Piagetian Approach: The Preoperational Child

Information-Processing Approach: Memory

Intelligence: Psychometric and Vygotskian Approaches

Language Development

Early Childhood Education

learning objectives

Identify physical changes in early childhood.

Describe three views of the cognitive changes that occur in early childhood.

Summarize how language develops in early childhood.

Evaluate different approaches to early childhood education.



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did you know?

- The leading cause of death in early childhood in the United States is accidents.
- The way parents talk with a child about a shared memory can affect how well the child will remember it.
- When children talk to themselves, they may be trying to solve a problem by thinking out loud.

In this chapter we look at physical and cognitive development from ages 3 to 6. Children grow more slowly than before, but make enormous progress in muscle development and coordination. We trace their advances in the abilities to think, speak, and remember and consider several health concerns. We end with a discussion of early childhood education.

Truly wonderful, the mind of a child is.

—Yoda. ***Star Wars Episode II, Attack of the Clones.***

PHYSICAL DEVELOPMENT

Aspects of Physical Development

In early childhood, children slim down and shoot up. They need less sleep than before and are more likely to develop sleep problems. They improve in running, hopping, skipping, jumping, and throwing balls. They also become better at tying shoelaces, drawing with crayons, and pouring cereal, and they begin to show a preference for using either the right or left hand.

BODILY GROWTH AND CHANGE

Children grow rapidly between ages 3 and 6, but less quickly than before. At about 3, children normally begin to lose their babyish roundness and take on the slender, athletic appearance of childhood. As abdominal muscles develop, the toddler potbelly tightens. The trunk, arms, and legs grow longer. The head is still relatively large, but the other parts of the body continue to catch up as body proportions steadily become more adultlike.

The "average" 3-year-old now weighs about 34 pounds. Both boys and girls typically grow about 2 to 3 inches a year during early childhood and gain approximately 4 to 6 pounds annually (Table 1). Boys' slight edge in height and weight continues until the growth spurt of puberty.

Muscular and skeletal growth progresses, making children stronger. Cartilage turns to bone at a faster rate than before, and bones become harder, giving the child a firmer shape and protecting the internal organs. These changes, coordinated by the still-maturing brain and nervous system, promote the development of a wide range of motor skills.

checkpoint can you . . .

- Describe typical physical changes between ages 3 and 6, and compare boys' and girls' growth?

SLEEP PATTERNS AND PROBLEMS

Sleep patterns change throughout the growing-up years (Figure 1), and early childhood has its own distinct rhythms. Most U.S. children average about 11 hours of sleep at night by age 5 and give up daytime naps (Hoban, 2004). In some other cultures the timing of sleep may vary. Among the Gusii of Kenya, the Javanese in Indonesia, and the Zuni in New Mexico, young children have no regular bedtime and are allowed to stay up until they are sleepy. Among the Canadian Hare, 3-year-olds don't take naps but are put to sleep right after dinner and sleep as long as they wish in the morning (Broude, 1995).

TABLE 1 Physical Growth, Ages 3 to 6 (50th percentile*)

	HEIGHT (INCHES)		WEIGHT (POUNDS)	
Age	Boys	Girls	Boys	Girls
3	39	36.6	35.3	34.5
4	42	41.7	40.8	40.3
5	44.8	44.2	46.6	45.0
6	47.2	46.7	52.8	52.4

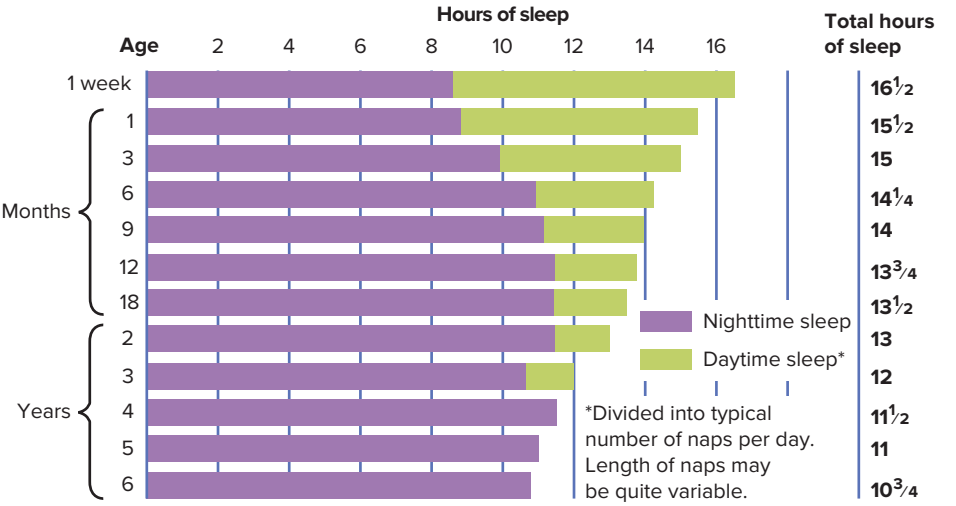
*Fifty percent of children in each category are above this height or weight level, and 50 percent are below it.
Source: Fryar, Gu, and Flegal, 2016.

FIGURE 1

Typical Sleep Requirements in Childhood

Preschoolers get all or almost all their sleep in one long nighttime period. The number of hours of sleep steadily decreases throughout childhood, but individual children may need more or fewer hours than shown here.

Source: Ferber, 1985; similar data in Iglowstein, Jenni, Molinari, and Largo, 2003. Fireside, a Division of Simon & Schuster, Inc., from *Solve Your Child's Sleep Problems*, New Revised & Expanded by Richard Ferber, M.D. 1985, 2006.



About a third of parents or caregivers of children ages 1 to 5 years say their child has a sleep problem (Mindell, Li, Sadeh, Kwon, & Goh, 2015). Sleep disturbances may be caused by accidental activation of the brain's motor control system (Hobson & Silvestri, 1999), by incomplete arousal from a deep sleep (Hoban, 2004), or by disordered breathing or restless leg movements (Guilleminault, Palombini, Pelayo, & Chervin, 2003). These disturbances tend to run in families (Caylak, 2009) and are often associated with separation anxiety (Petit, Touchette, Tremblay, Boivin, & Montplaisir, 2007), nasal abnormalities, and overweight (Bixler et al., 2009). The problems are particularly prevalent in children with physical or learning disabilities. Sleep problems are reported in 86 percent of such children up to 6 years old (Bruni & Novelli, 2010).

In most cases, sleep problems are occasional and are usually outgrown (Mason & Pack, 2007). The majority of sleep problems are behavioral in nature and most commonly include refusing to go to bed, taking a long time to go to sleep, or frequent night waking (Owens, Chervin, & Hoppin, 2019). Many sleep issues are the result of ineffective parenting practices that exacerbate rather than ease the problem (Sadeh, Tikotsky, & Scher, 2010; Table 2). For instance, allowing young children to nap in the daytime to catch up on sleep can result in difficulty getting to sleep later that evening. Persistent sleep problems may indicate an emotional, physiological, or neurological condition that needs to be examined. For example, colic, difficult temperament, premature birth, and altered circadian rhythm have been proposed as mechanisms responsible for the onset of disordered sleep (Bruni & Novelli, 2010). Possible sleep disturbances include night terrors, walking and talking while asleep, and nightmares.



Nightmares are common in children and have been related to difficult temperament, anxiety, dependency, and stress.
Yuliya Evstratenko/Shutterstock

A child who experiences a night terror appears to awaken abruptly from a deep sleep early in the night in a state of agitation. The child may scream and sit up in bed, breathing rapidly and staring or thrashing about. Yet he is not really awake. He quiets down quickly and remembers nothing about the episode the next morning. Night terrors generally peak at about 1½ years of age (Petit et al., 2015), are common between 2½ and 4 years of age, and decline thereafter (Petit et al., 2007). Prevalence estimates of night terrors vary widely, but current data suggest that about 56 percent of children will experience an episode at least once (Petit et al., 2015).

Walking and talking during sleep are fairly common in early and middle childhood. It is estimated that approximately 5 percent of children sleepwalk (Stallman & Kohler, 2016) and approximately 37 percent sleeptalk (Laberge, Tremblay, Vitaro, & Montplaisir, 2000). Sleepwalking and sleeptalking are generally harmless, and their frequency declines as children age.

TABLE 2 Encouraging Good Sleep Habits

HELPING CHILDREN GO TO SLEEP
• Establish a regular, unrushed bedtime routine—about 20 minutes of quiet activities, such as reading a story, singing lullabies, or having quiet conversation.
• Allow no scary or loud television shows.
• Avoid highly stimulating, active play before bedtime.
• Keep a small night-light on if it makes the child feel more comfortable.
• Don't feed or rock a child at bedtime.
• Stay calm but don't yield to requests for "just one more" story, one more drink of water, or one more bathroom trip.
• Offer rewards for good bedtime behavior, such as stickers on a chart or simple praise.
• Try sending the child to bed a little later. Sending a child to bed too early is a common reason for sleep problems.

Sources: American Academy of Child and Adolescent Psychiatry, 1997; American Academy of Pediatrics, 1992; Adams and Rickert, 1989; Graziano and Mooney, 1982.

Sleepwalking, sleeptalking, and night terrors share many characteristics. They all occur during slow wave sleep and are more common when children are sleep deprived, have a fever or are on medications, or when conditions are noisy. Moreover, during their occurrence, children are generally unresponsive to external stimulation and are confused. Some researchers have suggested that these events represent different manifestations of the same underlying disorder. There are several lines of evidence for this assertion. Sleepwalkers and people with sleep terrors tend to have family members who sleepwalk, have sleep terrors, or both. Moreover, parents who have a history of sleepwalking or sleeptalking tend to have children who have night terrors. Young children who have night terrors tend to later sleepwalk (Petit et al., 2015).

Nightmares are common during early childhood (Petit et al., 2007). The occurrence of nightmares has been related to difficult child temperament, high overall childhood anxiety, and bedtime parenting practices that promote dependency (Moore, 2012). They usually occur toward morning and are often brought on by staying up too late, eating a heavy meal close to bedtime, or overexcitement (Vgontzas & Kales, 1999). Sometimes watching an action-packed television program, seeing a terrifying movie, or hearing a frightening bedtime story have been implicated, although results on this are inconsistent (Schredl, Anders, Hellriegel, & Rehm, 2008).

An occasional bad dream is no cause for alarm, but frequent or persistent nightmares, especially those that make a child fearful or anxious during waking hours, may signal excessive stress (Kovachy et al., 2013; Hoban, 2004) and are correlated with emotional, attentional, and conduct problems (Schredl, Frieke-Oekermann, Mitschke, Wiater, & Lehmkuhl, 2009; Li et al., 2011).

Most children stay dry, day and night, by age 3 to 5, but **enuresis**, repeated, involuntary urination at night by children old enough to be expected to have bladder control, is not unusual. About 10 to 15 percent of 5-year-olds, more commonly boys, wet the bed regularly, often while sleeping deeply. More than half outgrow bed-wetting by age 8 without special help (Community Paediatrics Committee, 2005).

Enuresis runs in families, suggesting that genetics may play a role. The discovery of the approximate site of a gene linked to enuresis (Eiberg, 1995; von Gontard, Heron, & Joinson, 2011) points to heredity as a major factor, possibly in combination with slow motor maturation (von Gontard, Schmelzer, Seifen, & Pukrop, 2001), sleep apnea (Umlauf & Chasens, 2003), allergies, or poor behavioral control (Goleman, 1995).

Children and their parents need to be reassured that enuresis is common and not serious. The child is not to blame and should not be punished. Generally, parents need not seek professional help unless children themselves are distressed by bed-wetting. Enuresis that is particularly persistent is most commonly treated with an antidiuretic hormone or nighttime alarm (Walle et al., 2012).



Parents often view extended bed-wetting as deliberate, but generally it is not. It is a developmental issue, and no number of sticker charts or punishments will help a child outgrow enuresis until he or she is developmentally ready.

enuresis
Repeated urination in clothing or in bed.

BRAIN DEVELOPMENT

During the first few years of life, brain development is rapid and profound. By age 3, the brain is approximately 90 percent of adult weight (Gabbard, 1996). From ages 3 to 6, the most rapid brain growth occurs in the frontal areas that regulate planning and goal setting, and the density of synapses in the prefrontal cortex peaks at age 4 (Lenroot & Giedd, 2006). This "exuberant connectivity" will gradually be pruned over time as a result of experience, a process that underlies the great plasticity of the human brain (Innocenti & Price, 2005). In addition, myelin (a fatty substance that coats the axons of nerve fibers and accelerates neural conduction) continues to form (Giedd & Rapoport, 2010). By age 6, the brain has attained about 90 percent of its peak volume (Stiles & Jernigan, 2010). From ages 6 to 11, rapid brain growth occurs in areas that support associative thinking, language, and spatial relations (Thompson et al., 2000).

The *corpus callosum* is a thick band of nerve fibers that connects both hemispheres of the brain and allows them to communicate more rapidly and effectively with each other (Toga, Thompson, & Sowell, 2006), allowing improved coordination of the senses, attention and arousal, and speech and hearing (Lenroot & Giedd, 2006). The corpus callosum continues to be myelinized throughout childhood and adolescence, with peak volume occurring later in boys than in girls (Luders, Thompson, & Toga, 2010).

checkpoint
can you . . .

- Identify five common sleep problems and give recommendations for handling them?
- Summarize changes in the brain during childhood and discuss their possible effects?

gross motor skills
Physical skills that involve the large muscles.

MOTOR SKILLS

Development of the sensory and motor areas of the cerebral cortex permits better coordination between what children want to do and what they can do. Preschool children make great advances in **gross motor skills,** such as running and jumping, which involve the large muscles (Table 3).

Children vary in adeptness depending on their genetic endowment and their opportunities to learn and practice motor skills. Motor coordination in childhood tends to be a relatively stable trait over time (Vandorpe et al., 2012). The gross motor skills developed during early childhood are the basis for sports, dancing, and other activities that often begin in middle childhood. Thus, it is perhaps not surprising that motor coordination predicts participation in sports (Vandorpe et al., 2012). Motor coordination has also been associated with both childhood and adolescent levels of physical activity (Lopes, Rodrigues, Maia, & Malina, 2011; Barnett, Van Beurden, Morgan, Brooks, & Beard, 2009). Moreover, poor motor coordination has been associated with an increased risk of obesity or overweight in children in what is likely to be a reciprocal relationship (D'Hondt et al., 2013; D'Hondt et al., 2014).

TABLE 3 Gross Motor Skills in Early Childhood

3-Year-Olds	4-Year-Olds	5-Year-Olds
Cannot turn or stop suddenly or quickly	Have more effective control of stopping, starting, and turning	Can start, turn, and stop effectively in games
Can jump a distance of 15 to 24 inches	Can jump a distance of 24 to 33 inches	Can make a running jump of 28 to 36 inches
Can ascend a stairway unaided, alternating feet	Can descend a long stairway alternating feet, if supported	Can descend a long stairway unaided, alternating feet
Can hop, using largely an irregular series of jumps with some variations added	Can hop four to six steps on one foot	Can easily hop a distance of 16 feet

Source: Corbin, 1973.





Children make significant advances in motor skills during the preschool years. As they develop physically, they are better able to make their bodies do what they want. Large-muscle development lets them ride a tricycle or use a swing; increasing eye-hand coordination helps them use scissors effectively.

(tricycle): Elena Zakh/Shutterstock; (tire swing): Ariel Skelley/Blend Images/Getty Images; (cutting): Fertnig/E+/Getty Images

Children under 6 are rarely ready to take part in any organized sport. If the demands of the sport exceed the child's physical and motor capabilities, this can leave the child frustrated (AAP Committee on Sports Medicine and Fitness and Committee on School Health, 2001). Physical development can flourish in active, unstructured free play.

Fine motor skills, such as buttoning shirts and drawing pictures, involve eye-hand and small-muscle coordination. Gains in these skills allow young children to take more responsibility for their personal care.

fine motor skills
Physical skills that involve the small muscles and eye-hand coordination.

As they develop motor skills, preschoolers continually merge abilities they already have with those they are acquiring to produce more complex capabilities. Such combinations of skills are known as **systems of action.**

systems of action
Increasingly complex combinations of skills, which permit a wider or more precise range of movement and more control of the environment.

Handedness

Handedness, the preference for using one hand over the other, is usually evident by about age 3. Because the left hemisphere of the brain, which controls the right side of the body, is usually dominant, 90 percent of people favor their right side (Coren, 2012). Handedness is not always clear-cut; not everybody prefers one hand for every task. Boys are more likely to be left-handed than are girls. For every 100 left-handed girls, there are 123 left-handed boys (Papadatou-Pastou, Martin, Munafo, & Jones, 2008).

handedness
Preference for using a particular hand.

Is handedness genetic or environmental? Some researchers argue for genetic explanations, citing, for example, that left-handedness runs in families and the high heritability estimates between twins (Medland et al., 2009; Lien, Chen, Hsiao, & Tsuang, 2015). Identifying the genetic mechanism has been elusive; while inheritance patterns appear to suggest single gene inheritance, the genes themselves have not been easy to find, and some evidence suggests handedness may actually be the result of many genes working together (McManus, Davison, & Armour, 2013; Armour, Davison, & McManus, 2014).

Other researchers have argued that the environment must be more important. For example, children who were low birth weight or who had a difficult delivery are more likely to be left-handed (Alibeik & Angaji, 2010; Domellöf, Johansson, & Rönnqvist, 2011). Moreover, female twins from opposite-sex twin pairs are less likely to be left-handed than female twins from same-sex twin pairs, perhaps because of the influence of the testosterone provided by an opposite-sex male twin (Vuoksimaa, Eriksson, Pulkkinen, Rose, & Kaprio, 2010). As further evidence of environmental effects, children who attend schools are more likely to be right-handed than children who do not receive a formal education (Geuze et al., 2012). Both viewpoints—nature and nurture—may hold some truth.

checkpoint
can **you** . . .

- Distinguish between gross motor skills and fine motor skills, and give examples of each type that improve during early childhood?
- Tell how brain functioning is related to motor skills and handedness?

Health and Safety

Because of widespread immunization, many of what once were the major diseases of childhood are much less common in Western industrialized countries. In the developing world, however, such vaccine-preventable diseases as measles, pertussis (whooping cough), and tetanus still take a large toll. Even in technologically advanced societies, this is a less healthy time for some children than for others.

OBESITY



An obese child might have trouble keeping up with peers—physically and socially. Obesity among young children has increased.
kwanchai.c/Shutterstock

In 2008, Pixar films released Wall-E, an animated science fiction film in which humans were depicted as obese and sedentary, floating in a mechanized environment. Where do you think humans are headed if we do not change our ways? Could this view of humanity ever become a reality?

Worldwide, an estimated 41 million children under age 5 were obese in 2016. If current trends continue, 70 million children under age 5 will be overweight or obese by 2025. Rates are rising more quickly in developing countries with less income (World Health Organization, 2018).

Obesity is a serious problem among U.S. preschoolers. In 2015–2016, almost 14 percent of 2- to 5-year-olds had a body mass index (BMI) at or above the 95th percentile for their age; this number was slightly higher in boys than girls. This number was highest in Hispanic children (25.8 percent), followed by African American (22 percent), and white children (14.1 percent), with the lowest obesity rates found in Asian American children (11 percent) (Hales, Carroll, Fryar, & Ogden, 2017). Overweight was also an issue; approximately 23 percent of children aged 2 to 5 years old have a body mass index at or above the 85th percentile for their age, with findings for gender and ethnicity mirroring those for obesity (Ogden, Carroll, Kit, & Flegal, 2014). Children who come from families lower on the socioeconomic ladder are more likely to be obese (Ogden, Lamb, Caroll, & Flegal, 2010). While prevalence rates had for a time leveled off in the United States (Ogden, Carroll, Fryar, & Flegal, 2015), they once again rose (Hales et al., 2017).

A tendency toward obesity can be hereditary, but the main factors driving the obesity epidemic are environmental (AAP, 2004). Excessive weight gain hinges on increases in caloric intake, changes in diet composition, declining levels of physical activity, and changes in the gut microbiome (Sahoo et al., 2015; Ng et al., 2014). One particularly important factor may be the availability of highly processed, energy-dense, nutrient-poor foods (Crino, Sacks, Vandevijvere, Swinburn, & Neal, 2015).

Prevention of obesity in the early years, when excessive weight gain usually begins, is critical; the long-term success of treatment, especially when it is delayed, is limited (AAP Committee on Nutrition, 2003; Quattrin, Liu, Shaw, Shine, & Chiang, 2005). Overweight children, especially those who have overweight parents, tend to become obese adults (Singh, Mulder, Twisk, Van Mechelen, & Chinapaw, 2008), and excess body mass is a threat to health (Biro & Wein, 2010; Franks et al., 2010). Thus, early childhood is a good time to treat obesity, when a child's diet is still subject to parental influence or control (Quattrin et al., 2005). Trends toward childhood obesity can be identified as early as 6 months of age, and the earlier interventions start for at-risk children, the more likely they are to be effective (De Onis, Blössner, & Borghi, 2010).

Data suggest that three factors are important in the prevention of obesity: (1) regularly eating an evening meal as a family, (2) getting adequate sleep, and (3) watching less than 2 hours of television a day (Anderson & Whitaker, 2010). Each additional hour of TV above 2 hours increases the likelihood of obesity at age 30 by 7 percent, presumably because each additional hour of television replaces an hour of physical activity (Viner & Cole, 2005).

What children eat is as important as how much they eat. To avoid obesity and prevent cardiac problems, young children should get only about 30 percent of their total calories from fat, and no more than one-third of fat calories should come from saturated fat. Although well-planned vegetarian diets are healthy, most children should eat lean meat and dairy foods that provide protein, iron, and calcium. Milk and other dairy products should be skim or low fat (AAP Committee on Nutrition, 2006).

FOOD SECURITY

Food insecurity occurs when families do not have dependable access to adequate amounts of food to support healthy living. An estimated 15.8 million households in the United States experienced food insecurity during a portion of 2015 (Coleman-Jensen, Rabbit, Gregory, & Singh, 2016). Households with very low food security exhibit reduced food intake and disrupted eating patterns, with at least one family member periodically forgoing meals.

About 20 percent of low-income, food-insecure households contain children ages 0 to 5 (Johnson & Markowitz, 2017). When budgets stretch thin, healthy whole grains, lean meats, and fresh vegetables and fruits may be nixed in favor of empty-calorie foods such as highly processed foods and baked goods. Empty-calorie foods tend to cost less but are high in calories and low in nutrients (Drewnowski, 2009). In early childhood, food insecurity and low-quality diet have been linked to vitamin and mineral deficiencies, higher body weight, and reduced cognitive and social-emotional skills (Barroso et al., 2016; Johnson & Markowitz, 2017; Skalicky et al., 2006).

Poor nutrition can also be exacerbated in food deserts. Food deserts, typically found in rural and inner city areas, lack geographically accessible supermarkets or grocery stores (Centers for Disease Control and Prevention, 2013d). Instead, food is purchased from convenience stores or fast-food restaurants—each with a preponderance of "junk" food choices. For families on the financial brink, traveling outside of their neighborhood or town to obtain fresh, healthy foods constitutes a time and economic burden (Walker, Keane, & Burke, 2010). Research shows that children in food deserts have a higher body mass index (Thomsen, Nayga, Alviola, & Rouse, 2016) and face greater likelihood of being overweight (Shafft, Jensen, & Hinrichs, 2009).

Food accessibility issues uniquely impact young children because of their rapid growth and development. Estimates suggest that children likely consume inadequate amounts of micronutrients such as vitamin A, zinc, iron, and iodine (Barrett, 2010). Children need adequate nutrients, more so than just calories, to support optimal body growth (Lobstein et al., 2015). Nutritional deficiency in early childhood has long-lasting consequences for physical growth, brain development, and cognitive and social functioning (Johnson & Markowitz, 2017).

Many associate malnutrition with starvation; however, poor nutritional status can also arise through a consistent high-calorie, nutrient-poor diet of "empty foods." This type of diet has been implicated in promoting rapid weight gain during early childhood (Lobstein et al., 2015). For some, excess weight gain leads to onset of childhood obesity. Obese children are likely to stay obese. Recent studies suggest that 55 percent of obese children remain obese in adolescence, and around 80 percent of those adolescents become obese adults (Simmonds, Llewellyn, Owen, & Woolacott, 2016). Childhood obesity is linked with serious long-term health complications, including greater risk of metabolic syndrome and cardiovascular disease in adulthood (Kelsey, Zaepfel, Bjornstad, & Nadeau, 2014).

what's your view

In the United States, federal nutrition programs provide assistance to low-income families. What programs are you aware of? What are the benefits (and drawbacks) of these types of programs?

UNDERNUTRITION

In developed countries such as the United States, overweight and obesity are the common patterns. However, in many developing countries, a different pattern emerges. Some children appear to be of normal weight but are shorter than they should be for their age and may have cognitive and physical deficiencies. We call these children stunted. This form of malnutrition is often the result of chronic, persistent hunger. Other children are an appropriate height for their age but are thinner than they should be. We call these children wasted. This form of malnutrition is generally the result of a recent, rapid weight loss. In 2017, approximately 150.8 million children were stunted and another 50.5 million were wasted from lack of adequate nutrients and calories (World

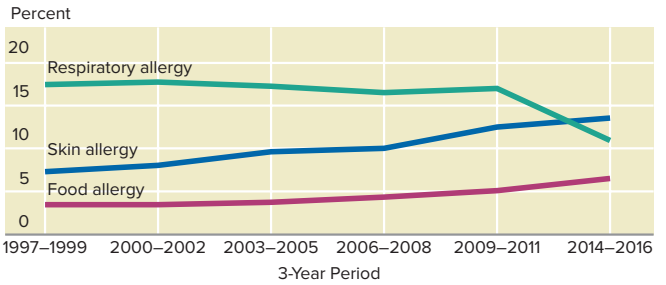


FIGURE 2

U.S. Children under Age 18 with a Reported Allergic Condition in Previous 12 Months, 1997–2016

Recent data show that skin and food allergies have increased among children birth to 17 years old.

Source: CDC/NCHS, Health Data Interactive, National Health Interview Survey.

Health Organization, 2018). Even in the United States, 18 percent of children under age 18 lived in food-insecure households in 2015 (Federal Interagency Forum on Child and Family Statistics, 2017; see Research in Action for a closer look).

Undernutrition is an underlying cause in about a third of worldwide deaths for children under 5 (World Health Organization, 2013). South Asia has the highest level of undernutrition: 35 million children under age 5 in South Asia are moderately or severely wasted as compared to 13.8 million in Africa, 700,000 in Latin America and the Caribbean, and 50.5 million worldwide (World Health Organization, 2018).

Because undernourished children usually live in extremely deprived circumstances, the specific effects of poor nutrition are hard to determine. However, taken together, these deprivations may negatively affect not only growth and physical well-being but cognitive and psychosocial development as well (Martorell, Melgar, Maluccio, Stein, & Rivera, 2010), and the effects are long-lasting (Liu, Raine, Venables, Dalais, & Mednick, 2003).

FOOD ALLERGIES

Ninety percent of food allergies can be attributed to eight foods: milk, eggs, peanuts, tree nuts, fish, soy, wheat, and shellfish (Boyce et al., 2010). Food allergies are more prevalent in children than adults, and most children will outgrow their allergies (Branum & Lukacs, 2008). In 2012, about 6 out of every 100 children suffered from some type of food allergy (Bloom, Jones, & Freeman, 2013). Children who suffer from food allergies are, on average, smaller and shorter than children without food allergies (Sova et al., 2013; Flammarion et al., 2011). Additionally, while morbidity and mortality as a result of allergic reactions are generally low given most families' vigilance in monitoring food intake, there are negative psychosocial consequences to having food allergies. These include an increased risk of anxiety and depression, constraints on the types of activities that can be participated in by a family, and negative influences on school attendance and participation (Cummings, Knibb, King, & Lucas, 2010).

Research on children under age 18 has demonstrated an increase in the prevalence of skin and food allergies over the past 30 years (Sicherer & Sampson, 2018; Figure 2). There is no clear pattern to this increase, and it exists equally for boys and girls and across different races and ethnicities (Branum & Lukacs, 2008; Jackson, Howie, & Akinbami, 2013). However, children across a variety of different cultures with a variety of allergies, including indoor and outdoor allergies, skin allergies, and food allergies, are more likely to come from families of higher socioeconomic status (Uphoff et al., 2015).

Changes in diet, how foods are processed, the timing of the introduction of foods, and decreased vitamin D based upon less exposure to the sun have all been suggested as contributors to the increase in allergy rates. A theory that society is too clean and that children's immune systems are less mature because they are not exposed to enough dirt and germs has also been explored. The link between eczema and food allergies has also led some researchers to theorize that sensitization to allergens develops through skin exposure. Additionally, better awareness by doctors and parents might factor into the reported increases. (Sicherer & Sampson, 2018; Lack, 2008). Although possible explanations abound, not enough evidence exists to pinpoint a cause.

ORAL HEALTH

Oral health is an important component of overall health. It starts in childhood with two common areas of oral health of concern to parents: thumbsucking and tooth decay.

By age 3, all the primary (baby) teeth are in place, and the permanent teeth, which will begin to appear at about age 6, are developing. Thus, parents usually can safely ignore the common habit of thumbsucking in children under age 4. If children stop sucking thumbs or fingers by that age, their permanent teeth are not likely to be affected (American Dental Association, 2007).

Tooth decay in early childhood often stems from overconsumption of sweetened milk and juices in infancy together with a lack of regular dental care. Some of the worst effects have been found in children who take bottles to bed with them and bathe their teeth in sugar over the course of an afternoon or evening. Though decay in primary teeth has declined overall from the early 1970s, there has been a slight reverse in this trend since the mid-1990s (Centers for Disease Control and Prevention, 2007c). Disadvantaged children still have more untreated cavities than other children (Bloom, Cohen, Vickerie, & Wondimu, 2000).

Fluoride is a mineral essential for the maintenance and solidification of bones (Giri, 2016). At low levels, fluoride has been shown to reduce the incidence of dental caries—or cavities (dos Santos, Nadanovsky, & de Oliveira, 2013). Fluoride can be administered topically, via toothpaste, mouthwashes, or gels; or systemically, via supplements or the water supply (Buzalaf & Levy, 2011). Given the low risk and high effectiveness of fluoridated toothpaste, topical administration is now generally recommended (Tubert-Jeannin et al., 2011).

checkpoint can you . . .

- Summarize obesity trends among preschoolers, and explain why overweight is a concern in early childhood?
- Identify effects related to undernutrition and factors that may influence the long-term outcome?

DEATHS AND ACCIDENTAL INJURIES

Worldwide, estimates are that approximately 5.4 million children under the age of 5 died in 2017 (Hug, Sharrow, Zhong, & You, 2018). The accompanying Window on the World discusses children's chances of surviving the first 5 years of life the world over.

Accidents are the leading cause of death in the United States for young children (Heron, 2018). Most deaths from injuries among preschoolers occur in the home—often from fires, drowning in bathtubs, suffocation, poisoning, or falls (Nagaraja et al., 2005). Everyday medications, such as aspirin, acetaminophen, and cough medicines, and even vitamins can be dangerous to inquisitive young children.

Car accidents are the most commonly reported cause of accidental death for children over the age of 4 (Durbin, 2011). All 50 states and the District of Columbia require young children to ride in specially designed car seats or wear seat belts. Recommendations are that 4-year-olds should use forward-facing car seats with a harness until they reach the top weight or height limit for their seat. After that, belt-positioning booster seats should be used until children are big enough to fit a seat belt properly. Airbags are designed to protect adults, not children. They have been shown to increase the risk of fatal injury to children under age 13 who are riding in the front seat.

Other common causes of death in early childhood include cancer, congenital abnormalities and chromosomal disorders, assault and homicide, heart disease, respiratory diseases (including both chronic respiratory disease as well as influenza and pneumonia), and septicemia (a bacterial infection that poisons the blood leading to organ failure) (Heron, 2018).



The typical symbol used for poison now is "Mr. Yuk"—a grimacing, green cartoon face sticking his tongue out. This graphic was put into use when researchers and public health agencies realized the traditional skull and crossbones, rather than indicating danger to young children, intrigued and interested them in the contents of containers.

HEALTH IN CONTEXT: ENVIRONMENTAL INFLUENCES

Why do some children have more illnesses or injuries than others? Some children seem genetically predisposed toward certain medical conditions. In addition, environmental factors play major roles.

Socioeconomic Status and Race/Ethnicity The lower a family's socioeconomic status, the greater a child's risks of illness, injury, and death (Braveman, Cubbin, Egerter, Williams, & Pamuk, 2010; Olson, Diekema, Elliott, & Renier, 2010). Poor children are more likely than other children to have chronic conditions and activity limitations, to lack health insurance, and to have unmet medical and dental needs. Social factors linked

to poverty, such as increased stress, also impact health outcomes (Murray et al., 2013). Children living in poverty—21 percent of children under the age of 6 and disproportionately minority children—are more likely than other children to have chronic conditions and activity limitations, to lack health insurance, and to have unmet medical and dental needs (Federal Interagency Forum on Child and Family Statistics, 2017).

Medicaid, a government program that provides medical assistance to eligible low-income persons and families, has been a safety net for many poor children since 1965. However, it had not reached millions of children whose families earned too much to qualify but too little to afford private insurance. In 1993, 14 percent of children did not have health insurance (Federal Interagency Forum on Child and Family Statistics, 2017). In 1997, the federal government created the State Children's Health Insurance Program (SCHIP) to help states extend health care coverage to uninsured children in poor and near-poor families. Legislation passed in 2009 expanded the program and extended the coverage from 7 million to 11 million children (Centers for Medicare and Medicaid Services, 2009). Even with that expansion, there were about 9 million uninsured children in the United States (Devoe, Ray, Krois, & Carlson, 2010). The passage of the Affordable Care Act of 2010 reduced this number. Among the provisions were the expansion of benefits to many previously ineligible poor families, elimination of preexisting condition coverage exclusions, oral and vision coverage for children, and initiatives to prevent and address childhood obesity. In 2015, the number of uninsured children dropped to 4.5 percent, a historic low (Federal Interagency Forum on Child and Family Statistics, 2017). Unfortunately, this promising trend reversed in 2017, when the number of insured children dropped by an estimated 276,000. This drop occurred primarily in states that opted not to expand Medicaid coverage to parents (Alker & Pham, 2018). In December 2017, the passage of President Donald Trump's Tax Cuts and Jobs Act of 2017 repealed the individual mandate—the requirement that all Americans carry a minimum level of health insurance or face a fee. The repeal of the individual mandate took effect in 2018. While the effects of the repeal remain to be seen, the nonpartisan Congressional Budget Office (2017) estimates that this will result in 4 million more uninsured people by 2019 and 13 million more uninsured people by 2027.

Access to quality health care is a particular problem among black and Latino children, especially those who are poor (Flores, 2010). According to the Children's Legal Defense Fund (2014), 1 in 7 Latino children and 1 in 11 black children are uninsured compared with a rate of 1 in 15 for white children. Language and cultural barriers and the need for more Latino care providers may help explain some of these disparities (Betancourt, Green, Carrillo, & Ananeh-Firempong, 2016). Even Asian American children, who tend to be in better health than non-Hispanic white children, are less likely to access and use health care, perhaps because of similar barriers (NCHS, 2005; Yu, Huang, & Singh, 2004).

Homelessness Homelessness results from circumstances that force people to choose between food, shelter, and other basic needs. Since the 1980s, as affordable rental housing has become scarce and poverty has spread, homelessness has increased dramatically in the United States. Factors that contribute to homelessness include lack of employment opportunities, declines in public assistance funds, lack of affordable health care, domestic violence, mental illness, and addiction (National Coalition for the Homeless, 2017). In 2011, there were an estimated 1.6 million homeless children in the United States (Bassuk, Murphy, Coupe, Kenney, & Beach, 2011). This number increased to 2.5 million by 2014 (America's Youngest Outcasts, 2014).

Families now make up roughly 33 percent of the homeless population on any given night, and the proportion is higher in rural areas (Henry, Watt, Rosenthal, & Shivji, 2018). While the overall economy of the United States is robust, the benefits have not reached the very poor, and the number of homeless children has increased to about 1 in every 30 children (Bassuk, DeCandia, Beach, & Berman, 2014). Many homeless families are headed by single mothers in their twenties (Park, Metraux, & Culhane, 2010). Often these families are fleeing domestic violence (National Coalition for the Homeless, 2018).

window on the world

SURVIVING THE FIRST FIVE YEARS OF LIFE

International efforts to improve child health focus on the first 5 years of life because more than 80 percent of deaths in children under age 15 occur during those years. Worldwide, about three quarters of deaths in children under the age of 5 are attributed to seven issues: preterm birth complications (18 percent), pneumonia (16 percent), intrapartum complications (12 percent), congenital abnormalities (9 percent), diarrhea (8 percent), neonatal sepsis (7 percent), and malaria (5 percent) (Hug et al., 2018). Excluding birth complications, nearly 50 percent of all children's deaths were caused by communicable diseases such as pneumonia, meningitis, tetanus, diarrhea, malaria, measles, sepsis, and AIDS (UNICEF, 2016b). The chances of a child living to his or her 5th birthday have nearly tripled during the past 50 years (Hug et al., 2018)

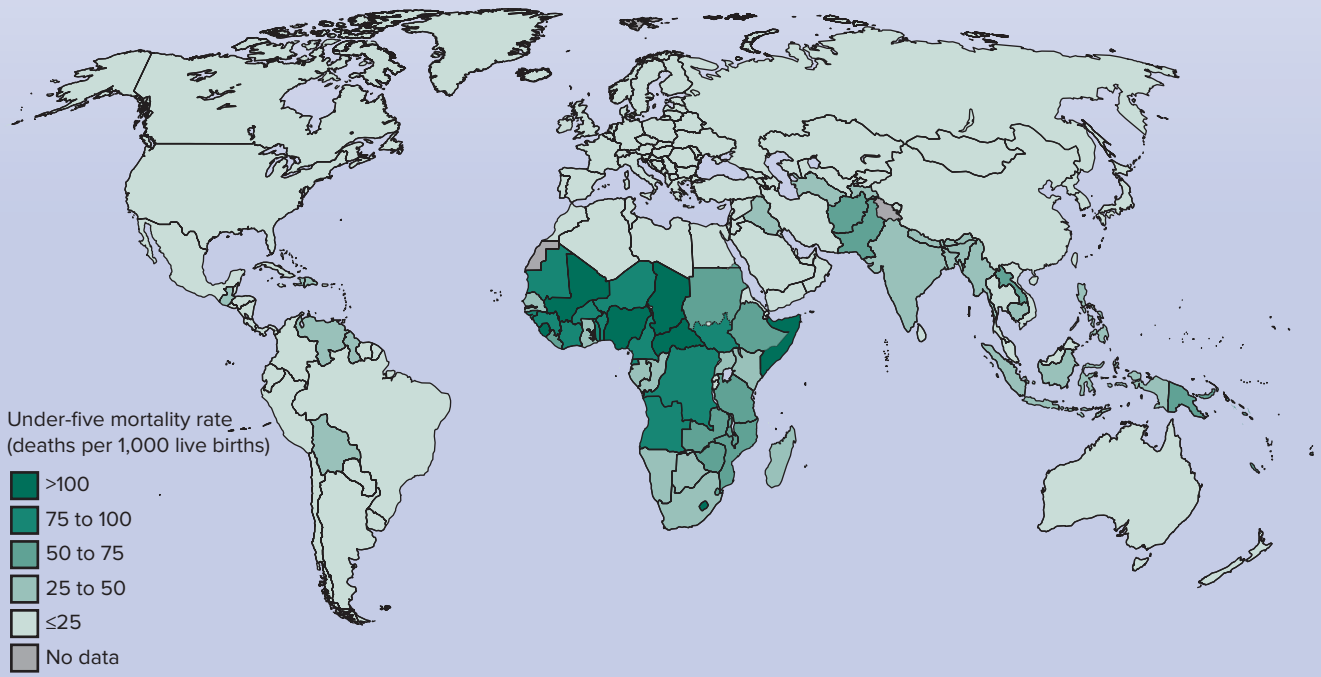
Almost all of child deaths (98 percent) occur in the poorest regions of developing countries, where nutrition is inadequate, water is unsafe, and sanitary facilities are lacking (UNICEF, 2015b). Poor air quality appears to be strongly associated with increased mortality risk. Maternal variables are also important with respect to under-5 mortality, particularly with respect to newborn deaths. Children born to mothers who are young, uneducated, or who have had children closely spaced are at higher risk (Hug et al., 2018).

Significant progress was made between 1990 and 2015. To put that in human terms, in 1990, 34,000 children died every day, and in 2017, 15,000 children died every day. While this is still a shockingly high number when considering the human cost, it is nonetheless a 58 percent reduction. The highest under-5 mortality rates are found in sub-Saharan African, where on average 1 child in every 13 dies before his or her 5th birthday. By contrast, in Australia and New Zealand, where the lowest rates of under-5 mortality are found, on average, 1 child in every 263 dies by the age of 5 (Hug et al., 2018).

A global effort is being made to reduce child mortality rates. The biggest focus is on improved family care and education, nutrition supplementation, and breastfeeding practices. These approaches are accompanied by interventions for maternal health, including skilled care during pregnancy and childbirth. Other successful programs focus on vaccinations, antibiotics, and insecticide-treated bed nets (UNICEF, 2015b).

what's your view

What might be done to produce more rapid and more evenly distributed improvements in child mortality throughout the world?



Source: Hug, Sharrow, Zhong, and Danzhen, 2018.



Families with children are the fastest-growing part of the homeless population. Homeless children tend to have more health problems than children with homes.
Tony Freeman/PhotoEdit

Many homeless children spend their crucial early years in unstable, insecure, and often unsanitary environments. They and their parents may be cut off from supportive community, family, and institutional resources, and from ready access to medical care and schooling. These children suffer more physical health problems than poor children who have homes, and they are more likely to have a low birth weight or need neonatal care in infancy. Homeless children also tend to suffer from depression and anxiety and to have academic and behavior problems (Bassuk, Richard, & Tsertvadze, 2015; Herbers et al., 2012; Richards, Merrill, & Baksh, 2011). More research is needed on evidence-based interventions to tackle the multitude of risk factors that homeless children are exposed to (Zlotnick, Tam, & Zerger, 2012).

checkpoint can **you** . . .

- Compare the health status of young children in developed and developing countries?
- Tell where and how young children are most likely to be injured?
- Discuss environmental influences that endanger children's health and development?

Exposure to Environmental Pollutants Smoking is bad for everyone; however, children, with their still-developing lungs and faster rate of respiration, are particularly sensitive to the damaging effects of exposure (Constant et al., 2011). Parental smoking is a preventable cause of childhood illness and death. Children exposed to parental smoke are at increased risk of respiratory infections such as bronchitis and pneumonia, ear problems, worsened asthma, and slowed lung growth. From 1988 to 1994, about 85 percent of children between the ages of 4 and 11 showed evidence of exposure to second-hand smoke. From 2011 to 2012, this number dropped to 40 percent (Federal Interagency Forum on Child and Family Statistics, 2017).

Air pollution is associated with increased risks of death and of chronic respiratory disease. Environmental contaminants also may play a role in certain childhood cancers, neurological disorders, attention-deficit/hyperactivity disorder, and mental retardation (Woodruff et al., 2004). In 2015, 59 percent of U.S. children lived in counties that failed to meet one or more national air quality standards (Federal Interagency Forum on Child and Family Statistics, 2017).

Children are more vulnerable than adults to chronic pesticide damage (Federal Interagency Forum on Child and Family Statistics, 2017). There is some evidence that low-dose pesticide exposure may affect the developing brain (Jurewicz & Hanke, 2008). Pesticide exposure is greater in children in agricultural and innercity families (Dilworth-Bart & Moore, 2006). More than half of all reported pesticide poisonings—almost 50,000 per year—occur in children younger than age 6 (Weiss, Amler, & Amler, 2004).

Children can get elevated concentrations of lead from lead-contaminated food or water, from airborne industrial wastes, from putting contaminated fingers in their mouths, or from inhaling dust or playing with paint chips in homes or schools where there is lead-based paint. Lead poisoning can seriously interfere with cognitive development and can lead to neurological and behavioral problems (Federal Interagency Forum on Child and Family Statistics, 2017). Very high levels of lead concentration in the blood may cause headaches, abdominal pain, loss of appetite, agitation, or lethargy, and eventually vomiting, stupor, and convulsions (AAP Committee on Environmental Health, 2005).

Children's median blood lead levels dropped by 89 percent in the United States from 1976 to 2002 due to laws mandating removal of lead from gasoline and paints and reducing smokestack emissions (Federal Interagency Forum on Child and Family Statistics, 2005). The number of children with elevated levels of lead in their blood has declined, from about 25 percent in 1994 to 1.2 percent in 2014; still, many children are at risk due to lead in dust, paint chips, and other sources, and rates of elevated lead levels are highest among non-Hispanic blacks and children living in poverty (Federal Interagency Forum for Child and Family Statistics, 2017).

COGNITIVE DEVELOPMENT

Piagetian Approach: The Preoperational Child

In Jean Piaget's theory, infants learn about the world via their senses and motor activity during the sensorimotor stage. Now, we turn our attention to Piaget's second stage, the **preoperational stage.** Lasting from approximately ages 2 to 7, it is characterized by an expansion in the use of symbolic thought. However, children are not yet fully ready to engage in logical mental operations. Let's look at some advances and some immature aspects of preoperational thought (Table 4 and Table 5) and at recent research, some of which challenges Piaget's conclusions.

preoperational stage
In Piaget's theory, the second major stage of cognitive development, in which symbolic thought expands but children cannot yet use logic effectively.

ADVANCES OF PREOPERATIONAL THOUGHT

Advances in symbolic thought are accompanied by a growing understanding of space, causality, identities, categorization, and number.



Children with imaginary friends have better storytelling skills.

Trionfi & Reese, 2009

The Symbolic Function "I want ice cream!" announces Kerstin, age 4, trudging indoors from the hot, dusty backyard. She has not seen or smelled or tasted anything that triggered this desire—no open freezer door, no television commercial, no bowl of sweet ice cream temptingly sitting on the counter waiting to be eaten. Rather, she has called up the concept from her memories.

TABLE 4 Cognitive Advances during Early Childhood

Advance	Significance	Example
Use of symbols	Children do not need to be in sensorimotor contact with an object, person, or event in order to think about it.	Simon asks his mother about the elephants they saw on their trip to the circus several months earlier.
	Children can imagine that objects or people have properties other than those they actually have.	Rolf pretends that a slice of apple is a vacuum cleaner "vrooming" across the kitchen table.
Understanding of identities	Children are aware that superficial alterations do not change the nature of things.	Antonio knows that his teacher is dressed up as a pirate but is still his teacher underneath the costume.
Understanding of cause and effect	Children realize that events have causes.	Seeing a ball roll from behind a wall, Aneko looks behind the wall for the person who kicked the ball.
Ability to classify	Children organize objects, people, and events into meaningful categories.	Rosa sorts the pinecones she collected on a nature walk into two piles: "big" and "little."
Understanding of number	Children can count and deal with quantities.	Lindsay shares some candy with her friends, counting to make sure that each gets the same amount.
Empathy	Children become more able to imagine how others might feel.	Emilio tries to comfort his friend when he sees that his friend is upset.
Theory of mind	Children become more aware of mental activity and the functioning of the mind.	Blanca wants to save some cookies for herself, so she hides them in a pasta box because she knows her brother will not look in a place where he doesn't expect to find cookies.

TABLE 5 Immature Aspects of Preoperational Thought (According to Piaget)

Limitation	Description	Example
Centration: inability to decenter	Children focus on one aspect of a situation and neglect others.	Jacob teases his younger sister that he has more juice because his juice box is in a tall, skinny glass, but hers is in into a short, wide glass.
Irreversibility	Children fail to understand that some operations or actions can be reversed, restoring the original situation.	Jacob does not realize that the juice in each glass can be poured back into the juice box from which it came, which means the amounts must be the same.
Focus on states rather than transformations	Children fail to understand the significance of the transformation between states.	In the conservation task, Jacob does not understand that transforming the shape of a liquid (pouring it from one container into another) does not change the amount.
Transductive reasoning	Children do not use deductive or inductive reasoning; instead they see cause where none exists.	Luis was mean to his sister. Then she got sick. Luis concludes that he made his sister sick.
Egocentrism	Children assume everyone else thinks, perceives, and feels as they do.	Kara holds a book so only she can see the picture she is asking her father to explain to her.
Animism	Children attribute life to objects not alive.	Amanda says the car is hungry and wants some gas to eat.
Inability to distinguish appearance from reality	Children confuse what is real with outward appearance.	Courtney believes that if she wears blue-tinted glasses, then everything she sees really did turn blue.

symbolic function
Piaget's term for ability to use mental representations (words, numbers, or images) to which a child has attached meaning.

pretend play
Play involving imaginary people and situations; also called *fantasy play, dramatic play,* or *imaginative play.*

Being able to think about something in the absence of sensory or motor cues characterizes the **symbolic function.** Children who have attained symbolic function can use symbols, or mental representations, such as words, numbers, or images to which a person has attached meaning. This is a vital achievement because without symbols people could not communicate verbally, make change, read maps, or treasure photos of distant loved ones.

Preschool children show symbolic function in a variety of ways. For example, *deferred imitation,* in which children imitate an action at some point after having observed it, becomes more robust after 18 months. Deferred imitation is related to symbolic function because it requires the child to have kept a mental representation of an observed action. A child must pull a representation out of memory in order to repeat it. Another marker of symbolic function is **pretend play.** In pretend play, also called *fantasy play, dramatic play,* or *imaginary play,* children use an object to represent something else. For example, a child may hold up a remote control to her ear while pretending to talk on a telephone. The remote control is a symbol for the telephone she has seen her mother use. By far the most extensive use of the symbolic function is language. Language, at its heart, is a system of symbols. For example, the word "key" is a symbol for the class of objects used to open doors. When we see the emergence of language in young children, we have a wide and clear window into their increasing use of the symbolic function.



As this girl pretends to listen to the bear's heart, she is showing deferred imitation, the ability to act out a behavior she observed some time before.
Duplass/Shutterstock

Understanding of Objects in Space In addition to their growing ability to use the symbolic function, children also begin to be able to understand the symbols that describe physical spaces, although this process is slow. It is not until at least age 3 that most children reliably grasp the relationships between pictures, maps, or scale models and the objects or spaces they represent. Older preschoolers can use simple maps, and they can transfer the spatial understanding gained from working with models to maps and vice versa. So, for example, as they approach

5 years of age, most preschoolers can view a scale model of a room, be shown on that model where a toy is hidden, and then find the toy in the actual room (DeLoache, 2011).

Understanding of Causality Piaget maintained that preoperational children cannot yet reason logically about cause and effect. Instead, he said, they reason by **transduction.** They mentally link two events, especially events close in time, whether or not there is logically a causal relationship. For example, Luis may think that his "bad" thoughts or behavior caused his own or his sister's illness or his parents' divorce.

transduction
Piaget's term for a preoperational child's tendency to mentally link particular phenomena, whether or not there is logically a causal relationship.

Piaget was incorrect in believing that young children could not understand causality. When tested in situations that are appropriate to their overall level of cognitive development, young children do grasp cause and effect. For example, naturalistic observations of 2½- to 5-year-olds' everyday language showed flexible causal reasoning. Children listed both physical ("The scissors have to be clean so I can cut better") and social-conventional ("I have to stop now because you said to") causes for their actions (Hickling & Wellman, 2001).

Other research has supported their ability to engage in more complex causal reasoning. In one study, children were shown two small and one large lights. Pressing on one of the small lights, which was attached to the large light by a wire, caused the large light to illuminate. Four-year-old children were able to understand that a relevant change (switching the wire connection to the other small light) would alter the causal sequence, but an irrelevant change (moving a block near the light) would not (Buchanan & Sobel, 2011).

Understanding of Identities and Categorization The world becomes more orderly and predictable as preschool children develop a better understanding of *identities:* the concept that people and many things are basically the same even if they change in outward form, size, or appearance. For example, putting on a wig does not make a person a different person; rather, it is just a surface change in appearance. This understanding underlies the emerging self-concept, and many of the processes involved in understanding the identity of others are mirrored in the understanding of one's own identity.

Categorization, or classification, requires a child to identify similarities and differences. By age 4, many children can classify by two criteria, such as color and shape. Children use this ability to order many aspects of their lives, categorizing people as "good," "bad," "nice," "mean," and so forth.

One type of categorization is the ability to distinguish living from nonliving things. When Piaget asked young children whether the wind and the clouds were alive, their answers led him to think they were confused. The tendency to attribute life to objects that are not alive is called **animism.** However, when later researchers questioned 3- and 4-year-olds about something more familiar to them—differences between a rock, a person, and a doll—the children showed they understood that people are alive and rocks and dolls are not (Gelman, Spelke, & Meck, 1983; Jipson & Gelman, 2007). In general, it appears that children attribute animism to items that share characteristics with living things: things that move, make sounds, or have lifelike features such as eyes (Opfer & Gelman, 2011). For example, after watching a robot stack a pile of blocks, children were likely to attribute cognitive, behavioral, and especially affective characteristics to a robot (Beran, Ramirez-Serrano, Kuzyk, Firo, & Nugent, 2011).

animism
Tendency to attribute life to objects that are not alive.

Understanding of Number Multiple lines of research have shown that infants have a rudimentary sense of number. Research suggests that infants as young as 4½ months indicate, with longer looking times and increased staring, that if one doll is added to another doll, there should be two dolls, not just one. By 6 months of age, they can "count" higher and know that 8 dots are different from 16 dots (Libertus & Brannon, 2010). Other research has found that ordinality—the concept of comparing quantities (more or less, bigger or smaller)—seems to begin around 9 to 11 months (Suanda, Tompson, & Brannon, 2008).

The cardinality principle, where children understand that the number of items in a set is the same regardless of how they are arranged and that the last number counted

is the total number of items in the set regardless of how they are counted, starts to develop at about 2½ years of age. However, this ability is grounded in practical situations, such as checking to see which one of two plates has more cookies in it (Gelman, 2006). When asked to count six items, children younger than 3½ tend to recite the number names (one through six) but not to say how many total items there are (six). Most children do not consistently apply the cardinality principle in counting until age 3½ or older (Sarnecka & Carey, 2007).

By age 4, most children can say one tree is bigger than another or one cup holds more juice than another. If they have one cookie and then get another, they know they have more cookies than they had before. By age 5, most children can count to 20 or more and know the relative sizes of the numbers 1 through 10 (Siegler, 1998). By the time they enter elementary school, most children have developed basic "number sense" (Jordan, Kaplan, Oláh, & Locuniak, 2006). This basic level of number skills includes counting, number knowledge (ordinality), number transformations (simple addition and subtraction), estimation ("Is this group of dots more or less than 5?"), and recognition of number patterns (2 plus 2 equals 4, and so does 3 plus 1).

Socioeconomic status (SES) and preschool experience affect how rapidly children advance in math. By age 4, children from middle-income families have markedly better number skills than children from lower-income families, and their initial advantage tends to continue. Children whose preschool teachers do a lot of "math talk," such as asking children to help count days on a calendar, tend to make greater gains than children whose teachers do not use this technique (Klibanoff, Levine, Huttenlocher, Vasilyeva, & Hedges, 2006). Likewise, the amount of "math talk" mothers use in their naturalistic interactions with their children is positively associated with their later preschool math abilities (Susperreguy & Davis-Kean, 2016). Finally, playing number board games with children enhances their numerical knowledge, especially if they are from low SES backgrounds (Siegler, 2009). In part this may be because games can make math fun. This may help spark children's interest in math, which has been associated with strong math skills, even when intelligence is statistically controlled for (Fisher, Dobbs-Oates, Doctoroff, & Arnold, 2012). Numerical competence is important; how well children understand numbers in kindergarten predicts their academic performance in math through 3rd grade (Jordan, Glutting, & Ramineni, 2010), and deficient number sense has been associated with mathematical learning disabilities (Mazzocco, Feigenson, & Halberda, 2011).

checkpoint can you . . .

- **Summarize findings about preschool children's understanding of symbols, space, causality, identities, categorization, and number?**

IMMATURE ASPECTS OF PREOPERATIONAL THOUGHT

centration
In Piaget's theory, the tendency of preoperational children to focus on one aspect of a situation and neglect others.

decenter
In Piaget's terminology, to think simultaneously about several aspects of a situation.

egocentrism
Piaget's term for inability to consider another person's point of view; a characteristic of young children's thought.

One of the main characteristics of preoperational thought is **centration:** the tendency to focus on one aspect of a situation and neglect others. According to Piaget, preschoolers come to illogical conclusions because they cannot **decenter**—think about several aspects of a situation at one time. Centration can limit young children's thinking about both social and physical relationships.

Egocentrism **Egocentrism** is a form of centration. According to Piaget, young children center so much on their own point of view that they cannot take in another's. Egocentrism may help explain why young children sometimes have trouble separating reality from what goes on inside their own heads and why they may show confusion about what causes what. When Luis believes that his "bad thoughts" have made his sister sick, or that he caused his parents' marital troubles, he is thinking egocentrically.

To study egocentrism, Piaget designed the *three-mountain task* (Figure 3). A child sits facing a table that holds three large mounds. A doll is placed on a chair at the opposite side of the table. The investigator asks the child how the "mountains" would look to the doll. Piaget found that young children could only describe the mountains from their own perspective. Piaget saw this as evidence that preoperational children cannot imagine a different point of view (Piaget & Inhelder, 1967).

However, posing the problem in a different way can yield different results. In one study, a child was given instructions to select one object from a set of objects by an

experimenter who could only see some of the objects. The researchers found that children as young as 3 were able to take the experimenter's perspective. For example, two of the objects were rubber ducks. In one condition, the experimenter could only see one of the rubber ducks. When the child heard the instructions to retrieve the rubber duck, the child more often selected the rubber duck that the experimenter could see even though the child could see both (Nilsen & Graham, 2009).

Why were these children able to take another person's point of view? It may be because the "rubber duck" task calls for thinking in more familiar, less abstract, and less complex ways. Most children do not look at mountains and do not think about what other people might see when looking at one, but most preschoolers do know something about passing objects to others. Thus young children may show egocentrism primarily in situations beyond their immediate experience.



FIGURE 3
Piaget's Three-Mountain Task

A preoperational child is unable to describe the mountains from the doll's point of view—an indication of egocentrism, according to Piaget.

Conservation Another classic example of centration is the failure to understand **conservation,** the fact that two things that are equal remain so if their appearance is altered, as long as nothing is added or taken away. Piaget found that children do not fully grasp this principle until the stage of concrete operations and that they develop different kinds of conservation at different ages. Table 6 shows how various dimensions of conservation have been tested.

conservation
Piaget's term for awareness that two objects that are equal according to a certain measure remain equal in the face of perceptual alteration so long as nothing has been added to or taken away from either object.

In one type of conservation task, conservation of liquid, 5-year-old Justin is shown two identical clear glasses, each short and wide and each holding the same amount of water. Justin is asked, "Is the amount of water in the two glasses equal?" When he

TABLE 6 Tests of Various Kinds of Conservation

Conservation Task	What Child Is Shown*	Transformation	Question for Child	Preoperational Child's Usual Answers
Number	Two equal, parallel rows of candies	Space the candies in one row farther apart.	"Are there the same number of candies in each row or does one row have more?"	"The longer one has more."
Length	Two parallel sticks of the same length	Move one stick to the right.	"Are both sticks the same size or is one longer?"	"The one on the right (or left) is longer."
Liquid	Two identical glasses holding equal amounts of liquid	Pour liquid from one glass into a taller, narrower glass.	"Do both glasses have the same amount of liquid or does one have more?"	"The taller one has more."
Matter (mass)	Two balls of clay of the same size	Roll one ball into a sausage shape.	"Do both pieces have the same amount of clay or does one have more?"	"The sausage has more."
Weight	Two balls of clay of the same weight	Roll one ball into a sausage shape.	"Do both weigh the same or does one weigh more?"	"The sausage weighs more."

*Child then acknowledges that both items are equal.

irreversibility
Piaget's term for a preoperational child's failure to understand that an operation can go in two or more directions.

agrees, the researcher pours the water in one glass into a third glass, a tall, thin one. Justin is now asked, "Do both glasses contain the same amount of water? Or does one contain more? Why?" In early childhood—even after watching the water being poured out of one of the short, fat glasses into a tall, thin glass or even after pouring it himself—Justin will say that either the taller glass or the wider one contains more water.

Why do children make this error? Their responses are influenced by two immature aspects of thought: centration and **irreversibility.** Centration involves focusing on one dimension while ignoring the other. Preoperational children cannot consider height and width at the same time as they cannot *decenter,* or consider multiple attributes of an object or situation. In addition, children are limited by irreversibility: failure to understand that an action can go in two or more directions. Because their thinking is concrete, preoperational children cannot mentally reverse the action and realize that the original state of the water can be restored by pouring it back into the other glass, and thus it must be the same. Preoperational children commonly think as if they were watching a slide show with a series of static frames: They *focus on successive states,* said Piaget, and do not recognize the transformation from one state to another.

checkpoint can you . . .

- Tell how centration limits preoperational thought?
- Discuss research that challenges Piaget's views on egocentrism in early childhood?

THEORY OF MIND

Clara, age 4, hates brussels sprouts, but when her mother asks for them to be passed at the dinner table, she places the bowl in her mother's hands. She now understands her mother might like brussels sprouts, even though she herself finds them highly suspect. In understanding this, Clara is illustrating her growing understanding of others' minds.

theory of mind
Awareness and understanding of mental processes.

Theory of mind is the awareness of the broad range of human mental states—beliefs, intents, desires, dreams, and so forth—and the understanding that others have their own distinctive beliefs, desires, and intentions. Having a theory of mind allows us to understand and predict the behavior of others and makes the social world understandable.

Piaget (1929) was interested in this growing ability, and to investigate it, he asked children such questions as "Where do dreams come from?" and "What do you think with?" On the basis of the answers, he concluded that children younger than 6 cannot distinguish between thoughts or dreams and real physical entities. However, Piaget's questions were abstract and he expected children to be able to put their understanding into words.

More recent research using more concrete and everyday tasks indicates that between ages 2 and 5, children's knowledge about mental processes and their ability to distinguish between mental states and reality grows dramatically. For example, at 2 years of age, children readily engage in pretend play. At 3 years of age, they can use deception in simple games and predict others' actions on the basis of their desires (Frye, 2014). They can tell the difference between a boy who has a cookie and a boy who is thinking about a cookie, and they know which boy can touch, share, and eat it (Astington, 1993). And at 4 to 5 years of age, they understand that a person can believe something that they themselves know is not true (Frye, 2014).

Knowledge about Thinking and Mental States Between ages 3 and 5, children come to understand that thinking goes on inside the mind, that it can deal with either real or imaginary things and that thinking is different from seeing, talking, touching, and knowing (Flavell, 2000). They understand that thinking about the past or the future might make someone feel sad or happy (Lagattuta, 2014) and that another child would be sad if her toy was taken from her (Pesowski & Friedman, 2015). They start to expect people to act in accordance with their beliefs, and when asked to explain people's behavior, they use words such as *want* or *think*. They also know that people's expressions might not necessarily match their internal state (Wellman, 2014) and realize that you can manipulate others' mental states to deceive or tease them (Miller, 2009). They infer knowledge on the basis of mistakes; for instance, by realizing that a puppet that plays a game incorrectly probably does not understand the rules (Ronfard & Corriveau, 2016). By 5 years of age, they understand that if they are sad about something, they can try to think about something else (Davis, Levine, Lench, & Quas, 2010).

However, preschoolers generally believe that mental activity starts and stops. Preschoolers also have little or no awareness that they or other people think in words, or "talk to themselves in their heads" (Flavell, Green, Flavell, & Grossman, 1997). It is not until a few years later that they understand that they can be wrong about what someone else thinks (Miller, 2009) and that the mind is continuously active (Flavell, 2000).

The recognition that others have mental states accompanies the decline of egocentrism and the development of empathy (Povinelli & Giambrone, 2001). In the following sections, we will look more closely at some of the abilities related to the understanding of mental states.

False Beliefs and Deception The understanding that people can hold false beliefs flows from the realization that people can hold incorrect mental representations of reality. For example, if you see your mother searching for an umbrella, but you know it's not raining outside, you can understand that she *thinks* it's raining, even if it is not. This ability is generally tested with what is called a false belief task. Children do not consistently pass false belief tasks until about 4 years of age (Baillargeon, Scott, & He, 2010). It is not until 5 to 6 years of age that children understand second-order false beliefs—that they may have an incorrect belief about what someone else believes (Miller, 2009).

Piagetian researchers have suggested young children's failure to recognize false beliefs stems from egocentric thinking (Lillard & Curenton, 1999). Other researchers have pointed to general processing mechanisms and predictive abilities (Berthiaume, Shultz, & Onishi, 2013). Still other researchers have argued that reasoning about false beliefs is likely to be a highly specialized skill with separate processing capabilities (Leslie, Friedman, & German, 2004).

There are links between the ability to pass false belief tasks and language (Low, 2010; Rubio-Fernández, & Geurts, 2013) and attentional and inhibitory processes (Leslie et al., 2004). Culturally diverse research has revealed a consistent association between executive functioning ability and theory of mind (Devine & Hughes, 2014). Research on the brain has shown that somewhat different areas of the brain are active during different types of false belief tasks (Shurz, Aichhorn, Martin, & Perner, 2013). Moreover, even after they have mastered false belief tasks, children's brain waveforms are different from those of adults, suggesting continued change over time (Meinhardt, Sodian, Thoermer, Döhnel, & Sommer, 2011). Thus, it may be that a variety of different processes underlie children's developing abilities in this area.

Deception is an effort to plant a false belief in someone else's mind. Not surprisingly, performance on the false belief task has been repeatedly shown to predict the ability to lie (Lee, 2013; Talwar & Lee, 2008; Bigelow & Dugas, 2009), and preschoolers who are more advanced in their understanding of others' mental states are better liars (Leduc, Williams, Gomez-Garibello, & Talwar, 2017). Thus, while most people do not view the ability to lie as a positive trait, it is nonetheless a developmental milestone illustrative of advances.

Generally, children become capable of telling simple lies, such as claiming they received a winning card in a game (Ahern, Lyon, & Quas, 2011) or denying looking at a hidden toy they were instructed to avoid (Evans & Lee, 2013), at about 3 years of age. However, when asked follow-up questions to their lie that if answered would reveal their deception, such as what kind of toy it was, young children fail to hide their knowledge (Evans & Lee, 2013). It is not until almost 8 years of age that children become better able to think about what they should and should not know and thus conceal their transgressions more effectively (Talwar & Lee, 2002). Furthermore, as children age and become more aware of social conventions as well as others' feelings, they become more likely to lie out of politeness or a desire to avoid hurting others' feelings. For example, they are more likely to tell an experimenter that they liked an unattractive gift when in reality they did not (Xu, Bau, Fu, Talwar, & Lee, 2010).

Distinguishing between Appearance and Reality According to Piaget, not until about age 5 or 6 do children begin to understand the distinction between what *seems* to

be and what *is*. Initial research seemed to support this view; however, more recent studies have found this ability emerging between 3 and 4 years of age.

In one classic series of experiments (Flavell, Green, & Flavell, 1986), 3-year-olds seemed to confuse appearance and reality in a variety of tests. For example, when the children put on special sunglasses that made milk look green, they said the milk *was* green. Similarly, 3-year-olds thought that a sponge that looked like a rock was a rock, even after being shown the sponge in use (Flavell, Flavell, & Green, 1983).

Later research showed that 3-year-old children could answer questions about reality and appearance correctly under certain circumstances. For example, when children were asked questions about how to use a sponge that looked like a rock, they answered incorrectly. However, when the experimenter indicated a sponge was needed to clean up some spilled water, the children were able to hand over the correct item (Sapp, Lee, & Muir, 2000). Later research showed that if children were presented with two objects, such as an eraser that looked like a chocolate bar and a real chocolate bar, and asked to hand an experimenter "the real one," they were able to select the correct item (Moll & Tomasello, 2012). Similarly, 3-year-old children were able to understand that an adult looking through a yellow screen at a blue object saw it as green, as evidenced by correctly selecting the blue toy after being asked, "Can you put the green one in the bag for me?" (Moll & Meltzoff, 2011). It may be that children do understand the difference between appearance and reality but have difficulty displaying their knowledge in traditional tasks that require verbal responses. When you ask them to display their knowledge via their actions, they are better able to do so.

Distinguishing between Fantasy and Reality Sometime between 18 months and 3 years, children learn to distinguish between real and imagined events. Three-year-olds know the difference between a real dog and a dog in a dream, and between something invisible (such as air) and something imaginary. They can pretend and can tell when someone else is pretending (Flavell, 2000). By 3, and, in some cases, by age 2, they know that pretense is intentional; they can tell the difference between trying to do something and pretending to do the same thing (Rakoczy, Tomasello, & Striano, 2004).

While more inclined to believe in storybook characters than older children, 3-year-olds are still skeptical about whether or not characters in books are real or pretend, especially if those books contain fantastical elements (Woolley & Cox, 2007). By the age of 4, most children, if given the choice, complete stories with real-world causal laws rather than magical or fantastical elements (Weisberg, Sobel, Goodstein, & Bloom, 2013). Religion can influence this process. Children raised in religious households are more likely to believe the protagonists in stories with fantastical elements are real if they think the stories are religious in nature than are children raised in secular households (Corriveau, Chen, & Harris, 2015). And, if told a particular story is a Bible story, 5-year-olds are more likely to assert magical events in the story are possible in real life (Woolley & Cox, 2007).



Is Mickey Mouse real? The ability to distinguish fantasy from reality develops by age 3, but 4- to 6-year-olds may enjoy pretending a character is real nonetheless.
Broadimage/Shutterstock

Magical thinking in children ages 3 and older does *not* seem to stem from confusion between fantasy and reality. Often magical thinking is a way to explain events that do not seem to have obvious realistic explanations (usually because children lack knowledge about them), or simply to indulge in the pleasures of pretending—as with a belief in imaginary companions. Children, like adults, generally are aware of the magical nature of fantasy figures but are more willing to entertain the possibility that they may be real (Woolley, 1997). Moreover, there are indications that imaginative activities may offer developmental benefits. In one study, children who had imaginary companions used richer and more elaborate narrative structure than children without imaginary companions when asked to recount a personal story (Trionfi & Reese, 2009). Other research has shown that children who watched a movie with magical themes later scored higher on creativity tests and drew more imaginative impossible objects, even though their beliefs about magic were unaffected (Subbotsky, Hysted, & Jones, 2010).

Individual Differences in Theory-of-Mind Development Some children develop theory-of-mind abilities earlier than others. In part, this development reflects brain maturation

and general improvements in cognition. What other influences explain these individual differences?

Several lines of research show that children who are better at paying attention to others as infants show more facility with theory-of-mind tasks at 4 years of age (Wellman, Lopez-Duran, LaBounty, & Hamilton, 2008; Aschersleben, Hofer, & Jovanovic, 2008). Social competence also matters: Children whose teachers and peers rate them high on social skills are better able to recognize false beliefs, to distinguish between real and pretend emotion, and to take another person's point of view (Cassidy, Werner, Rourke, Zubernis, & Balaraman, 2003). Findings such as these suggest continuity in social cognition and that skills build on each other over time.

The kind of talk a young child hears at home may affect the child's understanding of mental states. A mother's reference to others' thoughts and knowledge is a consistent predictor of a child's later mental state language (Dunn, 2006). Being bilingual may also help. Bilingual children do somewhat better on certain theory-of-mind tasks (Kovács, 2009). Bilingual children know that an object or idea can be represented linguistically in more than one way, and this may help them see that different people may have different perspectives. Bilingual children also recognize the need to match their language to that of their partner, making them more aware of others' mental states (Bialystok & Senman, 2004; Goetz, 2003).

Families that encourage pretend play stimulate the development of theory-of-mind skills. As children play roles, they assume others' perspectives. Theory of mind has also been positively related to reading storybooks, perhaps because parents and children often discuss characters and their desires, beliefs, or emotions (Mar, Tackett, & Moore, 2010). Talking with children about how the characters in a story feel helps them develop social understanding (Lillard & Curenton, 1999). Having siblings is also associated positively with theory of mind development (McAlister & Peterson, 2013).

While cross-cultural studies have shown few differences in basic abilities (Callaghan et al., 2005), culture can lead to variations in patterns of development. For example, in one study, 5- to 6-year-old British children were found to be advanced in theory-of-mind development relative to Japanese and Italian children, an effect the researchers suggested was likely the result of formal schooling (Hughes et al., 2014). In another study, while Iranian and Australian children from 3 to 9 years of age had overall equivalent theory-of-mind scores, Iranian children were able to understand sarcasm earlier, and Australian children were able to understand that others might have different beliefs than them earlier (Shahaeian, Nielsen, Peterson, & Slaughter, 2014).

Brain development is necessary for theory of mind. In particular, neural activity in the prefrontal cortex has been identified as important (Mitchell, Banaji, & MacRae, 2005). In one study, children who were able to correctly reason about the mental states of characters in animated scenarios showed brain wave activation in their left frontal cortex, much as the adults in the study did. However, those children who were not able to correctly pass the task did not (Liu, Sabbagh, Gehring, & Wellman, 2009).

An incomplete or ineffective theory of mind may be a sign of a cognitive or developmental impairment. Individuals with this type of impairment have difficulty determining the intentions of others, lack understanding of how their behavior affects others, and have a difficult time with social reciprocity. Research suggests that children with autism are deficient in theory of mind and that this is a core feature of autism (Baron-Cohen, Leslie, & Frith, 1985).



Young infants are extremely interested in other people's eyes. What relationship might this have to theory of mind? What type of social information does eye gaze convey?

checkpoint can **you** . . .

- Give examples of research that challenges Piaget's views on young children's cognitive limitations?
- Describe changes between ages 3 and 6 in children's knowledge about the way their minds work, and identify influences on that development?

Information-Processing Approach: Memory

During early childhood, children improve in attention and in the speed and efficiency with which they process information; and they begin to form long-lasting memories.

BASIC PROCESSES AND CAPACITIES

encoding
Process by which information is prepared for long-term storage and later retrieval.

storage
Retention of information in memory for future use.

retrieval
Process by which information is accessed or recalled from memory storage.

Information-processing theorists focus on the processes that affect cognition. According to this view, memory can be described as a filing system that has three steps, or processes: *encoding, storage,* and *retrieval.* **Encoding** is like putting information in a folder to be filed in memory; it attaches a "code" or "label" to the information so it will be easier to find when needed. For example, if you were asked to list "things that are red," you might list apples, stop signs, and hearts. Presumably, all these items were tagged in memory with the concept "red" when they were originally encoded. This code is what now enables you to access these seemingly disparate objects. **Storage** is putting the folder away in the filing cabinet. It is where the information is kept. When the information is needed, you access storage, and through the process of **retrieval,** you search for the file and take it out.

sensory memory
Initial, brief, temporary storage of sensory information.

working memory
Short-term storage of information being actively processed.

long-term memory
Storage of virtually unlimited capacity that holds information for long periods.

Information-processing models depict the brain as containing three types of storage: *sensory memory, working memory,* and *long-term memory.* **Sensory memory** is a temporary storehouse for incoming sensory information. For example, the light trail that is visible when a sparkler is moved quickly on a dark night illustrates visual sensory memory. Sensory memory shows little change from infancy on (Siegler, 1998). However, without processing (encoding), sensory memories fade quickly.

Information being encoded or retrieved is kept in **working memory,** a short-term storehouse for information a person is actively working on, trying to understand, remember, or think about. According to a widely used model, a central executive controls processing operations in working memory (Baddeley, 1998, 2001). The central executive orders information encoded for transfer to **long-term memory,** a storehouse of virtually unlimited capacity that holds information for long periods of time. The central executive also retrieves information from long-term memory for further processing. It is assisted by two subsystems: the phonological loop, which aids in the processing of verbal information, and the visuospatial sketchpad, which maintains and manipulates visual information.

Brain imaging studies have found that working memory is located partly in the prefrontal cortex (Nelson et al., 2000). Functions controlled by the **central executive** are found in a variety of regions in the frontal lobes and in some posterior, primarily parietal, areas. Functions controlled by the phonological loop are found in the left hemisphere in the inferior parietal areas and anterior temporal frontal areas, including Broca's area, the premotor cortex, and the sensory motor association cortex. Functions controlled by the visuospatial sketchpad are found in the right hemisphere in the occipital and inferior frontal areas (Gathercole, Pickering, Ambridge, & Wearing, 2004).



By the age of 3 or 4, children differentiate between fictional cartoon worlds. So, if Barney were to show up on Sesame Street, they would be extremely surprised.

Skolnick Weisberg & Bloom, 2009

central executive
In Baddeley's model, element of working memory that controls the processing of information.

executive function
Conscious control of thoughts, emotions, and actions to accomplish goals or solve problems.

The efficiency of working memory is limited by its capacity. Researchers can assess the capacity of working memory by asking children to recall a series of scrambled digits (for example, 2-8-3-7-5-1 if they heard 1-5-7-3-8-2). The capacity of working memory—in this case, the number of digits a child can recall backward—increases rapidly. At age 4, children typically remember only two digits; at 12, they typically remember six (Zelazo, Müller, Frye, & Marcovitch, 2003). All basic components of working memory are in place by 6 years of age and increase linearly with age until approximately 14 to 15 years of age (Gathercole et al., 2004).

The growth of working memory permits the development of **executive function,** the conscious control of thoughts, emotions, and actions to accomplish goals or to solve problems (McCabe, Roediger, McDaniel, Balota, & Hambrick, 2010). Executive function enables children to plan and carry out goal-directed mental activity (Zelazo & Carlson, 2012), and it is often useful when children need to focus their attention on something or override an inappropriate response. For example, despite being eager for a turn, a child might wait in line for a slide. Executive function emerges around the end of an infant's 1st year and develops in spurts with age. Changes in executive function between ages 2 and 5 enable children to make up and use complex rules for solving problems (Zelazo et al., 2003).

Executive function may explain why working memory is positively associated with academic performance, in fact, to a greater degree than is IQ (Alloway & Alloway, 2010).

These findings have held for both literacy and numeracy skills, and for children from low-income families, ethnic minority children, children born preterm, and children with attentional problems (Welsh, Nix, Blair, Bierman, & Nelson, 2010; Mulder, Pitchford, & Marlow, 2010; Alloway, Gathercole, & Elliot, 2010). Because of this association, attempts have been made to increase working memory capacity via training and intervention programs. Generally, such attempts have been successful in improving working memory (Melby-Lervåg & Hulme, 2013; Diamond & Lee, 2011) and are associated with changes in brain activity and dopamine receptor density (Klingberg, 2010). Some programs, especially those focused on literacy, have shown success (Dahlin, 2011; Titz & Karbach, 2014; Holmes & Gathercole, 2014). But other programs have had difficulty with the generalizability of training to other areas and have not resulted in academic gains (Rapport, Orban, Kofler, & Friedman, 2013; Dunning, Holmes, & Gathercole, 2013), and some have even shown declines in academic performance as a result of training (Roberts et al., 2016).

RECOGNITION AND RECALL

recognition
Ability to identify a previously encountered stimulus.

recall
Ability to reproduce material from memory.

Placing material in memory is not enough; it must also be retrieved to be used. Recognition and recall are types of retrieval. **Recognition** is the ability to identify something encountered before; for example, picking out a missing mitten from a lost-and-found box. **Recall** is the ability to reproduce knowledge from memory; for example, describing the mitten to someone.

Preschool children, like those in all age groups, do better on recognition than on recall, but both abilities improve with age. The more familiar children are with an item, the better they can recall it. However, young children often fail to use strategies for remembering—even strategies they already know—unless reminded, and they sometimes choose inefficient memory strategies (Schwenck, Bjorklund, & Schneider, 2009; Whitebread et al., 2009). This tendency not to generate efficient strategies may reflect lack of awareness about how a strategy would be useful (Sophian, Wood, & Vong, 1995). Older children, particularly once they begin formal schooling, tend to become more efficient in the spontaneous use of memory strategies (Schneider, 2008).

checkpoint
can you . . .

- Identify three processes and three storehouses of memory?
- Compare recognition and recall?

FORMING AND RETAINING CHILDHOOD MEMORIES

generic memory
Memory that produces scripts of familiar routines to guide behavior.

script
General remembered outline of a familiar, repeated event, used to guide behavior.

episodic memory
Long-term memory of specific experiences or events, linked to time and place.

autobiographical memory
Memory of specific events in one's life.

Memory of experiences in early childhood is rarely deliberate: young children simply remember events that made a strong impression. Most of these early conscious memories seem to be short-lived.

Generic memory, which begins at about age 2, produces a **script,** or general outline of a familiar, repeated event, such as riding the bus to preschool or having lunch at Grandma's house. It helps a child know what to expect and how to act.

Episodic memory refers to awareness of having experienced a particular event at a specific time and place. Given a young child's limited memory capacity, episodic memories are temporary. Unless they recur several times (in which case they are transferred to generic memory), they last for a few weeks or months and then fade (Nelson, 2005). For example, getting vaccinated at the pediatrician's office might originally be an episodic memory—a child might remember the particular event. Over time and repeated visits, a child might form a generic memory of the doctor's office being a place where shots are administered.

Autobiographical memory, a type of episodic memory, refers to memories of distinctive experiences that form a person's life history. Not everything in episodic memory becomes part of autobiographical memory—only those memories that have a special, personal meaning to the child (Fivush, 2011). Autobiographical memory generally emerges between ages 3 and 4 (Nelson, 2005).

A suggested explanation for the relatively slow arrival of autobiographical memory is that children cannot store in memory events pertaining to their own lives until they

develop a concept of self (Howe, 2003; Nelson & Fivush, 2004). Also critical is the emergence of language, which enables children to share memories and organize them into personal narratives (Fivush & Nelson, 2004; Nelson & Fivush, 2004; Nelson, 2005). For example, parents who spend more time reminiscing about and discussing past events have children who form more coherent autobiographical memories (Fivush, Habermas, Waters, & Zaman, 2011).



"Remember when we all played in the snow together last winter?" Young children are most likely to remember unique events and may recall details from a special trip for a year or longer.
Don Hammond/Design Pics

Influences on Memory Retention Why do some memories last longer than others? One important factor is the uniqueness of the event. When events are rare or unusual, children seem to remember them better (Peterson, 2011). Children, as they get older, are also more likely to remember unique details of an event they have a generic script for (Brubacher, Glisic, Powers, & Powell, 2011). Moreover, events with emotional impact seem to be remembered better (Buchanan, 2007), although some evidence suggests attention is focused on central aspects of the situation rather than on peripheral details (Levine & Edelstein, 2009). So, for example, if you were frightened by a scary film, you might show enhanced memory for events in the film but forget if you bought candy or who you went with. Still another factor is children's active participation. Preschoolers tend to remember things they *did* better than things they merely saw (Murachver, Pipe, Gordon, Owens, & Fivush, 1996).

Finally, the way adults talk with a child about experiences strongly affects autobiographical memory (Fivush, Habermas, Waters, & Zaman, 2011; Fivush & Haden, 2006). Why might this be the case? The **social interaction model,** based on Vygotsky's sociocultural approach, provides a rationale. Theorists argue that children collaboratively construct autobiographical memories with parents or other adults as they talk about events, such as might occur when a mother and child leaf through a photo album and talk about past events.

social interaction model
Model, based on Vygotsky's sociocultural theory, that proposes children construct autobiographical memories through conversation with adults about shared events.

checkpoint can you . . .

- Identify three types of early memories and four factors that affect retention?
- Discuss how social interaction and culture influence memory?

Intelligence: Psychometric and Vygotskian Approaches

One factor that may affect the strength of early cognitive skills is intelligence. Although the definition of intelligence is controversial, most psychologists agree that intelligence involves the ability to learn from situations, adapt to new experiences, and manipulate abstract concepts. Let's look at two ways intelligence is measured–through traditional psychometric tests and through newer tests of cognitive potential, and then at influences on children's performance.

TRADITIONAL PSYCHOMETRIC MEASURES

Three- to 5-year-old children are more proficient with language than younger children, so intelligence tests for this age group can include more verbal items. These tests, beginning at age 5, tend to be fairly reliable in predicting measured intelligence and school success later in childhood. The two most commonly used individual tests for preschoolers are the Stanford-Binet Intelligence Scales and the Wechsler Preschool and Primary Scale of Intelligence.

Stanford-Binet Intelligence Scales
Individual intelligence tests for ages 2 and up used to measure fluid reasoning, knowledge, quantitative reasoning, visual-spatial processing, and working memory.

The **Stanford-Binet Intelligence Scales** are used for ages 2 and up and take 45 to 60 minutes. The child is asked to define words, string beads, build with blocks, identify the missing parts of a picture, trace mazes, and show an understanding of numbers. The child's score is supposed to measure fluid reasoning (the ability to solve abstract or novel problems), knowledge, quantitative reasoning, visual-spatial processing, and working

memory. The fifth edition, revised in 2003, includes nonverbal methods of testing all five of these dimensions of cognition and permits comparisons of verbal and nonverbal performance. In addition to providing a full-scale IQ, the Stanford-Binet yields separate measures of verbal and nonverbal IQ plus composite scores spanning the five cognitive dimensions.

The **Wechsler Preschool and Primary Scale of Intelligence, Revised (WPPSI-IV)** is an individual test taking 30 to 60 minutes. It has separate levels for ages 2½ to 4 and 4 to 7 and yields verbal, performance, and combined scores. It includes subtests designed to measure both verbal and nonverbal fluid reasoning, receptive versus expressive vocabulary, and processing speed. Both the Stanford-Binet and the WPPSI-IV have been restandardized on samples of children representing the population of preschool-age children in the United States. The WPPSI-IV also has been validated for special populations, such as children with intellectual disabilities, developmental delays, language disorders, and autistic disorders.

Wechsler Preschool and Primary Scale of Intelligence, Revised (WPPSI-IV) Individual intelligence test for children ages 2½ to 7 that yields verbal and performance scores as well as a combined score.

INFLUENCES ON MEASURED INTELLIGENCE

A common misconception is that IQ scores represent a fixed quantity of inborn intelligence. In reality, an IQ score is simply a measure of how well a child can do certain tasks at a certain time in comparison with other children of the same age. Indeed, test scores of children in many industrialized countries have risen steadily since testing began, forcing test developers to raise standardized norms (Flynn, 1984, 1987). This trend was thought to reflect better nutrition, exposure to educational television, preschools, better-educated parents, smaller families in which each child receives more attention, and a wide variety of mentally demanding games, as well as changes in the tests themselves. Some researchers believed that the trend slowed and even reversed in the 1970s and 1980s, at least in industrialized countries, perhaps because such influences had reached a saturation point (Sundet, Barlaug, & Torjussen, 2004; Teasdale & Owen, 2008). However, recent meta-analyses suggest that average IQ continues to rise at a rate of 2.3 points per decade (Trahan, Stuebing, Fletcher, & Hiscock, 2014).

The degree to which family environment influences a child's intelligence is difficult to specify. Some of parents' influence on intelligence comes from their genetic contribution, and some results from the fact that they provide a child's earliest environment for learning. Twin and adoption studies suggest that family life has its strongest influence on IQ in early childhood, and this influence diminishes greatly by adolescence (Bouchard, 2013; Haworth et al., 2010).

The correlation between socioeconomic status and IQ is well documented (Strenze, 2007). Family income is associated with cognitive development and achievement in the preschool years and beyond. Family economic circumstances can exert a powerful influence, not so much in themselves as in the way they affect other factors such as health, stress, parenting practices, and the atmosphere in the home (Jenkins, Woolley, Hooper, & De Bellis, 2014; NICHD Early Child Care Research Network, 2005a).

The relationship between IQ and socioeconomic status interacts with other variables. For example, children in deprived families tend to have lower IQs. However, poor children with an outgoing temperament, warm mothering, and stimulating activities in the home (which may be influenced by parental IQ) tend to do better than other economically deprived children (Kim-Cohen, Moffitt, Caspi, & Taylor, 2004). Environmental differences also seem to matter more for some children than others. Children at risk may be more influenced by negative environments. For example, research has shown that children with low IQ show greater negative effects as a result of low socioeconomic status than do those with high IQ (Hanscombe et al., 2012). The IQ of children from homes of higher economic status is more strongly affected by genetic influences, while the IQ of children from homes of the lowest socioeconomic status is driven more by environmental deprivation (Turkheimer, Haley, Waldron, d'Onofrio, & Gottesman, 2003).

However, this is not universally true. In the United States, where low socioeconomic status is associated with greater deprivation, poverty and IQ are closely associated. Poor children in the United States do not show strong genetic influences on intelligence, although children from more affluent homes do. However, in countries with more robust social services, such as the Netherlands, the links between genes and intelligence remain



By giving suggestions for solving a puzzle until his son can do it on his own, this father supports the child's cognitive progress.
Africa Studio/Shutterstock

strong for children who live in poverty (Tucker-Drob & Bates, 2016). Presumably this is because despite living in poverty, they nonetheless have access to enriching experiences and thus are able to express their innate abilities.

TESTING AND TEACHING BASED ON VYGOTSKY'S THEORY

According to Vygotsky, children learn by internalizing the results of interactions with adults. This interactive learning is most effective in helping children cross the **zone of proximal development (ZPD),** the imaginary psychological space between what children can do or know by themselves and what they could do or know with help. The ZPD can be assessed by *dynamic tests* that, according to Vygotskyan theory, provide a better measure of children's intellectual potential than do traditional psychometric tests that measure what children have already mastered. Dynamic tests emphasize potential rather than present achievement. Examiners help the child when necessary by asking questions, giving examples or demonstrations, and offering feedback, making the test itself a learning situation.

The ZPD, in combination with the related concept of **scaffolding,** can help parents and teachers more efficiently guide children's cognitive progress. Scaffolding is the supportive assistance that a more sophisticated interaction partner provides, and ideally it should be aimed at the ZPD. For example, consider what happens when you are trying to learn a new skill, such as playing pool. When you play with someone who is worse than you, you are not likely to improve. Likewise, when you play with someone who is a master, their skills are so above yours that they overwhelm you. However, playing with someone who is just a bit better than you is likely to challenge you, illustrate strategies you might be successful at, and result in the greatest amount of learning.

zone of proximal development (ZPD)
Vygotsky's term for the difference between what a child can do alone and what the child can do with help.

scaffolding
Temporary support to help a child master a task.

Ideally, scaffolding is lessened as children gain in skills. The less able a child is to do a task, the more scaffolding, or support, an adult must give. As the child can do more and more, the adult helps less and less. When the child can do the job alone, the adult takes away the scaffold that is no longer needed.

Scaffolding helps children learn. For example, when the mothers of 2-year-old children helped maintain their child's interests by scaffolding their attention—by asking questions, making comments, or offering choices—their children tended to show more independence and cognitive sophistication at 3½ to 4½ years of age (Landry, Smith, Swank, & Miller-Loncar, 2000). Teachers can also influence children's growing abilities. Prekindergarten children who receive scaffolding are better able to regulate their own learning when they get to kindergarten (Neitzel & Stright, 2003). First-grade students struggling with reading showed greater gains in their abilities when their teachers prompted them to use sources of information they were ignoring to decode difficult words when they got stuck (Rodgers, D'Agostino, Harmey, Kelly, & Brownfield, 2016). Teachers who scaffolded the group discussions of their fourth-grade classrooms had students who later modeled their behavior on that of the teachers', for example, by remembering to use evidence to support their statements (Jadallah et al., 2011).

Vygotsky believed play provided children with scaffolding, enabling them to work at the higher end of their ZPD. If asked to pretend to be a statue, children are able to stand still longer than if asked to just remain motionless. The "rules" of being a statue provide support for the emerging regulatory abilities of the children.

checkpoint can you . . .

- Describe two individual intelligence tests for preschoolers?
- Discuss the relationship between SES and IQ?
- Explain how a test score based on the ZPD differs from a psychometric test score?

Language Development

Preschoolers are full of questions: "Who filled the river with water?" "What does the fox say?" "Do smells come from inside my nose?" Between ages 3 and 6, children make rapid advances in vocabulary, grammar, and syntax. The child who, at 3, describes how Daddy "goed" to the store or asks Mommy to "piece" her food (cut it into little pieces) may, by age 5, tell her mother, "Don't be ridiculous!" or proudly point to her toys and say, "See how I organized everything?"



When exposed to rhymes, 5-year-olds from wealthier families show more localization of language in the left hemisphere (just like adults) than children from poorer families. This may result from children from wealthier homes being exposed to more complex vocabulary and syntax.

Raizada, Richards, Metlzoff, & Kuhl, 2008

VOCABULARY

At age 3 the average child knows and can use 900 to 1,000 words. By age 6, a child typically has an expressive (speaking) vocabulary of 2,600 words and understands more than 20,000. With the help of formal schooling, a child's passive, or receptive, vocabulary (words she can understand) will quadruple to 80,000 words by the time she enters high school (Owens, 1996).

This rapid expansion of vocabulary may occur through **fast mapping,** which allows a child to pick up the approximate meaning of a new word after hearing it only once or twice in conversation (Spiegel & Halberda, 2011). Using the context, children seem to form a quick hypothesis about the meaning of the word. For example, suppose a child is at the zoo and encounters an emu for the first time. The mother might point to the emu and say, "Look at the emu over there." The child might use what she knows about the rules for forming words, about the context, and about the subject to form a hypothesis about the meaning of the word *emu*. Names of objects (nouns) seem to be easier to fast map than names of actions (verbs), even across different languages (Imai et al., 2008).

fast mapping
Process by which a child absorbs the meaning of a new word after hearing it once or twice in conversation.

GRAMMAR AND SYNTAX

The ways children combine syllables into words and words into sentences grow increasingly sophisticated during early childhood as their understanding of grammar and syntax becomes more complex. When psychologists speak of grammar, they are referring to the deep underlying structure of a language that enables us to both produce and understand utterances. Syntax is a related concept and involves the rules for putting together sentences in a particular language.

At age 3, children typically begin to use plurals, possessives, and past tense and know the difference between *I, you,* and *we.* They can ask–and answer–what and where questions. However, their sentences are generally short, simple, and declarative ("Kitty wants milk").

Between ages 4 and 5, sentences average four to five words and may be declarative, negative ("I'm not hungry"), interrogative ("Why can't I go outside?"), or imperative ("Catch the ball!"). Four-year-olds use complex, multiclause sentences ("I'm eating because I'm hungry") more frequently if their parents often use such sentences (Huttenlocher, Vasilyeva, Cymerman, & Levine, 2002). They are also affected by their peers. When children interact with peers who have strong language skills, this results in a small but significant positive effect on their own language (Mashburn, Justice, Downer, & Pianta, 2009). Children this age tend to string sentences together in long run-on narratives (". . . And then . . . And then . . ."). In some respects, comprehension may be immature. For example, 4-year-old Noah can carry out a command that includes more than one step ("Pick up your toys and put them in the cupboard"). However, if his mother tells him, "You may watch TV after you pick up your toys," he may process the words in the order in which he hears them and think he can first watch television and then pick up his toys.

By ages 5 to 7, children's speech has become quite adultlike. They speak in longer and more complicated sentences. They use more conjunctions, prepositions, and articles. They use compound and complex sentences and can handle all parts of speech. Still, although children this age speak fluently, comprehensibly, and fairly grammatically,

they have yet to master many fine points of language. They rarely use the passive voice ("I was dressed by Grandpa"), conditional sentences ("If I were big, I could drive the bus"), or the auxiliary verb *have* ("I have seen that lady before") (C. S. Chomsky, 1969).

Young children often make errors because they have not yet learned exceptions to rules. Saying "holded" instead of "held" or "eated" instead of "ate" is a normal sign of linguistic progress. When young children discover a rule, such as adding *-ed* to a verb for past tense, they tend to overgeneralize—to use it even with words that do not conform to the rule. Eventually, they notice that *-ed* is not always used to form the past tense of a verb. Training can help children master such syntactical forms (Vasilyeva, Huttenlocher, & Waterfall, 2006).

PRAGMATICS AND SOCIAL SPEECH

pragmatics
The practical knowledge needed to use language for communicative purposes.

Language is a social process. As children learn vocabulary, grammar, and syntax, they also become more competent in **pragmatics.** Pragmatics involves the practical knowledge of how to use language to communicate. For example, a child is more likely to be successful with a request such as "May I please have a cookie?" than with "Give me a cookie now."

Pragmatics is related to theory of mind because to understand how to use language socially, you have to be able to put yourself in other people's shoes. This includes knowing how to ask for things, how to tell a story or joke, how to begin and continue a conversation, and how to adjust comments to the listener's perspective (M. L. Rice, 1982). These are all aspects of **social speech,** speech intended to be understood by a listener. Most 3-year-olds pay attention to the effect of their speech on others. If people cannot understand them, they try to explain themselves more clearly. Four-year-olds, especially girls, simplify their language and use a higher register when speaking to 2-year-olds (Owens, 1996; Shatz & Gelman, 1973).

social speech
Speech intended to be understood by a listener.

Most 5-year-olds can adapt what they say to what the listener knows. They can now use words to resolve disputes, and they use more polite language and fewer direct commands in talking to adults than to other children. Almost half of 5-year-olds can stick to a conversational topic for about a dozen turns—if they are comfortable with their partner and if the topic is one they know and care about.

PRIVATE SPEECH

Clara, age 4, was alone in her room, building a house from a set she had received for her birthday. Puzzling over the instructions, she was overheard saying aloud, "Now the blue blocks have to go on the sides. There are four of them on each side."

private speech
Talking aloud to oneself with no intent to communicate with others.

Private speech—talking aloud to oneself with no intent to communicate with others—is normal and common in childhood. Theorists have disagreed on the precise nature of private speech. Piaget (1962) saw private speech—what he called egocentric speech—as a sign of cognitive immaturity. He believed that children were simply vocalizing whatever was on their minds. Vygotsky (1962) viewed private speech as a special form of communication: conversation with the self. He believed private speech was part of the learning process.

Research generally supports Vygotsky. There is evidence for the role of private speech in self-regulation (Day & Smith, 2013; Lidstone, Meins, & Fernyhough, 2011). Private speech tends to increase when children are trying to solve problems or perform difficult tasks, especially without adult supervision (Berk, 1992). The use of private speech in young children also predicts their autobiographical memory (Al-Namlah, Meins, & Fernyhough, 2012), creativity (Daugherty & White, 2008), and spelling proficiency (Aram, Abiri, & Elad, 2014). Findings such as these support Vygotsky's view that private speech was part and parcel of learning, rather than Piaget's view that it was merely reflecting ongoing mental activity.

DELAYED LANGUAGE DEVELOPMENT

The fact that Albert Einstein did not start to use words until he was between 2 and 3 years old (Isaacson, 2007) may encourage parents of other children whose speech

develops later than usual. About 11 percent of 3- to 6-year-old children have a communication disorder, most frequently a problem with speech or language (Black, Vahratian, & Hoffman (2015).

Children who speak late do not necessarily lack linguistic input at home. Hearing problems and head and facial abnormalities may be associated with speech and language delays, as are premature birth, family history, socioeconomic factors, and other developmental delays (Dale et al., 1998; U.S. Preventive Services Task Force, 2006). Heredity seems to play a role (Newbury & Monaco, 2010; Spinath, Price, Dale, & Plomin, 2004). Boys are more likely than girls to be late talkers (U.S. Preventive Services Task Force, 2006).

Many children who speak late—especially those whose comprehension is normal—eventually catch up. One of the largest studies to date determined that 80 percent of children with language delays at age 2 catch up with their peers by age 7 (Rice, Taylor, & Zubrick, 2008). However, some children with early language delays, if left untreated, may experience far-reaching cognitive, social, and emotional consequences (McLaughlin, 2011; U.S. Preventive Services Task Force, 2006).

PREPARATION FOR LITERACY

To understand what is on the printed page, children first need to master certain prereading skills. The development of fundamental skills that eventually lead to being able to read is known as **emergent literacy.**

emergent literacy
Preschoolers' development of skills, knowledge, and attitudes that underlie reading and writing.

Prereading skills can be divided into two types: (1) oral language skills, such as vocabulary, syntax, narrative structure, and the understanding that language is used to communicate; and (2) specific phonological skills (linking letters with sounds) that help in decoding the printed word.

Social interaction promotes emergent literacy. Children are more likely to become good readers and writers if, during the preschool years, parents provide appropriate conversational challenges—if they use a rich vocabulary, read and talk about books, and center dinner-table talk on the day's activities, on mutually remembered past events, or on questions about why people do things and how things work (Reese, 1995; Reese, Sparks, & Leyva, 2010). Similar positive effects are found for preschool teachers. Children whose preschool teachers used sophisticated vocabulary during free play had larger vocabularies and better reading comprehension in fourth grade, providing they had good receptive vocabulary in kindergarten (Dickinson & Porsche, 2011).

Reading to children is one of the most effective paths to literacy (Evans & Shaw, 2008). Eighty-one percent of U.S. children age 3 to 5 and not in kindergarten are read to three or more times a week by a family member (Federal Interagency Forum on Child and Family Statistics, 2017). Children who are read to from an early age learn that reading and writing in English move from left to right and from top to bottom and that words are separated by spaces. They also are motivated to learn to read (Whitehurst & Lonigan, 2001; Baker, 2013). There are suggestions that these processes may be altered (Korat & Or, 2010) or interrupted (Parish-Morris, Mahajan, Hirsh-Pasek, Golinkoff, & Collins, 2013) when reading is conducted on electronic devices.



Toys and games that familiarize children with the alphabet and the sounds the letters make can give them a head start in learning to read.
Oksana Kuzmina/Shutterstock

MEDIA AND COGNITION

Unlike infants and toddlers, preschool-age children comprehend the symbolic nature of television and can readily imitate behaviors they see. Exposure to television during the first few years of life has been negatively associated with academic outcomes (Pagani, Fitzpatrick, Barnett, & Dubow, 2010) and cognitive development, especially when the television is left on for long periods of time or when young children are exposed to high levels of adult programming (Barr, Lauricella, Zack, & Calvert,

TABLE 7 Using Media Responsibly

• Limit screen time to the least amount possible.
• Set guidelines for appropriate viewing for all media, including TV, videos/DVDs, movies, and games.
• Protect children from inappropriate media.
• Require that children ask before turning on media.
• Remove TVs, video game systems, and computers from bedrooms.
• Watch programs and movies together and discuss what you are watching.
• Use media in a positive way to spark imagination and creativity.
• Limit the number of products you purchase for your child that are linked to TV programs.

Source: Teachers Resisting Unhealthy Children's Entertainment, 2008.

2010). Some researchers have also found that the fast-paced programming common now in many children's shows negatively impacts executive functioning and the ability to sustain attention in preschool children (Lillard & Peterson, 2011). Moreover, television and video games that consist of pure entertainment or violent content are negatively associated with cognitive competence and academic achievement (Kirkorian, Wartella, & Anderson, 2008).



U.S. booksellers have noted a trend away from picture books and toward chapter books for young children, presumably as a result of parents' concerns about literacy. Do chapter books with fewer pictures and more text help develop children's imagination, or do they push them too quickly?

Bosman, 2010

Not all content is bad; high-quality children's programming can result in cognitive enhancements (Kirkorian et al., 2008). For example, *Sesame Street*, developed specifically to improve school readiness in inner-city children, has been repeatedly shown to improve outcomes, including cognitive proficiency, literacy, and numeracy (Mares & Pan, 2013). Similar findings have emerged for other educational programming such as *Blue's Clues* and *Dora the Explorer* (Kirkorian et al., 2008). Additionally, parents who limit screen time; select well-designed, age-appropriate programs; and view the programs with their children can maximize the benefits of media (Table 7).

While for many years television was the most frequently used media source, the use of home computers, tablets, cellular phones, and other such devices has grown rapidly in recent years. The American Academy of Pediatrics (2016) recommends that children from 2 to 5 years of age should spend no more than an hour a day on *any* screen media and that parents should watch programming with their children and discuss it. For children 6 and older, there should be consistent limits and designated media-free times.

checkpoint can you . . .

- Trace normal progress in 3- to 6-year-olds' vocabulary, grammar, syntax, and conversational abilities?
- Give reasons why children use private speech?
- Discuss possible causes, consequences, and treatment of delayed language development?
- Identify factors that promote preparation for literacy?
- Discuss the relationship between media use and cognition?

Early Childhood Education

Going to preschool is an important step, widening a child's physical, cognitive, and social environment. The transition to kindergarten, the beginning of "real school," is another momentous step. Let's look at both of these transitions.

TYPES OF PRESCHOOLS

Preschools vary greatly in their goals and curriculums. Some programs emphasize academic achievement, and others focus on social and emotional development. Two of the most influential programs, Montessori and Reggio Emilia, were founded on similar philosophical premises.

The Montessori Method The Montessori method is based on the belief that children's natural intelligence involves rational, spiritual, and empirical aspects (Edwards, 2003). Montessori stresses the importance of children learning independently at their own pace, as they work with developmentally appropriate materials and self-chosen tasks. Teachers serve as guides, and older children help younger ones. The curriculum is individualized but has a definite scope and prescribed sequencing. Teachers provide an environment of calm productivity, and the classrooms are organized to be orderly, pleasing environments.

Montessori's approach has proven effective. An evaluation of Montessori education in Milwaukee found that 5-year-old Montessori students were better prepared for elementary school in reading and math than children who attended other types of preschools (Lillard & Else-Quest, 2006).

The Reggio Emilia Approach The Reggio Emilia approach, named for the town in Italy in which the movement started in the 1940s, is a less formal model than Montessori. Teachers follow children's interests and support them in exploring and investigating ideas and feelings through words, movement, dramatic play, and music. Learning is purposeful but less defined than with the Montessori curriculum. Teachers ask questions that draw out children's ideas and then create flexible plans to explore these ideas with the children. Classrooms are carefully constructed to offer complexity, beauty, organization, and a sense of well-being (Ceppi & Zini, 1998; Edwards, 2002).



The Harlem Children's Zone is an extremely successful current program based in Bronfenbrenner's bioecological model. One reason for its extraordinary success is the systems approach utilized to address children's deficiencies. The focus is as much on the community as it is on the children, with the goal of bringing about a "tipping point" of enriched events and environments that will, it is hoped, at some point become self-perpetuating.

COMPENSATORY PRESCHOOL PROGRAMS

Since the 1960s, large-scale compensatory preschool programs have been developed to help children who would otherwise enter school poorly prepared to learn compensate for what they have missed and to prepare them for school. Teachers and researchers in early childhood education generally work within a model of the whole child, seeking not just to enhance cognitive skills but also to improve physical health and to foster self-confidence and social skills.

The best known of the early intervention programs in the United States is Project Head Start, a federally funded program launched in 1965. Head Start provides medical, dental, and mental health care; social services; and at least one hot meal a day. About 72.1 percent of Head Start children are from English-speaking homes and 13 percent of enrolled children were diagnosed with disabilities (Administration for Children and Families, 2019).

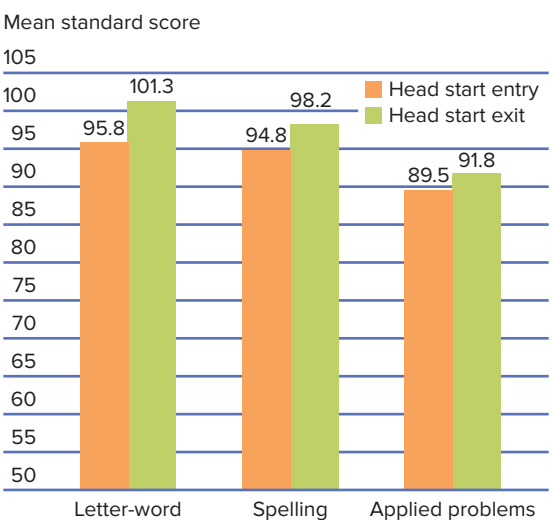
Research on Head Start and other similar programs has demonstrated that children who are enrolled in compensatory preschool programs show academic and social gains in multiple, but not all, target areas immediately following their participation. Head Start children make gains in vocabulary, letter recognition, early writing, early mathematics, and social skills (Figure 4). The gap between their vocabulary and early reading scores and national norms narrows significantly. Furthermore, their skills continue to progress in kindergarten. Gains are closely related to parental involvement and are stronger for children who are low in cognitive potential, have parents with a low educational level, or attend programs for more hours per week (Camilli, Vargas, Ryan, & Barnett, 2010; Lee, Zhai, Brooks-Gunn, Han, & Waldfogel, 2014; Bitler, Hoynes, & Domina, 2014).

However, some reports suggest that these gains are not maintained over time. These reports have been controversial, in part due to the complexity of comparing outcomes of diverse children in varying programs. About half the number of children who apply for but do not get into Head Start find alternative child care arrangements. Thus, the control group—those children who did not participate in Head Start—experience a variety of different child care situations rather than the lack of *any* enriching child care experiences. Some researchers argue that this

FIGURE 4

Academic Outcomes at the Beginning and End of Head Start

These outcomes represent all children who entered Head Start for the first time in the fall of 2009, completed 1 or 2 years of the program, and entered kindergarten in the fall of either 2010 or 2011. Immediate gains are most striking; however, better outcomes do persist over time.



Source: Aikens, Kopack Klein, Tarullo, and West, 2013.



Should the primary purpose of preschool be to provide a strong academic foundation or to foster social and emotional development?

might help explain why many children who do not participate in Head Start seemed to "catch up" to program participants by first grade (National Forum on Early Childhood Policy and Programs, 2010).

An analysis of long-term effects of Head Start suggests that even though benefits lessen with time (Ludwig & Phillips, 2007), the benefits still outweigh the costs (Puma et al., 2012). Children from Head Start and other compensatory programs were less likely to be placed in special education or to repeat a grade and were more likely to finish high school than low-income children who did not attend such programs (Deming, 2009). "Graduates" of similar programs were much less likely to become juvenile delinquents or to become pregnant in their teens (Schweihart, 2007). There were also differences in long-term outcomes for males and females. At ages 27 and 40, men were less likely to have been involved in criminal activity and more likely to be employed and have a higher income than the controls. For women, there were positive effects on both education and employment at ages 19 and 27, and negative effects on criminal activity at age 40 (Heckman, Moon, Pinto, Savelyev, & Yavitz, 2010; Reynolds, Temple, Ou, Arteaga, & White, 2011). Outcomes are best with earlier and longer-lasting intervention through high-quality, center-based programs (Brooks-Gunn, 2003; Zigler & Styfco, 2001).

THE CHILD IN KINDERGARTEN

Although some states do not require kindergarten programs or kindergarten attendance, most 5-year-olds attend kindergarten. Since the late 1970s, an increasing number of kindergarteners spend a full day in school, rather than the traditional half day (Kena et al., 2014). A practical impetus for this trend is the growing number of single-parent and dual-earner households.

Do children learn more in full-day kindergarten? While full-day kindergarten has been associated with small to moderate increases in reading and math skills when compared to a half-day schedule (Votruba-Drzal, Li-Grining, & Maldonado-Carreno, 2008), by the end of third grade these differences disappear (Cooper, Allen, Patall, & Dent, 2010; Rathbun, West, & Germino-Hausken, 2004).

Findings highlight the importance of the preparation a child receives before kindergarten. The resources with which children come to kindergarten—preliteracy skills and the richness of a home literacy environment—predict reading achievement in first grade, and these individual differences tend to persist or increase through the first four years of school (Rathbun et al., 2004). Emotional and social adjustment also affect readiness for kindergarten and strongly predict school success. It is important that children have the ability to sit still, follow directions, wait their turn, and regulate their own learning (Raver, 2002). Broadly, kindergarten readiness is associated with positive academic and social outcomes for children (Goldstein, McCoach, & Yu, 2017; Jones, Greenberg, & Crowley, 2015).

checkpoint can you . . .

- Compare goals and effectiveness of varying types of preschool programs?
- Assess the benefits of compensatory preschool education?
- Discuss factors that affect adjustment to kindergarten?

summary and key terms

PHYSICAL DEVELOPMENT

Aspects of Physical Development

- Physical growth continues during the years from 3 to 6, but more slowly than during infancy and toddlerhood. Boys are on average slightly taller, heavier, and more muscular than girls. Internal body systems are maturing.
- Sleep patterns change during early childhood, as throughout life, and are affected by cultural expectations. Occasional sleepwalking, sleep terrors, and nightmares are common, but persistent sleep problems may indicate emotional disturbances.
- Bed-wetting is usually outgrown without special help.
- Brain development continues steadily throughout childhood and affects motor development.
- Children progress rapidly in gross and fine motor skills, developing more complex systems of action.
- Handedness is usually evident by age 3, reflecting dominance by one hemisphere of the brain.

enuresis (*195*)
gross motor skills (*196*)
fine motor skills (*197*)
systems of action (*197*)
handedness (*197*)

Health and Safety

- Although major contagious illnesses are rare today in industrialized countries due to widespread immunization, preventable disease continues to be a major problem in the developing world.
- The prevalence of obesity among preschoolers has increased.
- Undernutrition can affect all aspects of development.
- Children's oral health can be improved when they are provided with regular dental care and fluoride supplements.
- Food allergies are becoming increasingly common.
- Accidents, most frequently in the home, are the leading cause of death in childhood in the United States.
- Environmental factors such as exposure to poverty, homelessness, smoking, air pollution, and pesticides increase the risks of illness or injury. Lead poisoning can have serious physical, cognitive, and behavioral effects.

COGNITIVE DEVELOPMENT

Piagetian Approach: The Preoperational Child

- Children in the preoperational stage show several important advances, as well as some immature aspects of thought.
- The symbolic function enables children to reflect on people, objects, and events that are not physically present. It is shown in deferred imitation, pretend play, and language.
- Symbolic development helps preoperational children make more accurate judgments of spatial relationships. They can link cause and effect with regard to familiar situations, understand the concept of identity, categorize, compare quantities, and understand principles of counting.
- Preoperational children appear to be less egocentric than Piaget thought.
- Centration keeps preoperational children from understanding principles of conservation. Their logic also is limited by irreversibility and a focus on states rather than transformations.
- Theory of mind, which develops markedly between ages 3 and 5, includes awareness of a child's own thought processes, social cognition, understanding that people can hold false beliefs, ability to deceive, ability to distinguish appearance from reality, and ability to distinguish fantasy from reality.
- Maturational and environmental influences affect individual differences in theory-of-mind development.

preoperational stage (*205*)
symbolic function (*206*)
pretend play (*206*)
transduction (*207*)
animism (*207*)
centration (*208*)
decenter (*208*)
egocentrism (*208*)
conservation (*209*)
irreversibility (*210*)
theory of mind (*210*)

Information-Processing Approach: Memory

- Information-processing models describe three steps in memory: encoding, storage, and retrieval.
- Although sensory memory shows little change with age, the capacity of working memory increases greatly. The central executive controls the flow of information to and from long-term memory.
- At all ages, recognition is better than recall, but both increase during early childhood.
- Early episodic memory is only temporary; it fades or is transferred to generic memory.
- Autobiographical memory typically begins at about age 3 or 4; it may be related to self-recognition and language development.
- According to the social interaction model, children and adults co-construct autobiographical memories by talking about shared experiences.
- Children are more likely to remember unusual activities that they actively participate in. The way adults talk with children about events influences memory formation.

encoding (*214*)
storage (*214*)
retrieval (*214*)
sensory memory (*214*)
working memory (*214*)
long-term memory (*214*)
central executive (*214*)
executive function (*214*)
recognition (*215*)
recall (*215*)
generic memory (*215*)
script (*215*)
episodic memory (*215*)
autobiographical memory (*215*)
social interaction model (*216*)

Intelligence: Psychometric and Vygotskian Approaches

- The two most commonly used psychometric intelligence tests for young children are the Stanford-Binet Intelligence Scales and the Wechsler Preschool and Primary Scale of Intelligence, Revised (WPPSI-IV).
- Intelligence test scores have risen in industrialized countries.
- Intelligence test scores may be influenced by a number of factors, including the home environment and SES.
- Newer tests based on Vygotsky's concept of the zone of proximal development (ZPD) indicate immediate potential for achievement.

Stanford-Binet Intelligence Scales (*216*)
Wechsler Preschool and Primary Scale of Intelligence, Revised (WPPSI-IV) (*217*)
zone of proximal development (ZPD) (*218*)
scaffolding (*218*)

Language Development

- During early childhood, vocabulary increases greatly, and grammar and syntax become fairly sophisticated. Children become more competent in pragmatics.
- Private speech is normal and common; it may aid in the shift to self-regulation.
- Causes of delayed language development are unclear. If untreated, language delays may have serious cognitive, social, and emotional consequences.
- Interaction with adults can promote emergent literacy.
- Well-designed, age-appropriate programming is associated with enhanced cognitive development.

fast mapping (*219*)

pragmatics (*220*)

social speech (*220*)

private speech (*220*)

emergent literacy (*221*)

Early Childhood Education

- Goals of preschool education vary across cultures.
- The academic content of early childhood education programs in the United States has increased, but studies support a child-centered approach.
- Compensatory preschool programs have had positive outcomes. Compensatory programs that start early may have better results.
- Many children today attend full-day kindergarten. Success in kindergarten depends largely on emotional and social adjustment and prekindergarten preparation.

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chapter 8

Psychosocial Development in Early Childhood

outline

The Developing Self

Gender

Play

Parenting

Relationships with Other Children

learning objectives

Discuss emotional and personality development in early childhood.

Discuss gender development in early childhood.

Describe play in early childhood.

Explain how parenting practices influence development.

Evaluate young children's relationships with siblings and peers.



Pauline Cutler/Alamy Stock Photo

did you know?

- Young children find it hard to understand that they can have conflicting emotions.
- Gender preferences in toys and playmates appear as early as 12 to 24 months.
- Children with imaginary companions are usually more socially competent.

In this chapter we discuss preschool children's understanding of themselves and their feelings. We see how their sense of male or female identity arises and how it affects behavior. We describe play, the activity in which children in industrialized countries typically spend most of their time. We consider the influence, for good or ill, of what parents do. Finally, we discuss relationships with siblings and other children.

Play is often talked about as if it were a relief from serious learning. But for children, play is really the work of childhood.

—Fred Rogers

The Developing Self

THE SELF-CONCEPT AND COGNITIVE DEVELOPMENT

The **self-concept** is our total picture of our abilities and traits. It is "a *cognitive construction* . . . a system of descriptive and evaluative representations about the self" that determines how we feel about ourselves and guides our actions (Harter, 1996, p. 207). The sense of self also has a social aspect: Children incorporate into their self-image their growing understanding of how others see them.

self-concept
Sense of self; descriptive and evaluative mental picture of one's abilities and traits.

self-definition
Cluster of characteristics used to describe oneself.

real self
The self one actually is.

ideal self
The self one would like to be.

Changes in Self-Definition: The 5 to 7 Shift Children's **self-definition**—the way they describe themselves—typically changes between about ages 5 and 7, reflecting self-concept development and advances in cognitive abilities. At age 4, Jason says,

> My name is Jason and I live in a big house with my mother and father and sister, Lisa. I have a kitty that's orange and a television set in my own room. . . . I like pizza and I have a nice teacher. I can count up to 100, want to hear me? I love my dog, Skipper. I can climb to the top of the jungle gym, I'm not scared! Just happy. You can't be happy *and* scared, no way! I have brown hair, and I go to preschool. I'm really strong. I can lift this chair, watch me! (Harter, 1996, p. 208)

The way Jason describes himself is typical of U.S. children his age. They are very concrete in their thinking. Jason focuses on what he does, what he looks like, things he owns, and the people and animals in his life. He speaks in specifics, mentioning a particular skill (climbing or counting) rather than general abilities (being athletic or good at math). Like most children, he is unrealistically positive about his abilities, and he has difficulty understanding how conflicting emotions can exist simultaneously. At about age 7, Jason will be able to describe himself in terms of generalized traits such as popular, smart, or dumb; recognize that he can have conflicting emotions; and be self-critical while holding a positive overall self-concept.

At 4, Jason's statements about himself are one-dimensional ("I like pizza . . . I'm really strong"). He cannot imagine having two emotions at once ("You can't be happy *and* scared") because he cannot consider different aspects of himself at the same time. His thinking about himself is all-or-nothing. He cannot acknowledge that his **real self,** the person he actually is, is not the same as his **ideal self,** the person he would like to be.

At about age 5 or 6, Jason begins to make logical connections between one aspect of himself and another: "I can run fast, and I can climb high. I'm also strong. I can throw a ball real far, I'm going to be on a team some day!" (Harter, 1996, p. 215). However, his image of himself is still expressed in completely positive, all-or-nothing terms. He cannot see how he might be good at some things and not at others.



Although our self-descriptions do get more accurate with age, even adults wildly overestimate their positive qualities. The only people who are accurate? The clinically depressed.



Jason describes himself in terms of his appearance (brown hair) and his possessions (his dog, Skipper).
Rob Hainer/Shutterstock

In middle childhood children begin to integrate specific features of the self into a general, multidimensional concept. As all-or-nothing thinking declines, Jason's self-descriptions will become more balanced and realistic: "I'm good at hockey but bad at arithmetic."

Cultural Differences in Self-Definition Culture helps shape the understanding of the self. For example, one major cultural dimension—individualism versus collectivism—impacts the understanding of the self in relation to others. In highly individualistic cultures such as the United States, individuals are seen as separate from one another, and independence and self-reliance are highly valued. In collectivistic cultures, such as India and China, individuals are seen as fundamentally interrelated, and group harmony and cohesiveness take precedence over individual concerns (Oyserman, Coon, & Kemmelmeir, 2002).

Parents transmit, often through everyday conversations, cultural ideas and beliefs about how to define the self. For example, Chinese parents tend to encourage interdependent aspects of the self, such as compliance with authority, appropriate conduct, humility, and a sense of belonging to the community. European American parents tend to encourage independent aspects of the self: individuality, self-expression, and self-esteem. Children absorb such differing cultural styles of self-definition as early as age 3 or 4, and these differences increase with age (Wang, 2004). These differences can even be seen in children's drawings. Children from cultures in which autonomy, individualism, and self-expression are valued tend to draw themselves larger, whereas children from cultures in which relatedness and social connections are viewed as more important draw themselves smaller (Rübeling et al., 2011; Gernhardt, Rübeling, & Keller, 2014).

SELF-ESTEEM

self-esteem
The judgment a person makes about his or her self-worth.

Self-esteem is the self-evaluative part of the self-concept, the judgment children make about their overall worth. Self-esteem, in part, is based on children's growing cognitive ability to describe and define themselves.

Developmental Changes in Self-Esteem Although children do not generally talk about a concept of self-worth until about age 8, younger children show by their behavior that they have one. For example, how they feel about themselves shows consistency; positive or negative self-perceptions at age 5 predict self-perceptions and socioemotional functioning at age 8 (Verschueren, Buyck, & Maroen, 2001).

Although there are individual differences in self-esteem, most young children wildly overestimate their abilities. Their self-esteem is not based on reality. One reason for this is that self-esteem is, in part, the result of feedback received from other people, and adults tend to give positive and uncritical feedback (Harter, 1998, 2006). For example, a kindergartener's crude lettering is not generally critiqued as being messy; rather, parents and teachers are more likely to praise and encourage the child's efforts.

In addition, children's self-esteem tends to be unidimensional. In other words, children believe they are either all good or all bad (Harter, 1998). In middle childhood, self-esteem will become more realistic as personal evaluations of competence based on internalization of parental and societal standards begin to shape and maintain self-worth (Harter, 1998).



The original research on learned helplessness involved restraining dogs as they were repeatedly shocked. Eventually they stopped struggling to get away and gave up. Research with human participants has to meet rigid ethical criteria, whereas research with animals is less constrained. What do you think of research such as this? Even if it gives us valuable information, is it ethical?

Contingent Self-Esteem: The "Helpless" Pattern Consider the praise parents give children for succeeding. If a child is generally praised for working hard and she fails at a task, the logical implication is that she did not try hard enough. That child might then be motivated to work harder next time. If the same child is praised for being smart and she fails at a task, the implication is far different. Now the implication is that the child is no longer smart. The motivation for working hard has been stripped away.

Not surprisingly then, children whose self-esteem is contingent on success tend to become demoralized when they fail. Often these children attribute failure to their deficiencies, which they believe they are unable to change. About one-third to one-half of preschoolers, kindergarteners, and first graders show a "learned helplessness" pat-

tern (Dweck & Grant, 2008). For example, when given a difficult puzzle, "helpless" children are likely to give up. They assume they will fail and so do not bother to try.

Children with noncontingent self-esteem, in contrast, tend to attribute failure or disappointment to factors outside themselves or to the need to try harder. For example, when faced with the same puzzle, such a child might assume the puzzle was for older children or might continue to try to put it together despite having initial difficulties. If initially unsuccessful or rejected, they persevere, trying new strategies until they find one that works (Harter, 1998; Pomerantz & Saxon, 2001). Children who believe they can succeed if they try, who enjoy challenges, and who have faith in their ability to meet those challenges tend to have parents who praise their efforts, not their inherent abilities, and who focus on specific, focused feedback rather than generic praise (Gunderson et al., 2013).

Generic praise—"great job!" for example, after being shown a picture of a drawing—is associated with giving up after failure because if children fail, they tend to assume they lack the critical ability to draw well. However, when praise is targeted— "great job drawing!"—children tend to persevere in the face of failure. This is because this implies their earlier success was due to their efforts related to drawing specifically. Even a little bit of nongeneric praise goes a long way. When praise is mixed, like in real life, even small amounts of nongeneric praise preserve mastery in children (Zentall & Morris, 2010).



This mother's approval of her 3-year-old daughter's artwork is an important contributer to her self-esteem.
Don Hammond/Design Pics/Getty Images

That closet full of participation trophies may not be the best thing for your young child. Research on self-esteem suggests that when children are praised and rewarded for everything they do, regardless of performance, they believe that praise uncritically. When they inevitably fail at a task, they take that as a sign that they are deficient.

Dweck, 2008

checkpoint can you . . .

- Trace early self-concept development?
- Explain the significance of the 5 to 7 shift?
- Tell how young children's self-esteem differs from older children's and explain how the helpless pattern arises?

REGULATING EMOTIONS

At 5-year-old Kayla's birthday party, Kayla opens a present from her grandmother and finds not the doll she was hoping to receive but a board game. Her face drops as her mother whispers in her ear, "Smile and tell grandma thank you. You don't want to hurt her feelings." Kayla tries, but her smile is unconvincing.

The ability to regulate, or control, one's feelings is one of the key advances of early childhood (Dennis, 2006). Emotional self-regulation helps children guide their behavior (Eisenberg, Fabes, & Spinrad, 2006) and adjust their responses to meet societal expectations. Children's ability to exert control over themselves is related to adjustment (Eisenberg et al., 2004). For example, children who, at 3 to 4 years of age, had difficulty in delay-of-gratification tasks were more likely to have behavior problems at 5 to 8 years. Similarly, young children who were poor at deliberately slowing down, inhibiting their movements in a game, or paying close attention were more likely to have academic difficulties when older (Kim, Nordling, Yoon, Boldt, & Kochanska, 2013). Children develop the ability to regulate their emotions slowly via a shift from early reliance on orienting processes supported by the parietal and frontal areas of the brain to control of affect using frontal brain networks in the anterior cingulate gyrus (Rothbart, Sheese, Rueda, & Posner, 2011).

Culture also is an influence. Individualistic cultures such as in the United States tend to value the free expression of emotions, whereas Asian cultures with collectivistic values tend to suppress the expression of negative emotions (Murata, Moser, & Kitayama, 2012). Not surprisingly, research has found that parents from different cultures show varied socialization patterns that reflect cultural values. For instance, parents from the United States and Germany tend to encourage their children to express their emotions when upset and see this as a healthy expression of autonomy, while parents from India and Nepal tend to become distressed when their children express negative emotions

Young children might be able to read your emotions better than you think. New research suggests that children as young as 6 can tell the difference between a real smile and a fake smile. But they're not great at it: They are only accurate about 60 percent of the time.

Gosselin, Perron, & Maassarani, 2009

(Heikamp, Trommsdorff, & Fäsche, 2013). Another study found that children in the United States expressed the most pride, Japanese children the most shame, and Korean children the most guilt (Furukawa, Tangney, & Higashibara, 2012).

UNDERSTANDING EMOTIONS

Emotional understanding appears to proceed in an ordered and hierarchical manner. First, by about 5 years of age, children understand the public aspects of emotions. In other words, they understand the things that cause other people to feel happy or sad, how those emotions look on other people, and that reminding someone of something that happened can elicit that emotion again (Pons, Harris, & de Rosnay, 2004). Preschoolers can talk about their feelings and often those of others, and they understand that emotions are connected with experiences and desires (Saarni, Campos, Camras, & Witherington, 2006). They also understand that someone who gets what he wants will be happy and someone who does not get what she wants will be sad (Lagattuta, 2005). By about 4 to 5 years, most children can recognize the facial expressions of joy, sadness, fear, anger, surprise, and disgust (Widen & Russell, 2008), although girls tend to outperform boys slightly (Denham, Bassett, Brown, Way, & Steed, 2015). They are also able to recognize emotions as reflected in vocal cues (Sauter, Panattoni, & Happé, 2013) and body posture, such as found in a sad person's slumped shoulders or an angry person's aggressive stance (Parker, Mathis, & Kupersmidt, 2013).

Children as young as 2 or 3 years of age can experience true clinical depression, although they are unable to verbalize what is going on.

By about 7 years of age, children start to understand that mental states can drive emotions. For example, they understand that someone can feel one way and look another. They also understand that what someone believes, even if it is not true, can affect emotional state and what someone wants, even if they themselves do not want it, can also affect emotional state (Pons et al., 2004). This process is involved in the development of moral behavior. In one study, 4- through 8-year-olds were asked to describe how a young boy would feel if his ball rolled into the street and he either retrieved it—and thus broke the rule of not going into the street—or refrained from retrieving it. The 4- and 5-year-olds tended to believe that the boy would be happy if he got the ball—even though he would be breaking a rule—and unhappy if he didn't. The older children, like adults, were more inclined to believe that obedience to a rule would make the boy feel good and disobedience would make him feel bad (Lagattuta, 2005).

Last, by about 9 years of age, children start to understand more complex aspects of emotion. For example, they understand that situations can be viewed from multiple perspectives, that people might have conflicting emotions such as feeling angry at someone while loving them, and that they can use cognitive strategies to regulate their emotional state (Pons et al., 2004). This process will be discussed more fully in Chapter 14.

social emotions
Emotions involved in the regulation of social behavior that require self-awareness and the understanding of others' viewpoints..

Understanding Emotions Directed toward the Self **Social emotions** involve a comparison of one's self or one's actions to social standards. These emotions are directed toward the self and include guilt, shame, and pride. They typically develop by the end of the 3rd year after children gain self-awareness and accept the standards of behavior their parents have set. They require the consideration of others' points of view.

In one study (Harter, 1993), 4- to 8-year-olds were told two stories. In the first story, a child takes a few coins from a jar after being told not to do so; in the second story, a child performs a difficult gymnastic feat—a flip on the bars. Each story was presented in two versions: one in which a parent sees the child doing the act and another in which no one sees the child. The children were asked how they and the parent would feel in each circumstance.

The answers revealed a gradual progression in understanding of feelings about the self (Harter, 1996). At ages 4 to 5, children did not say that either they or their parents would feel pride or shame. Instead they used such terms as "worried" or "scared" (for the money jar incident) and "excited" or "happy" (about the gymnastic accomplishment). At 5 to 6, children said their parents would be ashamed or proud of them but did not acknowledge feeling these emotions themselves. At 6 to 7, children said they would feel

proud or ashamed, but only if they were observed. Not until ages 7 to 8 did children say that they would feel ashamed or proud of themselves even if no one saw them.

initiative versus guilt
Erikson's third stage in psychosocial development, in which children balance the urge to pursue goals with reservations about doing so.

ERIKSON: INITIATIVE VERSUS GUILT

The need to deal with conflicting feelings about the self is at the heart of the third stage of psychosocial development identified by Erik Erikson (1950): **initiative versus guilt.** Preschool children can do—and want to do—more and more. At the same time, they are learning that some of the things they want to do meet social approval, whereas others do not.

This conflict marks a split between two parts of the personality: the part that remains a child, full of exuberance and a desire to try new things and test new powers, and the part that is becoming an adult, constantly examining the propriety of motives and actions. Children who learn how to regulate these opposing drives develop the virtue of *purpose,* the courage to envision and pursue goals without being unduly inhibited by guilt or fear of punishment (Erikson, 1982).

checkpoint can you . . .

- Trace two typical developments in understanding of emotions?
- Explain the significance of Erikson's third stage of personality development?

Gender

Gender identity, awareness of one's femaleness or maleness and all it implies in one's society of origin, is an important aspect of the developing self-concept.

gender identity
Awareness, developed in early childhood, that one is male or female.

GENDER DIFFERENCES

Gender differences are psychological or behavioral differences between males and females. This is a controversial area of psychology. Measurable differences between baby boys and girls are few. Although some gender differences become more pronounced after age 3, boys and girls on average remain more alike than different (Hyde, 2005).

Physically, among the larger gender differences are boys' higher activity level, superior motor performance, especially after puberty, and their greater propensity for physical aggression (Hyde, 2005; Archer, 2004; Baillargeon et al., 2007; Pellegrini & Archer, 2005; Nielsen, Pfister, & Anderson, 2011). These physical differences impact the nature of play. Boys engage in more rough-and-tumble, physically active play than girls do (LaFreniere, 2011). There are also sex-typed toy preferences; girls prefer to play with dolls and doll accessories, and boys prefer to play with construction and transportation toys (Pasterski et al., 2011). Sex-typed play preferences increase between toddlerhood and middle childhood, and the degree of sex-typed behavior exhibited early in life is a strong indicator of later gender-based behavior (Golombok et al., 2008).



Even in the womb, male fetuses are already more active than female fetuses.

Cognitive gender differences are few and small and are affected by task characteristics (Miller & Halpern, 2014; Ardila, Rosselli, Matute, & Inozemtseva, 2011). While there are fine-grain differences in particular areas, there do not appear to be gender differences in overall intelligence (Nisbett et al., 2012).

Boys and girls do equally well on tasks involving basic mathematical skills and are equally capable of learning math but show variations in specific abilities. Most of these differences emerge in elementary school or later (Spelke, 2005). Girls tend to perform better on tests on mathematical computation and memory for lists of numbers and objects. Girls also tend to outperform boys on problems requiring algebraic solutions or short-answer responses. Boys generally show an advantage in mental rotations, especially when the task involves three-dimensional objects and when it is timed (Miller & Halpern, 2014). Boys tend to do better in mathematical word problems and memory for spatial configurations (Spelke, 2005). Boys' mathematical abilities vary more than girls', with more boys at both the highest and lowest ends of the ability range (Halpern et al., 2007). However, in most studies, mathematics test performance tends to be about the same (Miller & Halpern, 2014).



One clear behavioral difference between young boys and girls is boys' greater physical aggressiveness.
RichVintage/iStock/Getty Images

checkpoint can you . . .

- Summarize the main behavioral and cognitive differences between boys and girls?

Girls generally show a verbal advantage (Bornstein, Hahn, & Haynes, 2004). Across different languages, they tend to start using language earlier, say more, and combine words earlier (Eriksson et al., 2012). Boys are more likely to stutter or to have a reading disability than girls (Wallentin, 2009; Rutter et al., 2004b). Girls tend to use more praise, agreement, acknowledgment, and elaboration on what someone else has said (Leaper & Smith, 2004). Girls also tend to show an advantage in school and tend to earn higher grades, especially in language classes (Voyer & Voyer, 2014).

PERSPECTIVES ON GENDER DEVELOPMENT

What accounts for gender differences, and why do some of them emerge with age? Some explanations center on the differing experiences and social expectations that boys and girls meet almost from birth.

gender roles
Behaviors, interests, attitudes, skills, and traits that a culture considers appropriate for each sex; differ for males and females.

Gender roles are the behaviors, interests, attitudes, skills, and personality traits that a culture considers appropriate for males or females. Historically, in most cultures, women have been expected to devote most of their time to caring for the household and children, while men were providers and protectors. Women were expected to be compliant and nurturing; men to be active, aggressive, and competitive. Today, gender roles have become more diverse and more flexible.

gender-typing
Socialization process whereby children, at an early age, learn appropriate gender roles.

Gender-typing, the acquisition of a gender role, takes place early in childhood (Iervolino, Hines, Golombok, Rust, & Plomin, 2005). **Gender stereotypes** are preconceived generalizations about male or female behavior: "All females are passive and dependent; all males are aggressive and independent." They appear to some degree in children as young as 2 or 3, increase during the preschool years, and reach a peak at age 5 (Campbell, Shirley, & Candy, 2004; Ruble & Martin, 1998).

gender stereotypes
Preconceived generalizations about male or female role behavior.

How do children acquire gender roles, and why do they adopt gender stereotypes? Let's look at five theoretical perspectives on gender development (summarized in Table 1): *biological*, *evolutionary*, *psychoanalytic, cognitive,* and *social learning*.

Biological Approach The existence of similar gender roles in many cultures suggests that some gender differences may be biologically based. In fact, if gender differences were purely cultural inventions, we would expect to see more variability in male and female roles and characteristics across cultures. Investigators are uncovering evidence of neurological, hormonal, and evolutionary explanations for some gender differences.

In this view, differences we see between boys and girls are influenced by brain anatomy. These differences arise from, among others, genes coding for differences in anatomy and function between the sexes, prenatal hormonal exposure, differing environmental experiences, or the activating effects of puberty in adolescence.

Across the life span and starting early in development, men, on average, have larger brain volume than women (Ruigrok et al., 2014; Reiss, Abrams, Singer, Ross, & Denckla, 1996). However, when controlling for total cerebral volume, girls' brains have a higher proportion of gray matter (neurons) and show greater cerebral blood flow, while boys' brains contain more white matter (axons for communication between neurons) (Cosgrove, Mazure, & Staley, 2007; Luders, Gaser, Narr, & Toga, 2009).

One important influence may be what occurs in the womb, where hormones affect the developing brain. Analysis of fetal testosterone levels has shown a link between higher testosterone levels in utero and male-typical play in boys (Auyeng et al., 2009). Moreover, testosterone has been linked to dominance and status striving behavior in humans (Eisenegger, Haushofer, & Fehr, 2011). Additional clues may be found in research focused on girls with a disorder called *congenital adrenal hyperplasia (CAH).* These girls have high prenatal levels of *androgens* (male sex hormones). They tend to show preferences for boys' toys, rough play, and male playmates, as well as strong spatial skills. This implies prenatal exposure in utero plays a role in the establishment of these early physical differences between boys and girls. *Estrogens* (female sex hormones), on the other hand, seem to have less influence on boys' gender-typed behavior (Pasterski et al., 2005).

TABLE 1 Five Perspectives on Gender Development

Theories	Major Theorists	Key Processes	Basic Beliefs
Biological Approach		Genetic, neurological, and hormonal activity	Many behavioral differences between the sexes can be traced to biological differences.
Evolutionary Approach	Charles Darwin	Natural and sexual selection	Child develops gender roles in preparation for adult mating and reproductive behavior.
Psychoanalytic Approach	Sigmund Freud	Resolution of unconscious emotional conflict	Gender identity occurs when the child identifies with the same-sex parent.
Cognitive Approach Cognitive-developmental theory	Lawrence Kohlberg	Self-categorization	Once a child learns she is a girl or he is a boy, the child sorts information about behavior by gender and acts accordingly.
Gender-schema theory	Sandra Bem, Carol Lynn Martin, & Charles F. Halverson	Self-categorization based on processing of cultural information	Child organizes information about what is considered appropriate for a boy or a girl on the basis of what a particular culture dictates. Child sorts by gender because gender is an important schema.
Social Learning Approach Social cognitive theory	Albert Bandura, Walter Mischel	Observation of models, reinforcement	Child mentally combines observations of gendered behavior and creates own behavioral variations.

Perhaps the most dramatic examples of biologically based research have to do with infants born with ambiguous sexual organs that are not clearly male or female. John Money and his colleagues (Money, Hampson, & Hampson, 1955) recommended that these children be assigned as early as possible to the gender that holds the potential for the most nearly normal functioning. They based this recommendation on the appearance of the genitals.

However, newer studies demonstrate the profound difficulty of predicting the outcome of sex assignment at birth. In one study, 14 genetically male children born without normal penises but with testes were legally and surgically assigned female sex during the first month of life and were raised as girls. Ultimately, eight declared themselves male, five declared female identity but expressed difficulty fitting in with other girls, and one refused to discuss the subject with anyone. Meanwhile, the two boys whose parents had refused the initial sexual assignment remained male (Reiner & Gearhart, 2004). This and other similar cases strongly suggest that gender identity is rooted in biological factors and is not easily changed (Meyer-Bahlburg, 2005; Reiner, 2005; Diamond & Sigmundson, 1997). Merely telling a boy or a girl what he or she is not enough to alter gender identity.

Recently, the issue of transgender children has garnered attention, driven in part by legal challenges regarding which bathroom is appropriate for those individuals who identify with the opposite gender. Transgender people are individuals whose gender identity is different from their biological sex. While many young children play with their identity—for example, dressing up in different clothes or pretending to be something they are not—children, especially girls, who will later identify as transgender show strong and persistent gender dysphoria early in childhood (Steensma, McGuire, Kreukels, Beekman, & Cohen-Kettenis, 2013).

There are indications that the disparity between gender and sex in transgender people is biologically influenced. For example, biological women who later identify as male have markers that suggest high androgen exposure in the womb (Leinung & Wi, 2017;

For years John Money promoted his most famous study—in which one biologically male twin boy was raised as a girl following a circumcision accident—as a success. It later came out that the boy had never successfully adjusted to life as a girl, had been unhappy throughout his childhood, and had several suicide attempts in his youth, finally succeeding in adulthood. Because of Money's research, thousands of gender reassignment surgeries were conducted on infants. This series of events illustrates one of the primary reasons science needs to be transparent and honest—it can have profound repercussions in the real world.

Wu & Leinung, 2015). Additionally, research on twins suggests there may be genetic influences at play as well (Diamond, 2013). Moreover, the volume of the stria terminalis (an area of the brain involved in sexual behavior) in biological men who later identify as women is more similar to that of other women than to that of other men (Zhou, Hofman, Gooren, & Swaab, 1995). The density, but not the volume, of their neurons is more similar to that of biological women as well (Luders et al., 2009). In short, there is emerging evidence that gender identity—a psychological construct housed in the brain—is influenced by biology and is not merely the consequence of biological sex or child-rearing practices. More research is needed in this controversial area.

Evolutionary Approach The evolutionary approach sees gendered behavior as biologically influenced. From this controversial perspective, children's gender roles underlie the evolved mating and child-rearing strategies of adult males and females.

According to Darwin's (1871) **theory of sexual selection**, the selection of sexual partners is a response to the differing reproductive pressures early men and women confronted in the struggle for survival (Wood & Eagly, 2002). In humans, females must contribute far more to raising children because of the constraints placed on them by pregnancy and nursing. Males, however, may contribute as little as a few teaspoonfuls of semen. While a child's survival may be more certain if a man invests resources in a child, that investment is not obligatory.

This puts into play different reproductive dynamics for each sex. The more widely a man can engage in sexual activity, the greater his chances to pass on his genetic inheritance. Thus, men tend to prefer more sexual partners than women do. They value physical prowess because it enables them to compete for mates and for control of resources and social status, which women value. Because a woman invests more time and energy in pregnancy and can bear only a limited number of children, each child's survival is of utmost importance to her, so she looks for a mate who will remain with her and support their offspring. More sexual activity after a pregnancy has already been achieved does not result in more children for a woman until after that child has been born and the woman is ready to carry another pregnancy. The need to raise children also explains why women tend to be more nurturing than men (Bjorklund & Pellegrini, 2000; Wood & Eagly, 2002). According to evolutionary theory, male competitiveness and aggressiveness and female nurturance develop during childhood as preparation for these adult roles (Pellegrini & Archer, 2005). Boys play at fighting; girls play at parenting.

Critics of evolutionary theory argue that society and culture are more important than biology in determining gender roles. But evolutionary theorists have never argued that culture is insignificant. Rather, they have argued that men and women have cognitive adaptations designed to be sensitive to environmental input. Moreover, they point out that culture does not exist by itself; it is a product of our evolved minds. As such, it reflects our proclivities and who we are. We made it. Thus, to say that culture makes us who we are is a tautological argument (Tooby & Cosmides, 1992).

Moreover, evolutionary psychology is not deterministic, as some critics have argued. Evolution has given us an evolved architecture of the mind that pushes us in certain directions, but it has also given us the ability to reflect upon our choices and make reasoned decisions. Thus, our behavior is flexible and adaptive. For example, in some nonindustrial societies, women are the main or equal providers, and men and women's mate preferences seem to be less pronounced in egalitarian societies in which women have more reproductive freedom and educational opportunities (Wood & Eagly, 2012).

theory of sexual selection
Darwin's theory that gender roles developed in response to men's and women's differing reproductive needs.

This approach does not imply that men and women are consciously striving to have lots of kids and pass on their genes. Instead, it is argued that men and women do things—such as have sex—that make it more likely they will leave descendants.

Psychoanalytic Approach "Daddy, where will you live when I grow up and marry Mommy?" asks Mario, age 4. From the psychoanalytic perspective, Mario's question is part of his acquisition of gender identity. That process, according to Freud, is one of **identification,** the adoption of characteristics, beliefs, attitudes, values, and behaviors of the parent of the same sex. Freud considered identification an important personality development of early childhood.

identification
In Freudian theory, the process by which a young child adopts characteristics, beliefs, attitudes, values, and behaviors of the parent of the same sex.

According to Freud, identification will occur for Mario when he represses or gives up the wish to possess the parent of the other sex (his mother) and identifies with the parent of the same sex (his father). A similar process was believed to occur for girls. Although this explanation for gender development has been influential, it has been difficult to test and has little research support (Maccoby, 2000). Most developmental psychologists today favor other explanations.

Cognitive Approach Sarah figures out she is a girl because people call her a girl. As she continues to observe and think about her world, she concludes that she will always be a girl. She comes to understand gender by actively thinking about and constructing her own gender-typing. This is the heart of Lawrence Kohlberg's (1966) cognitive-developmental theory.

Kohlberg's Cognitive-Developmental Theory In Kohlberg's theory, gender knowledge ("I am a boy") precedes gendered behavior ("so I like to do boy things"). Children actively search for cues about gender in their social world. As they realize which gender they belong to, they adopt behaviors they perceive as consistent with being male or female. Thus, 3-year-old Sarah prefers dolls to trucks because she sees girls playing with dolls and therefore views playing with dolls as consistent with her being a girl (Martin & Ruble, 2004).

The acquisition of gender roles, said Kohlberg, hinges on **gender constancy,** a child's realization that his or her gender will always be the same. Once children achieve this realization, they are motivated to adopt behaviors appropriate to their gender. Gender constancy develops *gender identity, gender stability,* and *gender consistency* (Martin et al., 2002):

gender constancy
Awareness that one will always be male or female; also called *sex-category constancy.*

- *Gender identity:* awareness of one's own gender and that of others typically occurs between ages 2 and 3.
- *Gender stability:* awareness that gender does not change. However, children at this stage base judgments about gender on superficial appearances (clothing or hairstyle) and stereotyped behaviors.
- *Gender consistency:* the realization that a girl remains a girl even if she has a short haircut and plays with trucks, and a boy remains a boy even if he has long hair and earrings, typically occurs between ages 3 and 7 (Martin et al., 2002).

What is the support for Kohlberg's theory? Children do start using gendered language, showing their awareness of gender identity, by about 2 years of age, although they are better at doing this for their own gender (Stennes, Burch, Sen, & Bauer, 2005; Gelman, Taylor, Nguyen, Leaper, & Bigler, 2004). The use of gender labels such as "girl" and "boy" while playing predict the later use of gender-typed toys in young children (Zosuls et al., 2009). Additionally, gender stability does seem to be related to greater attention toward same-sex models, the adoption of more gender-stereotypical clothing, more positive feelings for one's own gender group, and a more rigid adherence to gender stereotypes (Slaby & Frey, 1975; Halim et al., 2014). These findings are in line with Kohlberg's approach.

However, Kohlberg's theory does not fare as well with respect to predictions based on gender consistency. One of the implications of his theory is that gender consistency should precede gender typing. But long before children attain the final stage of gender consistency, they show strong gender-typed preferences (Martin & Ruble, 2004). For example, gender preferences in toys and playmates appear as early as 12 months (Jadva, Hines, & Golombok, 2010), and by 24 months, toddlers seem to recognize which gender group they belong to (Stennes et al., 2005).

Nevertheless, these findings do not challenge Kohlberg's basic insight: gender concepts influence behavior (Martin et al., 2002). Today, cognitive-developmental theorists no longer claim that gender constancy must precede gender-typing. Rather, gender-typing is heightened by the more sophisticated understanding that gender constancy brings. Each stage of gender constancy increases children's attention toward and memory for gender-relevant information.

gender-schema theory
Theory, proposed by Bem, that children socialize themselves in their gender roles by developing a mentally organized network of information about what it means to be male or female in a particular culture.

Gender-Schema Theory Another cognitive approach is **gender-schema theory.** Like cognitive-developmental theory, it views children as actively extracting knowledge about gender from their environment *before* engaging in gender-typed behavior. However, gender-schema theory places more emphasis on the influence of culture. Once children know what sex they are, they develop a concept of what it means to be male or female *in their culture.* Children then match their behavior to their culture's view of what boys and girls are "supposed" to be and do (Bem, 1993; Martin et al., 2002).

Bem suggests that children who show stereotypical behavior may do so as a result of pressure for gender conformity. However, there is little evidence that gender schemas are at the root of stereotyped behavior or that children who are highly gender-typed feel much pressure to conform (Yunger, Carver, & Perry, 2004).

Another problem with both gender-schema theory and Kohlberg's theory is that gender-stereotyping does not always become stronger with increased gender knowledge (Bandura & Bussey, 2004; Banse, Gawronski, Rebetez, Gutt, & Morton, 2010). In fact, gender-stereotyping rises and then falls as children learn more about gender (Ruble & Martin, 1998; Welch-Ross & Schmidt, 1996). Around ages 4 to 6, when, according to gender-schema theory, children are constructing and consolidating their gender schemas, they tend to notice and remember only information consistent with these schemas. Indeed, they tend to *mis*remember information that challenges gender stereotypes, such as photos of a girl sawing wood or a boy cooking. They are also quick to accept gender labels; when told that an unfamiliar toy is for the other sex, they will quickly discard it (Martin & Ruble, 2004). By ages 5 and 6, children develop rigid stereotypes about gender. A boy will pay more attention to what he considers boys' toys and a girl to girls' toys, and both will look to others when they encounter novel toys to determine if the toy is one that is intended for their gender group (Weisgram, Fulcher, & Dinella, 2014; Shutts, Banaji, & Spelke, 2010). Around age 7 or 8, schemas become more complex as children take in and integrate contradictory information, such as the fact that many girls have short hair. At this point, as children develop more complex beliefs about gender, they become more flexible in their views (Martin & Ruble, 2004; Trautner et al., 2005).



Coloring book and cereal box characters are not immune from gender stereotypes. Females are more likely to be portrayed as children or humans, males are more likely to be portrayed as animals, adults, and superheroes.

Cognitive approaches to gender development have been an important contribution. However, these approaches may not fully explain the link between knowledge and conduct. There is disagreement about precisely what mechanism prompts children to act out gender roles and why some children become more strongly gender-typed than others (Bussey & Bandura, 1992; 1999; Martin & Ruble, 2004).

Social Learning Approach According to Walter Mischel (1966), a traditional social learning theorist, children acquire gender roles by imitating models and being rewarded for gender-appropriate behavior. Behavioral feedback, together with direct teaching by parents and other adults, reinforces gender-typing. A boy who models his behavior after his father is commended for acting "like a boy." A girl gets compliments on a pretty dress or hairstyle. In this model, *gendered behavior precedes gender knowledge* ("I am rewarded for doing boy things, so I must be a boy").

Since the 1970s, however, studies have cast doubt on the power of same-sex modeling alone to account for gender differences. As cognitive explanations have come to the fore, traditional social learning theory has lost favor (Martin et al., 2002). Albert Bandura's (1986; Bussey & Bandura, 1999) newer **social cognitive theory,** an expansion of social learning theory, incorporates some cognitive elements.

social cognitive theory
Albert Bandura's expansion of social learning theory; holds that children learn gender roles through socialization.

According to social cognitive theory, observation enables children to learn much about gender-typed behaviors before performing them. They can mentally combine observations of multiple models and generate their own behavioral variations. Instead of viewing the environment as a given, social cognitive theory recognizes that children select or even create their environments through their choice of playmates and activities. However, critics say that social cognitive theory does not explain how children differentiate between boys and girls before they have a concept of gender, or what initially motivates children to acquire gender knowledge (Martin et al., 2002).

For social cognitive theorists, socialization—the way a child interprets and internalizes experiences with parents, teachers, peers, and cultural institutions—plays a central part in gender development. Socialization begins in infancy, long before a conscious understanding of gender begins to form. Gradually, as children begin to regulate their activities, standards of behavior become internalized. A child no longer needs praise, rebukes, or a model's presence to act in socially appropriate ways. Children feel good about themselves when they live up to their internal standards and feel bad when they do not. In the following sections, we address three primary sources of social influences on gender development: family, peer, and cultural.



This explanation of gender development focuses on the learning approaches. Theories help us understand and make sense of the world, and in this case, we use the principles of reinforcement and punishment to explain gender. Note that theories change in response to new data. When research began to indicate that cognition also mattered, the original approach was expanded to accommodate those findings.

Family Influences. Usually, experiences in the family reinforce gender-typical preferences and attitudes. It can be difficult to determine this, however, because it is difficult to separate parents' genetic influence from the influence of the environment they create. Also, parents may be responding to rather than encouraging children's gender-typed behavior (Iervolino et al., 2005).

Boys tend to be more strongly gender-socialized concerning play preferences than girls. Parents, especially fathers, generally show more discomfort if a boy plays with a doll than if a girl plays with a truck (Ruble, Martin, & Berenbaum, 2006; Sandnabba & Ahlberg, 1999). Girls have more freedom than boys in their clothes, games, and choice of playmates (Fagot, Rogers, & Leinbach, 2000).

Parents who adhere to traditional gender schemas are more likely to have strongly gender-typed children (Tenenbaum & Leaper, 2002), and the converse is also true. Children from families with lesbian and gay parents tend to show less gender-typed play behavior (Goldberg, Kashy, & Smith, 2012), and this is especially true for girls, and for children raised in families with lesbian parents (Goldberg & Garcia, 2016). There are indications that the father's role in gender socialization is especially important and that viewing fathers engaged in household and child care work is associated with decreased gender-typing (Deutsch, Servis, & Payne, 2001; Turner & Gervai, 1995).



Did you know that pink used to be considered masculine and blue feminine? Blue was considered soothing, and so more appropriate for girls. Pink was a variation of red, a strong and active color, and was seen as more appropriate for boys.

Siblings also influence gender development. Secondborns tend to become more like their older siblings in attitudes, personality, and leisure activities, whereas firstborns are more influenced by their parents and less by their younger siblings (McHale, Updegraff, Helms-Erikson, & Crouter, 2001). Young children with an older sibling of the same sex tend to be more gender-typed than those whose older sibling is of the other sec (Iervolino et al., 2005; Rust et al., 2000).

Peer Influences Even in early childhood, the peer group is a major influence on gender-typing. Preschoolers generally play in sex-segregated groups that reinforce gender-typed behavior (Martin et al., 2013), and the influence of the peer group increases with age (Martin et al., 2002). Children who play in same-sex groups (Maccoby, 2002; Martin & Fabes, 2001) or by themselves (Goble, Martin, Hanish, & Fabes, 2012) tend to be more gender-typed than children who do not. Additionally, the more children choose to play with particular friends, the more they mutually influence each other (Martin et al., 2013).

Peers can exert negative pressure on each other to behave in normative ways. Being gender atypical is associated with peer victimization (Zosuls, Andrews, Martin, England, & Field, 2016), although the relationship is not always simple. For example, in one study, peer harassment was associated with a decrease in gender atypicality for children with many male friends. However, it was also associated with an increase in gender typicality for children with many female friends (Lee & Troop-Gordon, 2011). This illustrates the interactive influence of peer processes and self-socialization. While peers can be a negative influence, friends can also serve as a protective buffer against victimization (Zosuls et al., 2016).

Cultural Influences Children's books have long been a source of gender stereotypes. Analyses of children's books have uncovered nearly twice as many male as female main characters, greater representation of males in book titles, and strong gender-stereotyping (McCabe, Fairchild, Grauerholz, Pescosolido, & Tope, 2011). Female main characters

nurtured more, were portrayed in indoor settings, and appeared to have no paid occupations (Hamilton, Anderson, Broaddus, & Young, 2006). Fathers were largely absent, and when they appeared, they were shown as withdrawn and ineffectual (Anderson & Hamilton, 2005). Similar results have been found in coloring books, where females are more typically portrayed as children and boys as superheroes, animals, or adults (Fitzpatric & McPhearson, 2010).

In the United States, television is a major format for the transmission of cultural attitudes toward gender (Collins, 2011). This includes television programming as well as commercials (Eisend, 2010) and music videos (Wallis, 2011). In both children's and in prime-time programming, boys and men are overrepresented and receive greater screen time. Moreover, in children's programming, boys display a wider range of emotions than girls do; while in adult programming, men are portrayed as dominant, and women are likely to be portrayed as sexually provocative (Martin, 2017; Sink & Mastro, 2017). Not surprisingly, children who watch more television become more strongly gender-typed (Kimball, 1986).

Movies also have an impact on the understanding of gender. Research has shown that males in G-rated movies are more likely to be main characters, and females are more likely to be portrayed as young and as possessing traits such as intelligence and beauty (Smith, Pieper, Granados, & Choueiti, 2010). Disney movies, in part because of their popularity, have been frequent targets of criticism because of their stereotypical portrayal of male and female roles. While Disney has made attempts at introducing more egalitarian ideals in its line of princess movies (England, Descartes, & Collier-Meek, 2011), more work remains. One recent study showed that preschool girls who were highly engaged with Disney princess movies showed higher gender-stereotypical behavior a year later than did children less engaged with princess movies (Coyne, Linder, Rasmussen, Nelson, & Birkbeck, 2016).

Major strengths of the socialization approach include the breadth and multiplicity of processes it examines and the scope for individual differences it reveals. But this very complexity makes it difficult to establish clear causal connections between the way children are raised and the way they think and act. Further research may help us see how socializing agents mesh with children's biological tendencies and cognitive understandings with regard to gender-related attitudes and behaviors.

checkpoint can you . . .

- Compare five approaches to the study of gender development?
- Assess evidence for biological explanations of gender differences?
- Discuss how various theories explain the acquisition of gender roles, and assess the support for each theory?

Play

Carmen, age 3, pretends that the pieces of cereal floating in her bowl are "fishies" swimming in the milk. After breakfast, she puts on her mother's hat, picks up a briefcase, and is a "mommy" going to work. She rides her tricycle through the puddles, comes in for an imaginary phone call, turns a wooden block into a truck and says, "Vroom, vroom!"

It would be a mistake to dismiss Carmen's activities as "just fun." Play is vitally important to development and has significant current and long-term functions (Bjorklund & Pellegrini, 2002; Whitebread, Basilio, Kuvalja, & Verma, 2012). Play is important to healthy development of body and brain. It enables children to engage with the world around them, to use their imagination, to discover flexible ways to use objects and solve problems, and to prepare for adult roles. Play is not what children do to burn off energy so they can get to the real business of learning. Play is the context in which much of the most important learning occurs (see Research in Action).



Across many animal species, play is practice for skills needed in adulthood. Young prey animals run and jump with each other, predators stalk and attack their littermates. How is children's play helping prepare children for adulthood? What social skills are being practiced?

Play contributes to all domains of development. Indeed, play is so important to children's development that the United Nations High Commissioner for Human Rights (1989) has recognized it as a right of every child.

Researchers categorize children's play in varying ways. One common classification system is by *cognitive complexity*. Another classification is based on the *social dimension* of play.

research in action

THE ADAPTIVE NATURE OF PLAY

Play is ubiquitous, not just in young humans—who take almost any opportunity they can to play—but also in the young of many species, especially intelligent ones (Bjorklund & Pellegrini, 2000; Graham & Burghardt, 2010). Why is this pattern of behavior so common across different species? Why is playing so much fun?

Evolutionary psychology can help us answer this question. From an evolutionary standpoint, play serves a purpose. During play, physical attributes plus cognitive and social skills necessary for adult life are practiced. Kittens pounce and stalk, puppies wrestle, horses run and kick. Play is a means of experimenting in a relatively risk-free fashion with new behavioral routines that will be needed in adulthood (Pellegrini, Dupuis, & Smith, 2007).

In humans, early locomotor play is believed to support gross motor skill and neuromuscular development (Burdette & Whitaker, 2005). Exercise play increases from early childhood to the early primary school years, and vigorous activity may help develop muscle strength, endurance, efficiency of movement, and athletic coordination (Graham & Burghardt, 2010; Smith & Pellegrini, 2013).

The most complex and difficult thing we will ever have to learn how to navigate is our social world, and social play helps us practice how to do this. Social play is abundant in childhood. Across cultures, social play allows children the opportunity to develop and sustain friendships, practice cooperation, negotiate conflict, and build complex social skills in coordination with peers (Jarvis, Newman, & Swiniarski, 2014; Kamp, 2001). Pretend play has been linked to cognitive functions, such as creativity, flexible thinking, perspective taking, and exploring bounds of fantasy and reality (Russ & Wallace, 2013). Play fighting, which is often discouraged by adults, has adaptive functions as children innovate story lines, practice controlled physical movements, and experiment with themes of competition and aggression (Hart & Tannock, 2013).

Evolutionary psychologists posit for play to be an adaptation, its benefits must outweigh its costs. Potential costs include energy expenditure, injury, aggression, and decreased vigilance from predators or other dangers (Graham & Burghardt, 2010). Comparatively, numerous adaptive developmental functions are learned, practiced, and refined through play. There are immediate benefits in psychological well-being, with potential lifelong impacts on social and emotional health (Hewes, 2014). One thing seems clear: Play is not frivolous activity, but time well spent.

what's your view

From your observations of children's play, what immediate and long-range purposes does it appear to serve? Have you noticed differences in the way boys and girls play together? What might be an evolutionary rationale for that?

COGNITIVE LEVELS OF PLAY

Courtney, at 3, talked for a doll, using a deeper voice than her own. Miguel, at 4, wore a kitchen towel as a cape and flew around as Batman. These children were engaged in play involving make-believe people or situations—one of four levels of play Smilansky (1968) identified as showing increasing amounts of cognitive complexity. Although certain types of play are more common at particular ages, the types of play can occur anytime.

The simplest level, which begins during infancy, is **functional play** (sometimes called *locomotor play*), consisting of repeated practice in large muscular movements, such as rolling a ball (Bjorklund & Pellegrini, 2002).

The second level, **constructive play** (also called *object play*), is the use of objects or materials to make something, such as a house of blocks or a crayon drawing (Bjorklund & Pellegrini, 2002).

functional play
Play involving repetitive large muscular movements.

constructive play
Play involving use of objects or materials to make something.



This young "butterfly" is participating in dramatic play based on the ability to use symbols to stand for people or things.
Sean Justice/Corbis/Fuse/Getty Images

The third level, **dramatic play** (also called *pretend play, fantasy play,* or *imaginative play*), involves imaginary objects, actions, or roles. More advanced cognitive development affords more sophisticated play, but play also helps strengthen the development of dense connections in the brain and promotes later capacity for abstract thought. Play is not just the response to a developing intellect; it is the driver of it as well. For example, studies have found the quality of dramatic play to be associated with social and linguistic competence (Bergen, 2002). Pretend play also may further the development of theory-of-mind skills (Smith, 2005b). Pretending that a banana is a telephone, for example, and understanding that you and I both agree on that pretense, can help children begin to understand others' thoughts.

Dramatic play peaks during the preschool years (Bjorklund & Pellegrini, 2002; Smith, 2005a) and then declines as school-age children become more involved in **formal games with rules**—organized games with known procedures and penalties, such as four square and freeze tag. However, many children continue to engage in pretending well beyond the elementary school years.

dramatic play
Play involving imaginary people or situations; also called *pretend play, fantasy play,* or *imaginative play.*

formal games with rules
Organized games with known procedures and penalties.

THE SOCIAL DIMENSION OF PLAY

In a classic study, Mildred B. Parten (1932) identified six types of play (Table 2). She found that as children get older, their play tends to become more social—that is, more interactive and more cooperative. Although this general progression is common, children of all ages also engage in all of Parten's categories of play (K. H. Rubin, Bukowski, & Parker, 1998).

Parten incorrectly regarded nonsocial play as less mature than social play. She suggested that young children who continue to play alone could develop social, psychological, or educational problems. It is true that solitary play is often a sign of shyness, anxiety, fearfulness, or social rejection (Coplan, Ooi, Rose-Krasnor, & Nocita, 2014; Degnan et al., 2014; Coplan, Prakash, O'Neill, & Armer, 2004; Henderson, Marshall, Fox, & Rubin, 2004). However, researchers now consider not only *whether* a child plays alone but *why*. Some children may just prefer to play alone (Coplan, Ooi, & Nocita, 2015). A preference for solitude is not necessarily associated with negative outcomes in adulthood, so it is reasonable to think the same might be true for children (Ooi, Baldwin, Coplan, & Rose-Krasnor, 2018). In fact, most children who like to play alone are rated as socially and cognitively competent by others (Harrist, Zain, Bates, Dodge, & Pettit, 1997).

Reticent play, a combination of Parten's unoccupied and onlooker categories, is often a manifestation of shyness (Coplan et al., 2004). Such behaviors as playing near other children, watching what they do, or wandering aimlessly may be a prelude to joining in others' play (Spinrad et al., 2004). Many children outgrow this pattern. In one study, 43 percent of toddlers who were initially assessed as high at 2 years of age declined in social reticence by 5 years of age, and only 16 percent remained high (Degnan et al., 2014). Even if reticent, such children may nonetheless remain well liked and show few problem behaviors (Spinrad et al., 2004). Nonsocial play, then, seems to be far more complex than Parten imagined.

One kind of play that becomes increasingly social during the preschool years is dramatic play (Rubin, Bukowski & Parker, 1998). Children typically engage in more dramatic play when playing with someone else than when playing alone (Bjorklund & Pellegrini, 2002). In pretending together, children develop joint problem-solving, planning, and goal-seeking skills; gain understanding of other people's perspectives; and construct an image of the social world (Bergen, 2002; Bjorklund & Pellegrini, 2002; Smith, 2005a).

A common type of dramatic play involves imaginary companions. This normal phenomenon of childhood is seen most often in firstborn and only children, who lack the

TABLE 2 Parten's Categories of Social and Nonsocial Play

Category	Description
Unoccupied behavior	The child does not seem to be playing but watches anything of momentary interest.
Onlooker behavior	The child spends most of the time watching other children play. The onlooker may talk to them but does not enter into the play. .
Solitary independent play	The child plays alone with toys that are different from those used by nearby children and makes no effort to get close to them.
Parallel play	The child plays independently beside rather than with the other children, playing with similar toys, and does not try to influence the other children's play.
Associative play	The children talk, borrow and lend toys, follow each other around, and play similarly. There is no division of labor and no organization around goals. The children behave as they wish and are more interested in being around each other than the activity itself
Cooperative or organized supplementary play	The child plays in a group organized for some goal—to make something, play a formal game, or dramatize a situation. One or two children direct activities. Children take on different roles and supplement each other's efforts.

Source: Adapted from Parten, 1932, pp. 249–251.

close company of siblings, and more often in girls. (Carlson & Taylor, 2005). Children who have imaginary companions are perfectly capable of distinguishing fantasy from reality (Taylor, Cartwright, & Carlson, 1993). They play more imaginatively and cooperatively than other children (Singer & Singer, 1990), they do not lack for friends (Gleason, Sebanc, & Hartrup, 2000), and they perform better on theory-of-mind tasks (such as differentiating appearance and reality and recognizing false beliefs) and tasks of emotional understanding (Giménez-Dasí, Pons, & Bender, 2016). Teachers rate children with imaginary companions as higher in social competence (Gleason & Kalpidou, 2014), and although 5½-year-olds with imaginary companions do not have a bigger vocabulary than children without imaginary companions, they engage in more private speech (Davis, Meins, & Fernyhough, 2013) and they tell more elaborate stories about both personal experiences and a storybook (Trionfi & Reese, 2009). Moreover, when children are encouraged to engage in fantastical play, such as pretending to take a trip to the moon and interact with space creatures, having an imaginary companion is associated with improvements in their working memory and attentional control tasks (Thibodeau, Gilpin, Brown, & Meyer, 2016). These types of results, as a whole, point to the role of play and imagination in the development of essential cognitive and socio-emotional skills.



How do you think the growing use of computers for both games and educational activities might affect preschool children's play?

gender segregation
Tendency to select playmates of one's own gender.

GENDER AND PLAY

As we have mentioned, sex segregation is common among preschoolers and becomes more prevalent in middle childhood. This tendency seems to be universal across cultures (Smith, 2005a). By 3 years of age, girls are much more likely to play with dolls and tea sets, whereas boys prefer toy guns and trucks (Dunn & Hughes, 2001). Children will sometimes reprimand each other for playing with the "wrong" toys for their gender (Mayeza, 2017). Girls and boys also prefer to dress in stereotypically gender-typed ways—girls in pink dresses, boys in cowboy hats—and this tendency occurs regardless of the parents' own desires about how their children dress (Halim et al., 2014).

Girls tend to select other girls as playmates, and boys prefer other boys (Maccoby & Jacklin, 1987; Martin & Fabes, 2001), a phenomenon known as **gender segregation**. Boys' tendency to be more active and physically aggressive in their play as compared to girls' more nurturing play styles are major contributors (Martin, Fabes, Hanish, Leonard, &



Preschool girls and boys do not typically play together. When they do, they usually play with "masculine" toys such as cars, trains, or blocks.
Romrodphoto/Shutterstock

Dinella, 2011). Boys engage in higher levels of rough-and-tumble play; girls tend to choose more structured, adult-supervised activities (Fabes, Martin, & Hanish, 2003; Smith, 2005a). Girls' pretend stories generally focus on social relationships and nurturing (Pellegrini & Archer, 2005; Smith, 2005a). Boys' pretend play often involves danger or discord and competitive, dominant roles, as in mock battles. Additionally, boys' play is more strongly gender-stereotyped than girls' (Bjorklund & Pellegrini, 2002). Thus, in mixed-sex groups, play tends to revolve around traditionally masculine activities (Goble, Martin, Hanish, & Fabes, 2012).

These differences in play styles are not driven solely by social influences. Regardless of the cultural group they come from, boys tend to engage in more exploratory play, and girls enjoy more symbolic and pretend play (Cote & Bornstein, 2009; Smith, 2005a). However, this does not mean social influences have no effect. The more salient gender is made (for example, with the use of different clothing for men and women or when children are separated into groups by gender), the more children believe in gender stereotypes and the less they play with other-sex peers (Hilliard & Liben, 2010). Children raised in gay and lesbian families, where beliefs about gender are more flexible (Goldberg, 2007), are less stereotyped in their play (Goldberg, Kashy, & Smith, 2012). Social influences can minimize or maximize existing differences, but they do not seem to create them.

CULTURE AND PLAY

Cultural values influence beliefs about the importance of play. In Western cultures such as the United States, some argue that adequate amounts of child-directed free play are necessary for optimal development. In other cultures, play may be viewed differently. For example, in one study, parents from China, Korea, Pakistan, Nepal, and India were asked about their beliefs and reported they saw little developmental value in play, preferring to encourage academics. The European parents in the same study, by contrast, believed that play was important for development (Parmar, Harkness, & Super, 2004). Similarly, teachers in Sweden and the United States in another study saw play as "children's work," although Japanese educators did not (Izumi-Taylor, Samuelsson, & Rogers, 2010). Cultural values also affect the play environments adults set up for children, and these environments in turn affect the frequency of specific forms of play across cultures (Bodrova & Leong, 2005).

Culture also influences the nature of play via peer interactions. Children who behave in ways that are contrary to cultural values may be met with rejection from peers, while those who embody those values are likely to be accepted (Chen, 2012). As one example, Western-style cultures are more likely to value independence and initiative; collectivistic cultures place a higher value on traits such as self-control and group harmony (Chen, 2012; Rogoff, 2003). One observational study compared middle-class Korean American and Anglo American children in separate preschools. The Korean American children played more cooperatively, often offering toys to other children—very likely a reflection of their culture's emphasis on group harmony. Anglo American children were more aggressive and often responded negatively to other children's suggestions, reflecting the competitiveness of American culture (Farver, Kim, & Lee, 1995). Similarly, in another study, Andalusian children (from a collectivistic culture) who unexpectedly engaged in more aggressive encounters than Dutch children (from an individualistic culture) during a naturalistic play interaction were nonetheless also able to more frequently negotiate a resolution rather than cut off the interaction. This reflected their culture's emphasis on social goals and accommodation (Martinez-Lozano, Sánchez-Medina, & Goudena, 2011).

checkpoint can you . . .

- Identify four cognitive levels of play and six categories of social and nonsocial play?
- Explain how cognitive and social dimensions of play may be connected?
- Tell how gender and culture influence the way children play, and give examples?

Parenting

Parenting can be a complex challenge. Parents must deal with small people who have independent minds and wills, but who still have a lot to learn about what kinds of behavior work well in society.

FORMS OF DISCIPLINE

In the field of human development, **discipline** refers to methods of molding character and of teaching self-control and acceptable behavior. In casual speech, we tend to think of discipline as involving only punishment, but the psychological definition of the word also includes techniques such as rewarding desired behaviors and drawing attention to how actions affect others.

discipline
Methods of molding children's character and of teaching them to exercise self-control and engage in acceptable behavior.

Reinforcement and Punishment "You're such a wonderful helper, Nick! Thank you so much for putting away your toys." Nick's mother smiles warmly at her son as he plops his dump truck into the toy box.

Parents sometimes punish children to stop undesirable behavior, but children usually learn more from being reinforced for good behavior. *External* reinforcements may be tangible (treats, more playtime) or intangible (a smile, a word of praise, or a special privilege). Whatever the reinforcement, the child must see it as rewarding and must receive it fairly consistently after showing the desired behavior. Eventually, the behavior should provide an *internal* reinforcement: a sense of pleasure or accomplishment.

There are occasions, however, when punishment, such as isolation or denial of privileges, is necessary. Children cannot be permitted to run out into traffic or hit another child. In such situations, punishment, if consistent, immediate, and clearly tied to the offense, may be effective. It should be administered calmly, in private, and aimed at eliciting compliance, not guilt. It is most effective when accompanied by a short, simple explanation (AAP Committee on Psychosocial Aspects of Child and Family Health, 1998; Baumrind, 1996a). It is important to remember that, in addition to punishment for undesired behaviors, the desired behaviors should be made clear. Children need to know what should be substituted for misbehavior.

Punishment that is too harsh can be harmful. Children who are punished harshly and frequently may have trouble interpreting other people's actions and words and may attribute hostile intentions where none exists (Weiss, Dodge, Bates, & Pettit, 1992). Young children who have been punished harshly also show more externalizing behaviors such as physical aggression and impulsivity (Erath, El-Sheikh, & Cummings, 2009). The link between harsh parenting and aggression is cross-cultural and has been found in research investigating mother-child dyads from China, India, Italy, Kenya, the Philippines, and Thailand (Gershoff et al., 2010). Harsh parenting has also been linked to relational aggression, in which attempts are made to damage another's social status or reputation (Kawabata, Alink, Tseng, Van IJzendoorn, & Crick, 2011).

The influence of harsh parenting is bidirectional; difficult children elicit more coercive parenting on the part of their parents (Pettit & Arsiwalla, 2008). Moreover, different children respond differently to harsh parenting. For example, children with attentional issues are particularly likely to respond to coercive parenting with behavior problems (Scott, Doolan, Beckett, Harry, & Cartwright, 2012), exacerbating the original problem, and potentially initiating a cascade of increasingly negative interactions between parent and child. By contrast, shyer children may become frightened if parents lose control and may eventually try to avoid a punitive parent, undermining the parent's ability to influence behavior (Grusec & Goodnow, 1994). Essentially, the effectiveness and influence of parenting tactics varies with child temperament (Kochanska, 1993).

One of the harshest forms of parenting involves the use of **corporal punishment**. Corporal punishment has been defined as "the use of physical force with the intention of causing a child to experience pain, but not injury, for the purpose of correction or control of the child's behavior" (Straus, 1994, p. 4). It can include spanking, hitting, slapping, pinching, shaking, and other physical acts. The rates of corporal punishment for American preschoolers trended down by 18 percent from 1975 to 2002, although the majority of parents of preschool children—almost 80 percent—still reported spanking or slapping their children (Zolotor, Theodore, Runyan, Chang, & Laskey, 2011). In 2015, 4 percent of parents reported spanking their children "often" and almost 17 percent of parents reported spanking their children at least some of the time (Parker, Horowitz, & Rohal, 2015). Corporal punishment is common across many cultures and found at all

A secure attachment with parents or a teacher in early childhood has been related to whether or not children view God as a "loving friend"—someone who is nice, loves you, and makes you happy. If you are religious, do you think your relationship with your parents affects your religious beliefs?

de Roos, 2006

Kids who come from homes in which there is domestic abuse, whether physical or emotional, are more likely to be spanked.

Taylor, Lee, Guterman, & Rice, 2010

Dante Cicchetti from the University of Minnesota has found that children from abusive homes are more likely to respond to a schoolmate's cries with aggression or withdrawal than are children from loving homes, who are more likely to try to comfort their schoolmate or go get a teacher. Why might abused children have developed this tendency? How might their parents' responses to their distress have shaped this?

corporal punishment
Use of physical force with the intention of causing pain but not injury so as to correct or control behavior.

income levels (Runyan et al., 2010). It is popularly believed to be more effective than other methods to instill respect for parental authority and to be harmless if done in moderation by loving parents (Kazdin & Benjet, 2003; McLoyd & Smith, 2002).

A large body of evidence suggests that corporal punishment is often counterproductive and should be avoided (Straus & Stewart, 1999; Gershoff, 2010). Apart from the risk of injury, children who experience corporal punishment may fail to internalize moral messages, develop poor parent-child relationships, and show increased physical aggressiveness or antisocial behavior. As adults, they are more likely to suffer from mental health issues, engage in criminal behavior, and abuse their own children (Gershoff, 2013). A link between spanking and externalizing behaviors has been found in children from different cultural and ethnic groups, both internationally, as well as within white, African American, Latino, and Asian American families in the United States (Gershoff et al., 2010; Gershoff, Lansford, Sexton, Davis-Kean, & Sameroff, 2012; Berlin et al., 2009). In addition, spanking has been negatively associated with cognitive development (MacKenzie, Nicklas, Waldfogel, & Brooks-Gunn, 2013; Berlin et al., 2009), and there is no clear line between mild and harsh spanking—mild spanking often leads to the other (Kazdiz & Benjet, 2003).

More than 110 countries have banned corporal punishment in schools (Center for Effective Discipline, 2009). The United Nations Convention on the Rights of Children opposes all forms of physical violence against children; the United States and Somalia remain the only nations yet to ratify the convention (Zolotor et al., 2011). In the United States, 15 states specifically allow the use of corporal punishment in schools, 7 states do not prohibit it, and 28 states specifically prohibit it (U.S. Department of Education, 2017). However, its prevalence varies widely by location. In some states, it is nearly absent. In other states, it is relatively common. For instance, in Mississippi, 1 in every 14 children can expect to experience an incident of corporal punishment within an academic year (Gershoff & Font, 2016). Some educators believe it is an effective deterrent to harmful misbehaviors, such as fighting, but others assert that corporal punishment degrades the educational environment. Moreover, critics point to the fact that ethnic minority children and children with disabilities are subject to corporal punishment more frequently (U.S. Department of Education, 2017).

Inductive Reasoning, Power Assertion, and Withdrawal of Love

When Sara took candy from a store, her father did not lecture her on honesty, spank her, or tell her what a bad girl she had been. Instead, he explained how the owner of the store would be harmed by her failure to pay for the candy and how sad he would feel that it was gone. He asked Sara how she would feel in the same situation. Then he took her back to the store to return the candy. Although he did not ask her to do so, Sara told the store owner she was sorry she had made him sad.

inductive techniques
Disciplinary techniques designed to induce desirable behavior by appealing to a child's sense of reason and fairness.

power assertion
Disciplinary strategy designed to discourage undesirable behavior through physical or verbal enforcement of parental control.

withdrawal of love
Disciplinary strategy that involves ignoring, isolating, or showing dislike for a child.

Inductive techniques, such as those Sara's father used, are designed to encourage desirable behavior or discourage undesirable behavior by setting limits, demonstrating logical consequences of an action, explaining, discussing, negotiating, and getting ideas from the child about what is fair. They also tend to include appeals to consider how one's actions affect how others feel.

Inductive techniques are usually the most effective method of getting children to accept parental standards, arouse empathy for the victims of wrongdoing, elicit appropriate feelings of guilt on the part of wrongdoers, and see the moral wrongness of bad behaviors (Hoffman, 1970; Kerr, Lopez, Olson, & Sameroff, 2004; Kochanska, Gross, Lin, & Nichols, 2002).

Two other broad categories of discipline are *power assertion* and *temporary withdrawal of love*. **Power assertion** is intended to stop or discourage undesirable behavior through physical or verbal enforcement of parental control; it includes demands, threats, withdrawal of privileges, spanking, and other types of punishment. **Withdrawal of love** may include ignoring, isolating, or showing dislike for a child. Neither of these is as effective as inductive reasoning in most circumstances, and both may be harmful (Baumrind, Larzelere, & Owens, 2010; Jagers et al., 1996; McCord, 1996).

checkpoint can you . . .

- Compare five forms of discipline, and discuss their effectiveness?

PARENTING STYLES

Just as children differ in their temperament, parents differ in their approach to parenting.

Baumrind's Model of Parenting Styles In pioneering research, Diana Baumrind (1971, 1996b; Baumrind & Black, 1967) studied 103 preschool children from 95 families. Through interviews, testing, and home studies, she measured how the children were functioning, identified three parenting styles, and described typical behavior patterns of children raised according to each (Baumrind, 1989; Darling & Steinberg, 1993; Pettit, Bates, & Dodge, 1997; see Table 3).

Authoritarian parenting emphasizes control and unquestioning obedience. Authoritarian parents try to make children conform to a set standard of conduct and punish them forcefully for violating it. They are less warm than other parents. Their children tend to be more discontented, withdrawn, and distrustful.

Permissive parenting emphasizes self-expression and self-regulation. Permissive parents make few demands. They consult with children about policy decisions and rarely punish. They are warm, noncontrolling, and undemanding. Their preschool children tend to be immature—the least self-controlled and the least exploratory.

Authoritative parenting emphasizes a child's individuality but also stresses limits. Authoritative parents are loving and accepting but also demand good behavior and are firm in maintaining standards. They impose limited, judicious punishment when necessary, within the context of a warm, supportive relationship. Preschoolers with authoritative parents tend to be the most self-reliant, self-controlled, self-assertive, exploratory, and content.

authoritarian parenting
In Baumrind's terminology, parenting style emphasizing control and obedience.

permissive parenting
In Baumrind's terminology, parenting style emphasizing self-expression and self-regulation.

authoritative parenting
In Baumrind's terminology, parenting style blending respect for a child's individuality with an effort to instill social values.

Eleanor Maccoby and John Martin (1983) added a fourth parenting style—*neglectful,* or *uninvolved*—to describe parents who, sometimes because of stress or depression, focus on their needs rather than on those of the child. Neglectful parenting has been linked with a variety of behavioral disorders in childhood and adolescence (Steinberg, Eisengard, & Cauffman, 2006).

Why does authoritative parenting seem to enhance children's social competence? It may be because authoritative parents set sensible expectations and realistic standards. By making clear, consistent rules, they let children know what is expected of them. In authoritarian homes, children are so strictly controlled that often they cannot make independent choices about their own behavior. In permissive homes, children receive so little guidance that they may become uncertain and anxious about whether they are doing the right thing. In authoritative homes, children know when they are meeting expectations and can decide whether it is worth risking parental displeasure to pursue a goal. These children are expected to perform well, fulfill commitments, and participate actively in family duties as well as family fun. They know the satisfaction of accepting responsibilities and achieving success.



As a parent, what form of discipline would you favor if your 3-year-old took a cookie from the cookie jar? Refused to nap? Hit his little sister? Tell why.

Criticisms of Baumrind's Model In research based on Baumrind's work, the benefits of authoritative parenting have generally been supported. This is important because identifying and promoting positive parenting practices is crucial to preventing early-onset problem behavior (Dishion & Stormshak, 2007). Families at high risk for problem behavior in children that participated in parenting support services were able to improve childhood outcomes by an early focus on positive and proactive parenting practices (Dishion et al., 2008).

TABLE 3 Parenting Styles

		WARMTH	
		High	**Low**
CONTROL	**High**	Authoritative	Authoritarian
	Low	Permissive	Neglectful



Traditional Asian culture stresses adults' responsibility to maintain the social order by teaching children socially proper behavior.
Anurak Pongpatimet/Shutterstock

However, Baumrind's findings are correlational. Thus, they merely establish associations between each parenting style and a particular set of child behaviors. They do not show that different styles of child rearing *cause* children to be more or less competent. As with all correlations, the direction of effects is not certain.

Moreover, Baumrind did not consider innate factors, such as temperament, that might have influenced the parents. An easy child might, for example, elicit authoritative parenting, and a difficult child, more power assertive techniques as parents search for a way to manage her defiance.

Another concern is that Baumrind's categories reflect a biased view of child development. Some researchers have argued that while authoritative parenting may be a beneficial parenting strategy for children within dominant U.S. culture, it may not function in the same way across different ethnic or cultural groups. For instance, some evidence suggests that while parenting style is associated with later academic achievement in European American teens, it is not necessarily associated with such outcomes in Latino, Asian, or African American adolescents (Dornbusch, Ritter, Leiderman, Roberts, & Fraleigh, 1987; Steinberg, Lamborn, Dornsbusch, & Darling, 1992).

But why might this be so? Parenting strategies reflect cultural values, and thus, they are interpreted by children within that context. In countries such as the United States, the traits of independence and initiative are highly valued. Moreover, constraints on behavior are often viewed negatively. Among Asian Americans, obedience and strictness are not necessarily associated with harshness and domination but instead with caring, concern, and involvement. Traditional Chinese culture, with its emphasis on respect for elders, stresses one's individual responsibility to maintain the social order. This obligation is modeled through firm and just control and governance of the child and even by physical punishment if necessary (Zhao, 2002). Although Asian American parenting is frequently described as authoritarian, the warmth and supportiveness that characterize Asian family relationships may more closely resemble Baumrind's authoritative parenting but without the emphasis on the European American values of individuality, choice, and freedom (Chao, 1994) and with stricter parental control (Chao, 2001). As another example, Mexican American families tend to use more authoritarian parenting than European American families, perhaps in line with the respect for authority characteristic of Mexican culture (Varela et al., 2004). Lastly, in African American families, who tend to use more physical punishment, authoritarian parenting is not related to negative behavioral outcomes, although this relationship does exist for white families (Baumrind, 1987; McLeod, Kruttschnitt, & Dornfield, 1994).

checkpoint can you . . .

- Summarize Baumrind's model of parenting styles?
- Explain how parents' way of resolving conflicts with young children can contribute to the success of authoritative child rearing?
- Discuss criticisms of Baumrind's model and cultural variations in parenting styles?

SPECIAL BEHAVIORAL CONCERNS

Three issues of special concern to parents, caregivers, and teachers of preschool children are how to promote altruism, curb aggression, and deal with fears that often arise at this age.

altruism
Behavior intended to help others out of inner concern and without expectation of external reward; may involve self-denial or self-sacrifice.

prosocial behavior
Any voluntary behavior intended to help others.

Prosocial Behaviorc Alex, at 3½, responded to two preschool classmates' complaints that they did not have enough modeling clay, his favorite plaything, by giving them half of his. Alex was showing **altruism:** motivation to help another person with no expectation of reward. Altruism is at the heart of **prosocial behavior,** voluntary, positive actions to help others.

Even before the 2nd birthday, children often help others, share belongings and food, and offer comfort. Children who are more advanced in their emotional understanding at the age of 3 years generally engage in more prosocial behaviors at the age of 4 (Ensor, Spencer, & Hughes, 2011). Also, those children with better theory of mind, who are more

effectively able to model other people's points of view, are more effective at helping, cooperating, and comforting others (Imuta, Henry, Slaughter, Selcuk, & Ruffman, 2016).

Early appearing and stable individual differences such as these suggest genetic influences, and indeed, heritability research suggests such a link exists (Knafo-Noam, Vertsberger, & Israel, 2018). However, while genes matter, so does the environment. Cultures vary in the degree to which they foster prosocial behavior. Traditional cultures in which people live in extended family groups and share work instill prosocial values more than cultures that stress individual achievement (Carlo, 2014; Eisenberg & Fabes, 1998). The more immediate environment matters as well. Parents who show affection and use positive (inductive) disciplinary strategies encourage their children's natural tendency to prosocial behavior (Knafo & Plomin, 2006). Additionally, parents of prosocial children tend to point out models of prosocial behavior and steer children toward stories, films, and television programs that depict cooperation, sharing, and empathy and encourage sympathy, generosity, and helpfulness (Singer & Singer, 1998), which have been shown to increase children's altruism, cooperation, and even tolerance for others (Wilson, 2008). Relationships with siblings, peers, and teachers also can model and reinforce prosocial behavior (Eisenberg, 1992).



Remember "harmonizing" with your pals in preschool music circles? Research in Germany suggests that when kids make music together, they are more likely to cooperate with and help each other.

Kirschner & Tomasello, 2010



Children think in concrete terms. When trying to encourage sharing between young children, it is better to encourage them to take turns (a concrete behavior) than to share (an abstract concept).

Aggression Noah walks over to Jake, who is playing quietly with a toy car. Noah hits Jake and snatches the car away. He has used aggression as a tool to gain access to a wanted object. This is **instrumental aggression,** or aggression used as an instrument to reach a goal—the most common type of aggression in early childhood. Between ages 2½ and 5, children frequently struggle over toys and control of space. Aggression surfaces mostly during social play; children who fight the most also tend to be the most sociable and competent. As children develop more self-control and become better able to express themselves verbally, they typically shift from showing aggression with blows to doing it with words (Coie & Dodge, 1998; Tremblay et al., 2004).

instrumental aggression
Aggressive behavior used as a means of achieving a goal.

overt (direct) aggression
Aggression that is openly directed at its target.

relational aggression
Aggression aimed at damaging or interfering with another person's relationships, reputation, or psychological well-being.

Gender Differences in Aggression Aggression is an exception to the generalization that boys and girls are more similar than different (Hyde, 2005). In all cultures studied, as among most mammals, boys are more physically and verbally aggressive than girls. This gender difference is apparent by age 2 (Baillargeon et al., 2007; Pellegrini & Archer, 2005).

However, when aggression is looked at more closely, it appears that boys and girls tend to use different kinds of aggression. Boys engage in more **overt (direct) aggression,** and tend to openly direct aggressive acts at a target. Girls, by contrast, tend to engage in a form of indirect social aggression known as **relational aggression** (Putallaz & Bierman, 2004). This more subtle kind of aggression consists of damaging or interfering with relationships, reputation, or psychological well-being, often through teasing, manipulation, ostracism, or bids for control. It may include spreading rumors, name-calling, put-downs, or excluding someone from a group. It can be either overt or covert (indirect)—for example, making mean faces or ignoring someone. Among preschoolers, it tends to be direct and face-to-face ("You can't come to my party if you don't give me that toy") (Archer, 2004; Brendgen et al., 2005).



The kind of aggression involved in fighting over a toy, without intention to hurt or dominate the other child, is instrumental aggression. It surfaces mostly during social play and normally declines as children learn to ask for what they want.

Fuse/Getty Images

Cross-cultural research has supported the clear propensity for boys to engage in higher levels of physical aggression. However, the data on relational aggression are less clear. Some studies have found girls engage in higher levels of relational aggression, while other studies have not found a difference between the genders (Lansford et al., 2012; Hyde, 2014; Archer, 2004). It is safe to say that if a difference does exist, it is quite small.

From an evolutionary perspective, boys' greater overt aggressiveness, like their greater size and strength, may prepare them to compete for a mate (Archer, 2004). Males can increase their reproductive output by gaining access to females. Thus, males are generally

predicted to be more competitive and are more likely to take the risks of physical aggression (Pellegrini & Archer, 2005).

Influences on Aggression Why are some children more aggressive than others? Temperament may play a part. Children who are intensely emotional and low in self-control or who have a difficult temperament tend to express anger aggressively (Eisenberg, Fabes, Nyman, Bernzweig, & Pinuelas, 1994; Rubin, Burgess, Dwyer, & Hastings, 2003; Yaman, Mesman, van IJzendoorn, & Bakersmans-Kranenburg, 2010; Röll, Koglin, & Petermann, 2012). This is true not only for physical aggression, but also for relational aggression, which has been associated with negative emotionality and poor self-regulation (Tackett, Kushner, Herzhoff, Smack, & Reardon, 2014; Han, Cho, & Kim, 2014).

Both physical and social aggression have genetic and environmental sources, but their relative influence differs. Among 234 6-year-old twins, physical aggression was 50 to 60 percent heritable; the remainder of the variance was attributable to nonshared or unique environmental influences. Social aggression was much more influenced by the environment; the variance was only 20 percent explained by genetics, 20 percent by shared environmental influences, and 60 percent by nonshared experiences (Brendgen et al., 2005).

Parental behaviors strongly influence aggressiveness. In several longitudinal studies, insecure attachment and lack of maternal warmth and affection in infancy predicted aggressiveness in early childhood (Coie & Dodge, 1998; MacKinnon-Lewis, Starnes, Volling, & Johnson, 1997; Rubin, Burgess, & Hastings, 2002). Manipulative behaviors such as withdrawal of love and making a child feel guilty or ashamed may foster social aggression (Brendgen et al., 2005).

Aggressiveness may result from a combination of a stressful and unstimulating home atmosphere, harsh discipline, lack of maternal warmth and social support, family dysfunction, exposure to aggressive adults and neighborhood violence, poverty, and transient peer groups, which prevent stable friendships (Dodge, Pettit, & Bates, 1994; Grusec & Goodnow, 1994; Romano, Tremblay, Boulerice, & Swisher, 2005). For example, children who witness gang activity, drug trafficking, police pursuits and arrests, or people carrying weapons tend to later show symptoms of distress at home and aggressive behavior at school (Farver, Xu, Eppe, Fernandez, & Schwartz, 2005). This violence need not even be real. Cross-culturally, children who are exposed to violent video games show increases in violent behavior, cognition, and affect (Anderson et al., 2010). We discuss the influence of media violence in greater detail in Chapter 14.

Culture can influence how much aggressive behavior a child shows. For example, in countries such as Japan and China, there is a cultural emphasis on harmony, self-control, and group cohesiveness. Anger and aggression contradict these cultural values. Thus, Chinese and Japanese mothers are more likely than U.S. mothers to use inductive discipline, pointing out how aggressive behavior hurts others. They also show strong disappointment when children fail to meet behavioral standards. Moreover, teachers and peers are more likely to reject or exclude such children, and they are more likely than less aggressive children to have low social status (Zahn-Waxler, Friedman, Cole, Mizuta, & Hiruma, 1996; Chen, 2010).



A young girl is brave enough to pick up a crab despite the risk of being pinched.
Johner Images/Getty Images

Fearfulness. Passing fears are common in early childhood. Many 2- to 4-year-olds are afraid of animals, especially dogs, snakes, and spiders. By age 6, children are more likely to be afraid of the dark. Other common fears are of thunderstorms, doctors, and imaginary creatures (DuPont, 1983; Stevenson-Hinde & Shouldice, 1996; LoBue, 2013).

Young children's fears stem largely from their intense fantasy life and their tendency to confuse appearance with reality. Sometimes their imaginations get carried away, making them worry about being attacked by a lion or being abandoned. Young children are more likely to be frightened by something that looks scary, such as a cartoon monster,

than by something capable of doing great harm, such as a nuclear explosion (Cantor, 1994). For the most part, older children's fears are more realistic (being kidnapped) and self-evaluative (failing a test) (Stevenson-Hinde & Shouldice, 1996).

Fears may come from hearing about other people's experiences or from "catching" their fear responses (LoBue, 2013; Muris, Merckelbach, & Collaris, 1997). Additionally, fears are also tied to negative events experienced directly by children. Although they come in contact with knives more frequently than needles, most children pay more attention to and fear needles more, presumably as a result of vaccinations (LoBue, Rakinson, & DeLoache, 2010).

It is both normal and appropriate for young children to have fears. It is also normal for these fears to fade as children age. Part of the reason many fears are outgrown is because young children get better at distinguishing the real and the imaginary. Additionally, as children master new skills, they develop an emerging sense of autonomy. When that sense of autonomy is coupled with their increased ability to understand and predict events in their environment, children feel more in control and thus less frightened (National Scientific Council on the Developing Child, 2010).

Parents can help prevent children's fears by instilling a sense of trust and normal caution without being too protective, by overcoming their own unrealistic fears, and particularly by modeling positive behaviors in the presence of feared objects. They can help a fearful child by reassurance and by encouraging open expression of feelings: "I know it is scary, but the thunder can't hurt you." Ridicule ("Don't be such a baby!"), coercion ("Pat the nice doggie—it won't hurt you"), and logical persuasion ("The closest bear is 20 miles away, locked in a zoo!") are not helpful (Cantor, 1994; Broeren, Lester, Muris, & Field, 2011; Egliston & Rapee, 2007).



When kids are little, their fears involve darkness, scary monsters, and imaginary threats. As they grow older, their fears become increasingly realistic. Why do you think this happens?

checkpoint can you . . .

- Discuss influences on altruism, aggression, and fearfulness?

Relationships with Other Children

Although the most important people in young children's world are the adults who take care of them, relationships with siblings and playmates become more important in early childhood.

SIBLING RELATIONSHIPS

The earliest, most frequent, and most intense disputes among siblings are over property rights or access to the mother. Although exasperated adults may not always see it that way, sibling disputes and their settlement are socialization opportunities in which children learn to stand up for principles and negotiate disagreements, in part because the involuntary nature of the relationship ensures that interactions will continue (Kramer, 2014). Another arena for socialization is joint dramatic play. Siblings who frequently play "let's pretend" develop a history of shared understandings that enable them to more easily resolve issues and build on each other's ideas (Howe, Petrakos, Rinaldi, & LeFebvre, 2005).

Conflict is common in siblings—in an hour, 2- to 4-year-old siblings will have an average of 7.65 disputes (Perlman & Ross, 2005). Despite the frequency of conflict, sibling rivalry is *not* the main pattern between brothers and sisters early in life. Affection, interest, companionship, and influence are also prevalent in sibling relationships. Indeed, prosocial and play-oriented behaviors are more common than rivalry, hostility, and competition. Older siblings initiate more behavior, both friendly and unfriendly, while younger siblings tend to imitate the older ones. As the children age, they tend to become less physical and more verbal in showing both aggression and care and affection (Abramovitch, Corter, Pepler, & Stanhope, 1986). Because older siblings tend to dominate younger ones, the quality of the relationship is more affected by the emotional and social



Younger siblings are more likely to take risks than older siblings. In one study on baseball statistics, 90 percent of younger brothers in Major League Baseball stole more bases than their older counterparts.

Sulloway & Zweigenhaft, 2010

adjustment of the older child than the younger one (Pike, Coldwell, & Dunn, 2005). Generally, same-sex siblings, particularly girls, are closer and play together more peaceably than boy-girl pairs (Kier & Lewis, 1998).

The quality of sibling relationships tends to carry over to relationships with other children. A child who is aggressive with siblings is likely to be aggressive with friends as well (Vlachou, Andreou, Botsoglou, & Didaskalou, 2011; Abramovitch et al., 1986). Siblings who frequently play amicably together tend to develop prosocial behaviors (Pike et al., 2005). Likewise, friendships can influence sibling relationships. Older siblings who have experienced a good relationship with a friend before the birth of a sibling are likely to treat their younger siblings better and are less likely to develop antisocial behavior in adolescence (Kramer & Kowal, 2005). For a young child at risk for behavioral problems, a positive relationship with *either* a sibling or a friend can buffer the effects of a negative relationship with the other (McElwain & Volling, 2005).

THE ONLY CHILD

In the United States, approximately 18 percent of families have only one child (Gao, 2015). Are only children selfish, lonely, or spoiled? Generally, this stereotype of only children appears to be false. A meta-analysis of 115 studies found that most "onlies" do well. With respect to academic outcomes and success in work, they perform slightly better than children with siblings. They tend to be more motivated to achieve and to have slightly higher self-esteem; and they do not differ in emotional adjustment, sociability, or popularity (Mancillas, 2006).

Why do onlies do better on some indices than children with siblings? Only children may do better because parents focus more attention on only children, talk to them more, and expect more of them than do parents with more than one child (Falbo, 2006). The more children in a family, the less individual time any one child receives. Given that children today spend considerable time in play groups, child care, and preschool, only children do not lack opportunities for social interaction with peers.

Research in China also has produced largely encouraging findings about only children. In 1979, to control an exploding population, the People's Republic of China established an official policy of limiting families to one child each. Although the policy has since been relaxed, most urban families now have only one child, and most rural families no more than two (Feng, Gu, & Cai, 2016; Hesketh, Lu, & Xing, 2005). This situation offered researchers a natural experiment: an opportunity to study the adjustment of large numbers of only children.



Young children learn the importance of being a friend to have a friend.
Courtesy, Gabriela Martorell

Only children seem to be at an advantage, at least in China. Those with siblings reported higher levels of fear, anxiety, and depression than only children, regardless of sex or age (Yang, Ollendick, Dong, Xia, & Lin, 1995). As adults, only children, overall, were less likely to show signs of anxiety or depression than those children born in families with siblings, particularly if they were born after the policy was reversed (Falbo & Hooper, 2015). Among 4,000 third and sixth graders, personality differences between only children and those with siblings—as rated by parents, teachers, peers, and the children themselves—were few. Only children's academic achievement and physical growth were about the same as, or better than, children with siblings,

window on the world

AGE SEGREGATION VERSUS MIXED-AGE PLAY

Historically, people of different ages mixed together. Families were bigger, and children and adults often worked and played side by side. If they went to school, children were often assigned to classes based on how much they knew rather than when they were born (Neyfakh, 2014), and particularly in rural areas, many schools consisted of one or a few rooms in which children of different ages were taught together.

In most developed countries today, as soon as children enter day care or school, many of their activities are structured by age. This is a recent change over the past 100 years and is related to the increased industrialization in society and the advent of compulsory education (Rogoff, 2003).

Parents sometimes believe that younger and older children do not have much to share and assume that children learn little from mixed-aged groupings. However, younger and older children both benefit from age mixing. Younger children learn by watching and modeling the older children's behavior and by participating in activities alongside them. Older children can develop their leadership abilities and serve as mentors. They expand their comprehension through teaching. This interaction helps to enhance their creativity and allows them to develop their ability to nurture and care for others (Gray, 2011).

Research backs up these assertions. For example, in Mexico, one study demonstrated that older siblings exhibited teaching behavior and the younger siblings learned by both observation and direct assistance from their siblings during playtime (Maynard, 2002). In Kenya, another study showed that boys who helped their mothers care for younger siblings were on average kinder, more helpful, and less aggressive than boys who did not have such experience (Gray, 2011). Researchers in Samoa found that young children learned about fishing and politics while in the presence of adults by observation without any intentional instruction (Odden & Rochat, 2004). Last, research in classroom settings indicates that academic achievement in mixed-grade classrooms is the same as, or slightly better than, in same-grade classrooms. Children in mixed-age classrooms are self-directed and more likely to cooperate with each other, engage in collaboration, and take charge of their own education (Reese, 1998).

While children can learn a great deal from those who are similar to them in age, there is also value in interactions with others of different ages. Cultures tend to gravitate toward one or the other dimension, but it may be that the ideal situation is a mix of the two approaches.

what's your view

What do you think is better for children: mixed-age or age-segregated? Do you think it matters if their interactions are in play or in educational settings?

although the differences were small (Falbo, 2012; Falbo & Poston, 1993). This finding may reflect the greater attention, stimulation, hopes, and expectations that parents shower on a baby they know will be their first and last.

PLAYMATES AND FRIENDS

Friendships develop as people develop. Toddlers play alongside or near each other, but not until about age 3 do children begin to have friends. Through friendships and interactions with casual playmates, young children learn how to get along with others. They learn that being a friend is the way to have a friend. They learn how to solve problems in relationships and how to put themselves in another person's place, and they see models of various kinds of behavior. They learn moral values and gender-role norms, and they practice adult roles.

checkpoint can you . . .

- Explain how the resolution of sibling disputes contributes to socialization?
- Tell how birth order and gender affect typical patterns of sibling interaction?
- Compare the development of only children with that of children with siblings?
- Discuss how preschoolers choose playmates and friends, how they behave with friends, and how they benefit from friendships?

Preschoolers usually like to play with children of the same age, at least in developed countries (see Window on the World for information on cultural variations). Preschoolers also tend to segregate by sex. Children who have frequent positive experiences with each other are most likely to become friends (Rubin et al., 1998; Snyder, West, Stockemer, Gibbons, & Almquist-Parks, 1996; Shin et al., 2011). About 3 out of 4 preschoolers have such mutual friendships (Hartup & Stevens, 1999).

The traits that young children look for in a playmate are similar to the traits they look for in a friend (C. H. Hart, DeWolf, Wozniak, & Burts, 1992). In one study, 4- to 7-year-olds rated the most important features of friendships as doing things together, liking and caring for each other, sharing and helping one another, and to a lesser degree, living nearby or going to the same school. Younger children rated physical traits, such as appearance and size, higher than older children did and rated affection and support lower (Furman & Bierman, 1983). Preschool children prefer prosocial playmates who like to play the same way and with the same things they do, and they reject disruptive, demanding, intrusive, or aggresive children (Hart, DeWolf, Wozniak, & Burts, 1992; Rekalidou & Petrogiannis, 2012; Ramsey & Lasquade, 1996; Roopnarine & Honig, 1985).

Well-liked preschoolers and kindergartners and those who are rated by parents and teachers as socially competent generally cope well with anger. They avoid insults and threats. Instead, they respond directly, in ways that minimize further conflict and keep relationships going. Less well-liked children tend to hit back or tattle (Fabes & Eisenberg, 1992).

summary and key terms

The Developing Self

- The self-concept undergoes major change in early childhood. According to a neo-Piagetian model, self-definition shifts from single representations to representational mappings. Young children do not see the difference between the real self and the ideal self.
- Self-esteem in early childhood tends to be global and unrealistic, reflecting adult approval.
- Understanding of emotions directed toward the self and of simultaneous emotions develops gradually.
- According to Erikson, the developmental conflict of early childhood is initiative versus guilt. Successful resolution of this conflict results in the virtue of *purpose*.

self-concept (*229*)
self-definition (*229*)
real self (*229*)
ideal self (*229*)
self-esteem (*230*)
social emotions (*232*)
initiative versus guilt (*233*)

Gender

- Gender identity is an aspect of the developing self-concept.
- The main gender difference in early childhood is boys' greater aggressiveness. Girls tend to be more empathic and prosocial and less prone to problem behavior. Some cognitive differences appear early, others not until preadolescence or later.
- Children learn gender roles at an early age through gender-typing. Gender stereotypes peak during the preschool years.
- Five major perspectives on gender development are biological, evolutionary, psychoanalytic, cognitive, and social learning.
- Evidence suggests that some gender differences may be biologically based.
- Evolutionary theory sees children's gender roles as preparation for adult mating behavior.
- In Freudian theory, a child identifies with the same-sex parent after giving up the wish to possess the other parent.
- Cognitive-developmental theory maintains that gender identity develops from thinking about one's gender. According to Kohlberg, gender constancy leads to acquisition of gender roles. Gender-schema theory holds that children categorize gender-related information by observing what males and females do in their culture.
- According to social cognitive theory, children learn gender roles through socialization. Parents, peers, and culture influence gender-typing.

gender identity (*233*)
gender roles (*234*)
gender-typing (*234*)
gender stereotypes (*234*)
theory of sexual selection (*236*)

identification (*236*)
gender constancy (*237*)
gender-schema theory (*238*)
social cognitive theory (*238*)

Play

- Play has physical, cognitive, and psychosocial benefits. Changes in the types of play children engage in reflect cognitive and social development.
- According to Smilansky, children progress cognitively from functional play to constructive play, dramatic play, and then formal games with rules. Dramatic play becomes increasingly common during early childhood and helps children develop social and cognitive skills. Rough-and-tumble play also begins during early childhood.
- According to Parten, play becomes more social during early childhood. However, later research has found that nonsocial play is not necessarily immature.
- Children prefer to play with (and play more socially with) others of their sex.
- Cognitive and social aspects of play are influenced by the culturally approved environments adults create for children.

functional play (*241*)
constructive play (*241*)
dramatic play (*242*)
formal games with rules (*242*)
gender segregation (*243*)

Parenting

- Discipline can be a powerful tool for socialization.
- Both positive reinforcement and prudently administered punishment can be appropriate tools of discipline within the context of a positive parent-child relationship.
- Power assertion, inductive techniques, and withdrawal of love are three categories of discipline. Induction is generally the most effective and power assertion the least effective in promoting internalization of parental standards. Spanking and other forms of corporal punishment can have negative consequences.
- Baumrind identified three parenting styles: authoritarian, permissive, and authoritative. A fourth style, neglectful or uninvolved, was identified later. Authoritative parents tend to raise more competent children. However, Baumrind's findings have been critiqued for being too simplistic and culturally biased.
- The roots of altruism and prosocial behavior appear early. This may be an inborn disposition, which can be cultivated by parental modeling and encouragement.
- Instrumental aggression—first physical, then verbal—is most common in early childhood.
- Boys tend to practice overt aggression, whereas girls often engage in relational aggression.
- Preschool children show temporary fears of real and imaginary objects and events; older children's fears tend to be more realistic.

discipline (*245*)
corporal punishment (*245*)
inductive techniques (*246*)
power assertion (*246*)
withdrawal of love (*246*)
authoritarian parenting (*247*)
permissive parenting (*247*)
authoritative parenting (*247*)
altruism (*248*)
prosocial behavior (*248*)
instrumental aggression (*249*)
overt (direct) aggression (*249*)
relational aggression (*249*)

Relationships with Other Children

- Most sibling interactions are positive. Older siblings tend to initiate activities, and younger siblings to imitate. Same-sex siblings, especially girls, get along best.
- Siblings tend to resolve disputes on the basis of moral principles.
- The kind of relationship children have with siblings often carries over into other peer relationships.
- Only children seem to develop at least as well as children with siblings.
- Preschoolers choose playmates and friends who are like them and with whom they have positive experiences.
- Aggressive children are less popular than prosocial children.

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part 4
MIDDLE CHILDHOOD

chapter 9

Physical and Cognitive Development in Middle Childhood

outline

PHYSICAL DEVELOPMENT

Aspects of Physical Development

Health, Fitness, and Safety

COGNITIVE DEVELOPMENT

Piagetian Approach: The Concrete Operational Child

Information-Processing Approach: Planning, Attention, and Memory

Psychometric Approach: Assessment of Intelligence

Language and Literacy

The Child in School

Educating Children with Special Needs

learning objectives

Describe physical changes and health in school-age children.

Describe cognitive development in school-age children.

Explain how language abilities continue developing in school-age children.

Summarize children's adjustment to school and influences on school achievement.

Describe how schools educate children with special needs.



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did you know?

- Neuropsychologist Howard Gardner identified eight separate types of intelligence.
- Children who believe they can master schoolwork are more likely to do so.
- Studies support the value of bilingual education.

In this chapter we look at strength, endurance, motor proficiency, and other physical developments. Cognitively, we examine concrete operations, memory, problem solving, intelligence testing, and literacy. We discuss school achievement, methods of teaching reading, and second-language education. Finally, we look at special needs education.

It is easier to build strong children than to repair broken men.

—Frederick Douglass

PHYSICAL DEVELOPMENT

Aspects of Physical Development

Growth during middle childhood slows considerably. Still, although day-by-day changes may not be obvious, they add up to a startling difference between 6-year-olds, who are still small children, and 11-year-olds, many of whom are now beginning to resemble adults.

HEIGHT AND WEIGHT

Children grow about 2 to 3 inches each year between ages 6 and 11 and approximately double their weight during that period (Table 1). Girls retain somewhat more fatty tissue than boys, a characteristic that will persist through adulthood. The average 10-year-old weighs about 18 pounds more than 40 years ago (Fryar, Gu, Ogden, & Flegal, 2016). African American boys and girls tend to grow faster than Caucasian children. By about age 6, African American girls have more muscle and bone mass than European American or Mexican American girls; and Mexican American girls have a higher percentage of body fat than European American girls the same size (Ellis, Abrams, & Wong, 1997).

TOOTH DEVELOPMENT AND DENTAL CARE

In the past 20 years, the number of U.S. children ages 6 to 18 with untreated cavities dropped nearly 80 percent (Centers for Disease Control and Prevention, 2014). Nonetheless, tooth decay remains one of the most common chronic untreated conditions in childhood in the United States. Approximately 21 percent of 6- to 11-year-old children

TABLE 1 Physical Growth, Ages 6 to 11 (50th percentile*)

	HEIGHT (INCHES)		WEIGHT (POUNDS)	
Age	Girls	Boys	Girls	Boys
6	46.7	47.2	52.4	52.8
7	49.0	49.8	58.7	61.9
8	51.8	51.9	69.9	69.4
9	54.2	53.7	82.7	74.4
10	56.8	56.3	90.9	88.7
11	59.3	59.2	104.5	107.0

*Fifty percent of children in each category are above this height or weight level and 50 percent are below it.

Source: Fryar, C. D., Q. Gu, C. L. Ogden, and K. M. Flegal. "Anthropometric Reference Data for Children and Adults: United States, 2011–2014." *National Center for Health Statistics. Vital Health Stat* 3 no 39(2016).

Almost half of American children 6 to 17 years old have a television in their bedroom.

Sisson, Broyles, Newton, Baker, & Chernausek, 2011

have had a cavity, and approximately 5.6 percent of them have not treated their tooth decay. Moreover, there are disparities by racial and ethnic group. While 4 percent of non-Hispanic white children have untreated cavities, 5.7 percent of Asian American children, 7.1 percent of African American children, and 8.8 percent of Hispanic children have untreated cavities (Dye, Thornton-Evans, Li, & Iafolla, 2015). Similarly, disparities exist as a function of socioeconomic status as well; 25 percent of children aged 5 to 19 years from low-income families have untreated cavities as compared with 11 percent of children from higher-income families (Dye, Li, Beltrán-Aguilar, 2012).

The improvements that have been seen can be attributed to a variety of factors, including parental education, access to dental care, fluoridated water supplies or the use of fluoride supplements, as well as the use of adhesive sealants on rough chewing surfaces (Centers for Disease Control, 2014).

Access to proper dental care is important for young children. During 2013–2014, 11 percent of children did not visit a dentist (Federal Interagency Forum on Child and Family Statistics, 2016). Untreated dental caries can result in pain, difficulties chewing food, missed school, problems with concentration, and discomfort with appearance (National Center for Chronic Disease Prevention and Health Promotion, 2016).

NUTRITION

The recommended calories per day for schoolchildren 9 to 13 years of age range from 1,400 to 2,600, depending on gender and activity level. Nutritionists recommend a varied diet, including plenty of grains, fruits, and vegetables, and high levels of complex carbohydrates such as whole grains. To avoid overweight and prevent cardiac problems, children, like adults, should get only about 25 to 30 percent of their total calories from fat and less than 10 percent of the total from saturated fat. They should consume less than 10 percent of their calories from added sugars (DeSalvo, Olson, & Casavale, 2016).

As children grow older, pressures and opportunities for unhealthy eating increase. Approximately 20 percent of children skip breakfast, a habit associated with a greater risk of obesity (Deshmukh-Taskar et al., 2010). Most children get almost a third of their daily calories through snacks (Shriver et al., 2018) and are eating almost three snacks a day in addition to the typical breakfast, lunch, and dinner (Piernas & Popkin, 2010). In schools in which vending machines are available, 18 percent of children report buying snacks or drinks from vending machines two or more days a week rather than lunch (Park, Sappenfield, Huang, Sherry, & Bensyl, 2010).

Approximately one-third of children eat at fast-food restaurants on any given day. African American (9.8 percent) and white (9.1 percent) children are more likely than Hispanic (8.4 percent) and Asian American (5.0 percent) children to eat fast food (Vikraman, Fryar, & Ogden, 2015). The media strongly influence children's food choices, and not for the better. For example, commercials that focus on fast-food restaurants and the enticing toys they often offer are common during children's programming hours. Exposure to fast-food and soft drink advertising is associated with increased consumption of both types of products, especially in overweight or obese children (Cairns, Angus, Hastings, & Caraher, 2013; Andreyeva, Kelly, & Harris, 2011).

Nutrition education in schools can be helpful when combined with parental education and changes in school lunch menus, although they have been more successful in improving fruit intake than vegetable intake. Additionally, efforts to combat obesity benefit from an additional focus on energy expenditure through increased activity as well (Evans, Christian, Cleghorn, Greenwood, & Cade, 2012; De Bourdeauhuij et al., 2011).

SLEEP

Sleep needs decline from 12.5 hours a day for 3- to 5-year-olds to 10 hours a day for ages 6 to 13 (National Sleep Foundation, 2016). However, many children do not get enough sleep, and such problems are on the rise. In 2011–2012, 41.9 percent of children

age 6 to 17 years reported at least one day per week of sleep problems, and 13.6 percent reported at least two days of disrupted sleep a week, a significant rise from 2003. A variety of factors seem to be at play, including exposure to media screens, physical inactivity, secondhand smoke, poor housing, vandalism, and a lack of parks and playgrounds (Singh & Kenney, 2013). The presence of a television in the bedroom can also be highly disruptive. At the age of 7, 23 percent of children have a television in their bedroom, and increased television viewing is associated with fewer hours of sleep (Cespedes et al., 2014).

Estimates of how many children habitually snore vary widely and range from 7 to 21 percent. Whether or not a child snores can be affected by a variety of factors, including age, gender, race, family susceptibility, chronic health problems, and overweight (Goldstein et al., 2011; Bonuck et al., 2011; Li et al., 2010). While children who snore sleep as long as do children who don't snore, their sleep is more fragmented, and fragmented sleep is associated with deficits in language and cognitive skills, fine motor skills, and activities of daily living skills, and lower scores on developmental tests (Yorbik, Mutlu, Koc, & Mutluer, 2014). Persistent snoring, at least three times a week, may indicate a child has sleep-disordered breathing (SDB), a condition that has been linked to behavioral and learning difficulties (Halbower et al., 2006).

Failure to get adequate sleep is associated with a variety of adjustment problems, and this effect is particularly marked when children are African American or come from homes of low socioeconomic status (El-Sheikh, Kelly, Buckhalt, & Hinnant, 2010; Beebe, 2011). Sleep quality, sleep duration, and daytime sleepiness have all been found to affect academic performance and seem to affect younger children, particularly boys, to a greater degree (Dewald, Meijer, Oort, Kerkhof, & Bögels, 2010). Moreover, short sleep duration in children is associated with later risk of obesity and overweight (Fatima & Mamun, 2015).

BRAIN DEVELOPMENT

A number of cognitive advances occur in middle childhood that can be traced back to changes in the brain's structure and functioning. In general, these changes can be characterized as resulting in faster, more efficient information processing and an increased ability to ignore distracting information (Amso & Casey, 2006; Wendelken, Baym, Gazzaley, & Bunge, 2011). For example, it becomes easier for children to concentrate on the teacher—even if it's a boring lesson—while filtering out the antics of the class clown.

Magnetic resonance imaging (MRI) technology shows us that the brain consists of both gray matter and white matter. Gray matter is composed of closely packed neurons in the cerebral cortex. White matter is made of glial cells, which provide support for neurons, and of myelinated axons, which transmit information across neurons.

The amount of gray matter in the frontal cortex, which is strongly influenced by genetics, is likely linked with differences in IQ (Toga & Thompson, 2005; Deary, Penke, & Johnson, 2010). Gray matter volume shows a U-shaped trajectory. The overall volume increases prepuberty and then declines by postpuberty (Gogtay & Thompson, 2010; Taki et al., 2013). The decline in overall volume is driven primarily by a loss in the density of gray matter. Although "less" gray matter may sound negative, the result is actually the opposite. The "loss" reflects pruning of unused dendrites. In other words, those connections that are used remain active; the unused connections eventually disappear. The result is that the brain becomes "tuned" to the experiences of the child. In this way, we can calibrate our growing brains to local conditions.

Changes in the volume of gray matter peak at different times in the different lobes (Figure 1). Beneath the cortex, gray matter volume in the caudate—a part of the basal ganglia involved in control of movement and muscle tone and in mediating higher cognitive functions, attention, and emotional states—peaks at age 7 in girls and age 10 in boys (Lenroot & Giedd, 2006). Gray matter volume in the parietal lobes, which deal with spatial understanding, and in the frontal lobes, which handle higher-order functions,

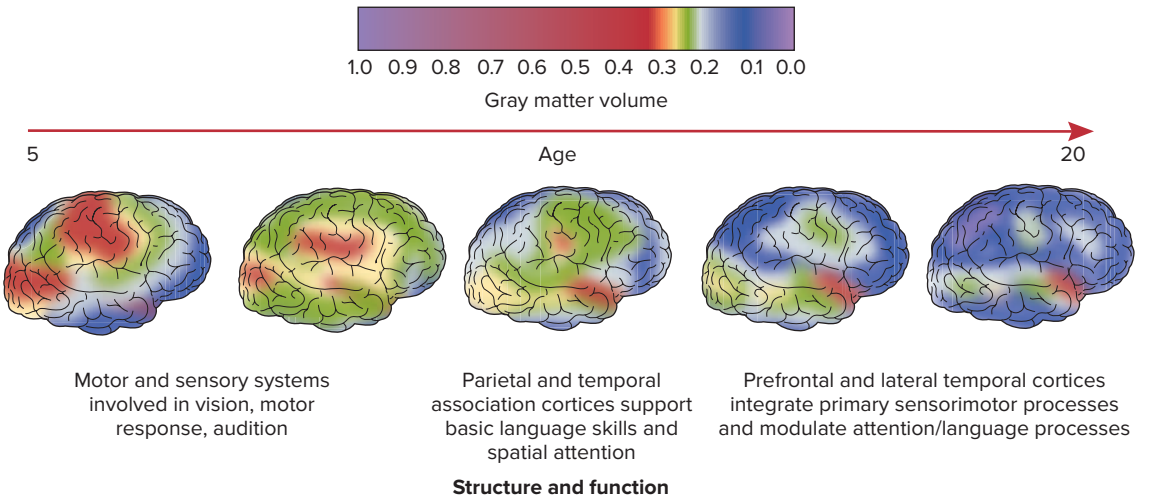


FIGURE 1

Gray-Matter Maturation in the Cerebral Cortex, Ages 5 to 20

Losses in gray matter density reflect maturation of various regions of the cortex, permitting more efficient functioning. Blue areas correspond to specific parts of the cortex undergoing loss of gray matter at a given age. These structures and their functional significance are described.

Source: Amso and Casey, 2006; adapted from Gogtay et al., 2004.

checkpoint can you . . .

- Summarize typical growth patterns of boys and girls in middle childhood, including ethnic variations?
- Summarize the nutritional and sleep needs of school-age children?
- Discuss changes in the brain at this age and their effects?

peaks at age 11. Gray matter in the temporal lobes, which deal with language, peaks at age 14, while the cerebellum, which regulates motor movements, takes longer. Children's brains also show changes in the thickness of the cortex. Overall, the volume of the cortex peaks in late childhood to early adolescence (Raznahan et al., 2011). Generally, gray matter volume peaks 1 to 2 years earlier in girls than in boys (Gogtay & Thompson, 2010).

The loss in density of gray matter with age is balanced by another change–a steady increase in white matter. The connections between neurons thicken and myelinate, beginning with the frontal lobes and moving toward the rear of the brain. Between ages 6 and 13, striking growth occurs in connections between the temporal and parietal lobes and continues into adulthood (Giedd & Rapoport, 2010; Kuhn, 2006; Lenroot & Giedd, 2006). In addition, changes in the density of the white matter in the corpus callosum may also underlie the advances seen in fine motor control in late childhood (Muetzel et al., 2008), such as the ability to write legibly, tie shoelaces, or play musical instruments.

MOTOR DEVELOPMENT AND PHYSICAL ACTIVITY

Motor skills continue to improve in middle childhood (Table 2). By this age, most children in developing countries go to work, and this leaves them little time and freedom for physical play (Larson & Verma, 1999). In the United States, school-age children now spend less time on sports and other outdoor activities than in the early 1980s and more hours on schooling, homework, and media activities (Juster, Ono, & Stafford, 2004; Basterfield et al., 2011). In 2016, only 21.6 percent of children ages 6 to 19 reached the recommendations for physical activity on 5 out of 7 days in a week (Centers for Disease Control, 2018d). At the same time, many children participate in organized sports.

Recess The games children play at recess tend to be informal. Most of recess activity involves socializing with peers (Holmes, 2012). Boys play more physically active games (Rose & Rudolf, 2006), whereas girls favor games that include verbal expression or counting aloud, such as hopscotch and jump rope (Pellegrini, Kato, Blatchford, &

TABLE 2 Motor Development in Middle Childhood

Age	Selected Behaviors
6	Girls are superior in movement accuracy; boys are superior in forceful, less complex acts. Skipping is possible. Children can throw with proper weight shift and step.
7	One-footed balancing without looking becomes possible. Children can walk 2-inch-wide balance beams. Children can hop and jump accurately into small squares. Children can execute accurate jumping-jack exercise.
8	Children have 12-pound pressure on grip strength. The number of games participated in by both sexes is greatest at this age. Children can engage in alternate rhythmic hopping in a 2-2, 2-3, or 3-3 pattern. Girls can throw a small ball 40 feet.
9	Boys can run 16½ feet per second. Boys can throw a small ball 70 feet.
10	Children can judge and intercept pathways of small balls thrown from a distance. Girls can run 17 feet per second.
11	A standing broad jump of 5 feet is possible for boys and of 4½ feet for girls.

Source: Adapted from Cratty, Bryant J. *Perceptual and Motor Development in Infants and Children*, 3rd ed. Englewood Cliff s, NJ: Prentice Hall, 1986.

Baines, 2002). When given the choice, most children opt to play in natural or green areas rather than concrete (Lucas & Dyment, 2010). However, when provided with more playground equipment, children tend to be more active during recess. Not surprisingly, more space to play in also leads to higher levels of activity, and children tend to decrease their activity levels as the temperature rises (Ridgers, Fairclough, & Stratton, 2010).

Younger children spend more time running and chasing each other (Holmes, 2012). About 10 percent of schoolchildren's free play in the early grades, peaking in middle childhood, consists of **rough-and-tumble play**—wrestling, kicking, tumbling, grappling, and chasing, often accompanied by laughing and screaming. It seems to be universal, and boys engage in higher levels of it than girls (Pellegrini et al., 2002; Smith, 2005a). This kind of play may look like fighting but is done playfully among friends (Jarvis, 2010).

Despite the perception that recess takes time away from learning, recess is associated with improvements in academic performance (Murray et al., 2013). The improvements may stem from the changes in behavior that occur after children are allowed free time. A meta-analysis showed that after recess, children were better able to focus on class material; they were less fidgety, less listless, more focused and on task, and this was true whether or not recess involved physical interaction or social activity (Rasberry et al., 2011).

Organized Sports Estimates are that approximately 37 percent of 6- to 12-year-old children played team sports on a regular basis in 2016, a slow but steady decline from 44.5 percent in 2008. Household income is a major factor impacting the ability of children to participate. In 2016, slightly under 35 percent of children from families that made less than $25,000 a year participated in organized sports on at least one day that year, while over 68 percent of children from families that made more than $100,000 did (The Aspen Institute, 2018). Participation in unorganized physical activity, such as bicycling and shooting baskets, is higher at 77.4 percent (Duke, Huhman, & Heitzler, 2003).

Developmental changes determine what types of organized sports are most effective. Six- to 9-year-olds need more flexible rules, shorter instruction time, and more free time for practice than older children. At this age, girls and boys are about equal in weight, height, endurance, and motor skill development. Older children are better able to process instruction and learn team strategies.

rough-and-tumble play
Vigorous play involving wrestling, hitting, and chasing, often accompanied by laughing and screaming.



Games at recess, such as jump rope, tend to be informal. They promote both agility and social competence.
Lane Oatey/Blue Jean Images/Getty Images

checkpoint can you . . .

- Contrast boys' and girls' recess-time activities?
- Explain the significance of rough-and-tumble play?
- Tell what types of physical play children engage in as they grow older?

Health, Fitness, and Safety

The development of vaccines for major childhood illnesses has made middle childhood a relatively safe time of life in most of the world. The death rate in these years is the lowest in the life span. Still, too many children are overweight, and some suffer from chronic medical conditions or accidental injuries or from lack of access to health care.

OBESITY AND BODY IMAGE

Overweight, a body mass index between the 85th and 95th percentile, and obesity, a body mass index over the 95th percentile, have become a major health issue for children worldwide. The prevalence rate has risen sharply—in 1975, just over 4 percent of children and teens ages 5 to 19 were overweight or obese. In 2016, 18 percent—or more than 340 million children and adolescents—were overweight or obese. Worldwide, the obesity rate has tripled since 1975. While overweight and obesity were once considered to be problems of high-income and urban countries, they are now found in low- and middle-income countries as well. In fact, many of these countries now carry a double burden and must manage the twin issues of undernutrition and obesity and overweight at the same time (World Health Organization, 2018).

In the United States, about 18.5 percent of children between the ages of 2 and 19 are obese and another 16.6 percent are overweight. Boys are slightly more likely to be overweight than girls. Although overweight has increased in all ethnic groups, it is most prevalent among Mexican American boys (29.2 percent) and African American girls (25.1 percent) (Fryar, Carroll, & Ogden, 2018). While Asian Americans show lower rates of overweight and obesity, there are indications they may have more body fat than Caucasian (white) children, and thus health risks may begin at a lower weight compared to other ethnic groups (Fryar, Carroll, & Odgen, 2016).

Unfortunately, children who try to lose weight are not always the ones who need to do so. Concern with **body image**—how one believes one looks—becomes important early in middle childhood, especially for girls, and may develop into eating disorders in adolescence. In one study on the development of body image in 9- to 12-year-old girls, between 49 and 55 percent were dissatisfied with their weight, with heavier girls experiencing overall higher dissatisfaction (Clark & Tiggeman, 2008). Playing with physically unrealistic dolls, such as Barbie, may be an influence in that direction (see Research in Action).

body image
Descriptive and evaluative beliefs about one's appearance.



What's in children's lunch boxes? The typical composition is 1 sandwich, 1 piece of fruit, and 1.5 "extras." The number of extras, which are more likely to be processed and low in nutritional value, peaks on Wednesdays.

Miles, Matthews, Brennan, & Mitchell, 2010

Causes of Obesity Obesity can result from an inherited tendency aggravated by too little exercise and too much or the wrong kinds of food (Sahoo et al., 2015). Children are more likely to be overweight if they have overweight parents or other relatives. Poor nutrition, encouraged by media advertising and wide availability of snack foods and beverages, also contributes. Eating fast food has been associated with overweight and obesity (Braithwaite et al., 2014), and on a typical day, approximately one-third of children and adolescents report eating fast food (Vikraman, Fryar, & Ogden, 2015). Children (like adults) should get about 10 percent of their total calories from saturated fat (U.S. Department of Agriculture, 2010). Sugar, especially in the form of sweetened beverages, should be consumed in limited quantities (Malik, Pan, Willet, & Hu, 2013; Davis, Bennett, Befort, & Nollen, 2011).

Inactivity is a major factor in the sharp rise in overweight children. As children get older, activity levels decrease significantly from an average of 180 minutes per day for 9-year-olds to 40 minutes per day for 15-year-olds (Nader, Bradley, Houts, McRitchie, & O'Brien, 2008). Television viewing appears to be an important variable and has been associated with an increased risk of obesity in both developing and developed nations (Katzmarzyk et al., 2015). Preadolescent girls, children with disabilities, children who live in public housing, and children in unsafe neighborhoods with no facilities for outdoor exercise are most likely to be sedentary (Council on Sports Medicine and Fitness

research in action

BARBIE DOLLS AND GIRLS' BODY IMAGE

Barbie has been the best-selling fashion doll for generations of girls. Barbies act as models for young girls, transmitting cultural ideals of beauty. However, although she is marketed as "every girl," Barbie is far from average. Her body proportions present an unrealistic and unattainable female image. If she were a real woman, Barbie would have a 39-inch bust, an impossibly small 18-inch waist, and 33-inch hips (Dittmar, Halliwell, & Ive, 2006; Lind & Brzuzy, 2008). Girls who do not measure up—which given Barbie's unrealistic proportions includes all girls—may experience body dissatisfaction.

Rice and colleagues (2016) examined the impact of Barbie on thin ideals and body dissatisfaction among 5- to 8-year-old girls. Barbie's mere presence, whether via photo, physical observation, or play engagement, was associated with higher thin-ideal internalization. This effect extends to judgments made about others as well. Worobey and Worobey (2014). showed preschool-age girls a variety of Barbie-like dolls of different body types and asked them to assign positive and negative traits to the dolls. The only difference between the dolls was body size, as they had the same head and identical clothing. The results were striking. Positive traits were frequently ascribed to thin and average-sized dolls (i.e., smart, pretty, happy, has a best friend), whereas fat dolls were almost exclusively linked with negative traits (i.e., sad, no friends, gets teased). Nearly two-thirds of the girls said the thin doll was pretty but failed to ascribe the same trait to the fat doll.

Although Barbie receives a great deal of critique, other brands of fashion dolls may be just as problematic. Boyd and Murnen (2017) examined 72 popular female dolls available in the United States. Approximately 62 percent of dolls in the sample were also noticeably thin. While Barbie has been repeatedly called out in American popular culture for exposing young girls to unrealistic body ideals, other types of dolls marketed to girls share the blame in promoting body dissatisfaction.

In response to consumer complaints, Barbie has undergone a series of body proportion makeovers over the years. In 2016, Barbies of three body types premiered—petite, tall, and curvy—with a wider range of skin tones, hair textures, and eye colors to represent a diverse and more inclusive range of beauty. Curvy Barbie has a rounder stomach and wider hips and thighs, but her figure remains slim, though not as unrealistically so (Jarman, 2016). So far, no studies have been published to determine if curvy Barbie can steer young girls away from body dissatisfaction, poor body image, and its ill effects.

what's your view

If you had (or have) a young daughter and she requested a Barbie, would you try to discourage her? What proactive measures do you think parents could take to instill healthy body image?

& Council on School Health, 2006). Physical inactivity and sedentary behaviors differ among children in various ethnic groups. For example, immigrant children are significantly more likely to be physically inactive and less likely to participate in sports than native children (Singh, Yu, Siahpush, & Kogan, 2008). Where children live also matters. Children who live in rural areas have a 26 percent higher risk of obesity than children who live in urban areas (Johnson & Johnson, 2015).

Impact of Overweight The adverse health effects of obesity for children are similar to those faced by adults. These children commonly have medical problems, including high blood pressure, high cholesterol, and high insulin levels, or they may develop such diseases at a younger age (National Center for Health Statistics, 2004; Sahoo et al., 2015). Some data show that obese boys have higher levels of cardiometabolic risk factors than obese girls, suggesting they may be at even greater risk for developing disease (Skinner, Perrin, Moss, & Skelton, 2015). Childhood diabetes is one of the prime results of rising obesity rates (Malik, Popkin, Bray, Després, & Hu, 2010).

Overweight children are also at risk for behavior problems, depression, low self-esteem, and falling behind in physical and social functioning (Datar & Sturm, 2006;



Taking in calories through snacks rather than meals is increasingly common in children today. The average child snacks approximately three times a day and takes in 600 calories a day from snacks.

Piernas & Popkin, 2010



Promoting an active lifestyle through both informal and organized sports is an important way to combat the problem of childhood obesity.
Ingram Publishing/SuperStock

Williams, Wake, Hesketh, Maher, & Waters, 2005; Sahoo et al., 2015). "Comfort" foods can activate pleasure circuits in the brain similar to those experienced by drug addicts (Kenny, 2011). Thus, overweight children may compensate for their suffering by indulging themselves with treats, making their physical and social problems even worse.

Overweight children are 5 times more likely to be obese in adulthood than children who are not obese (Simmonds, Llewellyn, Owen, & Woolacott, 2016), and they are at risk for problems in adulthood with hypertension (high blood pressure), heart disease, orthopedic problems, diabetes, and more (Sahoo et al., 2015). Indeed, childhood obesity may be a stronger predictor of some diseases than adult obesity (AAP, 2004; Baker, Olsen, & Sorensen, 2007) and may put children at risk of premature death (Franks et al., 2010).

Prevention and Treatment Childhood obesity rates are a significant public health issue. While a temporary plateau in young children (Ogden, Carroll, Kit, & Flegal, 2014; Ogden et al., 2016) gave researchers hope that efforts to combat obesity were finally paying off, more recent data suggest the decline was illusory. Childhood obesity rates continue to rise at alarming rates (Skinner, Ravanbakht, Skelton, Perrin, & Armstrong, 2018; Ludwig, 2018). The U.S. Preventive Services Task Force (USPSTF, 2010) recommends screening children for overweight and obesity starting at the age of 6 years.

Childhood obesity is a risk factor for adult obesity; 55 percent of obese children will become obese adults. However, a typical weight in childhood does not guarantee a healthy weight in adulthood. Seventy percent of obese adults were not obese in childhood (Simmonds, Llewellyn, Owen, & Woolacott, 2016). Thus, prevention and intervention programs should target health in all children, not just overweight children.

Generally, research supports efforts focused on overall lifestyle changes rather than narrowly defined diets or exercise programs. Recommendations include less time in front of television and computers, changes in food labeling and advertising, healthier school meals, education to help children make better food choices, and more time spent in physical education and informal exercise with family and friends, such as walking and unorganized sports (AAP, 2004). The most effective interventions are those in which parents are helped to change their own behaviors as well as those of their children (Kitzmann et al., 2010).

Schools that serve healthy foods and offer nutrition education have reduced the number of overweight children in their classrooms by 50 percent (Foster et al., 2008). Physical activity is also an important factor. The Centers for Disease Control (2018d) recommends that children and adolescents should get an hour of physical exercise per day. Most primary schools include a daily 30-minute recess period and two physical education classes a week. However, on average, primary school students spend only 15 minutes per school day engaged in vigorous- or moderate-intensity physical activity, a number that falls to 5 minutes per school day by high school (Kohl & Cook, 2013).

Cookie Monster's favorite cookie is chocolate chip, followed by oatmeal. However, since 2006, Cookie Monster admits that cookies are best used as "sometimes snacks."

checkpoint can **you** . . .

- Discuss the extent of childhood obesity, how it can affect health, and how it can be treated?

OTHER MEDICAL CONDITIONS

acute medical conditions
Illnesses that last a short time.

chronic medical conditions
Illnesses or impairments that persist for at least 3 months.

Illness in middle childhood tends to be brief. **Acute medical conditions**—occasional, short-term conditions, such as infections and warts—are common. Six or seven bouts a year with colds, flu, or viruses are typical as germs pass among children at school or at play (Behrman, 1992).

According to a nationally representative survey of more than 200,000 households, an estimated 12.8 percent of U.S. children have or are at risk for **chronic medical conditions:**

physical, developmental, behavioral, or emotional conditions that persist for 3 months or more (Kogan, Newacheck, Honberg, & Strickland, 2005). Two chronic conditions that have become increasingly common are asthma and diabetes.



Although generally not an issue in the United States and most industrialized nations, children in tropical countries are at risk for diseases that cause lethargy and problems with attention. The cause? Tropical parasites such as hookworm or schistosomiasis.

Out of sight, out of mind: Hidden cost of neglected tropical diseases, 2010

Asthma **Asthma** is a chronic, allergy-based respiratory disease characterized by sudden attacks of coughing, wheezing, and difficulty breathing. Its prevalence in the United States more than doubled between 1980 and 1995 and has remained high (Akinbami, 2006). More than 9.5 percent of U.S. children and adolescents up to age 17 have been diagnosed with asthma at some time (Akinbami et al., 2012). It is 20 percent more likely to be diagnosed in black children than in white children (McDaniel, Paxson, & Waldfogel, 2006). Its prevalence has leveled off in developed countries but is still increasing in developing countries (Asher, 2010).

The causes of the asthma increases are uncertain, but a genetic predisposition is likely (Eder, Ege, & von Mutius, 2006). For example, researchers have identified a gene variant that increases the risk of developing asthma, an effect that is exacerbated in homes where children are exposed to smoke (Calişkan et al., 2013). Smoke exposure is a major environmental risk factor by itself, as is pollution from car emissions (Burke et al., 2012; Gasana, Dillikar, Mendy, Forno, & Vieira, 2012). Approximately 54 percent of U.S. children live in counties where the pollutant concentrations are above air quality standards for 8 hours at least once a year, and 28 percent of children live in counties where concentrations are above standards for 24 hours at least once per year (Federal Interagency Forum on Child and Family Statistics, 2016). Increasing evidence points to an association between obesity and asthma (Weinmayr et al., 2014). There is also an association between low levels of vitamin D and increased incidence of asthma in children (Bener, Ehlayel, Tulic, & Hamid, 2012). Moreover, vitamin D enhances the anti-inflammatory effects of the inhaled steroids often used to treat asthma attacks in children (Searing et al., 2010).

asthma
A chronic respiratory disease characterized by sudden attacks of coughing, wheezing, and difficulty in breathing.

Diabetes **Diabetes** is one of the most common diseases in school-aged children. In 2015, more than 132,000 children in the United States had diabetes (Centers for Disease Control, 2017e). Diabetes is characterized by high levels of glucose in the blood as a result of defective insulin production, ineffective insulin action, or both.

Type 1 diabetes is the result of an insulin deficiency that occurs when insulin-producing cells in the pancreas are destroyed. Type 1 diabetes accounts for 5 to 10 percent of all diabetes cases and the majority of diabetes in children under 10 years of age. Symptoms include increased thirst and urination, hunger, weight loss, blurred vision, and fatigue. Treatment includes insulin administration, nutrition management, and physical activity (National Diabetes Education Program, 2008).

Type 2 diabetes is characterized by insulin resistance and used to be found mainly in overweight and older adults. As childhood obesity has increased, so has type 2 diabetes. Increases have been noted in white, Hispanic, and African American children (Dabelea et al., 2014), and, if current trends continue, estimates are that by 2050, over 84,000 American children will be diagnosed with type 2 diabetes (Imperatore et al., 2012). Symptoms are similar to type 1 diabetes (Zylke & DeAngelis, 2007). Nutrition management and increased physical activity can be effective treatments, although glucose-lowering medication or insulin may be needed for resistant cases.

diabetes
One of the most common diseases of childhood. It is characterized by high levels of glucose in the blood as a result of defective insulin production, ineffective insulin action, or both.

Childhood Hypertension **Hypertension,** or high blood pressure, once was relatively rare in childhood, but current estimates are that 19.2 percent of boys and 12.6 percent of girls have blood pressure at or above the 90th percentile (Rosner, Cook, Daniels, & Falkner, 2013). Risk factors include obesity or overweight, salt intake, sedentary lifestyle, poor sleep quality, and race (Bucher et al., 2013; Rosner et al., 2013)

Although high blood pressure in childhood is not generally associated with mortality as it is in adulthood, it does put children at risk for later disease and is associated with damage to organs. For example, it can lead to left ventricular hypertrophy (thickening and hardening of the left wall of the heart), damage to the retina of the eyes, or damage to arteries (Falkner, 2010). Additionally, there are indications that high blood pressure may negatively affect the developing brain. Children with hypertension are more likely

hypertension
Chronically high blood pressure.

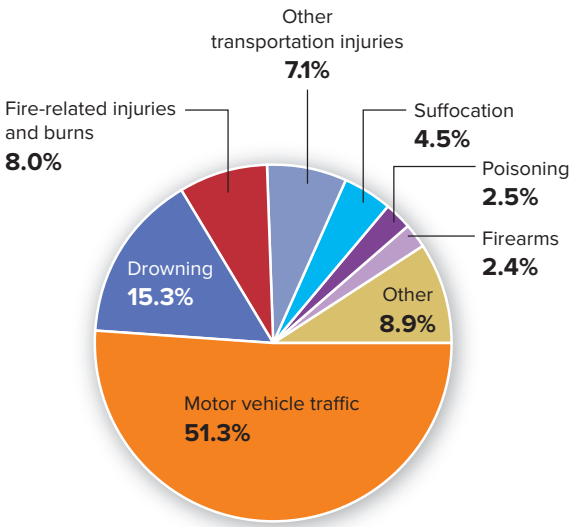


FIGURE 2

Accidental Deaths for Children under Age 18

Traffic accidents, drowning, and burns are the most common causes of accidental deaths among children under 18 years of age.

Source: Centers for Disease Control and Prevention, National Center for Injury Prevention and Control. "Web-based Injury Statistics Query and Reporting System (WISQARS)," *Unintentional Injury Deaths*. United States 2016, (2018): 5–14. Accessed at www.cdc.gov/injury/wisqars.

to have learning disabilities and may have problems with executive functioning (Sharma et al., 2010).

Weight reduction through dietary modification and regular physical activity is the primary treatment for overweight-related hypertension. Recommendations also include stress reduction, possibly via the use of meditation. If blood pressure does not come down, drug treatment can be considered. (Flynn et al., 2017). However, care must be taken in prescribing such drugs, as their long-term effects on children are uncertain.

ACCIDENTAL INJURIES

As in early childhood, accidental injuries are the leading cause of accidental death among school-age U.S. children (Centers for Disease Control and Prevention, 2018d; Figure 2). In 2016, 1,634 U.S. children between the ages of 5 and 14 years died in accidents, the majority—944—in car accidents (Xu, Murphy, Kochanek, Bastian, & Arias, 2018).

An estimated 70 percent of children in the United States ride bicycles (Mattei et al., 2012). Unfortunately, despite the existence of laws requiring wearing of bicycle helmets, their use is still low (Kaushik, Krisch, Schroeder, Flick, & Nemergut, 2015). An estimated 23,000 children each year suffer serious brain injuries from bicycle accidents, and as many as 88 percent of these injuries could be prevented by using helmets (AAP Council on Injury and Poison Prevention, 2001). Protective headgear also is vital for baseball, softball, football, roller-skating, in-line skating, skateboarding, scooter riding, horseback riding, hockey, speed sledding, snowmobiling, skiing, snowboarding, and tobogganing. For soccer, "heading" the ball should be minimized because of the danger of brain injury (AAP Committee on Sports Medicine and Fitness & Committee on School Health, 2001). Also, most pediatricians recommend that parents not buy trampolines because of their potential for injury and that children be allowed to use trampolines only as part of structured training programs (Briskin et al., 2012).

About half of kids who drown do so within 25 yards of an adult. This happens partly because drowning doesn't look like it does in movies. A drowning child does not yell for help or splash. Signs to look for? Head low in the water, perhaps tilted back with hair covering the eyes, silence, glassy or closed eyes, mouth at or slightly below the water line, and ineffective attempts to roll over to the back or swim.

Vittone, 2010

checkpoint can **you** . . .

- Distinguish between acute and chronic medical conditions?
- Discuss the incidence and causes of asthma and diabetes?
- Identify factors that increase the risks of accidental injury?

COGNITIVE DEVELOPMENT

Piagetian Approach: The Concrete Operational Child

concrete operations
Third stage of Piagetian cognitive development (approximately ages 7 to 12), during which children develop logical but not abstract thinking.

At about age 7, according to Piaget, children enter the stage of **concrete operations** when they can use mental operations, such as reasoning, to solve concrete problems. Children can think logically because they can take multiple aspects of a situation into account. However, their thinking is still limited to real situations in the here and now. Now we focus on the cognitive advances typical of this stage of development.

COGNITIVE ADVANCES

In the stage of concrete operations, children have a better understanding than preoperational children of spatial concepts, causality, categorization, inductive and deductive reasoning, conservation, and number (Table 3).

Spatial Relationships Eight-year-old Ella stares intently at the map. "The star means we are here," she points, "so that must mean the store is there!" Ella turns to her mother with a smile and they both begin walking.

Ella is now in the stage of concrete operations. She is better able to understand spatial relationships. This allows her to interpret a map, estimate the time to get from one place to another, and remember routes and landmarks. Children are more easily able to navigate a physical environment with which they have experience, and training can help improve spatial skills as well (Uttal et al., 2013).

Causality Another key development during middle childhood involves the ability to make judgments about cause and effect. For example, when 5- to 12-year-old children are asked to predict how balance scales work, older children give more correct answers. In addition, earlier in middle childhood they understood the number of objects on each side of a scale matters, but it is not until later they understood that the distance of objects from the center of a scale is also important (Amsel, Goodman, Savoie, & Clarke, 1996).

Additionally, as children learn more about the world, their growing knowledge informs the quality of their reasoning. For example, in one study, children ages 3 to 11 years were given information about oral health that was either consistent (e.g., going to the dentist is good for teeth) or inconsistent (e.g., drinking cola is good for teeth) with reality and scenarios in which the outcome was either good or bad oral health. Children were then asked how the causal association provided in the scenarios might be tested. When the information was consistent with reality and had a good outcome, or inconsistent and had a bad outcome, children were more likely to use appropriate hypothesis testing (i.e., manipulate only one variable at a time). In other conditions, they used

TABLE 3 Advances in Selected Cognitive Abilities during Middle Childhood

Ability	Example
Spatial thinking	Danielle can use a map to help her search for a hidden object and can give someone else directions. She can find her way to school, can estimate distances, and can judge how long it will take her to go from one place to another.
Cause and effect	Douglas knows which physical attributes of objects on each side of a scale will affect the result (i.e., number of objects matters but color does not). He does not know which spatial factors make a difference.
Categorization	Elena can sort objects into categories, such as shape, color, or both. She knows that a subclass (roses) has fewer members than the class of which it is a part (flowers).
Seriation	Catherine can arrange a group of sticks in order, from the shortest to the longest, and can insert an intermediate-size stick into the proper place. She knows that if one stick is longer than a second stick, and the second stick is longer than a third, then the first stick is longer than the third.
Inductive and deductive reasoning	Dominic can solve both inductive and deductive problems and knows that inductive conclusions (based on particular premises) are less certain than deductive conclusions (based on general premises).
Conservation	Felipe, at age 7, knows that if a clay ball is rolled into a sausage, it still contains the same amount of clay (conservation of substance). At age 9, he knows that the ball and the sausage weigh the same. Not until early adolescence will he understand that they displace the same amount of liquid.
Number and mathematics	Kevin can count in his head, can add by counting up from the smaller number, and can do simple story problems.

scientifically invalid procedures (e.g., changing all variables at a time) (Croker & Buchanan, 2011). Thus, the quality of their reasoning was better when they were able to use their understanding of the world to inform their thinking.

Categorization

John sits at the table, working on his class project. He is making a timeline of his life. His mother has given him six photographs of himself from infancy to the current time, and John carefully lays them in order from earliest to latest.

seriation
Ability to order items along a dimension.

Part of the reason John is now able to complete tasks such as this class project is because he is better able to categorize objects. One such ability is **seriation,** arranging objects in a series according to one or more dimensions. Children become increasingly better at seriation for dimensions such as time (earliest to latest), length (shortest to longest), or color (lightest to darkest) (Piaget, 1952). Children's later mathematical achievement is dependent on early numeracy, including seriation (Aunio & Niemivirta, 2010), and difficulties in seriation predict later learning disabilities in mathematics (Desoete, 2015; Stock, Desoete, & Roeyers, 2010).

transitive inferences
Understanding the relationship between two objects by knowing the relationship of each to a third object.

Another characteristic of this age is that of **transitive inferences** (if a < b and b < c, then a < c). For example, Mateo is shown three sticks. He is shown that the yellow stick is shorter than the green stick and is then shown that the green stick is shorter than the blue stick. However, he is not shown all three sticks in order of their length. If Mateo is able to understand transitive inferences, he should be able to quickly and easily infer that the yellow stick is shorter than the blue stick without physically comparing them (Piaget & Inhelder, 1967). While Piaget believed that children did not develop this ability until middle childhood, more recent research on visual preferences has shown that children as young as 15 months have some limited ability to reason in this fashion, at least for social stimuli (Gazes, Hampton, & Lourenco, 2017; Mascaro & Csibra, 2014; Mou, Province, & Luo, 2014).

class inclusion
Understanding of the relationship between a whole and its parts.

Class inclusion also becomes easier. **Class inclusion** is the ability to see the relationship between a whole and its parts, and to understand the categories within a whole. For example, Piaget (1964) showed preoperational children 10 flowers—seven roses and three carnations—and asked them whether there were more roses or more flowers. Children in the preoperational stage of development tended to say there were more roses because they were comparing the roses with the carnations rather than the whole bunch of flowers. Not until age 7 or 8 do children consistently report that roses are a subclass of flowers (Flavell, Miller, & Miller, 2002). More recent research indicates that children actually do have the ability to understand the logic of class inclusion, but usually fail to inhibit the incorrect response in favor of the misleading perceptual comparison (Borst, Poirel, Pineau, Cassotti, & Houdé, 2013).

Inductive and Deductive Reasoning

inductive reasoning
Type of logical reasoning that moves from particular observations about members of a class to a general conclusion about that class.

Inductive reasoning involves making observations about particular members of a class of people, animals, objects, or events, and then drawing conclusions about the class as a whole. For example, if one neighbor's dog barks and another neighbor's dog barks, then the conclusion might be that all dogs bark.

deductive reasoning
Type of logical reasoning that moves from a general premise about a class to a conclusion about a particular member or members of the class.

Deductive reasoning, by contrast, starts with a general statement—a premise—about a class and applies it to particular members of the class. If a premise is true of the whole class, and the reasoning is sound, then the conclusion must be true. So, for example, if the belief is that all dogs bark, and a new dog comes along, it would be reasonable to conclude that the new dog will also bark.

Piaget believed that children in the concrete operations stage of cognitive development only used inductive reasoning. Deductive reasoning, according to Piaget, did not develop until adolescence. However, research suggests Piaget underestimated the abilities of children. In one study, researchers gave inductive and deductive reasoning problems to kindergarteners, second graders, fourth graders, and sixth graders. Because they did not want the children to use real-world knowledge, they used imaginary terms and words to create both inductive and deductive reasoning problems. For example, one of the inductive problems was "Tombor is a popgop. Tombor wears blue boots. Do all popgops wear blue boots?" The corresponding deductive reasoning problem was "All popgops



How can parents and teachers help children improve their reasoning ability?

wear blue boots. Tombor is a popgop. Does Tombor wear blue boots?" Contrary to Piagetian theory, second graders (but not kindergartners) were able to answer both kinds of problems correctly (Galotti, Komatsu, & Voelz, 1997; Pillow, 2002). Moreover, children can be encouraged to reason at higher levels via training or intervention programs (Molnar, 2011; Barkl, Porter, & Ginns, 2012).



A child who has achieved conservation of liquid knows that pouring water from a wide, short glass into a tall, thin glass does not change the volume of water, even though the shape is different.
Marmaduke St. John/Alamy Stock Photo

Conservation In the preoperational stage of development, children are focused on appearances and have difficulty with abstract concepts. For example, Camilla, who is at the preoperational stage of development, is likely to think that if one of two identical clay balls is rolled into a long thin snake, it will now contain more clay because it is longer. She is deceived by appearances and thus fails this conservation task. However, Michael, who is in the stage of concrete operations, will say that the ball and the snake still contain the same amount of clay. What accounts for his ability to understand that the amount of clay remains unchanged regardless of the form it takes?

In solving various types of conservation problems, children in the stage of concrete operations can work out the answers in their heads. Three primary achievements allow them to do this. First, they understand the principle of *identity*. For instance, Michael understands that the clay is still the same clay even though it has a different shape because nothing was added or taken away from it. Second, children in the concrete operations stage understand the principle of *reversibility*. Michael can picture what would happen if he went backward in time and rolled the snake back into a ball. Third, children at this stage can *decenter*. When Camilla looked at the snake, she focused only on its length, ignoring that it was thinner and flatter than the ball of clay. She centered on one dimension (length) while excluding the other (thickness). Michael, however, is able to decenter and look at more than one aspect of the two objects at once. Thus, although the ball is shorter than the snake, it is also thicker.

Typically, children can solve problems involving conservation of matter, such as the clay task, at about age 7 or 8. However, it is not until age 8 or 9 that children correctly solve conservation of weight tasks in which they are asked, for instance, whether the ball and the snake weigh the same. In tasks involving conservation of volume—in which children must judge whether the snake and ball displace the same amount of liquid when placed in a glass of water—children rarely answer correctly before age 12. Children's thinking at this stage is so concrete, so closely tied to a particular situation, that they cannot readily transfer what they have learned about one type of conservation to another type, even though the underlying principles are the same.

Number and Mathematics When 4- to 5-year-old children deal a deck of cards or distribute portions of pizza, they demonstrate that they have some intuitive understanding of fractions (Bialystock & Codd, 2000; McCrink, Bloom, & Santos, 2010). However, children have more difficulty when dealing with numbers, which are more abstract. They tend not to think about the quantity a fraction represents; instead, they focus on the numerals that make it up. Thus, they may say that ½ plus ⅓ equals ⅖. It is also difficult for children to grasp that ½ is bigger than ¼—that the smaller fraction (¼) has the larger denominator (Geary, 2006; Sophian & Wood, 1997).

By age 6 or 7, many children can count in their heads. They also learn to count on: to add 5 and 3, they start counting at 5 and then go on to 6, 7, and 8. It may take 2 or 3 more years for them to count down for subtraction, but by age 9, most children can count up and down. Children also become more adept at solving simple story problems, such as "Pedro went to the store with $5 and spent $2 on candy. How much did he have left?" When the original amount is unknown—"Pedro went to the store, spent $2, and had $3 left. How much did he start out with?"—the problem is harder because the operation needed to solve it (addition) is not as clearly indicated. Few children can solve this kind of problem before age 8 or 9 (Resnick, 1989).

The ability to estimate progresses with age. When asked to place 24 numbers along a line from 0 to 100, kindergartners exaggerate the distances between low numbers and minimize the distances between high numbers. Most second graders produce number lines that are more evenly spaced (Siegler & Booth, 2004). Second, fourth, and sixth graders show a similar progression in producing number lines from 0 to 1,000 (Siegler & Opfer, 2003), most likely reflecting the experience older children gain in dealing with larger numbers (Berteletti, Lucangeli, Piazza, Dehaene, & Zorzi, 2010). Practice matters; children who play board games that include linear sequences show an advantage in their *number line estimation*, number estimation, and counting-on skills (Whyte & Bull, 2008; Laski & Siegler, 2014). In addition to improving in number line estimation with age, school-age children also improve in *computational estimation*, such as estimating the sum in an addition problem; *numerosity estimation*, such as estimating the number of candies in a jar; and *measurement estimation*, such as estimating the length of a line (Booth & Siegler, 2006).

Research with minimally schooled people in developing countries suggests that the ability to use mathematics can develop through concrete experience in a cultural context (Guberman, 1996; Resnick, 1989). For example, in a study of Brazilian street vendors ages 9 to 15, a researcher said, "I'll take two coconuts." Each coconut cost 40 cruzeiros; she paid with a 500-cruzeiros bill and asked, "What do I get back?" The child counted up from 80: "Eighty, 90, 100. . ." and gave the customer 420 cruzeiros. However, when this same child was given a similar problem in the classroom ("What is 500 minus 80?"), he arrived at the wrong answer by incorrectly using a series of steps learned in school (Carraher, Schliemann, & Carraher, 1988). In cultural contexts in which schooling is not as easily available, children develop mathematical abilities in their everyday lives that are not captured by their performance in academic settings but that nonetheless arrive at the correct answers (Guberman, 2004; Taylor, 2009; Guberman, 1999).

checkpoint can you . . .

- Identify six cognitive advances during middle childhood?
- Name three principles that help children understand conservation, and discuss influences on its mastery?

Information-Processing Approach: Planning, Attention, and Memory

Clara walks by the kitchen and smells cake cooling on the counter. A few years ago, she might have darted into the kitchen and stolen a few bites. But now, she thinks to herself, "No, that cake is for later. If I take a bite, my mom will get mad at me." Clara's more sophisticated cognitive abilities have allowed her to control her behavior in ways that were previously unavailable to her.

As children move through the school years, they make steady progress in the abilities to regulate and sustain attention, process and retain information, and plan and monitor their behavior. All of these interrelated developments contribute to **executive function,** the conscious control of thoughts, emotions, and actions to accomplish goals or solve problems. School-age children also understand more about how memory works, and this knowledge enables them to plan and use strategies, or deliberate techniques, to help them remember.

executive function
Conscious control of thoughts, emotions, and actions to accomplish goals or solve problems.

THE DEVELOPMENT OF EXECUTIVE FUNCTIONING

The gradual development of executive function from infancy through adolescence is the result of developmental changes in brain structure. The prefrontal cortex, the region that enables planning, judgment, and decision making, shows significant development during this period (Lamm, Zelazo, & Lewis, 2006). As unneeded synapses are pruned away and pathways become myelinated, processing speed—usually measured by reaction time—improves dramatically (Camarata & Woodcock, 2006). Faster, more efficient processing

increases the amount of information children can keep in working memory (McAuley & White, 2011). As children develop the ability to mentally juggle more concepts at the same time, they are also able to develop more complex thinking and goal-directed planning (Luna, Garver, Urban, Lazar, & Sweeney, 2004). Another aspect of executive function involves the development of self-regulatory capacity, including the ability to regulate attention, inhibit responses, and monitor errors. Advances in these areas, as well as in working memory, occur in concert with increases in activity of frontoparietal and frontostraital circuits (Hughes, 2011; Tau & Peterson, 2010).

In addition to the physical development of the brain, environmental influences also matter. Because of the slow rate of development of the frontal cortex, environmental influences exert a relatively large effect. For example, parenting quality and family environment—including such factors as cognitive stimulation, parental scaffolding, maternal sensitivity and attachment, and low parental control—have been found to predict later executive control (Fay-Stammbach, Hawes, & Meredith, 2014; Bernier, Carlson, Deschênes, & Matte-Gagné, 2012; Hammond, Müller, Carpendale, Bibok, & Lieberman-Finestone, 2012). Moreover, just as high-quality family environments can promote the development of executive functioning, less ideal circumstances can undermine its development. For example, children from disorganized and chaotic families tend to show less advanced executive functioning abilities (Hughes & Ensor, 2009). Environmental circumstances may interact with individual characteristics as well. In one series of studies, poverty did not impact the executive functioning abilities of children who were low in temperamental reactivity but negatively affected temperamentally reactive children (Raver, Blair, & Willoughby, 2013). Another individual characteristic that appears to be important is language. Children with robust language skills do well with executive function; those with language delays have difficulty (Gooch, Thompson, Nash, Snowling, & Hulme, 2016).

SELECTIVE ATTENTION

School-age children can concentrate longer than younger children and can focus on the information they need and want while screening out irrelevant information. For example, in school, it may be necessary for a child to focus on a teacher's less-than-exciting lesson while simultaneously ignoring the antics of the class clown. This growth in *selective attention*—the ability to deliberately direct one's attention and shut out distractions—may hinge on the executive skill of *inhibitory control,* the voluntary suppression of unwanted responses (Luna et al., 2004).

The increasing capacity for selective attention is believed to be due to neurological maturation and is one of the reasons memory improves during middle childhood (Sanders, Stevens, Coch, & Neville, 2006). Older children make fewer mistakes in recall than younger children because they are better able to expect and predict what might be important to remember, to then select and attend to the appropriate stimulus when presented with it, and, when asked, to recall the relevant information from memory while ignoring irrelevant information (Gazzaley & Nobre, 2012).

WORKING MEMORY

Working memory involves the short-term storage of information that is being actively processed, like a mental workspace. For example, if you are asked to compute what 42 × 60 is, you would use your working memory to hold part of the answer while you solved the rest of it.

The efficiency of working memory increases greatly in middle childhood, laying the foundation for a wide range of cognitive skills. For example, between the ages of 6 and 10 there are improvements in processing speed (how quickly information is processed) and storage capacity (how many



Contestants in a spelling bee make good use of mnemonic strategies—devices to aid memory—such as rehearsal (repetition), organization, and elaboration.
Jim Lo Scalzo/EPA/Shutterstock

things can be simultaneously held in working memory) (Bayliss, Jarrod, Baddeley, Gunn, & Leigh, 2005). Because working memory is necessary for storing information while other material is being mentally manipulated, the capacity of a child's working memory can directly affect academic success (Alloway & Alloway, 2010). For example, children with low working memory struggle with structured learning activities, especially when there are lengthy instructions (Gathercole & Alloway, 2008). Individual differences in working memory capacity are also linked to a child's ability to acquire knowledge and new skills (Alloway, 2006).

Research has indicated that as many as 10 percent of school-age children suffer from poor working memory (Alloway, Gathercole, Kirkwood, & Elliot, 2009). However, working memory is not a fixed entity. Training programs can improve working memory capacity, and indeed training programs have been shown to be associated with changes in brain activity in frontal and parietal cortex, basal ganglia, and dopamine receptor density (Klingberg, 2010). This is especially true for visuospatial working memory, such as that needed to play concentration games in which pairs of cards must be matched. Thus far, such training effects tend to be absent or short-lived or do not transfer to areas other than the specific form of working memory addressed (Melby-Lervåg & Hulme, 2013; Rapport, Orban, Kofler, & Friedman, 2013). However, more research is needed in this area, and there are suggestions that the adoption of tools that assess working memory in the classroom could still influence achievement for these children.

THE DEVELOPMENT OF MEMORY STRATEGIES

Were you ever taught the saying "please excuse my dear Aunt Sally" as a technique to help you remember the order of operations in solving an equation? This is an example of a **mnemonic device,** a strategy to aid memory.

mnemonic device
Strategy to aid memory.

external memory aids
Mnemonic strategies using something outside the person.

rehearsal
Mnemonic strategy to keep an item in working memory through conscious repetition.

organization
Mnemonic strategy of categorizing material to be remembered.

elaboration
Mnemonic strategy of making mental associations involving items to be remembered.

metamemory
Knowledge of and reflection about memory processes..

Common memory strategies are rehearsal, organization, and elaboration. Writing down a telephone number, making a list, setting a timer, and putting a library book by the front door are examples of **external memory aids**: prompts by something outside the person. Saying a telephone number over and over after looking it up, so as not to forget it before dialing, is a form of **rehearsal,** or conscious repetition. **Organization** is mentally placing information into categories (such as animals, furniture, vehicles, and clothing) to make it easier to recall. In **elaboration,** children associate items with something else, such as an imagined scene or story. To remember to buy lemons, ketchup, and napkins, for example, a child might visualize a ketchup bottle balanced on a lemon, with a pile of napkins handy to wipe up any spills

Metamemory can be described as the knowledge of and reflection about memory processes. From kindergarten through the elementary school years, children advance steadily in understanding memory (Schnieder, 2008). Kindergarteners and first graders know that people remember better if they study longer, that people forget things with time, and that relearning something is easier than learning it for the first time (Flavell et al., 2002). However, younger children tend not to use organizational memory strategies such as grouping things by categories to make them easier to remember, and they tend to overestimate their memory capacity (Karably & Zabrucky, 2017). Moreover, even when taught to use memory strategies, they tend to use those memory strategies only in the context in which they were taught and do not generalize them to other tasks in which they might be useful. By third grade, children know that some people remember better than others and that some things are easier to remember than others (Flavell et al., 2002), and they become more proficient in their use of memory strategies (Karably & Zabrucky, 2017). For example, they often use more than one strategy for a task, choose different kinds of strategies for different problems, and are better at assessing if they are reaching their memory goals (Bjorklund, Miller, Coyle, & Slawinski, 1997; Schneider, 2008). Children's metamemory abilities continue to progress through adolescence and quite possibly longer (van der Stel & Veenman, 2014).

Metamemory is one component of metacognition and is associated with a number of variables. For example, children's knowledge about their own minds is related to their

understanding of others' minds. An early understanding of others' mental states predicts superior metacognitive abilities later (Ebert, 2015; Lecce, Zocci, Pagnin, Palladino, & Taumoepeau, 2010). Language, too, appears to be an important factor and is linked to better metacognitive abilities (Ebert, 2015).

Metacognition is related to academic performance because it allows learners to reflect upon the strategies they are using and select those that are most effective (Vrugt & Oort, 2008). Metamemory may allow learners to calibrate whether or not the subjective assessment of the accuracy of responses (does it "feel right") aligns with reality by monitoring failures. This ability is supported by cortical thinning in the anterior insula and an increase in the thickness of the ventromedial prefrontal cortex from childhood through adolescence (Fandakova et al., 2017)

checkpoint can you . . .

- Identify four ways in which information processing improves during middle childhood?
- Explain the importance of executive function, selective attention, working memory, and metamemory?
- Name four common mnemonic aids and discuss developmental differences in their use?
- Give examples of how improved information processing explains cognitive advances Piaget described?

Psychometric Approach: Assessment of Intelligence

Psychometrics is a branch of psychology involved in the quantitative measurement of psychological variables, and psychometric techniques have been used extensively in the development of ways to measure intelligence. The most widely used individual test is the **Wechsler Intelligence Scale for Children (WISC-IV).** This test for ages 6 through 16 measures verbal and performance abilities, yielding separate scores for each as well as a total score. The separate subtest scores pinpoint a child's strengths and help diagnose specific problems. For example, if a child does well on verbal tests (such as general information and basic arithmetic operations) but poorly on performance tests (such as doing a puzzle or drawing the missing part of a picture), the child may be slow in perceptual or motor development. A child who does well on performance tests but poorly on verbal tests may have a language problem. Another commonly used individual test is the Stanford-Binet Intelligence Scales.

Wechsler Intelligence Scale for Children (WISC-IV)
Individual intelligence test for school-age children, which yields verbal and performance scores as well as a combined score.

A popular group test, the **Otis-Lennon School Ability Test (OLSAT8),** has levels for kindergarten through 12th grade. Children are asked to classify items, show an understanding of verbal and numerical concepts, display general information, and follow directions. Separate scores for verbal comprehension, verbal reasoning, pictorial reasoning, figural reasoning, and quantitative reasoning can identify specific strengths and weaknesses.

Otis-Lennon School Ability Test (OLSAT8)
Group intelligence test for kindergarten through 12th grade.

THE IQ CONTROVERSY

The use of psychometric intelligence tests such as those just described is controversial. On the positive side, because IQ tests have been standardized and widely used, there is extensive information about their norms, validity, and reliability. Scores on IQ tests taken during middle childhood are fairly good predictors of school achievement, especially for highly verbal children, and these scores are more reliable than during the preschool years. IQ at age 11 even has been found to predict length of life, functional independence late in life, and the presence or absence of dementia (Starr, Deary, Lemmon, & Whalley, 2000; Whalley & Deary, 2001; Whalley et al., 2000).

On the other hand, critics claim that the tests underestimate the intelligence of children who are in ill health or, for one reason or another, do not do well on tests (Ceci, 1991; Sternberg, 2004). Because the tests are timed, they equate intelligence with speed and penalize a child who works slowly and deliberately. Their appropriateness for diagnosing learning disabilities also has been questioned (Benson, 2003). Moreover, such variables as working memory (Alloway & Alloway, 2010) and self-control (Duckworth, Quinn, & Tsukayama, 2012) have been found to be important in predicting academic achievement.

checkpoint
can **you** . . .

- Name and describe two traditional intelligence tests for schoolchildren?
- Give arguments for and against IQ tests?

A more fundamental criticism is that IQ tests do not directly measure native ability; instead, they *infer* intelligence from what children already know. As we'll see, it is virtually impossible to design a test that requires no prior knowledge. Further, the tests are validated against measures of achievement, such as school performance, which are affected by such factors as schooling and culture. As we discuss in a later section, there is also controversy over whether intelligence is a single, general ability or whether there are types of intelligence not captured by IQ tests. For these and other reasons, strong disagreement exists over how accurately these tests assess children's intelligence.

INFLUENCES ON INTELLIGENCE (IQ)

Both heredity and environment influence intelligence. Keeping in mind the controversy over whether IQ tests actually measure intelligence, let's look more closely at these influences.

Brain Development Intelligence is highly heritable, and one mechanism of genetic action may be via brain development and structure. Brain imaging research shows a moderate correlation between brain size or amount of gray matter and general intelligence (Rushton & Ankney, 2009), especially for reasoning, problem-solving abilities, and nonverbal performance measures (Gray & Thompson, 2004; Lange, Froimowitz, Bigler, Lainhart, & Brain Development Cooperative Group, 2010). One study found that the amount of gray matter in the frontal cortex is largely inherited, varies widely among individuals, and is linked with differences in IQ (Thompson et al., 2001). Moreover, connectivity between frontal and parietal brain regions, especially in girls, has also been associated with nonverbal intelligence (Langeslag et al., 2013).

The developmental changes found in cortical thickness are also strongly influenced by genes (Fjell et al., 2015). Recent research has found that intelligence is highest in those children whose cortex thins most quickly (Schnack et al., 2014) or whose white matter develops most rapidly (Tamnes et al., 2010). Moreover, while IQ is generally a stable trait, there are sometimes fluctuations. Research has shown that children and adolescents who show declines in IQ over time also show reductions in cortical thickness, suggesting a neural substrate for their declines in intellectual performance (Burgaleta, Johnson, Waber, Colom, & Karama, 2014).

Although reasoning, problem solving, and executive function are linked to the prefrontal cortex, other brain regions under strong genetic influence also contribute to intelligent behavior (Davis, Hayworth, & Plomin, 2009), as does the speed and reliability of transmission of messages in the brain. The efficiency and integration of brain processes, both at the global and specific level, are associated with intellectual functioning (Kim et al., 2016).



Asian American children often do well in school. As with other academic differences found across racial and ethnic groups, the reasons seem to be cultural, not genetic.
image100 Ltd

Influence of Schooling on IQ Schooling increases tested intelligence (Adey, Csapó, Demetriou, Hautamäki, & Shayer, 2007). IQ scores drop during summer vacation and rise again during the academic year (Ceci & Williams, 1997; Huttenlocher, Levine, & Vevea, 1998). Additionally, scores attained on various educational assessment tests—which test knowledge, such as math and science, unlikely to be learned outside of an educational environment—are strongly correlated with IQ, and this relationship exists in all countries for which data are available (Lynn & Meisenberg, 2010; Lynn & Vanhanen, 2012). A recent meta-analysis suggests the effect of education on intelligence ranges from 1 to 5 IQ points per year of schooling (Ritchie & Tucker-Drob, 2018).

However, the cognitive gains associated with schooling do not appear to be general in nature and instead consist of direct gains in specific cognitive skills that are then tapped by IQ tests (Ritchie, Bates, & Deary, 2015). Not surprisingly, the type of

schooling also matters. Children who are enrolled in schools with an academic focus tend to show greater gains in intellectual performance than children in schools with a vocational focus (Becker, Lüdtke, Trautwein, Köller, & Baumert, 2012).

Influences of Race/Ethnicity and Socioeconomic Status on IQ Average test scores vary among racial/ethnic groups. Historically, black children scored about 15 points lower than white children and showed a comparable lag on school achievement tests (Neisser et al., 1996). However, these gaps have narrowed by as much as 4 to 7 points (Dickens & Flynn, 2006). Average IQ scores of Hispanic American children fall between those of black and white children (Ang, Rodgers, & Wangstrom, 2010). Projections for both African Americans and Hispanics are that the IQ gaps will fall even further in the coming decades (Rindermann & Pichelmann, 2015).

What accounts for racial/ethnic differences in IQ? Some researchers have argued for a substantial genetic factor (Herrnstein & Murray, 1994; Jensen, 1969; Rushton & Jensen, 2005). Although there is strong evidence of a genetic influence on *individual* differences in intelligence, there is no direct evidence that IQ differences among ethnic, cultural, or racial *groups* are hereditary (Gray & Thompson, 2004; Neisser et al., 1996; Sternberg et al., 2005). Instead, many studies attribute ethnic differences in IQ to inequalities in environment (Nisbett et al., 2012)—in income, nutrition, living conditions, health, parenting practices, early child care, intellectual stimulation, schooling, culture, or other circumstances such as the effects of oppression and discrimination that can affect self-esteem, motivation, and academic performance.

The strength of genetic and environmental influences varies with socioeconomic status (Nisbett et al., 2012). In one longitudinal study of 8,716 twin pairs, researchers found that the genetic influences on intelligence were high but relatively similar for twins of low and high SES. However, a different story emerged for environmental influences. Nonshared environmental experiences—those events and influences experienced differently by each twin—had a greater impact on IQ for children of lower SES (Hanscombe et al., 2012). Results such as these have policy implications as they suggest that genetic influences are more important for wealthy children but that the environment may matter more for children of lower SES—at least in countries like the United States. However, in countries where social services are offered more consistently to people at the lower ends of the socioeconomic scale and poverty is thus not associated with the same level of deprivation, genetic influences on intelligence function similarly for children of high and low socioeconomic status (Tucker-Drob & Bates, 2016).

What about Asian Americans, whose scholastic achievements consistently top those of other ethnic groups? Asian American children's strong scholastic achievement seems to be best explained by their culture's emphasis on obedience and respect for elders, the importance Asian American parents place on education as a route to upward mobility, and the devotion of Asian American students to homework and study (Nisbett et al., 2012).

checkpoint can you . . .

- Assess the effects of brain development on intellectual functioning?
- Assess the effects of schooling, race/ethnicity, SES, and culture on IQ?

IS THERE MORE THAN ONE INTELLIGENCE?

A serious criticism of IQ tests is that they focus almost entirely on abilities that are useful in school. Most IQ tests do not cover other important aspects of intelligent behavior, such as common sense, social skills, creative insight, and self-knowledge. Yet these abilities, in which some children with modest academic skills excel, may become equally or more important in later life and may even be considered separate forms of intelligence. Two of the chief advocates of this position are Howard Gardner and Robert Sternberg.

Gardner's Theory of Multiple Intelligences Is a child who is good at analyzing paragraphs and making analogies more intelligent than one who can play a challenging violin solo or pitch a curve ball at the right time? The answer is no, according to Gardner's (1993, 1998) **theory of multiple intelligences.**

theory of multiple intelligences
Gardner's theory that each person has several distinct forms of intelligence.

window on the world

CULTURE AND IQ

Intelligence and culture are inextricably linked, and behavior seen as intelligent in one culture may be viewed as foolish in another (Sternberg, 2004). For example, when given a sorting task, North Americans would be likely to place a robin under the category of birds, whereas the Kpelle people in North Africa would consider it more intelligent to place the robin in the functional category of flying things (Cole, 1998). Thus a test of intelligence developed in one culture may not be equally valid in another. Furthermore, the schooling offered in a culture may prepare a child to do well in certain tasks and not in others, and the competencies taught and tested in school are not necessarily the same as the practical skills needed to succeed in everyday life (Sternberg, 2004, 2005). Intelligence might thus be better defined as the skills and knowledge needed for success within a particular social and cultural context. The mental processes that underlie intelligence may be the same across cultures, but their products may be different and so should be the means of assessing performance (Sternberg, 2004).

These arguments have led to assertions that ethnic differences in IQ are not reflective of intelligence, but rather are an artifact of cultural bias. It may be that some questions use vocabulary or call for information or skills more familiar to some cultural groups than to others (Sternberg, 1985, 1987). Because these intelligence tests are built around the dominant thinking style and language of white people of European ancestry, minority children are at a disadvantage (Heath, 1989; Helms, 1992; Matsumoto & Juang, 2008).

Test developers have tried to design **culture-free tests**—tests with no culture-linked content by posing tasks that do not require language, such as tracing mazes, putting the right shapes in the right holes, and completing pictures—but they have been unable to eliminate all cultural influences. Test designers also have found it virtually impossible to produce **culture-fair tests** consisting only of experiences common to people in various cultures. Psychologists continue to work on constructing suitable tests and on interpreting the meanings of findings on intelligence.

what's your view

Do you think intelligence will be defined the same way 100 years in the future? Is there anything about intelligence that is always the same across time and place?

culture-free tests
Intelligence tests that, if they were possible to design, would have no culturally linked content.

culture-fair tests
Intelligence tests that deal with experiences common to various cultures, in an attempt to avoid cultural bias.

Gardner, a neuropsychologist and educational researcher at Harvard University, identified eight independent kinds of intelligence. According to Gardner, conventional intelligence tests tap only three "intelligences": *linguistic, logical-mathematical,* and, to some extent, *spatial.* The other five, which are not reflected in IQ scores, are *musical, bodily-kinesthetic, interpersonal, intrapersonal,* and *naturalist* (Table 4 gives definitions of each intelligence and examples of fields in which it is most useful).

Gardner argued that these intelligences are distinct from each other and that high intelligence in one area does not necessarily accompany high intelligence in any of the others. A person may be extremely gifted in art (a spatial ability), precision of movement (bodily-kinesthetic), social relations (interpersonal), or self-understanding (intrapersonal), but not have a high IQ. Thus an athlete, an artist, and a musician could be equally intelligent, each in a different area.

Gardner (1995) would assess each intelligence directly by observing its products—how well a child can tell a story, remember a melody, or get around in a strange area—and not with typical standardized tests. The type of intelligence being assessed would determine the type of test required. The purpose would be, not to compare individuals, but to reveal strengths and weaknesses to help people realize their potential.

Critics of Gardner argue that his multiple intelligences are actually more accurately labeled as talents or abilities and assert that *intelligence* is more closely associated with skills that lead to academic achievement. They further question his criteria for defining

In which of Gardner's types of intelligence are you strongest? Did your education focus on any of these?

TABLE 4 Eight Intelligences, According to Gardner

Intelligence	Definition	Fields or Occupations Where Used
Linguistic	Ability to use and understand words and nuances of meaning	Writing, editing, translating
Logical-mathematical	Ability to manipulate numbers and solve logical problems	Science, business, medicine
Spatial	Ability to find one's way around in an environment and judge relationships between objects in space	Architecture, carpentry, city planning
Musical	Ability to perceive and create patterns of pitch and rhythm	Musical composition, conducting
Bodily-kinesthetic	Ability to move with precision	Dancing, athletics, surgery
Interpersonal	Ability to understand and communicate with others	Teaching, acting, politics
Intrapersonal	Ability to understand the self	Counseling, psychiatry, spiritual leadership
Naturalist	Ability to distinguish species and their characteristics	Hunting, fishing, farming, gardening, cooking

Source: Based on Gardner, 1993, 1998.

separate intelligences that largely overlap such as mathematical and spatial intelligence (Willingham, 2004).

Sternberg's Triarchic Theory of Intelligence Gardner segmented intelligence on the basis of areas of ability, whereas Sternberg's (1985, 2004) **triarchic theory of intelligence** focuses on the processes involved in intelligent behavior. In this approach, intelligence consists of three elements: *componential, experiential,* and *contextual* intelligence.

triarchic theory of intelligence
Sternberg's theory describing three elements of intelligence: componential, experiential, and contextual.

- The **componential element** is the analytic aspect of intelligence; it determines how efficiently people process information. It helps people solve problems, monitor solutions, and evaluate the results. Some people are more effective information processors than others.
- The **experiential element** is insightful or creative; it determines how people approach novel or familiar tasks. It enables people to compare new information with what they already know and to come up with new ways of putting facts together—in other words, to think originally.
- The **contextual element** is practical; it helps people deal with their environment. It is the ability to size up a situation and decide what to do. What actions are most appropriate for a given situation depend on the context; a person might decide to adapt to a situation, change it, or get out of it.

componential element
Sternberg's term for the analytic aspect of intelligence.

experiential element
Sternberg's term for the insightful or creative aspect of intelligence.

contextual element
Sternberg's term for the practical aspect of intelligence.

According to Sternberg, everyone has these three abilities to a greater or lesser extent. A person may be strong in one, two, or all three. The *Sternberg Triarchic Abilities Test* (STAT) (Sternberg, 1993) seeks to measure each of the three aspects of intelligence through multiple-choice and essay questions. Because Sternberg focused on processes rather than content, and those processes should predict intelligent behavior across domains of knowledge, three domains of intelligence are assessed: *verbal, quantitative,* and *figural* (or spatial). For example, an item to test practical quantitative intelligence might be to solve an everyday math problem having to do with buying tickets to a ball game or following a recipe for making cookies. A creative verbal item might ask children to solve deductive reasoning problems that start with factually false premises (such as, "Money falls off trees"). An analytical figural item might ask children to identify the missing piece of a figure. As predicted, the three kinds of abilities are only weakly correlated with each other (Sternberg, 1997; Sternberg & Clinkenbeard,



The Kaufman Assessment Battery for Children (K-ABC-II) is designed to evaluate cognitive abilities in children with diverse needs, such as hearing impairments and language disorders.
Juan Silva/The Image Bank/Getty Images

1995). However, validation studies have found a positive correlation between the STAT and several other tests of critical thinking, creativity, and practical problem solving. Additionally, total STAT scores predict academic achievement (Sternberg, Castejon, Prieto, Hautamaki, & Grigorenko, 2001; Ekinci, 2014).

In the real world, book knowledge may not always be helpful. For example, children in many cultures have to learn practical skills, known as **tacit knowledge,** in order to succeed. In studies in Usenge, Kenya, and among Yup'ik Eskimo children in southwestern Alaska, children's tacit knowledge of medicinal herbs, hunting, fishing, and preserving plants showed no correlation with conventional measures of intelligence but were necessary for survival (Grigorenko et al., 2004; Sternberg, 2004).

OTHER DIRECTIONS IN INTELLIGENCE TESTING

Some other diagnostic and predictive tools are based on neurological research and information-processing theory. The second edition of the **Kaufman Assessment Battery for Children (K-ABC-II)** (Kaufman & Kaufman, 1983, 2003), an individual test for ages 3 to 18, is designed to evaluate cognitive abilities in children with diverse needs (such as autism, hearing impairments, and language disorders) and from varying cultural and linguistic backgrounds. It has subtests designed to minimize verbal instructions and responses as well as items with limited cultural content.

Dynamic tests based on Vygotsky's theories emphasize potential rather than present achievement. In contrast with traditional *static tests* that measure a child's current abilities, these tests seek to capture the *dynamic* nature of intelligence by measuring learning processes directly rather than through the products of past learning (Sternberg, 2004). Dynamic tests contain items up to 2 years above a child's current level of competence. Examiners help the child when necessary by asking leading questions, giving examples or demonstrations, and offering feedback; thus the test itself is a learning situation (Resing, 2013). Because Vygotsky focused on interaction as the context in which development occurred, part of what it means to be intelligent includes the ability to learn via scaffolded interactions.

tacit knowledge
Sternberg's term for information that is not formally taught or openly expressed but is necessary to get ahead.

Kaufman Assessment Battery for Children (K-ABC-II)
Nontraditional individual intelligence test designed to provide fair assessments of minority children and children with disabilities.

dynamic tests
Tests based on Vygotsky's theory that emphasize potential rather than past learning.

checkpoint can you . . .

- Compare Sternberg's and Gardner's theories of intelligence?
- Describe three new types of intelligence testing?

Language and Literacy

Language abilities continue to grow during middle childhood. School-age children are better able to understand and interpret oral and written communication and to make themselves understood. These tasks are especially challenging for children who are not native-language speakers.

VOCABULARY, GRAMMAR, AND SYNTAX

As vocabulary grows during the school years, children use increasingly precise verbs. They learn that a word like *run* can have more than one meaning, and they can tell from the context which meaning is intended. *Simile* and *metaphor,* figures of speech in which a word or phrase that usually designates one thing is compared or applied to another, become increasingly common (Owens, 1996). Although grammar is quite complex by age 6, children during the early school years rarely use the passive voice (as in "The sidewalk is being shoveled").

Children's understanding of rules of *syntax* (the deep underlying structure of language that organizes words into understandable phrases and sentences) becomes more sophisticated with age (C. S. Chomsky, 1969). For example, most children under age 5 or 6 think the sentences "John promised Bill to go shopping" and "John told Bill to go shopping" both mean that Bill is the one to go to the store. By age 8 most

children can interpret the first sentence correctly and by age 9 virtually all children can. They now look at the meaning of a sentence as a whole instead of focusing on word order alone.

Sentence structure continues to become more elaborate. Older children use more subordinate clauses ("The boy *who delivers the newspapers* rang the doorbell."). Still, some constructions, such as clauses beginning with *however* and *although,* do not become common until early adolescence (Owens, 1996).

PRAGMATICS: KNOWLEDGE ABOUT COMMUNICATION

The major area of linguistic growth during the school years is in **pragmatics:** the social context of language. Pragmatics includes both conversational and narrative skills.

Good conversationalists probe by asking questions before introducing a topic with which the other person may not be familiar. They quickly recognize a breakdown in communication and do something to repair it. There are wide individual differences in such skills; some 7-year-olds are better conversationalists than some adults (Anderson, Clark, & Mullin, 1994). There are also gender differences. Boys tend to use more controlling statements, negative interruptions, and competitive statements, whereas girls phrase their remarks in a more tentative, conciliatory way and are more polite and cooperative (Leman, Ahmed, & Ozarow, 2005; Cook-Gumperz & Syzmanski, 2001). However, not all children show this gender difference or to the same degree. In one study, children at 6½ years of age showed strong gender differences that declined by 9½ years of age (Bablekou, 2009). In another study, both Dutch girls and boys tend to be equally assertive and controlling in their play (Ladegaard, 2004).

Most 6-year-olds can retell the plot of a short book, movie, or television show. They are beginning to describe motives and causal links. By second grade, children's stories become longer and more complex. Fictional tales often have conventional beginnings and endings ("Once upon a time . . ." and "They lived happily ever after"). Word use is more varied than before, but characters do not show growth or change, and plots are not fully developed.

Older children usually set the stage with introductory information about the setting and characters, and they clearly indicate changes of time and place during the story. They construct more complex episodes than younger children do, but with less unnecessary detail. They focus more on the characters' motives and thoughts, and they think through how to resolve problems in the plot.

If you want children to tell you the truth, ask them to promise to do so before asking your question. Researchers have found that children are less likely to lie after promising to tell the truth.

Evans & Lee, 2010

In 1939, researchers at the University of Iowa conducted a study in which stuttering was deliberately induced in young children. In this "Monster study," a group of orphans were taunted and harassed over their speech in an attempt to demonstrate that stuttering was the result of psychological pressure. None of the children developed a stuttering problem, but many of them did develop psychological problems as a result of the experiment. Clearly, this study suffered from profound ethical issues, and in 2007, six of the children sued and were awarded settlements of approximately $1 million.

Huge payout in U.S. stuttering case, 2007

pragmatics
The social context of lanuage.

checkpoint can you . . .

- **Summarize improvements in language skills during middle childhood?**

SECOND-LANGUAGE LEARNING

In 2014, 22 percent of U.S. children ages 5 to 17 spoke a language other than English at home. The primary language most of these children spoke was Spanish, and 5 percent had difficulty speaking English (Federal Interagency Forum on Child and Family Statistics, 2016). About 9.4 percent of the public school population are defined as English-language learners (ELLs) (NCES, 2017).

Some schools use an **English-immersion approach** (sometimes called ESL, or English as a second language) in which language-minority children are immersed in English from the beginning in special classes. Other schools have adopted programs of **bilingual education,** in which children are taught in two languages, first learning in their native language and then switching to regular classes in English when they become more proficient. These programs can encourage children to become **bilingual** (fluent in two languages) and to feel pride in their cultural identity.

English-immersion approach
Approach to teaching English as a second language in which instruction is presented only in English.

bilingual education
System of teaching non-English-speaking children in their native language while they learn English, and later switching to all-English instruction.

bilingual
Fluent in two languages.

two-way (dual-language) learning
Approach to second-language education in which English speakers and non-English-speakers learn together in their own and each other's languages.

Advocates of early English immersion claim that the sooner children are exposed to English, the better they learn it. Proponents of bilingual programs claim that children progress faster academically in their native language and later make a smoother transition to all-English classrooms (Padilla et al., 1991).

Statistical analyses of multiple studies conclude that children in bilingual programs typically outperform those in all-English programs on tests of English proficiency (Crawford, 2007; Krashen & McField, 2005). Another, less common approach is **two-way (dual-language) learning,** in which English-speaking and foreign-speaking children learn together in their own and each other's languages. By valuing both languages equally, it reinforces self-esteem and improves school performance. However, less than 2 percent of English-language learners nationwide are enrolled in two-way programs (Crawford, 2007).

checkpoint can you . . .

- Describe and evaluate three types of second-language education?

BECOMING LITERATE

Once children can translate the marks on a page into patterns of sound and meaning, they can develop increasingly sophisticated strategies to understand what they read, and they can use written words to express ideas, thoughts, and feelings.

Reading and Writing Think of what happens in order for a child to learn to read words. First, a child must remember the distinctive features of letters—for example, that, a "c" consists of a curved half-circle and an "o" is a closed circle. Then a child must be able to recognize the different phonemes by breaking down words into their constituent parts. For example, a child must be able to understand that the word *dog* is composed of three different sounds, the "d," the "o," and the "g." Finally, the child must be able to match the visual features of letters and the phonemes and remember which ones go together. This process is known as **decoding.** Only when these skills are accomplished can children begin to read. Not surprisingly, learning to read is a complicated and difficult skill.

decoding
Process of phonetic analysis by which a printed word is converted to spoken form before retrieval from long-term memory.

phonetic (code-emphasis) approach
Approach to teaching reading that emphasizes decoding of unfamiliar words.

whole-language approach
Approach to teaching reading that emphasizes visual retrieval and use of contextual clues.

visually based retrieval
Process of retrieving the sound of a printed word when seeing the word as a whole.

Because of the difficulties involved in learning how to read, educators have developed a variety of ways to instruct children. In the traditional approach, called the **phonetic (code-emphasis) approach,** the child sounds out the word, translating it from print to speech before retrieving it from long-term memory. To do this, the child must master the phonetic code that matches the printed alphabet to spoken sounds (as described above). Instruction generally involves rigorous, teacher-directed tasks focused on memorizing sound-letter correspondences.

The **whole-language approach** emphasizes visual retrieval and the use of contextual cues. This approach is based on the belief that children can learn to read and write naturally, much as they learn to understand and use speech. By using **visually based retrieval,** the child simply looks at the word and then retrieves it. Whole-language proponents assert that children learn to read with better comprehension and more enjoyment if they experience written language from the outset as a way to gain information and express ideas and feelings, not as a system of isolated sounds and syllables to be learned by memorization and drill. Whole-language programs tend to feature real literature and open-ended, student-initiated activities.

Despite the popularity of the whole-language approach, research has found little support for its claims. Although humans have brains wired for spoken language, there is no theoretical reason to assume that written language, a relatively new invention in human history, has similar evolutionary roots and thus should be learned as naturally as spoken language. A long line of research supports the view that phonemic awareness and early phonetics training are keys to reading proficiency for most children (Jeynes & Littell, 2000; National Reading Panel, 2000).

Many experts recommend a blend of the best features of both approaches (National Reading Panel, 2000). Children can learn phonetic skills along with strategies to help them understand what they read. For example, they might be drilled in sound-letter correspondences, but also be asked to memorize certain common words like *"the"* and *"one"*

that are more difficult to decode. Children who can summon both visually based and phonetic strategies become better, more versatile, readers (Siegler, 1998, 2000).

Metacognitive abilities can help children develop literacy. **Metacognition** involves thinking about thinking. It can help children monitor their understanding of what they read and develop strategies to address challenges. For example, children with good metacognitive skills might use such strategies as reading more slowly, rereading difficult passages, trying to visualize information, or thinking of additional examples when trying to learn information in a challenging written passage. Metacognitive abilities can be encouraged by having students recall, summarize, and ask questions about what they read (National Reading Panel, 2000).

metacognition
Thinking about thinking, or awareness of one's own mental processes.

The acquisition of writing skills goes hand in hand with the development of reading. Older preschoolers begin using letters, numbers, and letterlike shapes as symbols to represent words or parts of words (syllables or phonemes). Often their spelling is quite inventive—so much so that they may not be able to read it themselves (Ouellette & Sénéchal, 2008; Whitehurst & Lonigan, 1998).

Writing is difficult for young children. Unlike conversation, which offers constant feedback, writing requires the child to judge independently whether the communicative goal has been met. The child also must keep in mind a variety of other constraints: spelling, punctuation, grammar, and capitalization, as well as the basic physical task of forming letters (Siegler, 1998).

Today's children are growing up in a world saturated with technology, and many of their literary experiences will take place on digital screens rather than on printed books. While some researchers have argued that e-books undermine children's understanding of the thematic content of a story and encourage a passive approach to reading (Labbo & Kuhn, 2000), other researchers have suggested that e-books can be used effectively to help children, especially reluctant readers, develop literacy skills (Maynard, 2010). Research has supported this assertion; a number of school-based interventions have found that e-books supported literacy development to a greater degree than printed books, especially for children at risk for learning disabilities (Ihmeideh, 2014; Shamir, Korat, & Fellah, 2012; Shamir & Shlafer, 2011). However, for technology to be useful, it must consist of carefully designed applications that encourage collaborative activity and be carefully scaffolded by parents or teachers (Moody, 2010; Flewitt, Messer, & Kucirkova, 2015).

checkpoint can you . . .

- Compare the phonetic and whole-language methods of teaching reading, and discuss how comprehension improves?
- Identify factors that affect reading improvement in poor beginning readers?
- Explain why writing is hard for young children?

The Child in School

First grade marks entry into "real school." It is a milestone in academic development and sets the stage for future success or failure. Let's examine influences on school achievement.



Did you take psychology because you thought it would be easy? You're not alone. By the age of 7, children believe that psychology is easier than the natural sciences.

Keil, Lockhart, & Schlegel, 2010

INFLUENCES ON SCHOOL ACHIEVEMENT

As Bronfenbrenner's bioecological theory would predict, in addition to children's own characteristics, each level of the context of their lives—from the immediate family to what goes on in the classroom to the messages children receive from peers and from the larger culture—influences how well they do in school.

Self-Efficacy Beliefs Think of how you felt the last time you studied for a big exam. Did you feel you could do well as long as you studied, and were you confident in your ability to master the material? Or did you feel that nothing you could do would matter and that the material was just too hard? Your attitude can be described as involving a construct called self-efficacy. Those students high in *self-efficacy* believe they can master schoolwork and regulate their own learning (Komarraju & Nadler, 2013). They are more likely to succeed than students who do not believe in their abilities (Caprara et al., 2008), in part because high self-efficacy has a positive effect on motivation (Skaalvik,



Interest, attention, and active participation all contribute to a child's academic success in school.
Andersen Ross/Blend Images/Getty Images

Federici, & Klassen, 2015). Self-regulated learners try hard, persist despite difficulties, and seek help when necessary. Moreover, doing well in school then results in increases in self-efficacy, which once again results in attitudes and behaviors likely to lead to academic success (Schöber, Schütte, Köller, McElvany, & Gebauer, 2018). Unfortunately, the converse is also true. Students who do not believe in their ability to succeed tend to become frustrated and depressed—feelings that make success increasingly elusive over time.

Gender Girls tend to do better in school than boys. They receive higher marks, on average, in every subject (Voyer & Voyer, 2014; Halpern et al., 2007), are less likely to repeat grades, have fewer school problems (Freeman, 2004), outperform boys in reading and writing assessments (Scheiber, Reynolds, Hajovsky, & Kaufman, 2015), and tend to do better than boys on timed tests (Camarata & Woodcock, 2006). Some research has suggested that boys outperform girls on science and math (Reilly, Neumann, & Andrews, 2015), but other research has not found a gender gap (Lindberg, Hyde, Petersen, & Linn, 2010), or has found it varies by culture (Else-Quest, Hyde, & Linn, 2010). While research with adults has shown a consistent male advantage for mental rotations, in second grade, boys' and girls' performance on mental rotation tasks does not differ. However, by fourth grade, boys begin to outperform girls on this task (Neuberger, Jansen, Heil, & Quaiser-Pohl, 2011).

Gender differences tend to become more prominent in high school. A combination of several factors, including early experience, biological differences, and cultural expectations, may help explain these differences (Nisbett et al., 2012; Halpern et al., 2007).

Parenting Practices Generally, regardless of how it is defined, parental involvement has a positive effect on academic achievement (Wilder, 2014; LaRocque, Kleiman, & Darling, 2011). However, some forms of involvement appear to be more effective than others. For example, homework assistance has not been consistently related to academic achievement (Hill & Tyson, 2009; McNeal, 2012). School involvement, including parental participation in school events and activities and good communication with teachers, is more strongly associated with strong academic performance (Overstreet, Devine, Bevans, & Efreom, 2005; Topor, Keane, Shelton, & Calkins, 2010). The strongest effects for parent involvement, however, center on parental expectations. Those parents who expect that their children will do well in school have children who live up to those beliefs (Wilder, 2014; Davis-Kean, 2005), perhaps because children also adopt the same attitude about their abilities (Topor et al., 2010).

In January 2011, a Roslyn, New York, school bought 47 iPads to hand out to students as part of a pilot program. Administrators argue that iPads will replace textbooks, increase homework completion, provide interactive material, and make communication with teachers more likely. What do you think?

Hu, 2011

Socioeconomic Status Socioeconomic status (SES) can be a powerful factor in educational achievement—not in and of itself, but through its influence on family atmosphere, choice of neighborhood, parenting practices (Evans, 2004; Rouse, Brooks-Gunn, & McLanahan, 2005), and parents' expectations for children (Davis-Kean, 2005). Generally, achievement gaps between advantaged and disadvantaged students widen from kindergarten to third grade (Rathbun, West, & Germino-Hausken, 2004). Summer vacation contributes to these gaps because of differences in the typical home environment and in the summer learning experiences the children have, particularly with respect to reading (Johnston, Riley, Ryan, & Kelly-Vance, 2015). This can help account for later differences in high school achievement and completion and college attendance (Alexander, Entwisle, & Olson, 2007). Moreover, as the income gap between wealthy and poor families has gotten larger, the achievement gap between wealthy and poor children has also grown (Reardon, 2011).

In addition to these factors, socioeconomic status may influence brain development itself. For example, children who live in poverty are more likely to be exposed to environmental toxins such as lead, which can negatively impact brain development. Poor children are also less likely to have access to healthy foods and more likely to suffer

from nutrient deficiencies. Moreover, poverty is associated with higher stress, and high levels of chronic stress can have a direct negative effect on development as well as indirect effects on development via its impact on relational processes (Hackman, Farah, & Meaney, 2010; Blair & Raver, 2016). Research has demonstrated that children living in poverty have 3 to 4 percent less gray matter volume in their frontal lobe, temporal lobe, and hippocampus, a finding that has implications for academic functioning (Hair, Hanson, & Wolfe, 2015).

Peer Acceptance Children who are disliked by their peers tend to do poorly in school, and this association exists for both boys and girls (Nakamoto & Schwartz, 2010; van Lier et al., 2012). It may be that the characteristics of some children, including aggression and oppositional behavior, lead to doing poorly in school and not being liked by peers. Then their academic underachievement and peer victimization lead to anxiety, depression, and further declines in academic performance (van Lier at al., 2012). There is also some evidence that this effect is bidirectional; students who do poorly in school also seem to later show social difficulties (Caemmerer & Keith, 2015).

Early teacher identification of children who exhibit social problems could lead to interventions that would improve such children's academic as well as emotional and social outcomes (Flook, Repetti, & Ullman, 2005). Additionally, teachers can serve as buffers against some of the effects of negative peer interactions, either by establishing a warm relationship with a rejected child or by promoting a classroom climate in which victimization of disliked children is discouraged and positive social identities are encouraged (Elledge, Elledge, Newgent, & Cavell, 2016; Serdiouk, Rodkin, Madill, Logis, & Gest, 2015).

checkpoint
can you . . .

- Evaluate how efficacy beliefs, gender, parenting practices, SES, and peer acceptance affect school achievement?

Educational Methods The No Child Left Behind (NCLB) Act of 2001 was a sweeping educational reform emphasizing accountability, expanded parental options, local control, and flexibility. The intent was to funnel federal funding to research-based programs and practices. Students in grades three through eight were tested annually to determine if they were meeting statewide progress objectives. NCLB was replaced in 2015 by the Every Student Succeeds Act (ESSA) with bipartisan support. ESSA retained the standardized testing requirements of NCLB but shifted the responsibility and accountability of oversight to the state governments.

What has been the influence of these regulatory systems? The pattern of improvements in achievement scores has been highly variable across states, grades, and subjects (Lee & Reeves, 2012). However, test scores do show improvement. In 2007, for example, math scores for fourth and eighth graders on the National Assessment of Educational Progress (NAEP) rose to their highest levels since the test began in 1990. Black, white, and Hispanic students all improved (NCES, 2007), but ethnic group gaps remain (Hernandez & Macartney, 2008). Efforts to improve the teaching of reading seem to be paying off more slowly (Dee & Jacob, 2011). In the NAEP in 2007, fourth graders' reading scores rose only modestly compared with those in 1990, and eighth graders' scores declined slightly but were better than in 2005 (NCES, 2007).

Many educators say the only real solution to a high failure rate is to identify at-risk students early and intervene *before* they fail. One way is to provide alternative schools or programs for at-risk students, offering smaller classes, remedial instruction, counseling, and crisis intervention (NCES, 2003).

Class Size The evidence on the importance of class size in educational achievement is mixed (Schneider, 2002). Some researchers have not found evidence that reducing class size benefits academic performance (Chingos, 2012; Hoxby, 2000). Other research has shown that reducing class size has a beneficial effect on academic performance but that the effects are small and not likely to lead to sizable increases in student learning (Cho, Glewwe, & Whitler, 2012).



Children who have a social network and who are liked and accepted by peers tend to do better in school.
Stockbyte/Digital Vision/Getty Images

However, many educators argue that smaller classes do benefit students. In smaller classes, students spend more time interacting with the teacher, are more likely to be the focus of a teacher's attention, and spend more time on-task and less time off-task (Blatchford, Bassett, & Brown, 2011; Folmer-Annevelink, Doolaard, Macareño, & Bosker, 2010). Smaller class size has been associated with improved test scores on reading, mathematics, and word recognition (Shin & Raudenbush, 2011).

Some data suggest that the students most at risk, including students of lower socioeconomic status or from marginalized or disenfranchised groups, benefit the most from small classrooms. Additionally, small class size seems to be most useful for younger children (Zyngier, 2014; Blatchford et al., 2011; Watson, Handal, Maher, & McGinty, 2013).

Alternative Educational Models When the Chicago public schools ended *social promotion,* the practice of promoting children to keep them with their age-mates even when they do not meet academic standards, many observers hailed the change. Others warned that, although retention in some cases can be a "wake-up call," more often it is the first step on a remedial track that leads to lowered expectations, poor performance, and dropping out of school (J. M. Fields & Smith, 1998; Lugaila, 2003; Temple, Reynolds, & Miedel, 2000). Indeed, studies found that Chicago's retention policy did *not* improve third graders' test scores, lowered sixth graders' scores, and greatly increased eighth-grade and high school dropout rates for retained students (Nagaoka & Roderick, 2004).

Many educators say the only real solution to a high failure rate is to identify at-risk students early and intervene *before* they fail. One way is to provide alternative schools or programs for at-risk students, offering smaller classes, remedial instruction, counseling, and crisis intervention (NCES, 2003).

Some parents, unhappy with their public schools or seeking a particular style of education, are choosing charter schools or homeschooling. In 2016–2017, an estimated 3.1 million children attended charter schools (National Alliance for Public Charter Schools, 2018). Charter schools tend to be smaller than regular public schools and have a unique philosophy, curriculum, structure, or organizational style. Some studies have found achievement gains, especially in mathematics, for students enrolled in charter schools (Betts & Tang, 2016), some studies have found mixed results (Berends, 2015), and some studies have found negative results (Clark, Gleason, Tuttle, & Silverberg, 2015). Currently, not enough data are available for general recommendations to be made.

Homeschooling is legal in all 50 states. In 2012, 1.8 million U.S. students representing 3.4 percent of the school-age population were homeschooled (Snyder, de Brey, & Dillow, 2016). The main reasons parents give for choosing to homeschool their children is a poor or unsafe learning environment in the schools and the desire to provide religious or moral instruction (NCES, 2008). Most homeschooled students are white (89 percent), and most (about 90 percent) live above the poverty level (Redford, Battle, & Bielick, 2016).

While advocates of homeschooling argue that homeschooling is associated with good academic outcomes (Christian Home Educators Association of California, 2013; Ray, 2010), the studies that have been conducted have serious methodological flaws and tend to come from a limited pool of researchers and organizations with potential biases (Kunzman & Gaither, 2012; Lubienski, Puckett, & Brewer, 2013). Thus, the efficacy of homeschooling remains in question. Given the variety of methods and materials used (Redford et al., 2016), it is likely the quality of instruction varies widely.

checkpoint can **you** . . .

- Discuss changes and innovations in educational philosophy and practice?

Media Use In 1994, only 4 percent of classrooms had Internet access, compared with 97 percent in 2008 (Snyder, deBrey, & Dillow, 2018). However, fewer black, Hispanic, and American Indian children than white and Asian children, and fewer poor children than nonpoor children, use these technologies.

In 2003, 6- to 12-year-old children spent approximately 14 hours per week watching television. Much less time (1 hour and 20 minutes per week) was spent on computers. Of that, the bulk of time was spent on video games, with e-mail, Internet usage, and

studying comprising the remainder. This type of exposure to media has varying influences, depending on what type of media is examined as well as the gender of the child. For example, television was associated with the displacement of other more beneficial experiences such as playing or sleeping for all children. Computer usage was associated with increases in achievement and problem-solving abilities for girls. However, for boys, who were more likely to play violent video games, computer usage was associated with increased aggressive behavior problems (Hofferth, 2010).

Computer literacy is an important skill in today's world. However, this tool poses dangers. Foremost is the risk of exposure to harmful or inappropriate material. Also, students need to learn to critically evaluate information they find in cyberspace and to separate facts from opinion and advertising.

checkpoint can you . . .

- Assess the impact of children's media use?

Educating Children with Special Needs

Public schools have a tremendous job educating children of varying abilities from all sorts of families and cultural backgrounds, including those children with special needs. When we consider special needs, most of us are likely to focus on those children who have learning or behavioral disorders. However, special needs also include a focus on children who are gifted, talented, or creative, as they have different educational needs than the typical child.

CHILDREN WITH LEARNING PROBLEMS

Just as educators have become more sensitive to teaching children from varied cultural backgrounds, they also have sought to meet the needs of children with special educational needs.

Intellectual Disability

Intellectual disability is significantly subnormal cognitive functioning. It is indicated by an IQ of about 70 or less, coupled with a deficiency in age-appropriate adaptive behavior (such as communication, social skills, and self-care), appearing before age 18 (American Psychiatric Association, 2013). Intellectual disability is sometimes referred to as cognitive disability or mental retardation. Less than 1 percent of U.S. children are intellectually disabled (NCHS, 2004). Worldwide, about 1 of every 10 people are intellectually disabled (Maulik, Mascrenhas, Mathers, Dua, & Saxena, 2011).

intellectual disability
Significantly subnormal cognitive functioning. Also referred to as cognitive disability or mental retardation.

In 30 to 50 percent of cases, the cause of intellectual disability is unknown. Known causes include genetic disorders, traumatic accidents, prenatal exposure to infection or alcohol, and environmental exposure to lead or high levels of mercury (Woodruff et al., 2004). Many cases may be preventable through genetic counseling, prenatal care, amniocentesis, routine screening and health care for newborns, and nutritional services for pregnant women and infants.

Most children with intellectual disabilities can benefit from schooling. Intervention programs have helped many of those mildly or moderately disabled and those considered borderline (with IQs ranging from 70 up to about 85) to hold jobs, live in the community, and function in society. The profoundly disabled need constant care and supervision, usually in institutions. For some, day care centers, hostels for intellectually disabled adults, and homemaking services for caregivers can be less costly and more humane alternatives.

Learning Disabilities

Nelson Rockefeller, former vice president of the United States, was one of many eminent persons with **dyslexia,** a developmental language disorder in which reading achievement is substantially below the level predicted by IQ or age.

dyslexia
Developmental disorder in which reading achievement is substantially lower than predicted by IQ or age.

learning disabilities (LDs)
Disorders that interfere with specific aspects of learning and school achievement.



People with dyslexia often fail to develop phonological awareness and have difficulty breaking speech sounds into their constituent parts. If you cannot "hear" that the word "dog" is made up of three distinct phonemes, then reading is definitely going to be a challenge.

Shaywitz et al., 2006

Dyslexia is the most commonly diagnosed of a large number of **learning disabilities (LDs).** These are disorders that interfere with specific aspects of school achievement, such as listening, speaking, reading, writing, or mathematics, resulting in performance substantially lower than would be expected given a child's age, intelligence, and amount of schooling. Approximately 2.4 million children in the United States in the public school system, two-thirds of them boys, were identified as having a learning disability in 2011. This represents a decline of 18 percent since 2002. This decline can be attributed to early screening and diagnostic services, as well as the influence of early childhood education. In recent years, rather than waiting for children to fail and then providing services, it is more typical to provide early–and more effective–assistance to these children (National Center for Learning Disabilities, 2014).

Children with LDs often have near-average to higher-than-average intelligence and normal vision and hearing, but they seem to have trouble processing sensory information. Although causes are uncertain, one factor is genetic. Research suggests that the genes most responsible for the high heritability of the most common LDs–language impairment, reading disability, and mathematical disability–are also responsible for normal variations in learning abilities (Plomin & Kovas, 2005). Environmental factors may include complications of pregnancy or birth, injuries after birth, nutritional deprivation, and exposure to lead (National Center for Learning Disabilities, 2014).

About 4 out of 5 children with LDs have been identified as dyslexic. Dyslexia is a chronic, persistent medical condition and tends to run in families (S. E. Shaywitz, 2003). It hinders the development of oral as well as written language skills and may cause problems with writing, spelling, grammar, and understanding speech as well as with reading (National Center for Learning Disabilities, 2014). Reading disability is more frequent in boys than in girls (Rutter et al., 2004). Although reading and intelligence are related to each other in children without dyslexia, they are not coupled in this fashion for children with dyslexia. In other words, dyslexia is not an issue of intelligence (Ferrer et al., 2010).

Brain imaging studies have found that dyslexia is due to a neurological defect that disrupts recognition of speech sounds (Shaywitz, Mody, & Shaywitz, 2006). Several identified genes contribute to this disruption (Eicher & Gruen, 2013; Carrion-Castillo, Franke, & Fisher, 2013). Many children–and even adults–with dyslexia can be taught to read through systematic phonological training, but the process does not become automatic, as it does with most readers (Eden et al., 2004; S. E. Shaywitz, 2003).

attention-deficit/hyperactivity disorder (ADHD)
Syndrome characterized by persistent inattention and distractibility, impulsivity, low tolerance for frustration, and inappropriate overactivity.

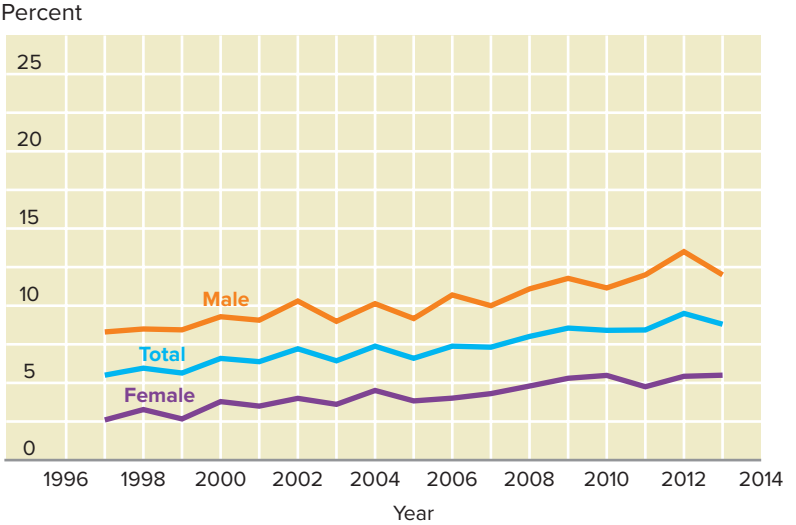


FIGURE 3
U.S. Diagnosis of Attention-Deficit/Hyperactivity Disorder by Year

Diagnosis of learning disabilities has remained constant, but diagnosis of ADHD rose from 1997 to 2009.

Source: Child Trends DataBank, www.childtrends.org/wp-content/uploads/2014/08/76_ADHD.pdf.

Attention-Deficit/Hyperactivity Disorder

Attention-deficit/hyperactivity disorder (ADHD) has been called the most common mental disorder in childhood (Wolraich et al., 2005). It is a chronic condition usually marked by persistent inattention, distractibility, impulsivity, and low tolerance for frustration. Among the well-known people who reportedly have had ADHD are the musician John Lennon, U.S. Senator Robert Kennedy, and the actors Robin Williams and Jim Carrey.

ADHD affects an estimated 7.2 percent of school-age children worldwide (Thomas, Sanders, Doust, Beller, & Glasziou, 2015). In 2016, about 5.4 million children in the United States had a current diagnosis of ADHD, a rate of about 8.4 percent (Danielson et al., 2018). The rate of ADHD has increased about 3 percent per year over the past 10 years (Pastor & Reuben, 2008).

Similar to LD, ADHD diagnosis rates vary greatly by gender, ethnicity, geographic area, and

other contextual factors. Boys are more likely than girls to have each of the diagnoses and are twice as likely to have ADHD (Pastor & Reuben, 2008). Prevalence rates are higher in non-Hispanic white children (12.5 percent) than black (9.6 percent) and Hispanic (6.4 percent) children (Pastor, Duran, & Reuben, 2015). Some of the diagnoses may be environmentally driven and related to the demands or characteristics of the school involved.

Imaging studies reveal that certain regions in the brains of children with ADHD—most notably areas in the frontal cortex—show delays in development. The motor cortex is the only area that matures faster than normal, and this mismatch may account for the restlessness and fidgeting characteristic of the disorder (Shaw, Krause, Liang, & Bennett, 2007). During tasks that require the deployment of attentional processes, children with ADHD show reduced activation in frontoparietal and ventral attention networks areas (Cortese et al., 2012). These frontal regions enable a person to set goals, focus attention, monitor progress, and inhibit negative impulses—all functions disturbed in children with ADHD.

ADHD is often managed with drugs, sometimes combined with behavioral therapy, counseling, training in social skills, and special classroom placement. Ritalin is a commonly prescribed drug and is generally very effective. However, it is related to slower growth in height and weight (Powell, Frydenberg, & Thomsen, 2015); other long-term effects of Ritalin are unclear (Wolraich et al., 2005).

Long-term effects of drug treatment for ADHD are unknown, but leaving the condition untreated also carries risks. If you had a child with ADHD, what would you do?

checkpoint can **you** . . .

- Discuss the causes, treatments, and prognoses for three conditions that interfere with learning?

Educating Children with Disabilities In 2014–2015, about 13 percent of public school students in the United States were receiving special educational services under the Individuals with Disabilities Education Act, (U.S. Department of Education, 2016). Most of these children had learning disabilities or speech or language impairments. Children must be educated in the "least restrictive environment" appropriate to their needs—which means, whenever possible, the regular classroom.

Programs in which children with special needs are included in the regular classroom are known as inclusion programs. Here, children with disabilities are integrated with nondisabled children for all or part of the day, sometimes with assistance. In 2014, 62 percent of students with disabilities spent at least 80 percent of their time in regular classrooms (NCES, 2017).

GIFTED CHILDREN

The traditional criterion of giftedness is high general intelligence as shown by an IQ score of 130 or higher. This definition tends to exclude highly creative children (whose unusual answers often lower their test scores), children from minority groups (whose abilities may not be well developed, though the potential is there), and children with specific aptitudes (who may be only average or even show learning problems in other areas). Thus, all 50 states have moved beyond a single-score definition of giftedness (McClain & Pfeiffer, 2012).

Most states and school districts have adopted a broader definition of creativity. Generally, multiple criteria are used for admission to programs for the gifted, including achievement test scores, grades, classroom performance, creative production, parent and teacher nominations, and student interviews. An estimated 6 percent of the student population is considered gifted (National Association for Gifted Children, n.d.). In the 2013–2014 academic year, approximately 3.32 million children were enrolled in gifted and talented programs in the United States (U.S. Department of Education, 2017).



It benefits children with disabilities or special needs when accommodations can be made for their inclusion in classrooms with nondisabled or neurotypical children.
FatCamera/E+/Getty Images

Causes of Giftedness High levels of performance require strong motivation and years of rigorous training (Gardner, 1993; Clinkenbeard, 2012; Al-Dhamit & Kreishan, 2016). However,



One possible reason creativity and academic achievement don't always relate is that the personality characteristics related to creativity are generally viewed negatively by teachers.

Westby & Dawson, 1995

motivation and training will not produce giftedness unless a child is endowed with unusual ability (Winner, 2000). Conversely, children with innate gifts are unlikely to show exceptional achievement without motivation and hard work (Achter & Lubinski, 2003).

Gifted children tend to grow up in enriched family environments with intellectual or artistic stimulation. Their parents recognize and often devote themselves to nurturing the children's gifts and curiosity, and tend to give their children an unusual degree of independence and expose them to new experiences. Parents of gifted children typically have high expectations and are hard workers and high achievers themselves (Winner, 2000; Al-Dhamit & Kreishan, 2016; Garn, Matthews & Jolly, 2010; Gottfried et al., 2016).

creativity
Ability to see situations in a new way, to produce innovations, or to discern previously unidentified problems and find novel solutions.

convergent thinking
Thinking aimed at finding the one right answer to a problem.

divergent thinking
Thinking that produces a variety of fresh, diverse possibilities.

enrichment programs
Programs for educating the gifted that broaden and deepen knowledge and skills through extra activities, projects, field trips, or mentoring.

acceleration programs
Programs for educating the gifted that move them through the curriculum at an unusually rapid pace.

Defining and Measuring Creativity

One definition of **creativity** is the ability to see things in a new light—to produce something never seen before or to discern problems others fail to recognize and find new and unusual solutions. High creativity and high academic intelligence (IQ) do not necessarily go hand in hand (Anastasi & Schaefer, 1971; Getzels, 1984; Getzels & Jackson, 1963).

However, it does appear that a threshold level of intelligence, which varies with the complexity of the creative activity, is necessary. Once the intelligence threshold is met, personality factors become more important (Jauk, Benedek, Dunst, & Neubauer, 2013).

The reason creativity is not highly correlated with traditional IQ tests is because traditional tests are measuring a different kind of thinking than is characteristic of creativity. J. P. Guilford (1986) distinguished two kinds of thinking: convergent and divergent **Convergent thinking**—the kind IQ tests measure—seeks a single correct answer. For example, when solving an arithmetic problem, there is one correct answer upon which everyone is expected to converge. **Divergent thinking,** by contrast, involves coming up with a wide array of fresh possibilities, such as when children are asked to list how many different uses there might be for a paper clip or to write down what a sound brings to mind. There is no one right answer. Tests of creativity call for divergent thinking. This ability can be assessed via the Torrance Tests of Creative Thinking (TTCT) (Torrance & Ball, 1984).

Educating Gifted Children

Programs for gifted children generally stress either enrichment or acceleration. **Enrichment programs** may deepen students' knowledge and skills through extra classroom activities, research projects, field trips, or expert coaching. **Acceleration programs** speed up their education through early school entrance, grade skipping, placement in fast-paced classes, or advanced courses. Other options include ability grouping within the classroom, which has been found to help children academically and not harm them socially (Winner, 2000), dual enrollment (for example, an eighth grader taking algebra at a nearby high school), magnet schools, and specialized schools for the gifted.

Moderate acceleration does not seem to harm social adjustment, at least in the long run (Winner, 1997). A 30-year study of 3,937 young people who took advanced placement courses in high school found that they were more satisfied with their school experience and ultimately achieved more than equally gifted young people who did not take AP courses (Bleske-Rechek, Lubinski, & Benbow, 2004).

checkpoint can you . . .

- Tell how gifted children are identified?
- Explain why creativity is hard to measure?
- Compare two approaches to the education of gifted children?

summary and key terms

PHYSICAL DEVELOPMENT

Aspects of Physical Development

- Physical development is less rapid in middle childhood than in earlier years. Wide differences in height and weight exist.
- Proper dental care, nutrition, and sleep are essential for normal growth and health.
- Changes in brain structure and functioning support cognitive advances.
- Because of improved motor development, boys and girls in middle childhood can engage in a wide range of motor activities.
- Informal recess-time activities help develop physical and social skills. Boys' games tend to be more physical and girls' games more verbal.
- About 10 percent of schoolchildren's play, especially among boys, is rough-and-tumble play.
- Many children, mostly boys, engage in organized, competitive sports. A sound physical education program should aim at skill development and fitness for all children.

rough-and-tumble play (*261*)

Health, Fitness, and Safety

- Middle childhood is a relatively healthy period; most children are immunized against major illnesses, and the death rate is the lowest in the life span.
- Overweight, which is increasingly common among U.S. children, entails multiple risks. It is influenced by genetic and environmental factors and is more easily prevented than treated. Many children do not get enough physical activity.
- Hypertension is becoming more common along with the rise in overweight.
- The rate of asthma is high, and it seems to be caused by a combination of genetic and environmental risk factors. Respiratory infections and other acute medical conditions are common at this age. Chronic conditions such as asthma are most prevalent among poor and minority children. Diabetes is one of the most common childhood chronic conditions.
- Accidents are the leading cause of death in middle childhood. Use of helmets and other protective devices and avoidance of trampolines, snowmobiling, and other dangerous sports can greatly reduce injuries.

body image (*262*)
acute medical conditions (*264*)
chronic medical conditions (*264*)
asthma (*265*)
diabetes (*265*)
hypertension (*265*)

COGNITIVE DEVELOPMENT

Piagetian Approach: The Concrete Operational Child

- A child from about age 7 to age 12 is in the stage of concrete operations. Children are less egocentric than before and are more proficient at tasks requiring logical reasoning, such as spatial thinking, understanding of causality, categorization, inductive and deductive reasoning, and conservation. However, their reasoning is largely limited to the here and now.
- Neurological development, culture, and schooling seem to contribute to the rate of development of Piagetian skills.

concrete operations (*266*)
seriation (*268*)
transitive inference (*268*)
class inclusion (*268*)
inductive reasoning (*268*)
deductive reasoning (*268*)

Information-Processing Approach: Planning, Attention, and Memory

- Executive skills, reaction time, processing speed, selective attention, metamemory, and use of mnemonic devices improve during the school years.

executive function (*270*)
mnemonic device (*272*)
external memory aids (*272*)
rehearsal (*272*)
organization (*272*)
elaboration (*272*)
metamemory (*272*)

Psychometric Approach: Assessment of Intelligence

- IQ tests are fairly good predictors of school success but may be unfair to some children.
- Differences in IQ among ethnic groups appear to result to a considerable degree from socioeconomic and other environmental differences.
- Schooling increases measured intelligence.
- Attempts to devise culture-free or culture-fair tests have been unsuccessful. Indeed, intelligence testing seems inextricably linked with culture.
- IQ tests tap only three of the intelligences in Howard Gardner's theory of multiple intelligences.
- According to Robert Sternberg's triarchic theory, IQ tests measure mainly the componential element of intelligence, not the experiential and contextual elements.
- Other directions in intelligence testing include the Sternberg Triarchic Abilities Tests (STAT), Kaufman Assessment Battery for Children (K-ABC-II), and dynamic tests based on Vygotsky's theory.

Wechsler Intelligence Scale for Children (WISC-IV) (*273*)
Otis-Lennon School Ability Test (OLSAT 8) (*273*)
theory of multiple intelligences (*275*)
culture-free tests (*276*)
culture-fair tests (*276*)
triarchic theory of intelligence (*277*)
componential element (*277*)
experiential element (*277*)
contextual element (*277*)
tacit knowledge (*278*)
Kaufman Assessment Battery for Children (K-ABC-II) (*278*)
dynamic tests (*278*)

Language and Literacy

- Use of vocabulary, grammar, and syntax become increasingly sophisticated, but the major area of linguistic growth is in pragmatics.
- Methods of second-language education are controversial. Issues include speed and facility with English, long-term achievement in academic subjects, and pride in cultural identity.
- Despite the popularity of whole-language programs, early phonetics training is a key to reading proficiency.

pragmatics (*279*)
English-immersion approach (*279*)
bilingual education (*279*)
bilingual (*279*)
two-way (dual-language) learning (*280*)
decoding (*280*)
phonetic (code-emphasis) approach (*280*)
whole-language approach (*280*)
visually based retrieval (*280*)
metacognition (*281*)

The Child in School

- Children's self-efficacy beliefs affect school achievement.
- Girls tend to do better in school than boys.
- Parents influence children's learning by becoming involved in their schooling, motivating them to achieve, and transmitting attitudes about learning.
- Socioeconomic status can influence parental beliefs and practices that, in turn, influence achievement.
- Peer acceptance and class size affect learning.
- Current educational issues and innovations include social promotion, charter schools, homeschooling, and computer literacy.

Educating Children with Special Needs

- Three frequent sources of learning problems are intellectual disability, learning disabilities (LDs), and attention-deficit/hyperactivity disorder (ADHD). Dyslexia is the most common learning disability.
- In the United States, all children with disabilities are entitled to a free, appropriate education. Children must be educated in the least restrictive environment possible, often in the regular classroom.
- An IQ of 130 or higher is a common standard for identifying gifted children.
- Creativity and IQ are *not* closely linked. Tests of creativity seek to measure divergent thinking, but their validity has been questioned.
- Special educational programs for gifted children stress enrichment or acceleration.

intellectual disability (*285*)
dyslexia (*285*)
learning disabilities (LDs) (*286*)
attention-deficit/hyperactivity disorder (ADHD) (*286*)
creativity (*286*)
convergent thinking (*288*)
divergent thinking (*288*)
enrichment programs (*288*)
acceleration programs (*288*)

Design elements: (Butterfly Icon): Stockbyte/Getty Images; (World Icon): janrysavy/Getty Images

chapter 10

Psychosocial Development in Middle Childhood

outline

The Developing Self

The Child in the Family

The Child in the Peer Group

Mental Health

learning objectives

Discuss emotional and personality development in school-age children.

Describe changes in family relationships in the school-age years.

Identify changes in peer relationships among school-age children.

Describe emotional disorders that can develop in school-age children, along with treatment techniques and children's ability to cope with stress.



imagenavi/Getty Images

did you know?

- Children in single-parent households do better on achievement tests in countries with supportive family policies.
- There are few significant differences in adjustment between adopted and nonadopted children.
- Patterns of bullying and victimization may become established as early as kindergarten.

In this chapter we see how children develop a more realistic self-concept. Through interacting with peers they make discoveries about their own attitudes, values, and skills. Still, the kind of household a child lives in and the relationships in it can profoundly affect psychosocial development. We look at several mental health problems and at resilient children, who can emerge from stress healthy and strong.

There can be no keener revelation of a society's soul than the way in which it treats its children.

—Nelson Mandela, former president of South Africa and antiapartheid revolutionary

The Developing Self

The cognitive growth that takes place during middle childhood enables children to develop more complex concepts of themselves and to gain in emotional understanding and control.

SELF-CONCEPT DEVELOPMENT: REPRESENTATIONAL SYSTEMS

"At school I'm feeling pretty smart in certain subjects, Language Arts and Social Studies," says 8-year-old Lisa. "I got A's in these subjects on my last report card and was really proud of myself. But I'm feeling really dumb in Arithmetic and Science, particularly when I see how well the other kids are doing. . . . I still like myself as a person, because Arithmetic and Science just aren't that important to me. How I look and how popular I am are more important" (Harter, 1996, p. 208).

Earlier in development young children have difficulty with abstract concepts and with integrating various dimensions of the self. Their self-concepts focus on physical attributes, possessions, and global descriptions. However, at around age 7 or 8, children reach the third stage of self-concept development. At this time judgments about the self become more conscious, realistic, balanced, and comprehensive as children form **representational systems:** broad, inclusive self-concepts that integrate various aspects of the self (Harter, 1993, 1996, 1998).

representational systems
In neo-Piagetian terminology, the third stage in development of self-definition, characterized by breadth, balance, and the integration and assessment of various aspects of the self.

We see these changes in Lisa's self-description. She can now focus on more than one dimension of herself. She has outgrown her earlier all-or-nothing, black-or-white self-definition. Now, she recognizes that she can be "smart" in certain subjects and "dumb" in others. She can verbalize her self-concept better, and she can weigh different aspects of it. She can compare her *real self* (who she is) with her *ideal self* (who she wants to be) and can judge how well she measures up to social standards in comparison with others. All of these changes contribute to the development of self-esteem, her assessment of her *global self-worth* ("I still like myself as a person").

INDUSTRY VERSUS INFERIORITY

According to Erikson (1982), a major determinant of self-esteem is children's view of their capacity for productive work, which develops in his fourth stage of psychosocial development: **industry versus inferiority.** As with all of Erikson's stages, there is an opportunity for growth represented by a sense of industry and a complementary risk represented by inferiority.

industry versus inferiority
Erikson's fourth stage of psychosocial development, in which children must learn the productive skills their culture requires or else face feelings of inferiority.

In the event that children are unable to obtain the praise of adults or peers in their lives, or lack motivation and self-esteem, they may develop a feeling of low self-worth, and thus develop a sense of inferiority. This is problematic because during middle childhood children must learn skills valued in their society. If children feel inadequate compared with their peers, they may retreat to the protective embrace of the family and not venture farther away from home.



Hie takes geese to market, developing her sense of competence and building her self-esteem. By taking responsibilities that match her growing capabilities, she also learns how her Vietnamese society works, what her role is in it, and what it means to do a job well.
Michael Justice/The Image Works

Developing a sense of industry, by contrast, involves learning how to work hard to achieve goals. The details may vary across societies: Arapesh boys in New Guinea learn to make bows and arrows and to lay traps for rats; Arapesh girls learn to plant, weed, and harvest; Inuit children of Alaska learn to hunt and fish; and children in industrialized countries learn to read, write, do math, and use computers. What these different experiences share, however, is an emphasis on developing responsibility and motivation to succeed. If the stage is successfully resolved, children develop a view of themselves as being able to master skills and complete tasks. This can go too far—if children become too industrious, they may neglect social relationships and turn into workaholics.

Parents strongly influence a child's beliefs about competence and, consequently, the amount of effort children put into different activities. In a longitudinal study of 987 European children, parents' beliefs about their children's competence in sports, music, and math were associated with their children's beliefs about their abilities and with their self-reports about motivation. Six years later, children's beliefs were then predictive of the amount of time children spent taking classes or participating in those activities (Yamamoto & Holloway, 2010).

EMOTIONAL GROWTH

As children grow older, they are more aware of their own and other people's feelings. They can better regulate or control their emotions and can respond to others' emotional distress (Saarni, Campos, Camras, & Witherington, 2006). Children learn what makes them angry, fearful, or sad and how other people react to displays of these emotions. They know that remembering things that happened in the past and thinking about things that are going to happen in the future can affect your mental state (Lagattuta, 2014). Children also start to understand conflicting emotions (Zajdel, Bloom, Fireman, & Larsen, 2013). As Emily says, "My brother is OK, but he can be annoying sometimes. I love him, but he does things that make me mad. But I don't yell at him because if I do, he cries and then I feel guilty."

At about the age of 9, white American children start to self-censor their speech so as not to mention the race of others in an attempt to appear unprejudiced.

Apfelbaum et al., 2008

By age 7 or 8, children typically are aware of feeling shame and pride, and they have a clearer idea of the difference between guilt and shame (Olthof, Shouten, Kuiper, Stegge, & Jennekens-Schinkel, 2000). Additionally, cultural values affect the expression and experience of these emotions. For example, one study found that children in the United States expressed the most pride, Japanese children the most shame, and Korean children the most guilt (Furukawa, Tangney, & Higashibara, 2012). In another study, when Braham children from India were asked how they would feel in a difficult interpersonal situation, they reported they would feel anger, while Tamang children from Tibet reported shame as their most likely emotion (Cole, Bruschi, & Tamang, 2002). Brahman adults generally ignore shame and respond to angry children with reasoning and yield to their demands. Tamang adults expect children to be socially compliant and are intolerant of anger but will reason with and yield to children who are ashamed. Thus, children learn to shape their emotional responses to what is expected and tolerated of them (Cole, Tamang, & Shrestha, 2006).

When parents are skilled at the recognition of emotions in others, label emotions, and allow children the latitude to express emotions, their children understand and recognize emotions better (Castro, Halberstadt, Lozada, & Craig, 2015). Parents who acknowledge children's feelings of distress and help them focus on solving the root problem foster empathy, prosocial development, and social skills (Bryant, 1987; Eisenberg et al., 1996). By contrast, when parents respond to the expression of emotions with excessive disapproval or punishment, emotions such as anger and fear may become more

intense and may impair children's social adjustment (Fabes, Leonard, Kupanoff, & Martin, 2001), or children may become secretive and anxious about negative feelings (Almas, Grusec, & Tackett, 2011). As children approach early adolescence, parental intolerance of negative emotions may heighten parent-child conflict (Fabes et al., 2001).

Have you ever received a gift you didn't like or had to hold in your anger to avoid getting in trouble? The ability to fake liking a gift or to smile when you are mad involves emotional self-regulation. Emotional self-regulation is effortful (voluntary) control of emotions, attention, and behavior (Eisenberg et al., 2004), and children get better at this with age. However, some children are better than others at this (Eisenberg, 2004). For example, children, especially girls, who are securely attached are better at recognizing emotions and producing emotion regulation strategies for handling hypothetical situations than insecurely attached children (Colle & Del Giudice, 2011). How good children are at regulatory strategies has behavioral and academic consequences. Children who at 3 to 4 years of age had difficulty in delay-of-gratification tasks were more likely to have behavior problems at 5 to 8 years. Similarly, young children who were poor at deliberately slowing down, inhibiting their movements in a game, or paying close attention were more likely to have academic difficulties when older (Kim, Nordling, Yoon, Boldt, & Kochanksa, 2013).

Children who have difficulty with identifying and understanding emotions can have social and behavioral issues. Fortunately, children can be trained to more accurately understand emotions (Sprung, Münch, Harris, Ebesutani, & Hofmann, 2015). For example, class interventions have been shown to help children develop empathy for others, increase spontaneous prosocial behavior, and decrease aggressive acts (Schonert-Reichl, Smith, Zaidman-Zait, & Hertzman, 2012).

Children tend to become more empathic and more inclined to prosocial behavior in middle childhood. Empathy—the capacity to understand and feel the emotions of another person—is likely one of the key motivators for prosocial behavior (Eisenberg, Eggum, & DiGiunta, 2010). Prosocial children tend to act appropriately in social situations, to be relatively free from negative emotion, and to cope with problems constructively (Eisenberg, Fabes, & Murphy, 1996). Empathy appears to be hardwired into the brains of typical children. As with adults, empathy has been associated with prefrontal activation in children as young as 4 years of age and continuing throughout childhood (Brink et al., 2011; Light et al., 2009; Decety, Michalalaska, Akisuki, & Lahey, 2009).

checkpoint can you . . .

- Discuss how the self-concept develops in middle childhood?
- Describe Erikson's fourth stage of psychosocial development?
- Identify several aspects of emotional growth in middle childhood?

The Child in the Family

School-age children spend more time away from home visiting and socializing with peers than when they were younger. They also spend more time at school and on studies and less time at family meals than children did a generation ago (Juster et al., 2004). Still, home and the people who live there remain an important part of most children's lives.

To understand the child in the family, we need to look at the family environment—its atmosphere and structure. As Bronfenbrenner's theory predicts, wider layers of influence—including parents' work and socioeconomic status and societal trends such as urbanization, changes in family size, divorce, and remarriage—help shape the family environment and, thus, children's development.

FAMILY ATMOSPHERE

Family atmosphere is a key influence on development. One key factor is whether or not conflict is present in the home. Other important influences include parents' work status and the family socioeconomic level.

Parenting Issues: From Control to Coregulation Babies don't have a lot of say in what happens to them; they experience what their parents decide they should experience. However, as children become more autonomous, control gradually shifts from parents



In general, adults are not very good at distinguishing when children lie. Adults are able to identify lies only slightly better than would be predicted by chance.

Stromwall, Granhag, & Landstrom, 2007

to child. Children begin to request certain types of experiences, negotiate for desired objects, and communicate their shifting needs to parents. One of the major influences in the family is how parents and children navigate this changing balance of power.

coregulation
Transitional stage in the control of behavior in which parents exercise general supervision and children exercise moment-to-moment self-regulation.

Middle childhood brings a transitional stage of **coregulation** in which parent and child share power. While parents still exercise oversight, children enjoy moment-to-moment self-regulation (Maccoby, 1984; 1992). For example, with regard to problems among peers, parents might now rely less on direct intervention and more on discussion with their child (Parke & Buriel, 1998).

The amount of autonomy parents provide affects how their children feel about them. For example, in one study, when parents were overbearing and overly directive when children were toddlers, they tended to also show low support for their child's autonomy at 10 years of age, and this in turn was associated with children's lowered expression of positive feelings for parents (Ispa et al., 2015). But this is a two-way street. How children respond to parents' attempts to regulate their behavior is affected by the overall relationship between parent and child. Children are more apt to follow their parents' wishes when they believe the parents are fair and concerned about the child's welfare and that they may "know better" because of experience. This is particularly true when parents take strong stands only on important issues (Maccoby, 1984, 1992).

The shift to coregulation affects discipline (Kochanska, Aksan, Prisco, & Adams, 2008). Parents of school-age children are more likely to use inductive techniques. For example, they might explain how their actions affect others, highlight moral values, or let their children experience the natural consequences of their behaviors. For example, 8-year-old Emily's father might point out: "Hitting John hurts him and makes him feel bad." In other situations, Emily's parents may appeal to her self-esteem ("What happened to the helpful girl who was here yesterday?") or moral values ("A big girl like you shouldn't sit on the train and let an old person stand"). Emily's parents also let her know she must bear the consequences of her behavior ("You missed the school bus today—you stayed up too late last night! Now you'll have to walk").

However, families vary in what type of discipline they use. Some families are more likely to use coercive parenting practices such as physical punishment, although its use tends to decrease as children get older. Generally, physical punishment is associated with negative outcomes for children. Those parents who continue to spank their children past the age of 10 years tend to have worse relationships with their children in adolescence and to have teens with more severe behavioral problems (Lansford et al., 2009). Exposure to any form of violence and conflict tends to be harmful to children, both in terms of direct exposure via parental discord (Kaczynski, Lindahl, Malik, & Laurenceau, 2006) and via indirect influences on variables such as low family cohesion and ineffective anger regulation strategies (Houltberg, Henry, & Morris, 2012).

internalizing behaviors
Behaviors by which emotional problems are turned inward; for example, anxiety or depression.

externalizing behaviors
Behaviors by which a child acts out emotional difficulties; for example, aggression or hostility.

Children exposed to high levels of family conflict are more likely to show a variety of responses that can include externalizing or internalizing behaviors (Kaczynski et al., 2006; Fear et al., 2009; Houltberg et al., 2012). **Internalizing behaviors** include anxiety, fearfulness, and depression—anger turned inward. **Externalizing behaviors** include aggression, fighting, disobedience, and hostility—anger turned outward.



Although school-age children spend less time at home, family influences continue to be important in their lives.
Denis Kuvaev/Shutterstock

How family conflict is resolved is also important. If family conflict is constructive, it can help children see the need for rules and standards and learn what issues are worth arguing about and what strategies can be effective (Eisenberg, 1996). For example, when family conflict in one longitudinal study was solved in constructive ways, children reported being more emotionally secure one year later and, one year after that, reported more prosocial behavior (McCoy, Cummings, & Davies, 2009).

Cultural differences are also important and tend to exert complex effects. Generally, researchers find that in cultures that stress family interdependence (such as in Turkey, India, and Latin America), authoritarian parenting, with its high degree of

control, is not associated with negative maternal feelings or low self-esteem in children as it is in more individualistic cultures (Rudy & Grusec, 2006). Latino parents, for example, have well-adjusted children as often as other groups although they tend to exert more control over their school-age children than European American parents do (Halgunseth, Ispa, & Rudy, 2006) and expectations for girls are even more strict (Domènech, Rodriguez, Donovick, & Crowley, 2009). However, children in China, also a collectivistic culture, tend to be negatively affected by high control just as are children from the individualistic United States (Pomerantz & Wang, 2009). With respect to low control, children of Iranian (Kazemi, Ardabili, & Solokian, 2010), Spanish (Garcia & Garcia, 2009), and some European parents (Calafat, García, Juan, Becoña, & Fernández-Hermida, 2014) with a permissive parenting style have good outcomes, contrary to what has been found in American samples (Pinquart, 2017). Thus, the influence of parental control strategies is shaped by the cultural context in which it occurs. We cannot say a particular parenting strategy is "good" or "bad" without taking into account the culture in which it occurs.

checkpoint can you . . .

- Describe how coregulation works, and how discipline and the handling of family conflict change during middle childhood?

Maternal Employment Because there has not been much variability in paternal employment but women have increasingly joined the work force, most studies of the impact of parents' work on children's well-being have focused on employed mothers. In 1975, the labor force participation rate of mothers with children was 47 percent (U.S. Bureau of Labor Statistics, 2008a). By 2016, 70.8 percent of U.S. mothers worked either full- or part-time (U.S. Department of Labor, 2018).

In general, the more satisfied a mother is with her employment status, the more effective she is likely to be as a parent. However, the impact of a mother's work depends on many other factors, including the child's age, sex, temperament, and personality; whether the mother works full or part-time; why she is working; whether she has a supportive or unsupportive partner, or none; the family's socioeconomic status; and the type of care the child receives before and/or after school (Parke, 2004a; Gottfried & Gottfried, 2013). Often a single mother must work to stave off economic disaster. How her working affects her children may hinge on how much time and energy she has left to spend with them. How well parents keep track of their children and monitor their activities may be more important than whether the mother works for pay (Fosco, Stormshak, Dishion, & Winter, 2012).

Mothers are far more likely to take on part-time work than fathers (Weeden, Cha, & Bucca, 2016), and if possible, this arrangement may be preferable. Children tend to do slightly better in school if one parent is able to work part-time, and mothers who work part-time tend to report lower levels of depression and better health than those who are not employed outside the home (Goldberg, Prause, Lucas-Thompson, & Himsel, 2008; Buehler & O'Brien, 2011). Whether mothers are working full-time or part-time, research indicates overall, children from dual-earner families do well, and there may even be advantages associated with having working parents (Gottfried & Gottfried, 2008).

When both parents work outside the home, child care arrangements are common. Half of grade school children are in some form of child care outside of school, often with relatives (Laughlin, 2013), while others attend organized programs. These programs vary widely in quality. Two important markers of quality are structural features (such as physical facilities and staff characteristics) and process features (such as the activities available for children and the overall culture of the program). When children are enrolled in quality programs, they show positive changes in academic outcomes, their attachment to their school, peer relationships, and self-confidence, and they show declines in problem behaviors and drug use (Durlack, Mahoney, Bohnert, & Parente, 2010).

Approximately 11 percent of school-age children and early adolescents are reported to be in self-care, regularly caring for themselves at home without adult supervision (Laughlin, 2013). This arrangement is advisable only for older children who are mature, responsible, and resourceful and know how to get help in an emergency—and, even then, only if a parent can stay in touch by telephone.



If finances permit, should one parent stay home to take care of the children?

Poverty and Parenting In 1999, about 16 percent of U.S children lived in poverty, and this number stayed relatively stable until about 2006. By 2007, however, the economic recession began to drive up the proportion of children living in poverty (Child Trends, 2019). In 2017, 17.5 percent of U.S. children up to age 17 lived in poverty (Fontenot, Semega, & Kollar, 2018). The poverty rate was 15.2 percent for white children but higher for black (28.3 percent) and Hispanic (25 percent) children. Children living with single mothers are about 4 times more likely to be poor than children living with married couples—46 percent as compared with 11 percent (Federal Interagency Forum on Child and Family Statistics, 2016).

Poor children are more likely than other children to have emotional or behavioral problems (Wadsworth et al., 2008). In addition, their cognitive potential and school performance suffer greatly (Najman et al., 2009).

Poverty can harm children's development through a multitude of pathways. Parents who live in poverty are likely to become anxious, depressed, and irritable and thus may become less affectionate with and responsive to their children. There may be increased levels of parent-child conflict and harsh discipline. Moreover, poverty also affects where children go to school and the neighborhood they live in, features that can exacerbate child stressors. These features in turn also affect parents and their perceived stress. In short, there are cascades of negative interactions that can have a deleterious effect on child outcomes. These outcomes include physical health, behaviors, mental health, and cognitive and intellectual development (Chaudry & Wimer, 2016; Morris et al., 2017; Yoshikawa, Aber, & Beardslee, 2012).

High-quality parenting can buffer children from the potential consequences of poverty. Effective family interventions promote positive parent-child interactions (for example, by encouraging parents to praise their children while also helping them develop reasonable rules and limits) and provide social support for parents (Morris et al., 2017). Parents who can turn to relatives or to other resources for emotional support, help with child care, and child-rearing information often can parent their children more effectively (Brody, Kim, Murry, & Brown, 2004). Community organizations, schools, and pediatricians can also be utilized to provide services and advocacy for children affected by poverty (Ellis & Dietz, 2017; Dreyer, Chung, Szilagyi, & Wong, 2016; Durlak, Weissberg, Dymnicki, Taylor, & Schellinger, 2011).

checkpoint can you . . .

- Identify ways in which parents' work can affect children?
- Discuss effects of poverty on parenting?

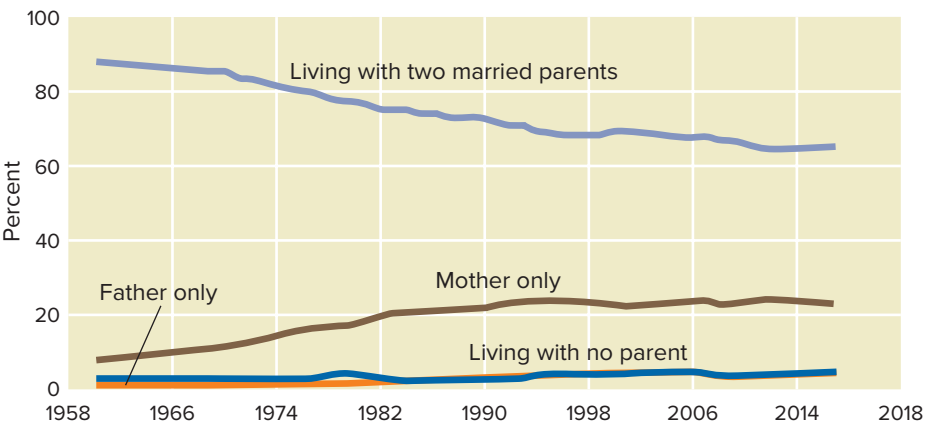
FAMILY STRUCTURE

In earlier generations, the vast majority of children grew up in families with two married parents. Today, although about 2 out of 3 children under 18 live with two married biological, adoptive, or stepparents, that proportion represents a dramatic decline—from 85 percent in 1960 to 65 percent in 2017 (Figure 1). Approximately 2.9 of those heterosexual couples are cohabitating, representing a steady increase over the past few decades (Child Trends Databank, 2017). Other increasingly common family types are gay and lesbian families and grandparent-headed families.

FIGURE 1
Living Arrangements of Children Younger than 18, 1970 to 2017

Most children under 18 in the United States live with two parents, but the prevalence of that household type has been diminishing.

Source: Child Trends DataBank, 2017.



Notes: Children living with two married parents may be living with biological, adoptive, or nonbiological parents. Prior to 2007, children who lived with their mother or father only may also have lived with the parent's unmarried partner.

Other things being equal, children tend to do better in families with two continuously married parents than in cohabiting, divorced, single-parent, or stepfamilies (Brown, 2010). The distinction is even stronger for children growing up with two *happily* married parents. This suggests that the parents' relationship, the quality of their parenting, and their ability to create a favorable family atmosphere affect children's adjustment more than their marital status does (Amato, 2005).

There are relatively few differences in child well-being regardless of whether children live with biological cohabitating families, married/cohabitating stepfamilies, or blended families (Artis, 2007). Family instability, however, may be harmful. Children who experience more family transitions, such as a divorce or a remarriage, are more likely to have behavior problems and to engage in delinquent behavior than children in stable families (Fomby & Cherlin, 2007; Magnuson & Berger, 2009). The negative effect of family transitions appears to be stronger if they occur earlier in development and for boys (Cavanagh & Huston, 2008).

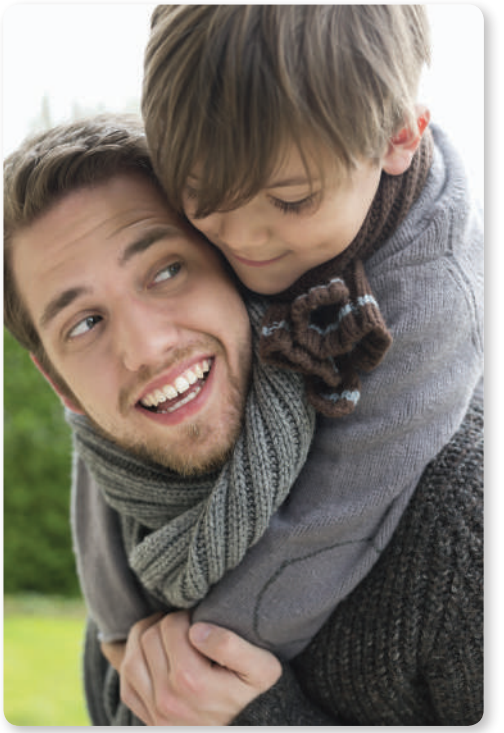
A father's frequent and positive involvement with his child is directly related to the child's well-being and physical, cognitive, and social development (McLanahan, Tach, & Schneider, 2013; Cabrera, Tamis-LeMonda, Bradley, Hofferth, & Lamb, 2000). Unfortunately, in 2014, more than 23.6 percent of children lived in homes without a biological father present (National Fatherhood Initiative, 2016).

Adjusting to Divorce The United States has a high divorce rate, although not as high as in many European countries (Organisation for Economic Co-operation and Development, 2018). The U.S. divorce rate rose from 2.2 per 1,000 people in 1960 to its peak level in 1980 (3.5 per 1,000 people) (Amato, 2014; Cherlin, 2010). Since then, the divorce rate has slowly dropped to 2.9 per 1,000 people (Centers for Disease Control, 2017k).

When Parents Divorce Divorce is stressful for children. First there is the stress of marital conflict and then of parental separation with the departure of one parent, usually the father. Children may not fully understand what is happening. Divorce is, of course, stressful for the parents as well and may negatively affect their parenting. The family's standard of living is likely to drop; and if a parent moves away, a child's relationship with the noncustodial parent may suffer (Kelly & Emery, 2003; Amato, 2014). A parent's remarriage or second divorce after remarriage can increase the stress on children, renewing feelings of loss (Ahrons & Tanner, 2003; Amato, 2003).

Family conflict is a consistently identified risk factor for children (Stallman & Ohan, 2016). Thus, when children exhibit emotional or behavioral problems after a divorce, this may actually reflect the influence of parental conflict *before* the divorce. Children whose parents later divorce show more anxiety, depression, or antisocial behavior prior to the divorce than those whose parents stay married (Strohschein, 2012). In fact, if predivorce parental discord is chronic, overt, or destructive, children may be as well or better off after a divorce (Amato, 2005). Additionally, the quality of parenting before divorce matters as well, with maternal sensitivity and support acting as a protective factor (Weaver & Schofield, 2015).

There is wide variability in children's adjustment to divorce. A child's adjustment to divorce depends in part on the child's age, maturity, gender, temperament, and psychosocial adjustment before the divorce. Children who are younger when their parents divorce tend to suffer from more behavioral problems. By contrast, older children are at higher risk with respect to academic and social outcomes (Lansford, 2009). Although previous research suggested boys were at higher risk than girls (Amato, 2005), current data suggest the relationship between gender and negative outcomes is less clear, with no clear disadvantage identified for boys. What is clear, however, is that children who showed poor adjustment prior to their parents' divorce generally fare worse in the long run (Lansford, 2009). Most children whose parents divorce eventually show good adjustment (Amato & Anthony, 2014).



Children of divorce tend to be better adjusted if they have reliable, frequent contact with the noncustodial parent.
Eric Audras/Onoky/SuperStock

Custody, Visitation, and Co-parenting There are various types of custody arrangements. In most divorce cases, the mother gets custody, though paternal custody is a growing trend. Joint custody, shared by both parents, is another arrangement. When parents have joint legal custody, they share the right and responsibility to make decisions regarding the child's welfare. When they have joint physical custody (which is less common), the child lives part-time with each parent.

All else being equal, research suggests children do better with joint custody (Warshak, 2014; Baude, Pearson, & Drapeau, 2016), perhaps because fathers are more likely to remain involved. Many children of divorce say that losing contact with a father is one of the most painful results of divorce (Fabricius, 2003). Children living with divorced mothers adjust better when the father pays child support, which may indicate a strong tie between father and child (Kelly & Emery, 2003).

When one parent has custody, children do better after divorce if the custodial parent is warm, supportive, and authoritative; monitors the child's activities; and holds age-appropriate expectations. In addition, conflict between the divorced parents needs to be minimal, and the nonresident parent should remain closely involved (Stallman & Ohan, 2016; Ahrons & Tanner, 2003). Conflict, as before divorce, is damaging and can result in lower life satisfaction, negative affect, externalizing symptoms, and adolescent delinquency (Lamela, Figueiredo, Bastos, & Feinberg, 2016; Teubert & Pinquart, 2010; Esmaelli & Yaacob, 2011). High conflict between parents, especially if a child is drawn into the conflict and forced to choose sides, can be extremely damaging (Fosco & Grych, 2010).

Co-parenting is a parenting relationship in which two people work together in a cooperative fashion to raise a child. With respect to divorced couples, it involves shared responsibility and active consultation between both partners on parenting decisions. Co-parenting has been consistently linked to positive child outcomes (Teubert & Pinquart, 2010), in part because it is strongly associated with more frequent contact between father and child (Sobolewski & King, 2005). For instance, children whose parents are able to parent cooperatively following a divorce tend to have closer ties to their fathers—and fewer behavioral problems—than children whose parents have more conflict following divorce (Amato, Kane, & James, 2011). Unfortunately, cooperative parenting is not the norm (Amato, 2005). Parent education programs that teach separated or divorced couples how to prevent or deal with conflict, keep lines of communication open, and help children adjust to divorce have been introduced in many states with measurable success (Ferraro, Malespin, Oehme, Bruker, & Opel, 2016).

Long-Term Effects Most children of divorce adjust well (Amato & Anthony, 2014). Nonetheless, there may be negative consequences. Children who experience their parent's divorce are more likely to develop internalizing or externalizing problems (Lansford, 2009), to have emotional issues, to initiate sexual activity early, to be at risk for depression and suicidal thoughts (D'Onofrio et al., 2006), and, in adolescence, to be at risk for antisocial behavior and difficulties with authority figures (Amato, 2005; Kelly & Emery, 2003). As adults, they are more likely to have poorer psychological well-being and a higher risk of depression (Amato, 2005; Uphold-Carrier & Utz, 2012).

Children of divorced parents also tend to have lower academic achievement (Lansford, 2009). In one study across 14 countries, children from divorced families were less likely to graduate from college, and this difference was most pronounced for children who came from highly educated families (Bernardi & Radl, 2014). This may account for the finding that children of divorce are more likely to have lower SES as adults (Amato, 2005; Gruber, 2004). Moreover, there are indications that these effects may persist across generations. Parental divorce can result in lower educational achievement in adult children of divorce, and the challenges created by this decline in achievement can then affect the subsequent generation in a similar fashion (Amato & Cheadle, 2005).

The anxiety connected with parental divorce may surface as children enter adulthood and form intimate relationships of their own. For example, children whose parents

divorced have higher separation and divorce rates (Mustonen, Huurre, Kiviruusu, Huakkala, & Aro, 2011). Having experienced their parents' divorce, some young adults are afraid of making commitments that might end in disappointment (Glenn & Marquardt, 2001). Although these differences are small, as adults, the children of divorce tend to have a greater chance of having a birth outside marriage. Their marriages tend to be less satisfying and are more likely to end in divorce (Amato, 2005). Additionally, adults whose parents divorced when they were children and who endured multiple or prolonged separation from a parent later may show compromised parenting themselves, including lower sensitivity and warmth, and more parent-child conflict and physical punishment (Friesen, Horwood, Fergusson, & Woodward, 2017).

However, much depends on how young people resolve and interpret the experience of parental divorce. Some who saw a high degree of conflict between their parents are able to learn from that negative example and to form highly intimate relationships themselves (Shulman, Scharf, Lumer, & Maurer, 2001). Interventions can help. One counseling intervention designed to improve children's postdivorce adjustment that focused on increasing effective child coping strategies, reducing negative thoughts about divorce-related stressors, and improving mother-child relationships showed positive effects at both 6 months and 6 years after the counseling sessions had concluded (Vélez, Wolchik, Tein, & Sandler, 2011). Thus, negative effects are not inevitable.

Living in a One-Parent Family One-parent families can result from divorce or separation, unwed parenthood, or death. The number of single-parent families in the United States has increased by approximately 3.4 times since 1960 (U.S. Census Bureau, 2017). Currently, about 27 percent of children live in a single-parent household. More than half (52.8 percent) of all black children live with a single parent, as compared with 22.4 percent of non-Hispanic white children and 29.1 percent of Hispanic children (U.S. Census Bureau, 2017). Although children are far more likely to live with a single mother than with a single father, the number of father-only families has more than quadrupled since 1960, due largely to the increase in paternal custody after divorce (Fields, 2004). Currently, about 16 percent of single-parent families are headed by fathers (U.S. Census Bureau, 2017).

Children in single-parent families do fairly well overall but tend to lag socially and educationally behind peers in two-parent families (Waldfogel, Craigie, & Brooks-Gunn, 2010; Brown, 2010). However, negative outcomes for children in one-parent families are not inevitable. The child's age and level of development, the family's financial circumstances and educational level, whether there are frequent moves, and a nonresident father's involvement make a difference (Amato, 2005; Seltzer, 2000; Ricciuti, 2004).

One key variable appears to be family stability, or whether or not children grow up with the same parent(s) that were present at birth (Heiland & Liu, 2006). In general, single-parent families are more unstable than married families (Craigie, Brooks-Gunn, & Waldfogel, 2012). However, when single-parent or cohabitating families are stable, children fare as well on cognitive and health outcomes as children from two-parent families (Waldfogel et al., 2010). Moreover, the type of instability matters as well. For instance, a transition out of a single-parent family into a two-parent family is often beneficial (Lee & McLanahan, 2015).

Income is another important factor. Many of the negative effects of single parenthood appear to be driven by lower socioeconomic status. Because single parents often lack resources, potential risks to children in these families can be reduced through increased access to economic, social, educational, and parenting support. Indeed, in countries with a robust welfare support system for single mothers, children in such families report higher levels of well-being than children in countries that do not provide as much aid to single mothers (Bjarnason et al., 2012).

Living in a Cohabiting Family Approximately 17 percent of births in the United States are to cohabitating couples—in other words, unmarried partners living together (U.S. Census Bureau, 2016), and about 40 percent of children will spend at least part

of their life in a cohabitating household (Manning, 2017). Cohabiting families are similar in many ways to married families, but the parents tend to be more disadvantaged (Mather, 2010). They traditionally have less income and education, report poorer relationships, and have more mental health problems.

Research shows worse emotional, behavioral, and academic outcomes for children living with cohabiting biological parents than for those living with married biological parents (Waldfogel et al., 2010; Brown, 2004). However, this difference in outcomes is primarily the result of differences in economic resources and family instability (Manning, 2017). Parenting differences explain only a small amount of the variation in child outcomes for cohabitating versus married couples (Thomson & McLanahan, 2012).

Cohabiting families are more likely to break up than married families. Although about 40 percent of unwed mothers are living with the child's father at the time of birth, 25 percent of cohabiting parents are no longer together 1 year later, and 31 percent break up after 5 years (Amato, 2005). The average cohabitating relationship lasts 18 months (Kennedy & Bumpass, 2008). However, there are social class differences. When cohabitating couples are from higher social classes, cohabitation is more likely to be seen as a step to marriage and eventually lead to marriage. By contrast, couples from lower socioeconomic classes are more likely to see their cohabitating relationship end (Kroeger & Smock, 2014).

Living in a Stepfamily Most divorced parents eventually remarry, and many unwed mothers marry men who were not the father of their children, forming step-, or blended, families. Fifteen percent of U.S. children live in blended families (Livingston, 2014).

Adjusting to a new stepparent may be stressful. A child's loyalties to an absent or dead parent may interfere with forming ties to a stepparent (Amato, 2005). For example, when children are emotionally close to a nonresident biological parent, this is associated with increased levels of stress during stepfamily formation in comparison to children who are not close to their nonresident parent (Jensen, Shafer, & Holmes, 2015). Both children and parents have to navigate shifting relationships, adapt to a new power structure in the family, and adjust to household changes. Studies have found small to moderate, but consistent, negative effects for children living in stepparent families when compared to those from continually married parents (Sweeney, 2010; Hofferth, 2006).

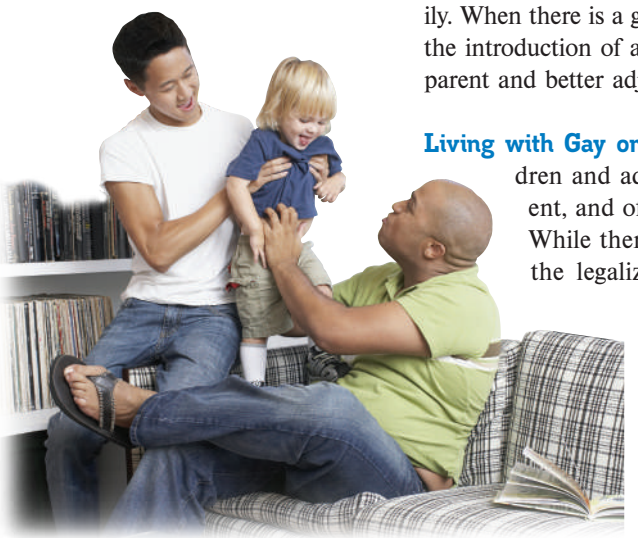
Adjustment to the stepparents and the potential negative influence of that on development appear to be influenced by family relationships prior to the formation of the stepfamily. When there is a good relationship with the biological parent (usually the mother) before the introduction of a stepparent, children show more positive relationships with their stepparent and better adjustment (King, Amato, & Lindstrom, 2015; Jensen & Shafer, 2013).

Living with Gay or Lesbian Parents An estimated 2 million to 3.7 million U.S. children and adolescents have a lesbian, gay, bisexual, or transgender (LGBT) parent, and of those, approximately 200,000 are being raised by same-sex couples. While there is still much discrimination leveled toward same-sex relationships, the legalization of same-sex marriage and a decrease in social stigma have resulted in many LGBT people coming out an earlier age. In the past, such adults were more likely to have first entered into heterosexual relationships that produced children. Now, same-sex couples are less likely to be raising children that were the product of such unions and more likely to jointly be raising children that are the product of reproductive technologies such as artificial insemination or adoption (Gates, 2015).

A considerable body of research has examined the development of children of gays and lesbians and has found no special concerns (APA, 2004). There are *no* consistent differences between homosexual and heterosexual parents in emotional health or parenting skills and attitudes, and where there are differences, they tend to favor gay and lesbian parents (Golombok et al., 2013;

checkpoint can you . . .

- Assess the impact of parental divorce on children?
- Discuss how living in a single-parent or cohabiting household can affect children?



Research has shown that children living with homosexual parents are no more likely than other children to have social or psychological problems or to turn out to be homosexual themselves.
Nick Cardillicchio/Corbis/VCG/Getty Images

Meezan & Rauch, 2005; Pawelski et al., 2006; Wainright, Russell, & Patterson, 2004; Biblarz & Stacey, 2010). Gay or lesbian parents usually have positive relationships with their children, and the children are no more likely than children raised by heterosexual parents to have emotional, social, academic, or psychological problems (APA, 2004; Perrin, Siegel, & Committee on Psychosocial Aspects of Child and Family Health, 2013; Fedewa, Black, & Ahn, 2015; Manning, Fettro, & Lamidi, 2014). Furthermore, children of gays and lesbians are no more likely to be homosexual or to be confused about their gender than are children of heterosexuals (Fedewa et al., 2015; Meezan & Rauch, 2005; Pawelski et al., 2006; Wainright et al., 2004).

Such findings have social policy implications for legal decisions on custody and visitation disputes, foster care, and adoptions (Manning et al., 2014). In the face of controversy, several states have considered or adopted legislation sanctioning second-parent adoption by same-sex partners. The American Academy of Pediatrics supports a right to civil marriage for gays and lesbians (Pawelski et al., 2006) and legislative and legal efforts to permit a partner in a same-sex couple to adopt the other partner's child (AAP Committee on Psychosocial Aspects of Child and Family Health, 2002).

Those who cite benefits for heterosexual parenting are drawing conclusions that the research does not warrant. Specifically, they often compare two-parent families with single-parent families. The appropriate comparisons are between homosexual and heterosexual two-parent families. And when this comparison is made, no negative effects are found.

Biblarz & Stacey, 2010

Adoptive Families Adoption is found in all cultures throughout history. It is not only for infertile people; single people, older people, gay and lesbian couples, and people who already have biological children have become adoptive parents. Roughly 1.5 million U.S. children under 18 (about 2 percent) live with at least one adoptive parent (Kreider & Lofquist, 2014). While it is difficult to compile accurate statistics as there is no one single source of data, estimates are that in 2012, approximately 119,500 children were adopted, which represents a 15 percent decrease since 2001 (Child Welfare Information Gateway, 2016).

Adoptions usually take place through public or private agencies. Traditionally, agency adoptions were intended to be confidential, with no contact between the birth mother and the adoptive parents. However, independent adoptions, made by direct agreement between birth parents and adoptive parents, have become more common. Often these are *open adoptions*, in which both parties share information or have direct contact with the child (Grotevant, 2012).

Generally, open adoptions are beneficial for all parties. Birth mothers who participate in open adoptions have less unresolved grief than those who participate in closed adoptions, and many tend to show less interest in contact as the child gets older and they become more certain the child is being well cared for (Grotevant, McRoy, Wrobel, & Ayers-Lopez, 2013). Whether an adoption is open or closed bears no relation to the children's adjustment or to the parents' satisfaction with the adoption, both of which are generally high (Berry, Dylla, Barth, & Needell, 1998). Likewise, adoptive parents of adolescents report no significant difference in their children's adjustment whether the adoption is open or confidential (VonKorff, Grotevant, & McRoy, 2006).

While adopted children do tend to have more psychological and academic difficulties than nonadopted children, these differences are small, and most adopted children fall within the normal range of development (Palacios & Brodzinsky, 2010; Haugaard, 1998). Age at adoption matters, however. For example, one large meta-analysis of over 62 studies including 17,767 children showed that adopted children were not at risk of lower intelligence. However, those children adopted after the age of 1, especially if they experienced significant preadoption adversity, were more likely to show lower school achievement (Juffer et al., 2011). Children adopted after the age of 1 are also more likely to show disturbances in their attachment patterns than children adopted before their first birthday (Mesman, van IJzendoorn, & Bakersman-Kranenburg, 2009). Similar findings have emerged for adjustment problems. Children adopted in infancy are least likely to have adjustment problems, as are younger children (Julian, 2013; Sharma, McGue, & Benson, 1996b). Any problems that do occur may surface during middle childhood, when children become more aware of differences in the way families are formed (Freeark et al., 2005), or in adolescence (Goodman, Emery, & Haugaard, 1998;

Do you think you would ever try to adopt? If so, would you want the adoption to be open? Why or why not?

Sharma, McGue, & Benson, 1996a), particularly among boys (Freeark et al., 2005) and international adoptees (Juffer et al., 2011).

Prior to the 1960s, most adopted children in the United States were healthy, white infants, adopted as newborns and surrendered by unmarried teen mothers. Adoption rates for children born to women of color were extremely low. In the 1960s, a variety of social and economic changes, including the growing acceptance of single motherhood and the rise of social support programs, led to an increase in the number of women who kept their babies. Additionally, the growing availability of birth control and the legalization of abortion led to a decrease in unintentional pregnancies. These changes resulted in fewer white babies available for adoption (Brodzinsky & Pinderhughes, 2002). Currently, only about 37 percent of adopted children are non-Hispanic white. The remainder are black (23 percent), Hispanic (15 percent), Asian (15 percent), and other (9 percent). Transracial adoptions, where at least one parent is of a different race than the child, are common and comprise about 40 percent of adoptions (Vandivere, Malm, & Radel, 2009).

As the number of babies available for adoption in the United States declined, adoptions of foreign-born children rose by a factor of nearly four from 1978 to 2004, from 5,315 to 20,679 (Bosch et al., 2003; Crary, 2007). Rates have since declined significantly as a result of changing international adoption protocols and in 2012 numbered 8,650 (Child Welfare Information Gateway, 2016).

Does foreign adoption entail special problems? Aside from the possibility of malnourishment or medical conditions in children from developing countries (Bosch et al., 2003), a number of studies find no significant problems with the children's psychological adjustment, school adjustment, and performance (Palacios & Brodzinsky, 2010). However, when foreign adoptees reach adolescence, they may experience feelings of loss of their native culture and growing awareness of racism and discrimination in their adopted culture. Parents who expose their adopted children to experiences that help them identify with their native culture and speak with their children about racism and discrimination may help buffer adopted children from negative effects (Lee, Grotevant, Hellerstedt, Gunnar, & The Minnesota International Adoption Project Team, 2006).

checkpoint can **you** . . .

- Identify some special issues and challenges of a stepfamily?
- Summarize findings on outcomes of child raising by gay and lesbian parents?
- Discuss trends in adoption and the adjustment of adopted children?



Culture influences how we interpret parenting choices. In many nonindustrialized cultures, children routinely care for their younger siblings. In countries such as the United States, this might be seen as neglectful, but in many cultures, it is an important culturally defined role for siblings.
Lucian Coman/Shutterstock

SIBLING RELATIONSHIPS

In remote rural areas of Asia, Africa, Oceania, and Central and South America, it is common to see older girls caring for three or four younger siblings (Cicirelli, 1994). This pattern is also seen in recent immigrants to industrialized societies such as the United States (Hafford, 2010). However, in most industrialized societies, parents generally try not to "burden" older children with the regular care of siblings (Weisner, 1993). Older siblings do teach younger siblings, but this usually happens informally and not as an established part of the social system (Cicirelli, 1994).

The number of siblings in a family and their spacing, birth order, and gender often determine roles and relationships. Sibling relations have both positive and negative aspects to them. Having a warm and supportive sibling relationship is associated with better adjustment (Noller, 2005), social competence (Kim, McHale, Crouter, & Osgood, 2007), and better emotion regulation (Kennedy & Kramer, 2008). Sibling relationships are also marked by conflict. While generally perceived as negative, conflict can nonetheless be a laboratory for conflict resolution. Siblings are motivated to make up after quarrels because they know they will see each other every day. They learn that expressing anger does not end a relationship. Through these conflicts, siblings learn about others' points of view, negotiation, and problem solving (McHale, Updegraff, & Whiteman, 2012).

However, sibling conflict is not always beneficial. High sibling conflict has been associated with internalizing (e.g., depression and anxiety) and externalizing (e.g., deliquency and aggression) problems as well as risky behaviors

(Buist, Deković, & Prinzie, 2012; Solmeyer, McHale, & Crouter, 2012). Siblings can exert a negative effect via modeling antisocial actions, introducing undesirable behaviors to younger siblings or encouraging antisocial acts or collusion against parents (McHale et al., 2012). For example, when older siblings use drugs or alcohol, or engage in early sexual activity, their younger siblings are more likely to do so as well (Low, Shortt, & Snyder, 2012; McHale, Bissell, & Kim, 2009). Interestingly, there is also another side to the positive effects of sibling warmth. In the presence of antisocial behaviors, sibling warmth can actually be a risk factor (McHale et al., 2009). For example, an older teen who is abusing substances might be more likely to introduce those substances to a sibling he is close to than to one he is not.

Gender also appears to be an influence on sibling relationships. Sisters are higher in sibling intimacy than brothers or mixed-sex dyads (Kim, McHale, Osgood, & Crouter, 2006). Children are more likely to squabble with same-sex siblings. However, two brothers quarrel more (Cicirelli, 1976; 1995) and show less caring and intimacy than any other combination (Cole & Kerns, 2001). Additionally, the negative influence of an older antisocial sibling on a younger sibling, in some research, has been limited to same-sex siblings (Buist, 2010).

Siblings also influence each other indirectly, through their impact on each other's relationship with their parents. Parents' experience with an older sibling influences their expectations and treatment of a younger one (Brody, 2004). When a parent-child relationship is warm and affectionate, siblings tend to have positive relationships as well. When the parent-child relationship is conflictual, sibling conflict is more likely (Pike, Coldwell, & Dunn., 2005).

checkpoint can you . . .

- Compare sibling roles in industrialized and nonindustrialized countries?
- Discuss how siblings affect each other's development?

The Child in the Peer Group

How does the peer group influence children? What determines their acceptance by peers and their ability to make friends?

POSITIVE AND NEGATIVE EFFECTS OF PEER RELATIONS

As children begin to move away from parental influence, the peer group opens new perspectives. The peer group helps children learn how to adjust their needs and desires to those of others, when to yield, and when to stand firm. In comparing themselves to others their age, children can gauge their abilities and gain a clearer sense of self-efficacy (Bandura, 1994).

The peer group can sometimes foster antisocial tendencies. While some degree of conformity to group standards is healthy, it is unhealthy when it becomes destructive or prompts young people to act against their better judgment. It is usually in the company of peers that some children shoplift and begin to use drugs (Dishion & Tipsord, 2011; Hartup, 1992).

Unfortunately, peer groups may also reinforce **prejudice:** unfavorable attitudes toward outsiders, especially members of certain racial or ethnic groups. Children tend to be biased toward children like themselves. These biases peak at about 5 to 7 years of age and then decrease through late childhood. As children move into adolescence, social context and what children learn from others seem to matter more (Raabe & Beelmann, 2011).

Children can be negatively affected by discrimination. The perception of being discriminated against has been linked to reductions in well-being, self-esteem, and life satisfaction, and to increases in anxiety, depression, and conduct problems (Schmitt, Branscombe, Postmes, & Garcia, 2014; Brody et al., 2006).

However, prejudice is not inevitable. In one study, children who were prejudiced against refugees showed reductions in that bias when they were read stories about close friendships between English children and refugee children, followed by group discussions (Cameron, Rutland, Brown, & Douch, 2006). In another study, the degree of bias toward immigrants was related to whether the adolescents in the study had immigrant friends.

prejudice
Unfavorable attitude toward members of certain groups outside one's own, especially racial or ethnic groups.



By the age of 10, children from both the United States and Korea think it's OK to dislike another child because he or she is aggressive or shy, but it's less acceptable to dislike another child because of his or her race or gender, characteristics that cannot change.

Park & Killen, 2010

Those who did were more tolerant of differences and showed less bias toward immigrants (van Zalk & Kerr, 2014). Group norms also matter. Children whose social groups or schools have a norm of inclusion are less likely to show prejudiced behavior (Nesdale, 2011; Tropp, O'Brien, & Migacheva, 2014; Tezanos-Pinto, Bratt, & Brown, 2010). Intervention programs, including direct or extended contact, imagined contact, the promotion of empathy, and perspective-taking, have been moderately successful at reducing prejudice (Beelmann & Heinemann, 2014; Jones & Rutland, 2018).

GENDER AND PEER GROUPS

Boys' and girls' peer groups engage in different types of activities. Groups of boys more consistently pursue gender-typed activities (Rose & Rudolph, 2006), while those of girls are more likely to engage in cross-gender activities, such as team sports (McHale, Kim, Whiteman, & Crouter, 2004). Boys play in large groups with well-defined leadership hierarchies and engage in more competitive and rough-and-tumble play. Girls have more intimate conversations characterized by prosocial interactions and shared confidences (Rose & Rudolph, 2006). Boys and girls also prefer different characteristics in friends. Boys report liking friends high in positive affect and low in anxiety and are not overly concerned with how empathic their friends are. Girls, by contrast, prefer friends high in empathy and optimism, but low in positive affect (Oberle, Schonert-Reichl, & Thomson, 2010).

Why do children segregate themselves by sex and engage in such different activities? One of the most clearly identified reasons is because of boys' higher activity levels and more vigorous play (Pellegrini & Archer, 2005; Trost, Rozencranz, & Dzewaltowski, 2008). However, it also appears that socialization influences are at play. Even very active girls often end up in same-sex groups (Pellegrini, Long, Roseth, Bohn, & Van Ryzin, 2007). One reason may be that same-sex peer groups may help children learn gender-appropriate behaviors and incorporate gender roles into their self-concept. A sense of being typical of one's gender and being content with that gender increases self-esteem and well-being, whereas feeling pressure—from parents, oneself, or, in this case, peers—to conform to gender stereotypes lessens well-being (Yunger, Carver, & Perry, 2004). Indeed, such pressure may result in children adopting more gender typical behaviors as a result. In one study, peer harassment predicted decreases in gender atypical behavior for boys. For girls, at least those with many female friends, peer harassment was not associated with a decrease in gender atypicality (Lee & Troop-Gordon, 2011), perhaps because girls are generally subject to less pressure to conform to gender norms at this age (Katz & Walsh, 1991).

POPULARITY

Much of research in child development depends on asking children the right questions in the right way. If a researcher asked schoolchildren to tell her the social ranking of all the children in a classroom, she would most likely be met with a blank stare. However, children can easily say who they like to play with, who they like the most, or who they think other kids like the most. This is known as a *positive nomination.*

Children can also easily describe which children they don't like to play with, like the least, or think other kids don't like—this is a *negative nomination.* By asking these types of questions of every child in a classroom, a researcher can use the aggregated responses to get an overall score, or tally, for each child. The tally may be composed of positive nominations, negative nominations, or no nominations. This measure is known as *sociometric popularity.*



Children who squint are invited to fewer birthday parties.

Mojon-Azzi, Kunz, & Mojon, 2010

Sociometrically *popular* children receive many positive nominations and few negative nominations. They generally have good cognitive abilities, are high achievers, are good at solving social problems, are kind and help other children, and are assertive without being disruptive or aggressive. Their superior social skills make others enjoy being with them (Cillessen & Mayeux, 2004; LaFontana & Cillessen, 2002; Masten & Coatsworth, 1998).

Children can be unpopular in one of two ways. Some children are *rejected*, and they receive a large number of negative nominations. Other children are *neglected* and receive

few nominations of any kind. Some unpopular children are aggressive; others are hyperactive, inattentive, or withdrawn (Dodge, Coie, Pettit, & Price, 1990; LaFontana & Cillessen, 2002; Masten & Coatsworth, 1998). Still others act silly and immature or anxious and uncertain. Unpopular children are often insensitive to other children's feelings and do not adapt well to new situations (Bierman, Smoot, & Aumiller, 1993).

Other children can be *average* in their ratings and do not receive an unusual number of either positive or negative nominations. Finally, some children are *controversial* and receive many positive and negative nominations, indicating that some children like them a great deal and some dislike them a great deal. Less is known about outcomes related to average and controversial sociometric categories.

Popularity is important in middle childhood. Schoolchildren whose peers like them are likely to be well adjusted as adolescents. Those who have trouble getting along with peers are more likely to develop psychological problems, drop out of school, or become delinquent (Dishion & Tipsord, 2011; Mrug et al., 2012; Hartup, 1992). Peer rejection has also been linked to lower levels of classroom participation and poor academic achievement (Ladd, Herald-Brown, & Reiser, 2008; Wentzel & Muenks, 2016).

Children's sociometric popularity is influenced by family context. It is often in the family that children acquire behaviors that affect popularity. In one study, fourth-grade children were more socially competent when they were from families in which the parent-child relationships were warm and nurturing, parents provided direct advice about how to manage conflictual social interactions, and parents provided children with appropriate high-quality peer experiences (McDowell & Parke, 2009). By contrast, parents who are very controlling or negative in their interactions with their children are more likely to have children who are aggressive, low in social competence, and rejected by peers (Li, Putallaz, & Su, 2011; Attili, Vermigli, & Roazzi, 2011; Attili, Vermigli, & Roazzi, 2010).

checkpoint can **you** . . .

- Identify positive and negative effects of the peer group?
- Identify characteristics of popular and unpopular children, and discuss influences on popularity?

FRIENDSHIP

Children look for friends who are like them in age, sex, activity level, and interests (McDonald et al., 2013; Macdonald-Wallis, Jago, Page, Brockman, & Thompson, 2011). Though children tend to choose friends with similar ethnic backgrounds, cross-racial/ethnic friendships are associated with positive developmental outcomes (Kawabata & Crick, 2008). Friends agree they are friends, derive pleasure from each other's company, and the relationship, unlike that of siblings, is voluntary (Bagwell & Schmidt, 2011).

With their friends, children learn to communicate and cooperate. They help each other weather stressful situations, such as starting at a new school or adjusting to parents' divorce. The inevitable quarrels help children learn to resolve conflicts. In short, friendships are a means by which children practice and hone social interaction skills (Glick & Rose, 2011; Newcomb & Bagwell, 1995).

Children's concepts of friendship and the ways they act with their friends change with age, reflecting cognitive and emotional growth. On the basis of interviews with people between the ages of 3 and 45, Robert Selman (1980; Selman & Selman, 1979) traced changing conceptions of friendship across development (Table 1). Preschool friends play together and have preferred playmates, but they are not friends in the same sense that older children are. Children cannot be or have true friends until they achieve the cognitive maturity to consider other people's views and needs as well as their own (Dodge, Coie, & Lynam, 2006; Hartup & Stevens, 1999). Friendship among school-age children is thus deeper, more reciprocal, and more stable.

School-age children distinguish among "best friends," "good friends," and "casual friends" on the basis of intimacy and time spent together. Children this age typically have three to five best friends but usually play with only one or two at a time (Hartup & Stevens, 1999). School-age girls seem to care less about having many friends than about having a few close friends they can rely



Friends often share secrets—and laughs. Friendships deepen and become more stable in middle childhood, reflecting cognitive and emotional growth. Girls tend to have fewer, more intimate friends than boys.
Jupiterimages/Getty Images

TABLE 1 Selman's Stages of Friendship

Stage	Description	Example
Stage 0: Momentary playmateship (ages 3 to 7)	On this *undifferentiated* level of friendship, children think only about what they want from a relationship. Most very young children value their friends for material or physical attributes.	"She lives on my street" or "He has the Power Rangers."
Stage 1: One-way assistance (ages 4 to 9)	On this *unilateral* level, a "good friend" does what the child wants the friend to do.	"She's not my friend anymore because she wouldn't go with me when I wanted her to."
Stage 2: Two-way fair-weather cooperation (ages 6 to 12)	This *reciprocal* level overlaps stage 1. It involves give-and-take but still serves many separate self-interests, rather than the common interests of the two friends.	"We are friends; we do things for each other" or "A friend is someone who plays with you when you don't have anybody else to play with."
Stage 3: Intimate, mutually shared relationships (ages 9 to 15)	On this *mutual* level, children view a friendship as an ongoing, systematic, committed relationship. Friends become possessive and demand exclusivity.	"It takes a long time to make a close friend, so you really feel bad if you find out that your friend is trying to make other friends too."
Stage 4: Autonomous interdependence (beginning at age 12)	In this *interdependent stage,* children respect friends' needs for both dependency and autonomy.	"A good friendship is a real commitment; you have to support and trust and give, but you have to be able to let go too."

Sources: Selman, 1980; Selman & Selman, 1979.

checkpoint
can **you** . . .

- List characteristics children look for in friends?
- Tell how age and gender affect friendships?

on. Boys have more friendships, but they tend to be less intimate and affectionate (Furman & Buhrmester, 1985; Hartup & Stevens, 1999). The prevalence of friends is similar across cultures (French, Purwono, & Rodkin, 2012).

Unpopular children can make friends, but they tend to have fewer friends than popular children, and they demonstrate a preference for younger friends, other unpopular children, or children in a different class or a different school (Hartup, 1996b; Deptula & Cohen, 2004). This can put children on a negative trajectory, as having few friends or low friendship quality in grade school has been associated longitudinally with loneliness in middle school (Kingery, Erdley, & Marshall, 2011).

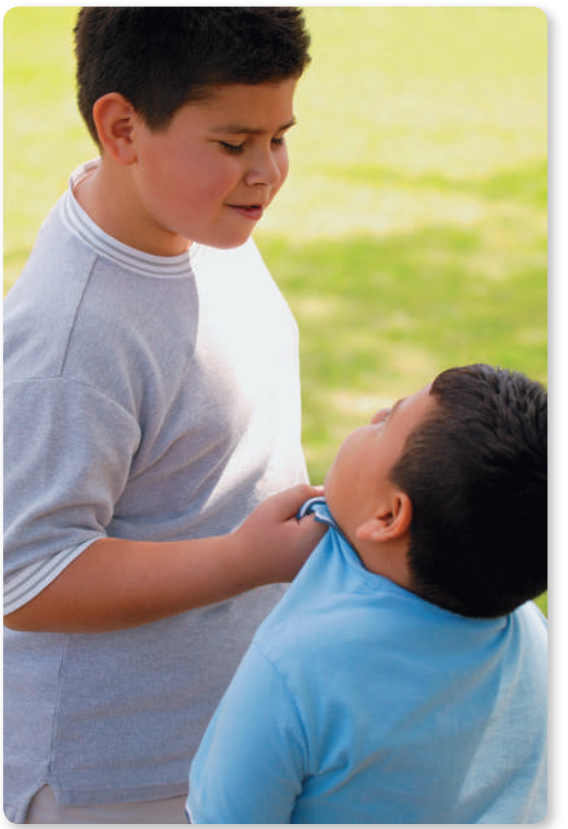
AGGRESSION AND BULLYING

Aggression declines and changes in form during the early school years. After age 6 or 7, most children become less aggressive as they grow less egocentric, more empathic, more cooperative, and better able to communicate. They can now put themselves in someone else's place, can understand another person's motives, and can find positive ways of asserting themselves. *Instrumental aggression,* aggression aimed at achieving an objective—the hallmark of the preschool period—becomes much less common. However, as aggression declines overall, *hostile aggression,* aggression intended to hurt another person, proportionately increases (Dodge, Coie, & Lynam, 2006), often taking verbal rather than physical form (Pellegrini & Archer, 2005). Boys continue to engage in more *direct aggression*, and girls are increasingly more likely to engage in *social* or *indirect aggression*, although some researchers argue the differences have been overstated (Card, Stucky, Sawalani, & Little, 2008).

A small minority of children do not learn to control physical aggression (Coie & Dodge, 1998). These children tend to have social and psychological problems, but it is not clear whether aggression causes these problems or is a response to them, or both (Crick & Grotpeter, 1995). Not surprisingly, school-age boys who are physically aggressive may become juvenile delinquents in adolescence (Hay, Meldrum, Widdowson, & Piquero, 2017). Being a boy, having a reactive temperament, parental separation, early onset of motherhood, and controlling parenting have all been shown to contribute to

physical aggression in 6- to 12-year-olds (Joussemet et al., 2008). Children, especially girls, who are high in physical aggression are disliked, although there are indications that how much these children are disliked is moderated by age. Physically aggressive children sometimes can attain higher social status as they get older, and sometimes popularity can lead to increased aggression as a strategy for the maintenance of social position (Garandeau, Ahn, & Rodkin, 2011; Cillessen & Mayeux, 2004; Garandeau, Wilson, & Rodkin, 2010).

Relational aggression does not appear to show the same dynamic and has been associated with increased social influence and popularity (Vaillencourt & Hymel, 2006). Girls who, for example, talk behind another girl's back or exclude her socially are sometimes perceived as being among the most popular in the classroom (Cillessen & Mayeux, 2004; Rodkin, Farmer, Pearl, & Van Acker, 2000). There is evidence that relationally aggressive children seek out other relationally aggressive children as friends and that both interaction members then mutually influence each other (Sijtsema et al., 2010; Dikjstra, Berger, & Lindenberg, 2011). Children who are high in relational aggression tend to have parents low in positive parenting and high in harsh parenting, mothers who are uninvolved, and fathers who are psychologically controlling (Kawabata, Alink, Tseng, Van IJzendoorn, & Crick, 2011).



Aggressive boys tend to gain in social status by the end of fifth grade, suggesting that bullying behavior may be seen as cool or glamorous by preadolescents.
Don Hammond/Design Pics Inc./Alamy Stock Photo

Types of Aggression and Social Information Processing What makes children act aggressively? One answer may lie in the way they process social information.

Instrumental, or *proactive*, aggressors view force and coercion as effective ways to get what they want. They act deliberately, not out of anger. For example, such a child might learn that he can force another child to trade lunch items with him by threatening to hit the other child. If that strategy works, the child has been reinforced for his aggressive acts, and his belief in aggression is confirmed. Other children are more likely to engage in *hostile* or *reactive* aggression. Such a child might, after being accidentally pushed by someone in the lunch line, assume that the bump was on purpose and push back angrily. All children might sometimes assume the worst of others, but children who habitually assume the worst of others in situations such as these are said to have a **hostile attributional bias.** They quickly conclude, in ambiguous situations, that others were acting with ill intent and are likely to strike out in retaliation or self-defense. Generally, other children then respond to this hostility with aggression, thereby confirming the original hostile attributional bias and strengthening it (Crick & Dodge, 1996; de Castro, Veerman, Koops, Bosch, & Monshouwer, 2002; Waldman, 1996).

hostile attribution bias
Tendency to perceive others as trying to hurt one and to strike out in retaliation or self-defense.

Rejected children and those exposed to harsh parenting also tend to have a hostile attribution bias, as do children who seek dominance and control (Coie & Dodge, 1998; de Castro et al., 2002; Erdley et al., 1997; Masten & Coatsworth, 1998; Weiss et al., 1992). Because people often *do* become hostile toward someone who acts aggressively toward them, a hostile bias may become a self-fulfilling prophecy, setting in motion a cycle of aggression (de Castro et al., 2002; Lansford, Malone, Dodge, Pettit, & Bates, 2010). Hostile attribution bias becomes more common between ages 6 and 12 (Aber, Brown, & Jones, 2003).

The Influence of Media Violence on Aggression On average, children spend more than 7 hours a day in front of a television or computer screen (Anderson, Bushman, Donnerstein, Hummer, & Warburton, 2015; Rideout, Foehr, & Roberts, 2010). As television, movies, video games, cell phones, and computers take on larger roles in children's daily lives, it is critical to understand the impact mass media has on children's behavior.

Violence is prevalent in U.S. media. About 6 out of 10 television programs portray violence, usually glamorized, glorified, or trivialized (Yokota & Thompson, 2000). Music

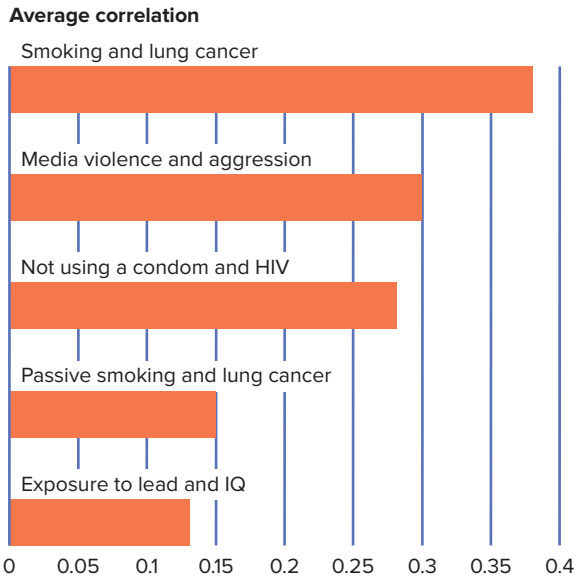


FIGURE 2

Effects of Threats to Public Health

The effect of media violence is the same or greater than the effect of many other recognized threats to public health.

Source: Bushman, B. J., and L. Rowell Huesmann. "Effects of Televised Violence on Aggression." In Handbook of Children and the Media, edited by Dorothy G. Singer and Jerome L. Singer. 235, Figure 11.5, 2001.

videos disproportionately feature violence against women and blacks. The motion picture, music, and video game industries aggressively market violent, adult-rated products to children (AAP Committee on Public Education, 2001). In a study of U.S. children, 40 movies that were rated R for violence were seen by a median of 12.5 percent of an estimated 22 million children aged 10 to 14 (Worth et al., 2008).

Evidence from research conducted over the past 50 years on exposure to violence on TV, movies, and video games supports a causal relationship between media violence and violent behavior on the viewer's part (Anderson et al., 2015; Huesmann, 2007). Although the strongest single correlate of violent behavior is previous exposure to violence (AAP Committee on Public Education, 2001; Anderson et al., 2003; Huesmann, Moise-Titus, Podolski, & Eron, 2003), the effect of exposure to violence via mass media is significant (Figure 2). Moreover, cross-cultural research has shown that the positive relationship between violent media exposure and increases in aggressive behavior holds across different cultures (C. A. Anderson et al., 2017; C. A. Anderson et al., 2010).

How does media violence lead to long-term aggressiveness? Longitudinal studies have demonstrated that children's exposure to violent media increases their risk for long-term effects based on observational learning, desensitization, and enactive learning that occurs automatically in children (Huesmann, 2007). Children who see characters use violence to achieve their goals conclude that force is an effective way to resolve conflicts. Media provides visceral thrills without showing the human cost, leads children to view aggression as acceptable, and desensitizes them. Negative reactions to violent scenes have been shown to decline in intensity with repeated exposure (Huesmann & Kirwil, 2007). The more realistically violence is portrayed, the more likely it is to be accepted (AAP Committee on Public Education, 2001; Anderson et al., 2003).

Children are more vulnerable than adults to the influence of televised violence (AAP Committee on Public Education, 2001; Coie & Dodge, 1998). The influence is stronger if the child believes the violence on the screen is real, identifies with the violent character, finds that character attractive, and watches without parental supervision or intervention (Anderson et al., 2003; Coie & Dodge, 1998). Highly aggressive children are more strongly affected by media violence than are less aggressive children (Anderson et al., 2003).

More than 90 percent of children play video games (Gentile, 2009). Some psychologists have argued that research on effects of video games and the Internet suggest that long-term increases in violent behavior could be even greater for video games than for TV and movies. Players of violent games are active participants who receive positive reinforcement for violent actions (Huesmann, 2007). Violent video game players show less prosocial behavior and empathy, more aggressive behaviors and thoughts, more angry feelings, physiological arousal, hostile appraisals, desensitization to violence, and are more likely to respond violently to provocation (Anderson et al., 2017; Ferguson, 2015; Gentile, Bender, & Anderson, 2017).

Although the majority of researchers endorse the association between video game violence and aggression (Bushman, Gollwitzer, & Cruz, 2015), others believe this link may be overstated (Ferguson, 2013). For example, they argue that methodological flaws such as a failure to consider confounding variables, difficulty generalizing from laboratory studies of aggression to real-world aggressive acts, and inappropriate statistical modeling call into question some of the claims (Ferguson & Savage, 2012). Moreover, researchers have also pointed out that media violence is just one of many factors, and perhaps not even the most important one (Bushman, Anderson, Donnerstein, Hummer, & Warburton, 2016). In support of these assertions are data indicating that youth violence has declined even though exposure to violent media has remained stable (Ferguson, 2013) and video game consumption is inversely related to youth violence (Ferguson, 2015).

Recent experimental evidence casts even greater doubt on the existence of a direct causal relationship between the electronically mediated aggression in video games and aggression in the real world. In this study, 275 male undergraduates played one of two video games. One version was a violent first-person shooter game, the second a closely matched nonviolent version in which booger monsters needed to be sent back to their home dimension. Following the game, participants were provoked in real life by a confederate and given the chance to respond aggressively. The researchers did not find an effect for video game violence. In other words, violence within the context of the video game did not translate, at least in the short term, into real-world behavior (Hilgard, Englehardt, Rouder, Segert, & Bartholow, 2019).

However, this does not mean that children should be allowed to watch violent content without limits or that modeling of aggression across all media has no effects. Media-induced aggressiveness can be minimized by cutting down on television use and by parental monitoring and guidance of the shows children watch (Anderson et al., 2003). Additionally, just as viewing violent media promotes aggression, viewing media that promotes messages of empathy and helping promotes prosocial behavior in children (Anderson et al., 2015).



Research shows that children who see televised violence tend to act aggressively. When the violence is child-initiated, as in video games, the effect may be even stronger.
Andrey_Popov/Shutterstock

What can and should be done about children's exposure to media violence?

Bullies and Victims Aggression becomes **bullying** when it is deliberately, persistently directed against a particular target: a victim. Bullying can be physical (hitting, punching, kicking, or damaging or taking of personal belongings), verbal (name-calling or threatening), or relational or emotional (isolating and gossiping, often behind the victim's back). Bullying can be *proactive*—done to show dominance, bolster power, or win admiration—or *reactive,* responding to a real or imagined attack. *Cyberbullying*—posting negative comments or derogatory photos of the victim on a website—has become increasingly common (Berger, 2007). The increase in use of cell phones, text messaging, e-mail, and social media use has opened new venues for bullies that provide access to victims without the protection of family and community (Huesmann, 2007).

bullying
Aggression deliberately and persistently directed against a particular target, or victim, typically one who is weak, vulnerable, and defenseless.

Bullying may reflect a genetic tendency toward aggressiveness combined with environmental influences, such as coercive parents and antisocial friends (Berger, 2007). Bullies also tend to be low in empathy, especially with respect to the ability to experience the emotions that other people are feeling, or the affective component of empathy (Fink, Deighton, Humphrey, & Wolpert, 2015). Both bullies and victims tend to be deficient in social problem-solving skills, and those who also have academic problems are more likely to be bullies than victims (Cook, Williams, Guerra, Kim, & Sadek, 2010). Most bullies are boys who tend to victimize other boys; female bullies tend to target other girls (Berger, 2007; Pellegrini & Long, 2002; Veenstra et al., 2005).

Patterns of bullying and victimization may become established as early as kindergarten. As tentative peer groups form, aggressors soon get to know which children make the easiest targets. The frequency of bullying increases from elementary school to middle school before declining again in high school (Hong & Espelage, 2012). Some 24 percent of U.S. primary schools, 42 percent of middle schools, and 21 percent of high schools report student bullying at school at least once a week (Guerino, Hurwitz, Noonan, & Kaffenberger, 2006). Whereas younger children reject an aggressive child, by early adolescence bullies are sometimes dominant, respected, feared, and even liked (Berger, 2007).

Risk factors for victimization seem to be similar across cultures (Schwartz, Change, & Farver, 2001). Victims do not fit in. They tend to be anxious, depressed, cautious, quiet, and submissive and to cry easily or to be argumentative and provocative (Hodges, Boivin, Vitaro, & Bukowski, 1999; Veenstra et al., 2005). They have few friends and may live in harsh, punitive family environments (Nansel et al., 2001; Schwartz, Dodge, Pettit, Bates, & Conduct Problems Prevention Research Group, 2000). Victims are apt to have low self-esteem, though it is not clear whether low self-esteem leads to or follows from victimization (Boulton & Smith, 1994; Olweus, 1995). Some victims are small, passive, weak,

window on the world

BULLYING: A WORLDWIDE PROBLEM

In the United States, 28 percent of U.S. students in grades 6 to 12 report having been bullied, approximately 30 percent of young people admit to bullying others, and 70.6 percent of young people say they have seen bullying in their schools (U.S. Department of Health and Human Services, 2014). How does this compare to other countries? In France, 32 percent of students reported being the victim of verbal bullying, and 35 percent were the victims of physical bullying. In Kenya, between 63 and 82 percent of students reported being subjected to various types of bullying, and in South Africa, more than half of respondents had experienced bullying. Reports vary widely—in Sweden, 15 percent reported bullying, while in Lithuania, 67 percent of students reported being bullied (UNESCO, 2017). Though the statistics vary from country to country, bullying is a global problem.

Bullying occurs regardless of whether or not a country is wealthy or poor and in every country that has been measured. For example, bullying ranges from 7 percent in Tajikistan to 74 percent in Samoa. Wealthy countries show a similar range, with prevalence rates ranging from a low of 14 percent in the Czech Republic to a high of 69 percent in Latvia and Romania (UNICEF, 2014).

Bullying and unsafe environments create a climate of fear and insecurity that can lead to negative developmental outcomes. Cross-cultural research conducted with adults in 30 European countries indicated that those adults who had been bullied as children showed lower life satisfaction (29 percent) than those who had not been bullied (40 percent) (UNESCO, 2017). Health promotion and prevention strategies need to address bullying problems to make the world safer for all.



Although the wealth of a country does not seem to account for bullying prevalence rates, there are wide disparities in these rates among countries. What do you think some relevant country-level variables might be? Might culture impact which characteristics put children at risk of being bullying?

and submissive. Other victims are provocative; they goad their attackers, and they may even attack other children themselves (Berger, 2007; Veenstra et al., 2005). Children who are overweight are more likely to become either victims or bullies (Janssen, Craig, Boyce, & Pickett, 2004; Bacchini et al., 2015; Van Geel, Vedder, & Tanilon, 2014).

Bullying is harmful to both bullies and victims (Berger, 2007). Both bullies and victims tend to have conduct problems and lower academic achievement (Golmaryami et al., 2016; Shetgiri, Espelage, & Carroll, 2015). Bullies are at increased risk of delinquency, crime, or alcohol abuse. They are also more likely be diagnosed with anxiety or depression. Victims of chronic bullying tend to develop behavior problems. They may become more aggressive themselves or depressed (Schwartz, McFadyen-Ketchum, Dodge, Pettit, & Bates, 1998; Veenstra et al., 2005; Turcotte Benedict, Vivier, & Gjelsvik, 2015). Furthermore, frequent bullying affects the school atmosphere, leading to widespread underachievement, alienation from school, stomachaches and headaches, reluctance to go to school, and frequent absences (Berger, 2007).

As more children gain access to electronic devices (Kowalski, Giumetti, Schroeder, & Lattanner, 2014), there has been a rise in incidents of cyberbullying. Research suggests that cyberbullying is often an extension of face-to-face bullying, as cyberbullies also tend to engage in aggressive acts in person as well as online (Modecki, Minchin, Harbaugh, Guerra, & Runions, 2014; Kowalski et al., 2014). Cyberbullies tend to believe that aggression is normative and show low empathy for others (Kowalski et al., 2014). While overall, boys cyberbully at higher levels than do girls, girls engage in more cyberbullying in early to middle adolescence, while boys' cyberbullying peaks somewhat later (Barlett & Coyne, 2014). Being a victim of cyberbullying is associated with a wealth of mental health and

academic issues, and, for some children, an elevated risk of suicidal ideation and suicide (Van Geel, Vedder, & Tanilon, 2014).

The U.S. Department of Health and Human Services has promoted Steps to Respect, a program for grades 3 to 6 that aims to (1) increase staff awareness and responsiveness to bullying, (2) teach students social and emotional skills, and (3) foster socially responsible beliefs. Some research has found a reduction in playground bullying and argumentative behavior and an increase in harmonious interactions among children who participated in the program (Frey et al., 2005). However, other data have indicated the impact on actual bullying behavior is minimal, although the programs may enhance students' social competence and self-esteem (Merrell, Gueldner, Ross, & Isava, 2008).

checkpoint can you . . .

- Tell how aggression changes during middle childhood, and how social information processing and media violence can contribute to it?
- Describe how patterns of bullying and victimization become established and change?

Mental Health

Although most children are fairly well adjusted, worldwide, the prevalence rate of mental disorders in children and adolescents is about 13.4 percent (Polancyzk, Salum, Sugaya, Caye, & Rodhe, 2015). Estimates for the prevalence rate in the United States range from 13 to 20 percent, and there are suggestions that this rate may be increasing (Perou et al., 2013).

Let's look at several common emotional disturbances and then at types of treatment.



Paraplush, a European toy company, has released a line of plush animals illustrating common psychological disorders. Their tagline is "Psychiatry for Abused Toys." The animals include a hallucinating snake, a depressed turtle, a paranoid crocodile, and others. Do you think this approach helps destigmatize mental disorders, or does it promote negative stereotypes and inaccurate perceptions?

COMMON EMOTIONAL PROBLEMS

Children with emotional, behavioral, and developmental problems tend to be an underserved group. Only about half of all children in the United States who need services for mental health issues currently receive the help they need (Merikangas et al., 2010).

A reported 55.7 percent of children diagnosed with emotional, behavioral, and developmental problems have *disruptive conduct disorders:* aggression, defiance, or antisocial behavior. Almost all the rest, 43.5 percent, have *anxiety* or *mood disorders:* feeling sad, depressed, unloved, nervous, fearful, or lonely (Bethell, Read, & Blumberg, 2005).

Disruptive Conduct Disorders Temper tantrums and defiant, argumentative, hostile, or deliberately annoying behavior—common among 4- and 5-year-olds—typically are outgrown by middle childhood as children get better at controlling these behaviors (Miner & Clarke-Sterwart, 2009). When such a pattern of behavior persists until age 8, children (usually boys) may be diagnosed with **oppositional defiant disorder (ODD),** a pattern of defiance, disobedience, and hostility toward adult authority figures lasting at least 6 months and going beyond the bounds of normal childhood behavior. Children with ODD constantly fight, argue, lose their temper, snatch things, blame others, and are angry and resentful. They have few friends, are in constant trouble in school, and test the limits of adults' patience (American Academy of Child and Adolescent Psychiatry, 2013a; Matthys & John, 2017).

oppositional defiant disorder (ODD)
Pattern of behavior, persisting into middle childhood, marked by negativity, hostility, and defiance.

Some children with ODD may later be diagnosed with **conduct disorder (CD),** a persistent, repetitive pattern, beginning at an early age, of aggressive, antisocial acts, such as truancy, setting fires, habitual lying, fighting, bullying, theft, vandalism, assaults, and drug and alcohol use (American Academy of Child and Adolescent Psychiatry, 2013b; Matthys & John, 2017).

conduct disorder (CD)
Repetitive, persistent pattern of aggressive, antisocial behavior violating societal norms or the rights of others.

Slightly more than 6 percent of boys and 3 percent of girls under age 18 in the United States receive a diagnosis of behavioral or conduct problems. Rates are highest (8.1 percent) in African American children and adolescents, and lowest in Hispanics (3.9 percent) (Perou et al., 2013). Conduct disorder in childhood is strongly predictive of antisocial and criminal behavior in adulthood (Mordre, Groholt, Kjelsberg, Sandstad, & Myhre, 2011; Lynam, Caspi, Moffitt, Loeber, & Stouthamer-Loeber, 2007).

What determines whether a particular child with antisocial tendencies will become severely and chronically antisocial? Neurobiological deficits may be important. These deficits may affect their ability to feel empathy for others, leading to a characteristic

callous unemotionality (Lockwood et al., 2013; Michalska, Zeffiro, & Decety, 2016). Children who are at elevated risk of becoming antisocial adults also tend to be impulsive and have low IQ and poor academic achievement (Murray & Farrington, 2010). They also tend to experience substandard parenting. Their parents may not supervise them well, or they may be overly punitive or erratic in their care. They may be cold or antisocial, abusive, use hostile parenting strategies, or have high levels of family conflict (van Goozen, Fairchild, Snoek, & Harold, 2007; Miner & Clarke-Stewart, 2009). Their families are more likely to be large or poor. Additionally, children who later become antisocial are more likely to have antisocial peers, to go to schools with high delinquency rates, and to live in high crime neighborhoods. These risk factors are additive–the more of them present, the higher the risk (Murray & Farrington, 2010).

School Phobia and Other Anxiety Disorders

Some children have realistic reasons to fear going to school: a sarcastic teacher, overly demanding work, or a bully to avoid. In such cases, the environment may need changing, not the child. However, some children have **school phobia,** an unrealistic fear of going to school. True school phobia may be a type of **separation anxiety disorder,** a condition involving excessive anxiety for at least 4 weeks concerning separation from home or from people to whom the child is attached. Although separation anxiety is normal in infancy, when it persists in older children, it is cause for concern. Separation anxiety disorder affects some 4 percent of children and young adolescents and may persist through the college years. These children often come from close-knit, caring families. They may develop the disorder spontaneously or after a stressful event, such as the death of a pet, an illness, or a move to a new school (American Psychiatric Association, 2000; Harvard Medical School, 2004a).

school phobia
Unrealistic fear of going to school; may be a form of *separation anxiety disorder* or *social phobia.*

separation anxiety disorder
Condition involving excessive, prolonged anxiety concerning separation from home or from people to whom a person is attached.

Sometimes school phobia may be a form of **social phobia,** or *social anxiety:* extreme fear and/or avoidance of social situations such as speaking in class or meeting an acquaintance on the street. Social phobia affects about 5 percent of children; it runs in families, so there may be a genetic component. Often these phobias are triggered by traumatic experiences, such as a child's mind going blank when the child is called on in class (Beidel & Turner, 1998). Social anxiety tends to increase with age, whereas separation anxiety decreases (Costello et al., 2003).

social phobia
Extreme fear and/or avoidance of social situations.

Some children have a **generalized anxiety disorder,** not focused on any specific part of their lives. These children worry about just about everything: school grades, storms, earthquakes, and hurting themselves on the playground. They tend to be self-conscious, self-doubting, and excessively concerned with meeting the expectations of others. They seek approval and need constant reassurance, but their worry seems independent of performance or of how they are regarded by others (Harvard Medical School, 2004a; USDHHS, 1999b). Far less common is **obsessive-compulsive disorder (OCD).** Children with this disorder may be obsessed by repetitive, intrusive thoughts, images, or impulses (often involving irrational fears); or may show compulsive behaviors, such as constant hand-washing; or both (American Psychiatric Association, 2000; Harvard Medical School, 2004a).

generalized anxiety disorder
Anxiety not focused on any single target.

obsessive-compulsive disorder (OCD)
Anxiety aroused by repetitive, intrusive thoughts, images, or impulses, often leading to compulsive ritual behaviors.

Childhood Depression

Childhood depression is a disorder of mood that goes beyond normal, temporary sadness. A recent meta-analysis including 41 studies across 27 cultures estimated the prevalence of childhood and adolescent depressive disorders at 2.6 percent (Polanczyk et al., 2015). In the United States, the prevalence rate of depression in 6- to 17-year-old children is estimated to be 2.1 percent and becomes proportionately more common in girls with age (Perou et al., 2013). Symptoms include inability to have fun or concentrate, fatigue, extreme activity or apathy, crying, sleep problems, weight change, physical complaints, feelings of worthlessness, a prolonged sense of friendlessness, or frequent thoughts about death or suicide. Childhood depression may signal the beginning of a recurrent problem that is likely to persist into adulthood (Birmaher, 1998; Katz, Conway, Hammen, Brennan, & Najman, 2011).

childhood depression
Mood disorder characterized by such symptoms as a prolonged sense of friendlessness, inability to have fun or concentrate, fatigue, extreme activity or apathy, feelings of worthlessness, weight change, physical complaints, and thoughts of death or suicide.

The exact causes of childhood depression are unknown, but depressed children tend to come from families with high levels of parental depression, anxiety, substance abuse,

or antisocial behavior. The atmosphere in such families may increase children's risk of depression (Cicchetti & Toth, 1998; USDHHS, 1999b). Genetics are also important, given the existence of gene variants that increase the risk of depression (Dunn et al., 2015; Aguilera et al., 2009; Caspi et al., 2003; Young et al., 2007).

Children as young as 5 or 6 can accurately report depressed moods and feelings that forecast later trouble, from academic problems to major depression and ideas of suicide (Ialongo, Edelsohn, & Kellam, 2001). Depression often emerges during the transition to middle school and may be related to stiffer academic pressures (Cicchetti & Toth, 1998), weak self-efficacy beliefs, and lack of personal investment in academic success (Rudolph, Lambert, Clark, & Kurlakowsky, 2001). Depression becomes more prevalent during adolescence (Perou et al., 2013).

TREATMENT TECHNIQUES

Psychological treatment for emotional disturbances can take several forms. In **individual psychotherapy,** a therapist sees a child one-on-one to help the child gain insights into his or her personality and relationships and to interpret feelings and behavior. Such treatment may be helpful at a time of stress, such as the death of a parent or parental divorce, even when a child has not shown signs of disturbance. Child psychotherapy is usually more effective when combined with counseling for the parents.

individual psychotherapy
Psychological treatment in which a therapist sees a troubled person one-on-one.

In **family therapy,** the therapist sees the family together, observes how members interact, and points out both growth-producing and growth-inhibiting or destructive patterns of family functioning. Therapy can help parents confront their conflicts and begin to resolve them. This is often the first step toward resolving the child's problems as well.

family therapy
Psychological treatment in which a therapist sees the whole family together to analyze patterns of family functioning.

Behavior therapy, or *behavior modification,* is a form of psychotherapy that uses principles of learning theory to eliminate undesirable behaviors or to develop desirable ones. A statistical analysis of many studies found that psychotherapy is generally effective with children and adolescents, but behavior therapy is more effective than nonbehavioral methods. Results are best when treatment is targeted to specific problems and desired outcomes (Weisz, Weiss, Han, Granger, & Morton, 1995). *Cognitive behavioral therapy,* which seeks to change negative thoughts through gradual exposure, modeling, rewards, or talking to oneself, has proven the most effective treatment for anxiety disorders in children and adolescents (Hofmann, Asnaani, Vonk, Sawyer, & Fang, 2012).

behavior therapy
Therapeutic approach using principles of learning theory to encourage desired behaviors or eliminate undesired ones; also called *behavior modification.*

When children have limited verbal and conceptual skills or have suffered emotional trauma, **art therapy** can help them describe what is troubling them without the need to put their feelings into words. The child may express deep emotions through his or her choice of colors and subjects to depict (Kozlowska & Hanney, 1999). Art therapy has been demonstrated to be beneficial and is often used in conjunction with other forms of therapy (Slayton, D'Archer, & Kaplan, 2010).

art therapy
Therapeutic approach that allows a person to express troubled feelings without words, using a variety of art materials and media.

Play therapy, in which a child plays freely while a therapist occasionally comments, asks questions, or makes suggestions, has proven effective with a variety of emotional, cognitive, and social problems, especially when consultation with parents or other close family members is part of the process (Lin & Bratton, 2015; Ray, Armstrong, Balkin, & Jayne, 2015; Leblanc & Ritchie, 2001).

play therapy
Therapeutic approach that uses play to help a child cope with emotional distress.

The use of **drug therapy**—antidepressants, stimulants, tranquilizers, or antipsychotic medications—to treat childhood emotional disorders is controversial. During a 10-year period, the rate at which antipsychotic medications were prescribed for children and adolescents more than quintupled (Olfson, Blanco, Liu, Moreno, & Laje, 2006). For example, from 1999 to 2001 approximately 1 in 650 children were receiving antipsychotic medications; this number rose to 1 in 329 for 2007 (Olfson, Crystal, Huang, & Gerhard, 2010). Sufficient research on the effectiveness and safety of many of these drugs, especially for children, is lacking.

drug therapy
Administration of drugs to treat emotional disorders.



In play therapy, the therapist observes as a child acts out troubled feelings, often using developmentally appropriate materials such as dolls.
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Despite this lack of data, use of such drugs in children has been rising sharply. Much of the increase has involved off-label use. In other

checkpoint can you . . .

- Discuss causes, symptoms, and treatments of common emotional disorders?

words, most children using these drugs are receiving them for nonapproved psychiatric conditions (Pathak, West, Martin, Help, & Henderson, 2010). The reasons for this are varied. Sometimes, a shortage of trained providers, reimbursement for behavioral treatment, or a lack of treatment options leaves parents with few remaining options for managing difficult children. Additionally, increased knowledge and awareness of drug offerings, as well as increased acceptance of their use, is also a factor (Alexander, Gallagher, Mascola, Moloney, & Stafford, 2011). Sufficient research on the effectiveness and safety of many of these drugs for children is lacking.

RESILIENCE

Much of the early history of psychology was marked by investigations into the various risks that can pull a child into a negative developmental trajectory. However, psychologists have increasingly come to realize that there is also value in examining resilience. **Resilient children** are those who weather circumstances that might blight others, who maintain their composure and competence under challenge or threat, or who bounce back from traumatic events. The two most important **protective factors** that help children and adolescents overcome stress and contribute to resilience are *good family relationships* and *cognitive functioning* (Masten & Coatsworth, 1998; see Table 2).

resilient children
Children who weather adverse circumstances, function well despite challenges or threats, or bounce back from traumatic events.

protective factors
Influences that reduce the impact of potentially negative influences and tend to predict positive outcomes.

Resilient children also tend to have high IQs and to be good problem solvers, and their cognitive ability may help them cope with adversity, protect themselves, regulate their behavior, and learn from experience. They may attract the interest of teachers, who can act as guides, confidants, or mentors (Masten & Coatsworth, 1998). They may even have protective genes, which may buffer the effects of an unfavorable environment (Caspi et al., 2002; Kim-Cohen et al., 2004).

Other frequently cited protective factors include the following (Ackerman, Kogos, Youngstrom, Schoff, & Izard, 1999; Eisenberg et al., 2004; Masten & Coatsworth, 1998; E. E. Werner, 1993):

- *The child's temperament or personality:* Resilient children are adaptable, friendly, well liked, independent, and sensitive to others. They are competent and have high self-esteem. When under stress, they can regulate their emotions by shifting attention to something else.
- *Compensating experiences:* A supportive school environment or successful experiences in studies, sports, or music or with other children or adults can help make up for a destructive home life.

TABLE 2 Characteristics of Resilient Children and Adolescents

Source	Characteristic
Individual	Good intellectual functioning Appealing, sociable, easygoing disposition Self-efficacy, self-confidence, high self-esteem Talents Faith
Family	Close relationship to caring parent figure Authoritative parenting: warmth, structure, high expectations Socioeconomic advantages Connections to extended supportive family networks
Extrafamilial context	Bonds to prosocial adults outside the family Connections to prosocial organizations Attending effective schools

Source: Masten and Coatsworth, 1998, 212.

research in action

CHILDREN'S EXPERIENCES WITH TERRORIST ATTACKS

On May 22, 2017, a terrorist attack occurred at singer Ariana Grande's concert in Manchester, England. Many of those injured were children whose parents had taken them to the concert. Hundreds of other children were separated from their parents during the chaos that ensued (Smith & Chan, 2017). Compared to natural disasters, terrorist events have been associated with higher levels of distress (Hagan, Committee of Psychosocial Aspects of Child and Family Health, & Task Force on Terrorism, 2005), and the intermittent and unpredictable nature of these attacks may contribute to heightened stress and anxiety levels that continue long after the event (Fremont, 2004).

Children exposed to terrorist attacks have been reported to show elevated post-traumatic stress symptoms for months afterward (Comer, Bry, Poznanski, & Golik, 2016). Symptoms are often commensurate with direct threat to life, loss of loved ones, and local community devastation (Drury & Williams, 2012). Sleep disturbances, attention problems, headache and stomachache complaints, school avoidance, or irrational fears are also common (Saraiya, Garakani, & Billick, 2013). Even watching recorded TV footage may induce elevated threat perceptions and anxiety symptoms (Comer et al., 2008).

All too often, parents are forced to confront questions from their children about mass violence and terrorism seen in the world around them. Although difficult, these are important conversations. The American Academy of Child and Adolescent Psychiatry has issued guidelines (2017):

1. *Listen to children.* Let children ask questions and help them express themselves. Sometimes children are more comfortable drawing pictures or playing with toys rather than talking about their feelings.
2. *Answer their questions.* Be honest when answering tough questions. Use words the child can understand, and try not to overload with too much information. You may have to repeat yourself. Be consistent and reassuring.
3. *Provide support.* Children are comfortable with structure and familiarity. Maintain a predictable routine. Avoid exposure to violent images. Watch for physical signs of stress, such as trouble sleeping or separation anxiety, and seek professional help if symptoms are persistent.



Tomsickova Tatyana/Shutterstock

what's your view

What would you say to a child to soothe upset emotions and fears regarding terrorist attacks? How might you respond differently to a 6-year-old versus an 11-year-old who has questions about what happened?

- *Reduced risk:* Children who have been exposed to only one of a number of factors for psychiatric disorder (such as parental discord, a disturbed mother, a criminal father, and experience in foster care) are often better able to overcome stress than children who have been exposed to more than one risk factor.

This does not mean that bad things that happen in a child's life do not matter. In general, children with unfavorable backgrounds have more adjustment problems than children with more favorable backgrounds, and even some outwardly resilient children may suffer internal distress that may have long-term consequences (Masten & Coatsworth, 1998). Still, what is heartening about these findings is that negative childhood experiences do not necessarily determine the outcome of a person's life and that many children have the strength to rise above the most difficult circumstances.

checkpoint can you . . .

- Name the most common sources of fear, stress, and anxiety in children?
- Identify protective factors that contribute to resilience?

summary and key terms

The Developing Self

- The self-concept becomes more realistic during middle childhood, when, according to a neo-Piagetian model, children form representational systems.
- According to Erikson, the chief source of self-esteem is children's view of their productive competence. This virtue develops through resolution of the fourth psychosocial conflict, industry versus inferiority.
- School-age children have internalized shame and pride and can better understand and regulate negative emotions.
- Empathy and prosocial behavior increase.
- Emotional growth is affected by parents' reactions to displays of negative emotions.
- Emotional regulation involves effortful control.

representational systems (*293*)

industry versus inferiority (*293*)

The Child in the Family

- School-age children spend less time with parents and are less close to them than before, but relationships with parents continue to be important. Culture influences family relationships and roles.
- The family environment has two major components: family structure and family atmosphere.
- The emotional tone of the home, the way parents handle disciplinary issues and conflict, the effects of parents' work, and the adequacy of financial resources all contribute to family atmosphere.
- Development of coregulation may affect the way a family handles conflicts and discipline.
- The impact of mothers' employment depends on many factors concerning the child, the mother's work and her feelings about it, whether she has a supportive partner, the family's socioeconomic status, and the type of care and degree of monitoring the child receives.
- Poverty can harm children's development indirectly through its effects on parents' well-being and parenting practices.
- Many children today grow up in nontraditional family structures. Other things being equal, children tend to do better in traditional two-parent families than in cohabiting, divorced, single-parent, or stepfamilies. The structure of the family, however, is less important than its effects on family atmosphere.
- Children's adjustment to divorce depends on factors concerning the child, the parents' handling of the situation, custody and visitation arrangements, financial circumstances, contact with the noncustodial parent (usually the father), and a parent's remarriage.
- The amount of conflict in a marriage and the likelihood of its continuing after divorce may influence whether children are better off if the parents stay together.
- In most divorces the mother gets custody, though paternal custody is a growing trend. Quality of contact with a noncustodial father is more important than frequency of contact.
- Joint custody can be beneficial to children when the parents can cooperate. Joint legal custody is more common than joint physical custody.
- Although parental divorce increases the risk of long-term problems for children, most adjust reasonably well.
- Children living with only one parent are at heightened risk of behavioral and academic problems, largely related to socioeconomic status.
- Studies have found positive developmental outcomes in children living with gay or lesbian parents.
- Adopted children are generally well adjusted, though they face special challenges.
- The roles and responsibilities of siblings in nonindustrialized societies are more structured than in industrialized societies.
- Siblings learn about conflict resolution from their relationships with each other. Relationships with parents affect sibling relationships.

coregulation (*296*)

internalizing behaviors (*296*)

externalizing behaviors (*296*)

The Child in the Peer Group

- The peer group becomes more important in middle childhood. Peer groups generally consist of children who are similar in age, sex, ethnicity, and socioeconomic status and who live near one another or go to school together.
- The peer group helps children develop social skills, allows them to test and adopt values independent of parents, gives them a sense of belonging, and helps develop their self-concept and gender identity. It also may encourage conformity and prejudice.
- Popularity in middle childhood tends to influence future adjustment. It can be measured sociometrically or by perceived social status, and the results may differ. Popular children tend to have good cognitive abilities and social skills. Behaviors that affect popularity may be derived from family relationships and cultural values.
- Intimacy and stability of friendships increase during middle childhood. Boys tend to have more friends, whereas girls tend to have closer friends.
- During middle childhood, aggression typically declines. Instrumental aggression generally gives way to hostile aggression, often with a hostile bias. Highly aggressive children tend to be unpopular but may gain in status as children move into adolescence.
- Aggressiveness is promoted by exposure to media violence and can extend into adult life.
- Middle childhood is a prime time for bullying, but patterns of bullying and victimization may be established much earlier. Victims tend to be weak and submissive or argumentative and provocative and to have low self-esteem.

prejudice (*305*)
hostile attribution bias (*309*)
bullying (*311*)

Mental Health

- Common emotional and behavioral disorders among school-age children include disruptive behavioral disorders, anxiety disorders, and childhood depression.
- Treatment techniques include individual psychotherapy, family therapy, behavior therapy, art therapy, play therapy, and drug therapy. Often therapies are used in combination.
- Children may be traumatized by exposure to terrorism or war.
- Resilient children are better able than others to withstand stress. Protective factors involve family relationships, cognitive ability, personality, degree of risk, and compensating experiences.

oppositional defiant disorder (ODD) (*313*)
conduct disorder (CD) (*313*)
school phobia (*314*)
separation anxiety disorder (*314*)
social phobia (*314*)
generalized anxiety disorder (*314*)
obsessive-compulsive disorder (OCD) (*314*)
childhood depression (*314*)
individual psychotherapy (*315*)
family therapy (*315*)
behavior therapy (*315*)
art therapy (*315*)
play therapy (*315*)
drug therapy (*315*)
resilient children (*316*)
protective factors (*316*)

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part 5
ADOLESCENCE

chapter 11

Physical and Cognitive Development in Adolescence

outline

Adolescence: A Developmental Transition

PHYSICAL DEVELOPMENT

Puberty

The Adolescent Brain

Physical and Mental Health

COGNITIVE DEVELOPMENT

Aspects of Cognitive Maturation

Educational and Vocational Issues

learning objectives

Discuss the nature of adolescence.

Describe the changes involved in puberty, as well as the changes in the adolescent brain.

Identify adolescent problems related to health.

Explain cognitive changes in adolescence.

Summarize key aspects of how schools influence adolescent development.



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did you know?

- About 40 percent of U.S. adolescents have tried illegal drugs by the time they leave high school.
- Depression in young people sometimes looks like irritation or boredom.
- Participation in after-school activities is associated with academic achievement.

In this chapter, we describe the physical transformations of adolescence and how they affect young people's feelings. We look at the not-yet-mature adolescent brain and discuss health issues associated with this time of life. We examine the Piagetian stage of formal operations and linguistic and moral development. Finally, we explore educational and vocational issues.

Life would be infinitely happier if we could only be born at the age of 80 and gradually approach 18.

—Mark Twain, *American author and humorist* 1835–1910

Adolescence: A Developmental Transition

This chapter focuses on processes that occur in the long period known as **adolescence**—a developmental transition that involves physical, cognitive, emotional, and social changes and takes varying forms in different social, cultural, and economic settings.

An important physical change is the onset of **puberty,** the process that leads to sexual maturity, or fertility—the ability to reproduce. In this book, we define adolescence roughly as encompassing the years between 11 and 19 or 20.

adolescence
Developmental transition between childhood and adulthood entailing major physical, cognitive, and psychosocial changes.

puberty
Process by which a person attains sexual maturity and the ability to reproduce.

ADOLESCENCE AS A SOCIAL CONSTRUCTION

Adolescence is not a clearly defined physical or biological category—it is a social construction. In traditional and preindustrial cultures, children generally entered the adult world when they matured physically or when they began a vocational apprenticeship. In the Western world, adolescence was first recognized as a unique period in the life span in the twentieth century.

In most parts of the world, adolescence lasts longer and is less clear-cut than in the past. There are myriad reasons for this social change. First, puberty generally begins earlier. In addition, as the world becomes more driven by technology and information, the amount of training required to be eligible for higher-paying occupations has increased. Because of this, the period of adolescence has been extended upward as young adults tend to go to school for more years, delay marriage and childbirth, and settle into permanent careers later and less firmly than in the past.

ADOLESCENCE: A TIME OF OPPORTUNITIES AND RISKS

Any time of transition and change in the life span offers opportunities for both advances and risks. Adolescence is no different. It offers opportunities for growth in cognitive and social competence, autonomy, self-esteem, and intimacy.

However, adolescence is also a time of risk, and adolescents in the United States today face hazards to their well-being, including death from accidents, homicide, and suicide (Xu, Murphy, Kochanek, Bastian, & Arias, 2018). Why is adolescence such a risky stage in the life span? Psychologists believe the tendency to engage in risky behaviors may reflect the immaturity of the adolescent brain. Nonetheless, teens can respond to messages about safety and responsibility. Since the 1990s, adolescents are less likely to use alcohol, tobacco, or marijuana; to ride in a car without a seat belt or to ride with a driver who has been drinking; to carry weapons; to have sexual intercourse or to have it without condoms; or to attempt suicide (Centers for Disease Control and Prevention [CDC], 2012; Eaton et al., 2008). These positive trends increase the chance that young people will come through the adolescent years in good health.

checkpoint
can **you** . . .

- Point out similarities and differences among adolescents in various parts of the world?
- Identify risky behavior patterns common during adolescence?

PHYSICAL DEVELOPMENT

Puberty

Puberty involves dramatic biological changes. These changes are part of a long, complex process of maturation that begins even before birth, and their psychological ramifications may continue into adulthood.

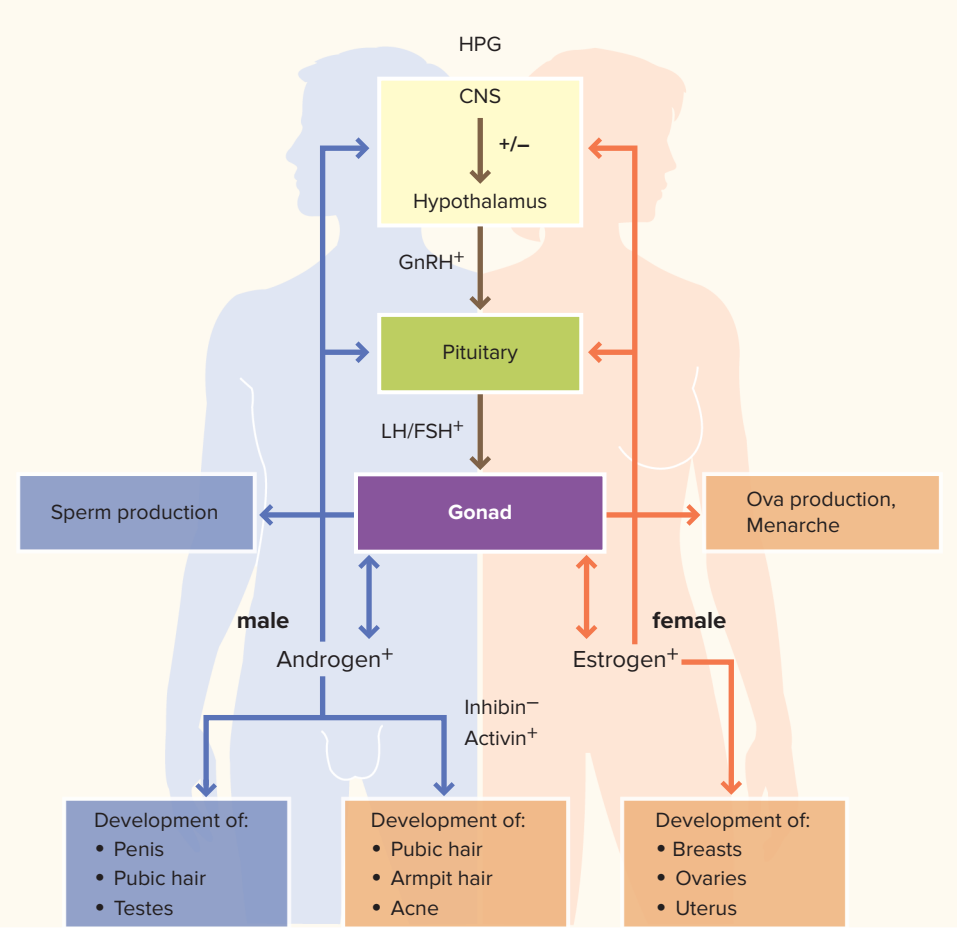
HOW PUBERTY BEGINS: HORMONAL CHANGES

The advent of puberty is not caused by any single factor. Rather, puberty results from a cascade of hormonal responses (Figure 1). First, the hypothalamus releases elevated levels of gonadotropin releasing hormone (GnRH). The increased GnRH then triggers a rise in lutenizing hormone (LH) and follicle-stimulating hormone (FSH). These hormones exert their actions differentially on boys and girls. In girls, increased levels of FSH lead to the onset of menstruation. In boys, LH initiates the release of two additional hormones: testosterone and androstendione (Buck Louis et al., 2008).

Puberty can be broken down into two basic stages: adrenarche and gonadarche. Adrenarche occurs between ages 6 and 8. During this stage, the adrenal glands secrete increasing levels of androgens, most notably dehydroepiandrosterone (DHEA) (Susman & Rogol, 2004). Levels increase gradually but consistently, and by the time a child is 10 years of age, the levels of DHEA are 10 times what they were between ages 1 and 4. DHEA

FIGURE 1
Regulation of Human Puberty Onset and Progression

HPG (hypothalamuspituitary-gonadal) activation requires a signal from the central nervous system (CNS) to the hypothalamus, which stimulates the production of LH and FSH from the pituitary.



Source: American Academy of Pediatrics.

influences the growth of pubic, axillary (underarm), and facial hair. It also contributes to faster body growth, oilier skin, and the development of body odor.

The second stage, gonadarche, is marked by the maturing of the sex organs, which triggers a second burst of DHEA production (McClintock & Herdt, 1996). During this time, a girl's ovaries increase their input of estrogen, which in turn stimulates the growth of female genitals, breasts, and the development of pubic and underarm hair. In boys, the testes increase the production of androgens, especially testosterone. This increase leads to the growth of male genitals, muscle mass, and body hair.

TIMING, SIGNS, AND SEQUENCE OF PUBERTY AND SEXUAL MATURITY

Changes that herald puberty typically begin at age 8 in girls and age 9 in boys (Susman & Rogol, 2004), but a wide range of ages exists for various changes. The pubertal process typically takes about 3 to 4 years for both sexes.

Race and ethnicity also influence pubertal development. African American and Mexican American girls generally enter puberty earlier than white and Asian American girls (Wu, Mendola, & Buck, 2002; Biro et al., 2013), although data suggest the proportion of white girls who enter puberty early may be increasing (Biro et al., 2010). Recent data in boys suggest a similar pattern, with African American boys developing at a more rapid pace than white or Hispanic boys (Papadimitriou, 2016; Herman-Giddens et al., 2012).

Primary and Secondary Sex Characteristics The **primary sex characteristics** are the organs necessary for reproduction. In the female, the sex organs include the ovaries, fallopian tubes, uterus, clitoris, and vagina. In the male, they include the testes, penis, scrotum, seminal vesicles, and prostate gland. During puberty, these organs enlarge and mature.

primary sex characteristics
Organs directly related to reproduction, which enlarge and mature during adolescence.

The **secondary sex characteristics** are physiological signs of sexual maturation that do not directly involve the sex organs, for example, the breasts of females and the broad shoulders of males. Other secondary sex characteristics are changes in the voice and skin texture, muscular development, and the growth of pubic, facial, axillary, and body hair.

secondary sex characteristics
Physiological signs of sexual maturation (such as breast development and growth of body hair) that do not involve the sex organs.

These changes unfold in a sequence that is much more consistent than their timing. One girl may develop breasts and body hair at about the same rate; in another girl, body hair may reach adultlike growth a year or so before breasts develop. Similar variations in pubertal status (degree of pubertal development) and timing occur among boys.

Signs of Puberty The first external signs of puberty typically are breast tissue and pubic hair in girls and enlargement of the testes in boys (Susman & Rogol, 2004). A girl's nipples enlarge and protrude, the *areolae* (the pigmented areas surrounding the nipples) enlarge, and the breasts assume first a conical and then a rounded shape. Some adolescent boys experience temporary breast enlargement, much to their distress; this development is normal and generally does not last longer than 18 months.

Pubic hair, at first straight and silky, eventually becomes coarse, dark, and curly. It appears in different patterns in males and females. Adolescent boys are usually happy to see hair on the face and chest; but girls are generally dismayed at the appearance of even a slight amount of hair on the face or around the nipples, though this, too, is normal.

The voice deepens, especially in boys, partly in response to the growth of the larynx and partly in response to the production of male hormones. The skin becomes coarser and oilier, giving rise to pimples and blackheads. Acne is more common in boys and seems related to increased amounts of testosterone.

The Adolescent Growth Spurt The **adolescent growth spurt**—a rapid increase in height, weight, and muscle and bone growth that occurs during puberty—generally begins in girls between ages 9½ and 14½ (usually at about 10) and in boys, between 10½ and 16 (usually at 12 or 13). It typically lasts about 2 years; soon after it ends, the young person reaches sexual maturity. Both growth hormone and the sex hormones (androgens and estrogen) contribute to this normal pubertal growth pattern (Susman & Rogol, 2004).

adolescent growth spurt
Sharp increase in height and weight that precedes sexual maturity.



Most girls experience a growth spurt 2 years earlier than most boys, so between ages 11 and 13 girls tend to be taller, heavier, and stronger than boys the same age.
Brocreative/Shutterstock

Because girls' growth spurt usually occurs 2 years earlier than that of boys, girls between ages 11 and 13 tend to be taller, heavier, and stronger than boys the same age. After their growth spurt, boys are again larger. Girls typically reach full height at age 15 and boys at age 17 (Gans, 1990).

Boys and girls grow differently, not only in rates of growth, but also in form and shape. A boy becomes larger overall: his shoulders wider, his legs longer relative to his trunk, and his forearms longer relative to his upper arms and his height. A girl's pelvis widens to make childbearing easier, and layers of fat accumulate under her skin, giving her a more rounded appearance (Susman & Rogol, 2004). Because each of these changes follows its own timetable, parts of the body may be out of proportion for a while.

Signs of Sexual Maturity: Sperm Production and Menstruation The maturation of the reproductive organs brings the beginning of menstruation in girls and the production of sperm in boys. The principal sign of sexual maturity in boys is the production of sperm. The first ejaculation, or **spermarche,** occurs at an average age of 13. A boy may wake up to find a wet spot or a hardened, dried spot on the sheets—the result of a *nocturnal emission,* an involuntary ejaculation of semen (commonly referred to as a *wet dream*). Most adolescent boys have these emissions, sometimes in connection with an erotic dream.

spermarche
Boy's first ejaculation.

The principal sign of sexual maturity in girls is *menstruation*, a monthly shedding of tissue from the lining of the womb. The first menstruation, called **menarche,** occurs fairly late in the sequence of female development; its normal timing can vary from age 10 to 16½. The average age of menarche in U.S. girls fell from greater than 14 years before 1900 to the current 12.8 years. On average, black girls experience menarche 6 months earlier than white girls (Cabrera, Bright, Frane, Blethen, & Lee, 2014). While menarche is a significant event, the reproductive system may not yet be functionally mature, as menstrual cycles may occur without ova, especially in very young girls (Eveleth, 2017).

menarche
Girl's first menstruation.

Influences on Pubertal Timing Many studies have indicated that the start of puberty has shifted downward in the twentieth century (Papadimitriou, 2016). Developmental scientists call a pattern such as this a **secular trend**—a trend that spans several generations. The trend, which also involves increases in adult height and weight, began about 100 years ago. It has occurred in such places as the United States, Western Europe, and Japan (Anderson, Dallal, & Must, 2003), with better evidence existing for girls than for boys (Papadimitriou, 2016; Euling, Selevan, Pescovitz, & Skakkebaek, 2008). This may not be the only change in pubertal processes; recent research indicates there may be a compensatory delay in pubertal maturation that is associated with earlier puberty. In other words, children may be starting puberty earlier but spending more time to reach full sexual maturity (Papadimitrious, 2016; Mendle, 2014).

secular trend
Trend that can be seen only by observing several generations, such as the trend toward earlier attainment of adult height and sexual maturity, which began a century ago in some countries.

One set of proposed explanations for the secular trend focuses on environmental factors that influence the pace of pubertal development. One such factor is a higher standard of living. Undernutrition, whether because of insufficient food supply or because of disease, has been associated with delayed onset of puberty and a reduced puberty growth spurt (Soliman, De Sanctis, & Elalaily, 2014). Alternatively, children who are healthier, better nourished, and better cared for might be expected to mature earlier and grow bigger (Slyper, 2006). Thus, the average age of sexual maturity is earlier in developed countries than in developing countries.

The timing of hormonal activity signaling the start of puberty seems to depend in part on reaching a critical amount of body fat necessary for successful reproduction.

Thus, a contributing factor in the United States during the last part of the twentieth century may have been the increase in obesity among young girls (Anderson et al., 2003; Lee et al., 2007). Girls with a higher percentage of body fat in early childhood and those who experience unusual weight gain between ages 5 and 9 tend to show earlier pubertal development (Davison, Susman, & Birch, 2003; Lee et al., 2007).

Studies suggest that an accumulation of leptin, a hormone associated with obesity, may be the link between body fat and earlier puberty in girls (Kaplowitz, 2008). Increased levels of leptin may signal the pituitary and sex glands to increase their secretion of hormones (Susman & Rogol, 2004). This suggests that leptin may play a permissive role for puberty to start. In other words, leptin may need to be present in sufficient amounts for puberty to occur, but leptin alone does not initiate puberty (Kaplowitz, 2008).

Weight and leptin appear to influence pubertal timing differently in boys. While leptin still plays a permissive role (Clayton et al., 1997), having a high body mass index in childhood or being obese appears to delay puberty rather than accelerate it (Lee et al., 2010; Wang, 2002). Interestingly, recent research has found that being overweight, rather than either thin or obese, results in an earlier start to puberty in boys (Lee et al., 2016). More research is needed in this area.

Another explanation focuses on exposure to endocrine-disrupting chemicals, such as those found in some plastics, flame retardants, and pesticides. Research has indicated that exposure to such substances appears to be related to earlier pubertal timing (Lee & Styne, 2013; Özen & Darcan, 2011). Some of this exposure may be during childhood and adolescence, most commonly through foods and liquids or the inhalation of dust or sprays, and some of it is likely via prenatal exposure in utero (Frye et al., 2012). Other toxins may also have an effect. With respect to prenatal influences, studies have also shown that earlier menarche is associated with maternal smoking during pregnancy (Maisonet et al., 2010).

A variety of social factors also influence when puberty begins. For example, studies on maternal influences have shown that earlier menarche is associated with being the firstborn child (Maisonet et al., 2010), as well as being born to a single mother (Belsky et al., 2007; Ellis, McFadyen-Ketchum, Dodge, Pettit, & Bates, 1999) and harsh maternal parenting practices (Belsky, Steinberg, Houts, & Halpren-Felsher, 2010). Fathers also play a role. Girls with absent, distant, or conflictual relationships with their fathers tend to reach menarche earlier than girls with close supportive paternal relationships (Belsky et al., 2007; Mendle et al., 2006; Ellis et al., 1999; Tither & Ellis, 2008). The unifying theme in these influences is stress, which has been proposed to mediate the above associations. In other words, it is not being firstborn, or being born to a single mother, or having a conflictual relationship with a father per se that influences puberty; rather, it is the presence or absence of high levels of stress. Those children who are exposed to high stress when young tend to reach pubertal milestones earlier than those who are not (Belsky, Ruttle, Boyce, Armstrong, & Essex, 2015; Ellis & Del Guiduce, 2014; Bleil et al., 2013).

Genetic factors are also important. One genetic influence seems to be the age at which parents themselves began puberty. Both maternal and paternal pubertal timing are associated with an individual's pubertal timing (Wohlfahrt-Veje et al., 2016). Additionally, twin studies have documented the heritability of age of menarche (Mendle et al., 2006), and further support for genetic influences is illustrated by the finding that the age of a girl's first menstruation tends to be similar to that of her mother's (Maisonet et al., 2010) if nutrition and standards of living remain stable from one generation to the next (Susman & Rogol, 2004).



Did you mature early, late, or "on time"? How did you feel about the timing of your maturation?

checkpoint can **you** . . .

- Tell how puberty begins and how its timing and length vary?
- Describe typical pubertal changes in boys and girls, and identify factors that affect psychological reactions to these changes?

IMPLICATIONS OF PUBERTAL TIMING

The onset of puberty can vary by as many as 5 years among typical boys and girls. Early maturation increases the likelihood of accelerated skeletal maturation and psychosocial difficulties and has been linked to adult health issues, including reproductive tract cancers, type 2 diabetes, and cardiovascular disease (Golub et al., 2008). Early puberty is

also predictive of adult obesity, and this effect is partially independent of childhood body mass index. In other words, the finding that early puberty predicts adult obesity is not entirely a consequence of childhood obesity hastening puberty or the association between childhood and adult obesity (Prentice & Viner, 2013). As adults, women who had early puberty are somewhat more likely to have polycystic ovarian syndrome, a hormonal disorder causing acne, irregular periods, excess hair growth, and the growth of cysts on the ovaries (Fuqua, 2013; Franceschi et al., 2010). Other effects of early and late maturation vary in boys and girls, and the timing of maturation tends to influence adolescent mental health and health-related behaviors in adulthood (Susman & Rogol, 2004).

Research on early-maturing boys has had mixed results. The most consistent trends to emerge from the literature are that early-maturing boys are at significant risk for a wide variety of negative outcomes (Mendle & Ferrero, 2012). Earlier studies found that early-maturing boys reported being better adjusted than later-maturing boys (Graber, Brooks-Gunn, & Warren, 2006). However, more recent research suggested greater risk for early-maturing boys, particularly for substance use and delinquent behavior (Hummel, Shelton, Heron, Moore, & Bree, 2013; Westling, Andrews, Hampson, & Peterson, 2008). Early-maturing boys also demonstrate a higher incidence of conduct and behavioral disorders during adolescence (Golub et al., 2008). The data for late-maturing boys are less consistent and more characteristic of internalizing symptoms (Mendle & Ferrero, 2012). Late-maturing boys have been found to feel more inadequate, self-conscious, rejected, and dominated; to be more dependent, aggressive, insecure, or depressed; to have more conflict with parents and more trouble in school; and to have poorer social and coping skills and be at higher risk for aggression problems (Graber, Lewinsohn, Seeley, & Brooks-Gunn, et al., 1997; Sontag, Graber, & Clemans, 2011).

Early-maturing girls are at increased risk of anxiety and depression, disruptive behavior, eating disorders, early smoking, drinking, and substance abuse, antisocial behavior, precocious sexual activity, early pregnancy, and attempted suicide (Copeland et al., 2010; Galvao et al., 2014; Blumenthal et al., 2011; Belsky et al., 2010; Deardorff, Gonzalez, Christopher, Roosa, & Millsap, 2005; Susman & Rogol, 2004; Golub et al., 2008). Early maturers tend to be particularly vulnerable to risky behavior and the influence of deviant peers (Mrug et al., 2014; Orr & Ingersoll, 1995; Susman & Rogol, 2004). Less data exist on late-maturing girls. Generally, they are not at risk for poor psychological outcomes when compared to "on-time" girls (Ge, Conger, & Elder, 2001); however, there are some indications that they may be more reactive to interpersonal stress (Smith & Powers, 2009).

It is hard to generalize about the psychological effects of pubertal timing because they depend on how the adolescent and other people in his or her world interpret the accompanying changes. Effects of early or late maturation are most likely to be negative when adolescents are much more or less developed than their peers; when they do not see the changes as advantageous; and when several stressful events, such as the advent of puberty and the transition to junior high school, occur about the same time (Petersen, 1993; Simmons, Blyth, & McKinney, 1983). Contextual factors such as ethnicity, school, and neighborhood can make a difference. For example, African American and Hispanic late maturers report less satisfaction with their bodies, but timing of puberty for Asian American and European American youth does not seem to affect body image to the same degree (Susman & Rogol, 2004). Additionally, early-maturing girls are more likely to show problem behavior in mixed-gender schools than in all-girl schools and in disadvantaged urban communities than in rural or middle-class urban communities (Dick, Rose, Kaprio, & Viken, 2000; Ge, Brody, Conger, Simons, & Murry, 2002).

The Adolescent Brain

Adolescents tend to engage in certain types of behaviors. They become more interested in and influenced by their peers and social relationships. Additionally, they show an increased tendency for impulsivity and risk-taking, are more likely to experiment with drugs and alcohol, have a propensity for reckless behavior, and find it hard to focus on

long-term goals. Nonetheless they are able to think in more complex and sophisticated ways and can imagine possible futures and alternative realities. The adolescent brain contributes to some of these characteristic teen behaviors. Adolescents process information differently than adults do. To understand the immaturity of the adolescent brain, we need to look at changes in the structure and composition of the brain (Figure 2).

On the positive side, a steady increase in white matter, nerve fibers that connect distant portions of the brain, permits faster transmission of information and better communication across hemispheres (Casey, Jones, & Somerville, 2011). In adolescence, this process continues in the frontal lobes (Bava et al., 2010; Blakemore & Choudhury, 2006), occurring earlier in women than men (Asato, Terwilliger, Woo, & Luna, 2010). In addition, there is a major spurt in production of gray matter in the frontal lobes (Blakemore & Choudhury, 2006; Kuhn, 2006). The pruning of unused dendritic connections during childhood results in a reduction in density of gray matter, or nerve cells, thus increasing the brain's efficiency. This process begins in the rear portions of the brain and moves forward (Konrad, Firk, & Uhlhaas, 2013; Casey et al., 2011). Thus, by mid- to late adolescence, young people have fewer but stronger, smoother, and more effective neuronal connections, making cognitive processing more efficient (Kuhn, 2006).

The frontal lobes are generally associated with problem solving, impulse control, goal setting, planning, and other similar behaviors generally associated with monitoring social behavior. Given the relatively slow development of the prefrontal cortex, we might expect to see similar slow improvements in social behavior and decision making as children age into the teen years. However, we are more likely to see a rapid shift in trajectory to impulsivity and risk-taking (Casey et al., 2011; Windle et al., 2008).

One possible explanation for this rapid shift to risk-taking lies with patterns of brain development. Because development starts in the back of the brain and moves forward (Konrad et al., 2013; Casey et al., 2011), subcortical brain areas, including the limbic and



The immaturity of these brain centers, and the consequent propensity to act impulsively and without fully considering consequences, are why some people take issue with the death penalty being applied against teenagers. Do you think this is a valid argument? Why or why not?

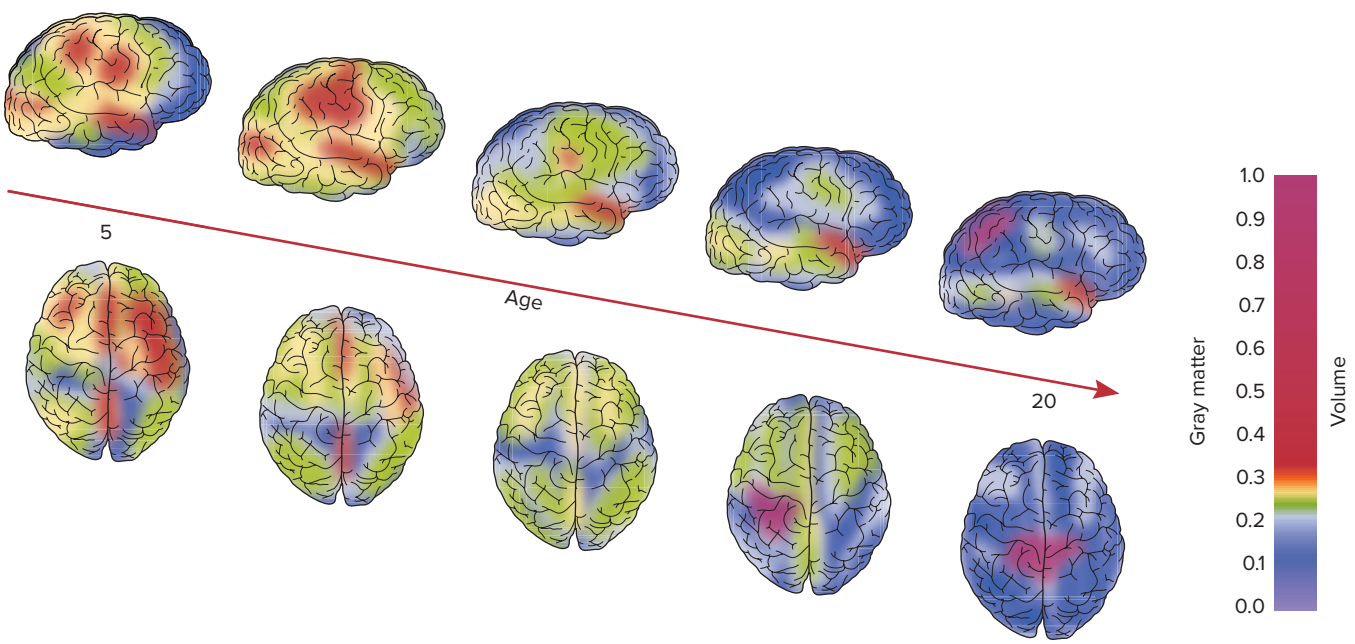


FIGURE 2

Brain Development from 5 to 15 Years of Age

Constructed from MRI scans of healthy children and teens, these images compress 15 years of brain development (ages 5–20). Red indicates more gray matter, blue less gray matter.

Source: Gogtay et al., 2004.

reward systems, mature earlier (Konrad et al., 2013; Albert, Chein, & Steinberg, 2013). The underdevelopment of frontal cortical systems by comparison may help explain why adolescents tend to seek thrills and novelty and why many of them find it hard to focus on long-term goals (Bjork et al., 2004; Chambers, Taylor, & Potenza, 2003). While teens are *capable* of thinking in a sophisticated fashion, the more advanced development in reward areas biases them toward thinking with their subcortical "gas pedal" rather than with the "brakes" that might be provided by their prefrontal cortex (Casey et al., 2011).

Adolescence is a time of social change. Compared with children, adolescents tend to form more complex relationships and are more concerned with social hierarchies (Steinberg & Morris, 2001). Adolescents grapple with changes in identity and feelings of self-consciousness, and they become more sensitive to acceptance and rejection from their peers (Blakemore, 2012). Peers tend to exert a stronger influence in adolescence in part because of a heightened neurobehavioral susceptibility to social reward cues and concurrent immaturity in the cognitive control system (Albert et al., 2013). The changes in the processing of social information are mirrored in brain structure; most clearly in the temporoparietal junction and the posterior superior temporal sulcus. Generally, these areas decrease in volume (suggesting dendritic pruning) from adolescence into the early twenties (Mills, Lalonde, Clasen, Giedd, & Blakemore, 2012). Moreover, there is also a decline in medial prefrontal cortex activity and gray matter volume at the same time (Blakemore, 2012).

We live lives of great complexity, and our slowly developing brains give us the time and flexibility to learn about the wide variety of environments in which we find ourselves. However, because the brain develops so slowly and extensively during the teen years, this makes it particularly susceptible to both beneficial and harmful environmental influences (Konrad et al., 2013). Thus, cognitive stimulation in adolescence makes a critical difference in the brain's development. Likewise, adolescent drug use can have particularly devastating effects, depending on how drugs interact with the growing brain.

Physical and Mental Health

About 1.2 billion people in the world—1 in 6—are adolescents. Across many countries, adolescents from less affluent families tend to report poorer health and more frequent symptoms. Adolescents from more affluent families tend to have healthier diets and to be more physically active (Elgar et al., 2015; Mullan & Currie, 2000; Scheidt, Overpeck, Whatt, & Aszmann, 2000).

Many health problems are preventable and stem from lifestyle choices (World Health Organization, 2018a). Because adolescents are generally healthy, they may not feel the effects of their choices for decades. Lifestyle patterns tend to solidify in adolescence, which may result in poor lifelong health habits and early death in adults.

Health concerns related to adolescence include physical fitness, sleep needs, eating disorders, drug abuse, depression, and causes of death in adolescence.

PHYSICAL ACTIVITY

Exercise, or lack of it, affects both physical and mental health. The benefits of regular exercise include improved strength and endurance, healthier bones and muscles, weight control, and reduced anxiety and stress, as well as increased self-esteem, school grades, and well-being. Exercise also decreases the likelihood an adolescent will participate in risky behavior. Even moderate physical activity has health benefits if done regularly for at least 30 minutes almost every day. A sedentary lifestyle may result in increased risk of poor mental health, obesity, type 2 diabetes, and an increased likelihood of heart disease and cancer in adulthood (Janssen & LeBlanc, 2010; Nelson & Gordon-Larsen, 2006; Biddle & Asare, 2011).

The Centers for Disease Control (2016b) recommends that adolescents do one hour or more of physical activity a day. Unfortunately, only 27.1 percent of U.S. high school students engage in the recommended amounts of physical activity. Males are almost

twice as likely to meet the guidelines as females (CDC, 2016c). Age also matters. Adolescents show a steep drop in physical activity upon entering puberty, shifting from an average of 3 hours per day of physical activity at age 9 to an average of only 49 minutes of activity per day at age 15 (Nader et al., 2008), and the proportion of young people who are inactive increases even more throughout the high school years (CDC, 2016c; Eaton et al., 2008). Additionally, adolescents from less affluent families and ethnic minorities tend to be less physically active (Foltz et al., 2011). U.S. adolescents exercise less frequently than in past years and less than adolescents in most other industrialized countries (Centers for Disease Control, 2000a; Hickman, Roberts, & de Matos, 2000).



Adolescents who engage in sports tend to feel better than those who do not.
Fuse/Getty Images

SLEEP NEEDS AND PROBLEMS

Sleep deprivation among adolescents has been called an epidemic (Hansen, Janssen, Schiff, Zee, & Dubocovich, 2005). The American Academy of Sleep Medicine (2016) recommends that adolescents ages 13 to 18 should regularly sleep a minimum of 8 to 10 hours per 24-hour period. However, most do not. Children generally go to sleep later and sleep less on school days the older they get. While 61.3 percent of U.S. sixth graders report sleeping less than 8 hours a night, by 12th grade, almost 78 percent do not sleep a full 8 hours (Wheaton, Jones, Cooper, & Croft, 2018), a pattern that is true internationally (Owens & Adolescent Sleep Working Group, 2014). This is particularly distressing as both children and adolescents need sleep, and adolescents need even more sleep than when they were younger (Hoban, 2004). Although many teens attempt to catch up with the sleep deficit on weekends (Owens & Adolescent Sleep Working Group, 2014), sleeping in on weekends does not make up for the loss of sleep on school nights (Hoban, 2004).

Sleep deprivation can sap motivation and cause irritability, and concentration and school performance can suffer. Sleepiness has also been associated with impaired driving and automobile accidents (Garner et al., 2015; Owens & Adolescent Sleep Working Group, 2014). Studies have found that young people ages 16 to 29 are most likely to be involved in crashes caused by the driver falling asleep (Millman et al., 2005). Morever, insufficient sleep is associated with increased risk for obesity, diabetes, injuries, poor mental health, attention and behavioral problems, and poor academic performance (Wheaton et al., 2018).

Why do adolescents stay up late? They may be doing homework, listening to music, playing video games, talking to or texting friends, and surfing the web. Such behavior has been clearly linked to the chronic sleep deprivation of modern teenagers (Bartel, Gradisar, & Williamson, 2015; Owens & Adolescent Sleep Working Group, 2014). However, sleep experts now recognize that biological changes are also behind adolescents' sleep problems. The timing of secretion of the hormone *melatonin* is a gauge of when the brain is ready for sleep. After puberty, this secretion takes place later at night (Carskadon, Vieira, & Acebo, 1993), making it difficult for adolescents to go to bed early. But adolescents still need just as much sleep as before, so when they go to bed later than younger children, they need to get up later as well. Yet most secondary schools start *earlier* than elementary schools. Their schedules are out of sync with students' biological rhythms (Carskadon, 2011). Starting school later, or at least offering difficult courses later in the day, would positively influence key outcomes such as student attendance, fatigue, and academic achievement (Adolescent Sleep Working Group, 2014; Boergers, Gable, & Owens, 2014; Carrell, Maghakian, & West, 2011).

NUTRITION AND EATING DISORDERS

Good nutrition is important to support the rapid growth of adolescence and to establish healthy eating habits that will last through adulthood. Unfortunately, many U.S. adolescents eat fewer fruits and vegetables and consume more foods high in cholesterol, fat, and calories and lower in nutrients than they should. With respect to dietary quality, the average American 12 to 19 years of age scores 46 out of a possible 100 points as measured on the Healthy Eating Index (U.S. Department of Health and Human Services, 2014).

Globally, a lack of sufficient nutrients and calories is more likely to be an issue for many adolescents in developing countries, particularly with respect to iron deficiency anemia. In low-, middle-, and higher-income countries, teens are increasingly becoming overweight and obese (World Health Organization, 2018b).

Overweight and Obesity Worldwide, overweight and obesity in children and adolescents has increased substantially. In the developing world, nearly 13 percent of boys and more than 13 percent of girls were overweight or obese in 2013. In developed countries, more than 22 percent of girls and nearly 24 percent of boys were overweight or obese (Murray & Ng, 2017).

Within high-income countries, such as the United States, Canada, Greece, and Italy, approximately a third of teens are overweight, with boys more likely to be overweight. In middle- and especially lower-income countries, undernutrition often co-occurs with overweight. For example, between a fifth to a third of boys in China, the eastern Mediterranean, Latin American countries, Mauritania, Thailand, and the region of Oceania are overweight (Patton et al., 2012).

About 34 percent of U.S. teens have a body mass index (BMI) at or above the 85th percentile for age and sex. The percentage of U.S. adolescents with BMIs at this level rose from 5 percent in 1980 (Ogden et al., 2010) to over 20 percent in 2014 (National Center for Health Statistics, 2017). Among older adolescents, obesity is 50 percent more prevalent in those from poor families (Miech et al., 2006). Mexican American girls and boys and non-Hispanic black girls, who tend to be poorer than their peers, are more likely to be overweight than non-Hispanic white adolescents (Hernandez & Macartney, 2008; Ogden et al., 2010).

There are clear genetic contributions to obesity. Being born to overweight or obese parents is a risk factor for childhood and adolescent obesity, and overweight and BMI appear to be strongly influenced genetically (Wardle, Carnell, Haworth, & Plomin, 2008; Silventoinen, Rokholm, Kaprio, & Sørenson, 2010). However, the rise in obesity rates has happened too quickly for it to be due purely to genetic influences. An obesogenic environment in conjunction with genetic influences is to blame. This trend is being driven by increased consumption of animal fat and protein, refined grains, and added sugar, and concurrent decreases in physical activity. These diet and lifestyle changes are brought about by global trade liberalization, economic growth, and urbanization (Malik, Willett, & Hu, 2013).

Overweight teenagers tend to be in poorer health than their peers and are more likely to have difficulty attending school or engaging in strenuous activity or personal care (Swallen, Reither, Haas, & Meier, 2005). They are at heightened risk of hypertension, diabetes, and cardiac disease (Sahoo et al., 2015; Flynn, 2013; Pulgarón, 2013). One in 5 have abnormal lipid levels, including either too much bad cholesterol, too little good cholesterol, or high blood triglycerides (Centers for Disease Control, 2010). They tend to become obese adults, subject to a variety of physical, social, and psychological risks (Singh, Mulder, Twist, Van Mechelen, & Chinapaw, 2008).

Dieting for adolescents may be counterproductive as interventions in which dieting is encouraged can sometimes result in weight gain for participants (Field et al., 2003). Programs that use behavioral modification techniques to help adolescents make lifestyle changes have had better success. For example, interventions that have encouraged increases in physical activity, reductions in television viewing, and encouragement of healthier eating habits, either home- or school-based, have been shown to reduce body mass index and other weight-related outcome measures (Wang et al., 2013; Doak, Visscher, Renders, & Seidell, 2006). Still, despite many interventions, a recent study showed that the number of 15-year-olds who are overweight or obese has steadily increased since 2000 in most countries that have implemented such programs (World Health Organization, 2018b).

body image
Descriptive and evaluative beliefs about one's appearance.

Body Image and Body Satisfaction Boys and girls respond differently to the body changes that result from puberty. **Body image**—or one's perceptions, thoughts, and feelings

about one's body—can be affected by puberty. Overall, boys tend to be more satisfied with their bodies than girls (Mäkinen, Puukko-Viertomies, Lindberg, Siimes, & Aalberg, 2012; Lawler & Nixon, 2011). Because of the normal increase in girls' body fat during puberty, many become unhappy with their appearance, reflecting the cultural emphasis on women's physical attributes (Susman & Rogol, 2004). Girls tend to express the highest levels of body satisfaction when underweight, some dissatisfaction when average weight, and the most dissatisfaction when overweight. Boys express the most dissatisfaction when overweight and underweight but are more satisfied with an average weight body (Mäkinen et al., 2012; Lawler & Nixon, 2011).

Body satisfaction is important because it has been related to self-esteem (Wichstrøm & von Soest, 2016), dieting, and disordered eating (Bucchianeri et al., 2016). Body satisfaction may be protective for overweight girls. In one study, overweight girls with low body satisfaction gained significantly more weight over a decade—an almost 3 unit increase in body mass index—than overweight girls with high body satisfaction. Thus, being dissatisfied with one's body, at least in girls, does not motivate weight loss as is commonly believed (Loth, Watts, Van Den Berg, & Newmark-Sztainer, 2015).

There are ethnic differences in body satisfaction. Asian American boys and girls have the highest levels of body dissatisfaction, followed by Hispanics, whites, and African Americans (Bucchianeri et al., 2016). African American girls are generally more satisfied with their bodies and less concerned about weight and dieting than are white girls (Gillen & Lefkowitz, 2012).

By age 15, more than half the girls sampled in 16 countries were dieting or thought they should be. The United States was at the top of the list, with 47 percent of 11-year-old girls and 62 percent of 15-year-old girls concerned about their weight (Vereecken & Maes, 2000). Part of this may be driven by the ways in which parents discuss weight concerns with their children. When fathers talk to their sons, they are more likely to focus on healthy eating and exercise. By contrast, when mothers talk to their daughters, they are more likely to talk about weight management (Berge et al., 2015).

There are clearly other influences at play as well. Friends are one important influence. For example, friends' dieting, teasing about weight, and pressure to conform to weight ideals predict weight-control behaviors and negative body image (Balantekin, Birch, & Savage, 2018; Kenny, O'Malley-Keighran, Molcho, & Kelly, 2017; Eisenberg & Neumark-Sztainer, 2010). Media also exerts a powerful influence. When adolescents, especially young women, are exposed to images of a thin ideal in mass media content, they show more dissatisfaction with their bodies, more concern with their appearance, and greater endorsement of disordered eating behaviors (Grabe, Ward, & Hyde, 2008). Similar findings have emerged with respect to social media. Research indicates that the use of social media such as Facebook and Instagram is associated with body image concerns in adolescents and that these concerns become more pronounced over time (Fardouly & Vartanian, 2016).

Excessive concern with weight control and body image may be signs of anorexia nervosa or bulimia nervosa, both of which involve abnormal patterns of food intake (Table 1).

anorexia nervosa
Eating disorder characterized by self-starvation.



People with anorexia, such as this girl, have a distorted body image. They see themselves as fat even when they are emaciated.
Ted Foxx/Alamy Stock Photo

Anorexia Nervosa

Anorexia nervosa, or *self-starvation,* is potentially life threatening. An estimated 0.3 percent of residents of Western countries will be diagnosed with anorexia at some point in their adolescent years (Swanson, Crow, Le Grange, Swendsen, & Merikangas, 2011). Most research has found higher prevalence rates in women and girls. People with anorexia have a distorted body image and, though typically severely underweight, think they are too fat. They often are good students but may be withdrawn or depressed and may engage in repetitive, perfectionist behavior. They are extremely afraid of losing control and becoming overweight (National Institutes of Mental Health, 2016; Wilson, Grilo, & Vitousek, 2007). Early warning signs include determined, secret dieting; dissatisfaction after losing weight; setting new, lower

TABLE 1 Eating Disorders: Symptoms

Anorexia	Bulimia
• Using laxatives, enemas, or diuretics inappropriately	• Abuse of laxatives, diuretics, or enemas to prevent weight gain
• Binge eating	• Binge eating
• Going to the bathroom right after meals	• Going to the bathroom right after meals
• Exercising compulsively	• Frequent weighing
• Restricting the amount of food eaten	• Self-induced vomiting
• Cutting food into small pieces	• Overachieving behavior
• Dental cavities due to self-induced vomiting	• Dental cavities due to self-induced vomiting
• Confused or slow thinking, poor memory and judgment	
• Depression	
• Extreme sensitivity to cold	
• Fine hair	
• Low blood pressure	
• No menstruation	
• Significant weight loss and muscle wasting	

weight goals after reaching an initial desired weight; excessive exercising; and interruption of regular menstruation.

Anorexia is, paradoxically, both deliberate and involuntary: an affected person deliberately refuses food needed for sustenance, yet cannot stop doing so even when rewarded or punished. These behavior patterns have been traced back to medieval times and seem to have existed in all parts of the world. Thus anorexia may be, in part, a reaction to societal pressure to be slender, but this does not seem to be the only factor (Keel & Klump, 2003; Striegel-Moore & Bulik, 2007).

bulimia nervosa
Eating disorder in which a person regularly eats huge quantities of food and then purges the body by laxatives, induced vomiting, fasting, or excessive exercise.

Bulimia Nervosa and Binge Eating Disorder **Bulimia nervosa** affects about 1 to 2 percent of international populations (Wilson et al., 2007). A person with bulimia regularly goes on huge, short-lived eating binges (2 hours or less) and then may try to purge the high caloric intake through self-induced vomiting, strict dieting or fasting, excessively vigorous exercise, or laxatives, enemas, or diuretics. These episodes occur at least twice a week for at least 3 months (American Psychiatric Association, 2000). People with bulimia are usually not overweight, but they are obsessed with their weight and shape. They tend to have low self-esteem and may become overwhelmed with shame, self-contempt, and depression (Wilson et al., 2007).

binge eating disorder
Eating disorder in which a person loses control over eating and binges huge quantities of food.

The related **binge eating disorder** (BED) involves frequent binging but without subsequent fasting, exercise, or vomiting (American Psychiatric Association, 2013). Not surprisingly, people who binge frequently tend to be overweight and to experience emotional distress and other medical and psychological disorders. BED is the most common eating disorder in the United States, affecting approximately 1.6 percent of adolescents and becoming more common in adulthood. Approximately 2 percent of adult men and 3.5 percent of adult women meet the criteria for diagnosis (Swanson et al., 2011).

Treatment and Outcomes The immediate goal of treatment for anorexia is to get patients to eat and gain weight—goals that are often difficult, given the strength of patients' beliefs about their bodies. Patients who show signs of severe malnutrition, are resistant to treatment, or do not make progress on an outpatient basis may be admitted to a hospital, where they can be given 24-hour care. Once their weight is stabilized, patients may enter less intensive daytime care (McCallum & Bruton, 2003).

One widely used treatment is a type of family therapy in which parents take control of their child's eating patterns. When the child begins to comply with parental directives, she (or he) may be given more age-appropriate autonomy. Cognitive behavioral therapy, which seeks to change a distorted body image and rewards eating with such privileges as being allowed to get out of bed and leave the room, appears to be the most effective treatment (Hay, 2013). Patients may keep daily diaries of their eating patterns and are taught ways to avoid the temptation to binge. Bulimia, too, is best treated with cognitive behavioral therapy (Wilson, Grilo, & Vitousek, 2007).

Individual, group, or family psychotherapy can help both anorexia and bulimia patients, usually after initial behavior therapy has brought symptoms under control. Initially, both family and individual therapy show similar outcomes. However, at 6 to 12 months post-treatment, teens who participated in family therapy show more lasting gains than those who participated in individual therapy (Courturier, Kimber, & Szatmari, 2013).

Because these patients are at risk for depression and suicide, antidepressant drugs are often combined with psychotherapy (Chesney, Goodwin, & Fazel, 2014; McCallum & Bruton, 2003), but evidence of their long-term effectiveness on either anorexia or bulimia is lacking (Wilson et al., 2007).

Mortality rates among those affected with anorexia nervosa have been estimated at about 10 percent of cases. Among the surviving anorexia patients, less than one-half make a full recovery; 20 percent remain chronically ill (Steinhausen, 2002). Up to one-third of patients drop out of treatment before achieving an appropriate weight (McCallum & Bruton, 2003). Those who drop out are most likely to have had low motivation and engaged in more binge and purge behaviors (Vall & Wade, 2015). Recovery rates from bulimia are a bit better and average 30 to 50 percent after cognitive behavioral therapy (Wilson et al., 2007).

checkpoint
can **you** . . .

- Identify typical dietary deficiencies of adolescents?
- Discuss risk factors, effects, treatment, and prognoses for obesity, anorexia, and bulimia?

USE AND ABUSE OF DRUGS

Although the great majority of adolescents do not abuse drugs, a significant minority do. **Substance abuse** is harmful use of alcohol or other drugs. Abuse can lead to **substance dependence,** or *addiction,* which may be physiological, psychological, or both and is likely to continue into adulthood.

substance abuse
Repeated, harmful use of a substance, usually alcohol or other drugs.

substance dependence
Addiction (physical, or psychological, or both) to a harmful substance.

Trends in Drug Use Nearly half (47 percent) of U.S. adolescents have tried illicit drugs by the time they leave high school (Johnston, O'Malley, Bachman, & Schulenberg, 2013). There was an upsurge in drug use during the mid- to late 1990s, then drug use started to go down in the late 1990s until 2008, where it once again started to rise (Figure 3). This pattern once again reversed in 2011, and illicit drug use started to decline again, although less so for marijuana (Johnston, O'Malley, Bachman, Schulenberg, & Miech, 2016).

A recent trend is the abuse of nonprescription cough and cold medications; 3 percent of 8th graders, 4.7 percent of 10th graders, and 5.6 percent of 12th graders report taking medicines containing dextromethorphan (DXM), a cough suppressant, to get high within the past year (Johnston et al., 2013).

In the past two decades, there has also been a general increase in opioid abuse. This involves both prescription and street drugs (Dart et al., 2015; Substance Abuse and Mental Health Services Administration, 2013). With respect to adolescents, use of legal narcotics nearly tripled from 1992 to 2009 and then declined slightly. Use of heroin by children in 8th through 12th grade peaked in the mid to late 1990s and then showed a downward path since that time (Johnston, O'Malley, Miech, Bachman, & Schulenberg, 2017). The sharp rise in heroin usage reported in the United States has primarily been limited to older teens and emerging adults, where peak levels of usage were reached in the mid-2000s (Schulenberg et al., 2017).

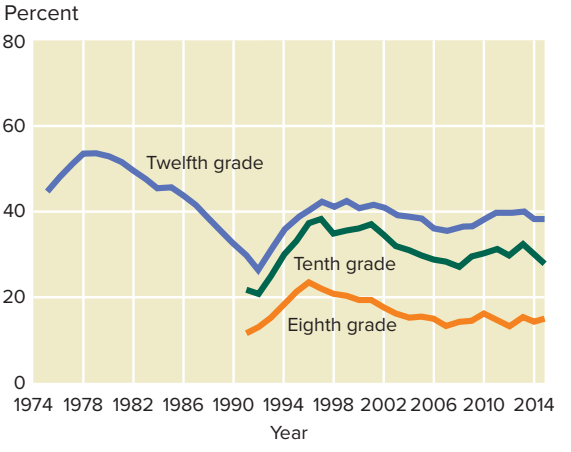


FIGURE 3
Trends in High School Students' Use of Illicit Drugs over the Previous 12 Months

Source: Source: Johnston, O'Malley, Bachman, and Schulenberg, 2013.

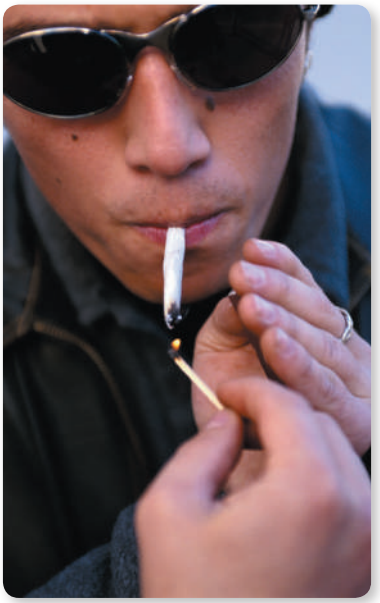
Alcohol, Marijuana, and Tobacco Alcohol is a potent, mind-altering drug with major effects on physical, emotional, and social wellbeing. Worldwide, 34.1 percent of adolescents age 15 to 19 years reported themselves to be current drinkers, and another 12 percent reported having consumed alcohol previously. Drinking alcohol was more common in European and American regions and least common in Southeast Asian and Eastern Mediterranean regions. Adolescents also reported episodic drinking in the previous month at relatively high rates—11.7 percent, compared to a rate of 7.5 percent in adults. Adolescent women reported drinking less on average, less often, and were less likely to report heavy episodic drinking than adolescent men (World Health Organization and WHO Management of Substance Abuse Unit, 2014).

Alcohol use in U.S. teenagers showed a dramatic rise in the 1990s, followed by a smaller, gradual decline (Johnston et al., 2013; Johnston et al., 2016). In 2016, 26 percent of U.S. 8th graders, 47 percent of 10th graders, and 64 percent of 12th graders said they had tried alcohol, and current use (in the past 30 days) was likewise high (Johnston et al., 2016). The majority of high school students who drink engaged in **binge drinking**—consuming five or more drinks on one occasion. About 25 percent of high school seniors admitted to binge drinking (McQueeny et al., 2009). MRI-based studies have revealed that binge drinking in teenagers may affect thinking and memory by damaging sensitive "white matter" in the brain (McQueeny et al., 2009).

binge drinking
Consuming 5 or more drinks (for men) or 4 or more drinks (for women) on one occasion.

From a theoretical perspective, it would be expected that adolescence, when the brain is undergoing significant structural and functional change, might be a period of the life span during which teens should be particularly sensitive to environmental influences (Gogtay et al., 2004). Additionally, alcohol interacts with inhibitory (e.g., GABA) and excitatory (e.g., N-methyl-d-aspartate) receptor systems that are developing in adolescence, making adolescents more sensitive to the rewarding effects of alcohol and less sensitive to its negative features (Spear, 2014).

Brain imaging studies have documented structural brain changes in adolescents as a result of alcohol consumption. Generally, those changes can be characterized as consisting of dose-dependent smaller gray matter volume and lower white matter integrity as a result of alcohol use. When compared to teens who do not drink alcohol, a recent meta-analysis showed that those who do drink show changes in key prefrontal areas, including the middle frontal gyrus, superior frontal gyrus, left frontal cortex, frontal pole, and left frontal gyrus—all areas involved in executive control. Structural differences have also been found in areas of the brain involved in reward mechanisms, including the dorsal striatum, thalamus, anterior cingulate, and inferior frontal gyrus (Ewing, Sakhardande, & Blakemore, 2014).



Marijuana is the most widely used illicit drug in the United States. Aside from its own ill effects, marijuana may lead to other addictions.
Doug Menuez/Photodisc/Getty Images

Despite the decline in marijuana use since 1996–1997, it is still by far the most widely used illicit drug in the United States. In 2012, about 11 percent of 8th graders, 28 percent of 10th graders, and 36 percent of 12th graders admitted to having used it in the past year (Johnston et al., 2013). Approximately 1 in every 17 high school seniors uses marijuana daily (Johnston et al., 2016). The impact of recent movements to legalize marijuana for recreational use, such as has happened in 11 states and the District of Columbia as of 2019, remains to be seen.

Marijuana potency quadrupled from 1980 to 2014 (ElSohly et al, 2014). Heavy use has been associated with damage to the brain, heart, and lungs. It has been correlated with declines in school performance, memory problems, and increased risk for anxiety and depression. Like any drug, if used while driving, it can contribute to traffic accidents. Given the higher potency of modern marijuana, older studies may not fully capture potential for harm at current levels. The debate about marijuana use is also complicated by the fact that marijuana does have legitimate medical applications



Although marijuana clearly has negative effects, there are also documented medical applications. For example, marijuana is an effective treatment for nausea in cancer patients, and it has been used to reduce ocular pressure in glaucoma patients.

and has been used to manage such conditions as nausea, chronic pain, and epilepsy (Volkow, Baler, Compton, & Weiss, 2014).

The use of cigarettes and other tobacco products is a global health issue. Adolescent use is particularly concerning because the vast majority of smokers begin smoking prior to adulthood and became addicted in adolescence. Cigarettes will kill approximately half of all lifetime users and increase the risk of multiple cancers, especially lung cancer, as well as heart disease, stroke, emphysema, and multiple other diseases (Eriksen, Mackay, & Ross, 2013).

Adolescent tobacco use is a less widespread problem in the United States than in most other industrialized countries (Gabhainn & François, 2000). Still, in the United States, approximately 5 percent of 8th graders, 11 percent of 10th graders, and 17 percent of 12th graders are current (past-month) tobacco smokers (Johnston et al., 2013). Black youth tend to smoke less but metabolize nicotine more slowly than white youth, so their bodies take longer to get rid of it and they are quicker to become dependent (Moolchan, Franken, & Jaszyna-Gasior, 2006).

Although this number is high and cause for concern, there is some good news. In the late 1990s, about 28 percent of high school students reported being current smokers. Current data now put this number at 7 percent (Johnston et al., 2016). In 2015, e-cigarettes were the most commonly used form of tobacco among middle and high school students (Signh et al., 2016). This is troubling, as there is reason to suspect that e-cigarette users may eventually graduate to cigarettes.

A randomized, controlled trial found nicotine replacement therapy plus behavioral skills training effective in helping adolescents stop smoking (Killen et al., 2004). Additionally, parents can provide a positive influence by discouraging friendships with peers who smoke (Simons-Morton & Farhat, 2010).



Playing Tetris can help ameliorate the flashbacks associated with posttraumatic stress disorder.

Holmes, James, Kilford, & Deeprose, 2010

checkpoint can you . . .

- Summarize recent trends in substance use among adolescents?
- Discuss risk factors and influences connected with use of drugs, specifically alcohol, marijuana, and tobacco?
- Tell why early initiation into substance use is dangerous?

DEPRESSION

The prevalence of depression increases during adolescence. In 2017, 13.3 percent of young people ages 12 to 17 experienced at least one episode of major depression, and only 41.5 percent of them had been treated (Substance Abuse and Mental Health Services Administration, 2018; see Figure 4). Depression in young people does not necessarily appear as sadness; it can also manifest as irritability, boredom, or an inability to experience pleasure. At least 1 in 5 persons who experience bouts of depression in childhood or adolescence are at risk for bipolar disorder, in which depressive episodes ("low" periods) alternate with manic episodes ("high" periods) characterized by increased energy, euphoria, grandiosity, and risk-taking (Brent & Birmaher, 2002).

Being female is a risk factor for depression. Adolescent girls, especially early-maturing girls, are more likely to be depressed than adolescent boys (Galvao et al., 2014; NSDUH, 2012). This gender difference may be related to biological changes associated with puberty, socialization influences, or girls' greater vulnerability to stress in social relationships (Susman & Rogol, 2004; Birmaher et al., 1996; Hankin, Mermelstein, & Roesch, 2007).

In addition to female gender, risk factors for depression include anxiety, fear of social contact, stressful life events, chronic illnesses such as diabetes or epilepsy, parent-child

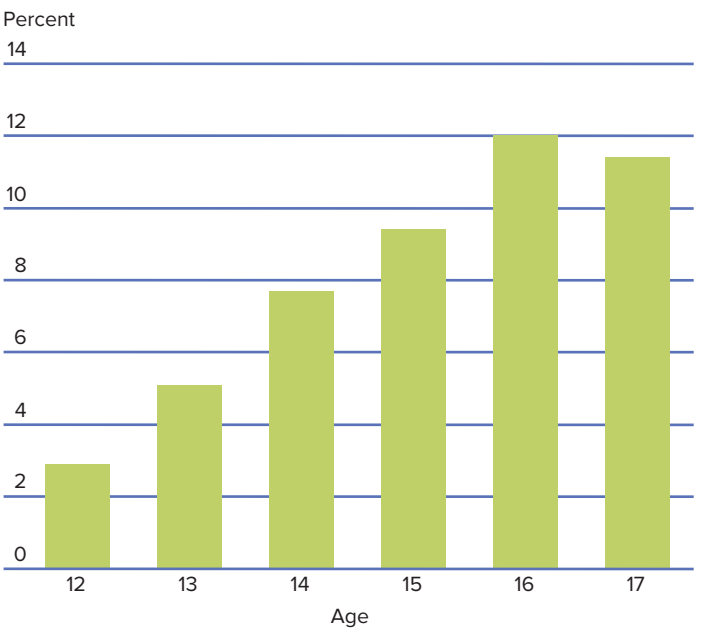
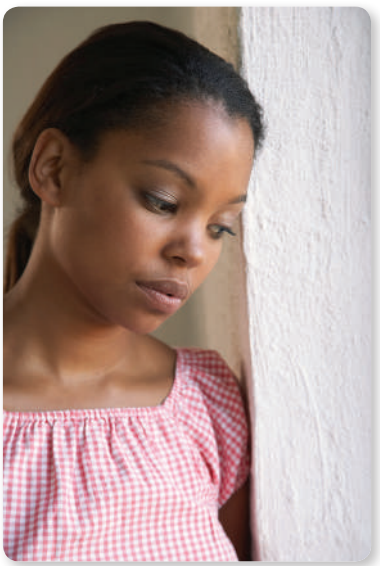


FIGURE 4
Depression Rates for 12- to 17-Year-Olds

Source: NSDUH, 2012.



This young girl might be sad or worried about grades or a relationship—normal worries for an adolescent. But if sadness persists along with symptoms such as the inability to concentrate, fatigue, apathy, or feelings of worthlessness, it might indicate depression.

Tomas Rodriguez/Fancy/SuperStock

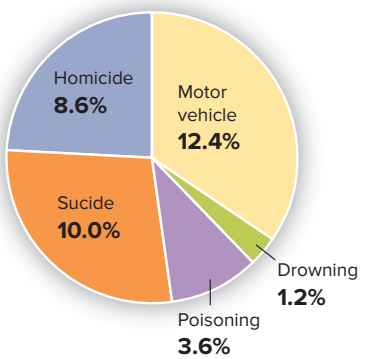


FIGURE 5

Leading Causes of Adolescent Deaths

In the United States, motor vehicle crashes are responsible for the greatest percentage of deaths among teens aged 15 to 19 years old, followed by suicide and homicide

Source: Curtin, Heron, Miniño, & Warner, 2018.

conflict, abuse or neglect, alcohol and drug use, sexual activity, and having a parent with a history of depression. Alcohol and drug use and sexual activity are more likely to lead to depression in girls than in boys (Hallfors, Waller, Bauer, Ford, & Halpern, 2005; NSDUH, 2012; Waller et al., 2006).

Depressed adolescents who do not respond to outpatient treatment or who have substance dependence or psychosis or seem suicidal may need to be hospitalized. Psychotherapy is often used as a treatment; however, studies have found that while it can be effective in the short term, its effects last no more than a year (Weisz, McCarty, & Valeri, 2006). More commonly, medications are used. Selective serotonin reuptake inhibitors (SSRIs) are currently approved for use in children and adolescents and commonly prescribed. Although there are concerns about their safety, research suggests that the benefits outweigh the risks (Bridge et al., 2007). The most effective treatment for depressed adolescents, at least in the short term, seems to be a combination of medications and cognitive behavioral therapy (Dubicka et al., 2010; March & the TADS Team, 2007).

DEATH IN ADOLESCENCE

Death this early in life is always tragic and usually but not always accidental. Worldwide in 2012, a 50-year downward trend for lower adolescent mortality continued, although that number still comprised some 1.3 million teens. Worldwide, leading causes of death in adolescence include road traffic injuries, HIV/AIDS, suicide, lower respiratory infections, and interpersonal violence (World Health Organization, 2014).

After declining between 1999 and 2013, the U.S. death rate for adolescents rose by 12 percent as a result of an increase in motor vehicle crashes, other unintentional injuries, homicide, and suicide. Deaths stemming from medical causes such as cancer, heart disease, and congenital malformations remained relatively stable (Curtin, Heron, Minono, & Warner, 2018) (see Figure 5).

Deaths from Vehicle Accidents and Firearms Motor vehicle collisions are the leading cause of accidental death among U.S. teenagers (Cunningham, Walton, & Carter, 2018). The risk of collision is greater among 16- to 19-year-olds than for any other age group, and especially so for males (Miniño, Anderson, Fingerhut, Boudreault, & Warner, 2006; Centers for Disease Control, 2018e). Collisions are more likely to be fatal when teenage passengers are in the vehicle, probably because adolescents tend to drive more recklessly in the presence of peers (Centers for Disease Control, 2018e). In the United States, about 1 in 5 teens involved in fatal traffic crashes had been drinking, suggesting that alcohol is a major factor in accident-related fatalities (National Highway Traffic Safety Administration, 2017).

Another important risk factor is distracted driving, which includes texting, talking on a cell phone, or eating. While all drivers risk a crash if distracted, novice drivers are at the highest risk (Miniño et al., 2006). For example, they are 8 times more likely to crash or have a near miss when dialing a phone in comparison to experienced drivers who are 2 times more likely to do so (Klauer et al., 2014).

Despite efforts aimed at increasing seat belt use among teens, observed use among teens and young adults was 59 percent in 2017—the lowest of any age group (Centers for Disease Control, 2018e). In fact, in 2015, 58 percent of young people 16 to 20 years old involved in fatal motor vehicle crashes were unbuckled (National Highway Traffic Safety Administration, 2017).

Homicides are the third leading cause of death for adolescents in the United States (Heron, 2018). Firearm-related deaths are far more common in the United States than in other industrialized countries (Cunningham et al., 2018). The United States has a higher firearm mortality rate than the next highest 25 industrialized nations combined (Blum & Qureshi, 2011).

Adolescent boys are 8 times more likely to be fatally shot than girls (Price & Khubchandani, 2017). Race and ethnicity matter as well; the homicide rate for African American male teens is more than 20 times higher than that of white male teens (Child Trends

Databank, 2015; Price & Khubchandani, 2017). Gun fatalities make up about one-third of all injury deaths and more than 85 percent of homicides in that age group. The chief reason for these grim statistics seems to be the ease of obtaining a gun in the United States (AAP Committee on Injury and Poison Prevention, 2000). Indeed, having a firearm in the home is correlated with being the victim of a homicide (Anglemyer, Horvath, & Rutherford, 2014).

Suicide Suicide is the second leading cause of death among U.S. 15- to 19-year-olds (Heron, 2018). Having a firearm in the home is strongly associated with an increased risk of completed suicide (Anglemyer et al., 2014), and firearms are the most common method used to commit suicide (Kegler, 2017).

Adolescent girls are more likely to attempt suicide but tend to use less lethal methods, such as suffocation or poisoning, and thus are more likely to survive. Although adolescent boys are less likely to attempt suicide, their greater propensity to use firearms results in a greater chance of a successful attempt (Price & Khubchandani, 2017; Child Trends Databank, 2015).

Although suicide occurs in all ethnic groups, white adolescents have the highest rates, followed by Hispanics and African Americans (Price & Khubchandani, 2017). Gay, lesbian, and bisexual youths, who have high rates of depression, also have unusually high rates of suicide and attempted suicide (AAP Committee on Adolescence, 2000). The highest rates of suicide are found in transgender and gender nonconforming individuals. Forty-one percent of such adults report having attempted suicide at some point in their life (Herman, Haas, & Rodgers, 2014).

Young people who consider or attempt suicide tend to have histories of emotional illness. They are likely to be either perpetrators or victims of violence and to have school problems, academic or behavioral. Many have suffered from maltreatment in childhood and have severe problems with relationships. They tend to think poorly of themselves, to feel hopeless, and to have poor impulse control and a low tolerance for frustration and stress. These young people are often alienated from their parents and have no one outside the family to turn to. They also tend to have attempted suicide before, to have friends or family members who did so, or to report suicidal ideation (Borowsky, Ireland, & Resnick, 2001; Brent & Mann, 2006; Nock et al., 2013). Substance abuse, especially heroin, is also a risk factor, and that risk increases with the number of illicit substances being used (Wong, Zhou, Goebert, & Hishinuma, 2013). Protective factors that reduce the risk of suicide include a sense of connectedness to family and school, emotional well-being, and academic achievement (Taliaferro & Muehlenkamp, 2014; Borowsky et al., 2001).

checkpoint can you . . .

- Discuss factors affecting gender differences in adolescent depression?
- Identify risk factors for teenage suicide?

COGNITIVE DEVELOPMENT

Aspects of Cognitive Maturation

Adolescents not only look different from younger children, but they also think and talk differently. Their speed of information processing continues to increase. Although their thinking may remain immature in some ways, many are capable of abstract reasoning and sophisticated moral judgments and can plan more realistically for the future.

PIAGET'S STAGE OF FORMAL OPERATIONS

Adolescents enter what Piaget called the highest level of cognitive development—**formal operations**—when they move away from their reliance on concrete, real-world stimuli and develop the capacity for abstract thought. This development, usually around

formal operations
Piaget's final stage of cognitive development, characterized by the ability to think abstractly.

age 11, gives them a new, more flexible way to manipulate information. They can use symbols to represent other symbols (for example, letting the letter X stand for an unknown numeral) and thus can learn algebra and calculus. They can better appreciate the hidden messages in metaphor and allegory and thus can find richer meanings in literature. They can think in terms of what *might be,* not just what *is*. They can imagine possibilities and can form and test hypotheses.

The ability to think abstractly has emotional implications too. Whereas a young child could love a parent or hate a classmate, "the adolescent can love freedom or hate exploitation. . . . The possible and the ideal captivate both mind and feeling" (H. Ginsburg & Opper, 1979, p. 201).

hypothetical-deductive reasoning
Ability, believed by Piaget, to accompany the stage of formal operations, to develop, consider, and test hypotheses.

Hypothetical-Deductive Reasoning

Hypothetical-deductive reasoning involves a methodical, scientific approach to problem solving, and it characterizes formal operations thinking. It involves the ability to develop, consider, and test hypotheses, and the young person can be compared to a scientist exploring a problem. To appreciate the difference formal reasoning makes, let's follow the progress of a typical child in dealing with a classic Piagetian problem, the pendulum problem.*

The child, Adam, is shown the pendulum—an object hanging from a string. He is then shown how he can change any of four factors: the length of the string, the weight of the object, the height from which the object is released, and the amount of force he may use to push the object. He is asked to figure out which factor or combination of factors determines how fast the pendulum swings.

When Adam first sees the pendulum, he is not yet 7 years old and is in the preoperational stage. He tries one thing after another in a hit-or-miss manner. First, he puts a light weight on a long string and pushes it; then he tries swinging a heavy weight on a short string; then he removes the weight entirely. He cannot solve the problem.

Adam next encounters the pendulum at age 10, when he is in the stage of concrete operations. This time, he discovers that varying the length of the string and the weight of the object affects the speed of the swing. However, because he varies both factors at the same time, he cannot tell which is critical or whether both are.

At 15, Adam goes at the pendulum problem systematically. He varies one factor at a time, holding the other three factors constant. In this way, he is able to solve the problem and determine that only one factor—the length of the string—impacts how fast the pendulum swings. He is now capable of hypothetical deductive reasoning.

Adam's solution of the pendulum problem shows that he has arrived at the stage of formal operations. He is now capable of hypothetical-deductive reasoning. He considers all the relationships he can imagine and tests them systematically, one by one, to eliminate the false and arrive at the true. Hypothetical-deductive reasoning gives him a tool to solve problems, from fixing the family car to constructing a political theory.

What brings about the shift to formal reasoning? Piaget attributed it to a combination of brain maturation and expanding environmental opportunities. Both are essential: even if young people's neurological development has advanced enough to permit formal reasoning, they can attain it only with appropriate stimulation.

As with the development of concrete operations, schooling and culture play a role, as Piaget (1972) ultimately recognized (see Window on the World).

How can parents and teachers help adolescents improve their reasoning ability?

Fifty percent of college students, even those enrolled in psychology courses where perception is addressed, believe that vision includes rays coming into our eyes (which is correct) as well as rays bouncing back out of our eyes (which is not). In other words, 50 percent of students think we can see with something akin to X-ray vision.

Gregg, Winer, Cottrell, Hedman, & Fournier, 2001

IMMATURE ASPECTS OF ADOLESCENT THOUGHT

As children's thinking becomes more complex, they develop from egocentric beings to persons capable of solving abstract problems and imagining ideal societies. Yet in some ways, adolescents' thinking seems strangely immature. According to the psychologist David Elkind (1967), such behavior stems from adolescents' inexperienced ventures into formal operational thought. This new way of thinking, which fundamentally transforms

*This description of age-related differences in the approach to the pendulum problem is adapted from H. Ginsburg & Opper, 1979.

window on the world

CULTURE AND COGNITION

When Piaget first developed his theories, it was assumed his stages of cognitive development represented universal aspects of human development and that all people in all cultures went through the same processes as those in Western countries. However, as research began in different cultures, it became clear this original conception was simplistic and that culture profoundly affects the path development takes.

For example, when adolescents in New Guinea were tested on the pendulum task, none was able to solve it. In Rwanda (Gardiner & Kozmitzki, 2005) and Nigeria (Hollos & Richards, 1993), only a few teens were able to adequately solve the puzzle. On the other hand, Chinese children in Hong Kong, who had been to British schools, did at least as well if not better than U.S. and European children. Apparently, formal reasoning is a learned ability that is not equally necessary or equally valued in all cultures, and the experiences children have shape their developing abilities.

Does this mean, then, that adults in cultures other than Western ones function at lower levels of cognitive complexity? Even Piaget (1972) eventually realized this was not the case. Rather, adults learn to reason in the ways their culture demands and while doing culturally relevant activities. For example, when African men from the Côte d'Ivoire play *baoule*, a board game in which opponents capture seeds from each other, they use a mix of sophisticated cognitive strategies, including complex rules, offensive and defensive moves, and abstract calculations (Retschitzki, 1989).

That Piaget had to change his theories does not make them bad theories; rather, this is how science works. Piaget was instrumental in developing the fields of cognitive and developmental psychology. However, his original theories required modification in light of what we know today.

what's your view

Do you think it would be possible to construct a reasoning task free of cultural content? Why or why not?

the way they look at themselves and their world, is as unfamiliar to them as their reshaped bodies, and they sometimes feel just as awkward in its use.

Adolescents' immaturity of thinking, Elkind suggests, manifests itself in a number of characteristic ways. For example, adolescents tend to be idealistic and critical of others. As adolescents envision an ideal world, they realize how far the real world, for which they hold adults responsible, falls short. Convinced they know better than adults how to run the world, they frequently find fault with their parents and other authority figures. Moreover, adolescents can keep many alternatives in mind at the same time yet may lack effective strategies for choosing among them. They may struggle with simple decisions such as whether they should go to the mall with a friend or work on a school assignment. Young adolescents also often do not recognize the difference between expressing an ideal, such as conserving energy, and making the sacrifices necessary to live up to it, such as driving less often.

Another characteristic of adolescent thought is self-consciousness: Adolescents can think about thinking–their own and other people's. However, in their preoccupation with their own mental state, adolescents often assume everyone else is thinking about the same thing they are thinking about: themselves. Elkind refers to this as the *imaginary audience*, a conceptualized "observer" who is as concerned with a young person's thoughts and behavior as he or she is. The certainty, for example, that everyone is staring at a small pimple all day long is one example of this. The imaginary audience fantasy is especially strong in the early teens but persists to a lesser degree into adult life.

Last, Elkind uses the term *personal fable* to describe a belief by adolescents that they are special, their experience is unique, and they are not subject to the rules that govern the rest of the world. This belief might encourage adolescents to believe they can drive fast and recklessly and not get into an accident. According to Elkind, this form of

Research has shown that liberals are more creative than conservatives but that conservatives are happier.

Dollinger, 2007; Napier & Jost, 2008

egocentrism underlies much risky, self-destructive behavior. Like the imaginary audience, the personal fable continues into adulthood.

How has Elkind's model stood up to research? In general, research support has been spotty. For example, research has generally shown that, rather than being indecisive, adolescents are more likely to make impulsive or risky decisions (Albert & Steinberg, 2011). This tendency to make risky decisions does not come from an inability to reason effectively about the consequences, nor does it stem from an adolescent belief about being special or unique. Rather, brain immaturity, as described earlier, biases adolescents toward risky decision making.

Data on the decline of egocentrism, another key feature, have also been equivocal. While some studies have found that levels of egocentrism are similar in teens and adults (Rai, Mitchell, Kadar, & Mackenzie, 2016), others have found that egocentrism, especially in girls, declines over adolescence (Van der Graaf et al., 2014). Others have found no influence of egocentrism on the imaginary audience but have found support for the role of self-consciousness (Galanaki, 2012).

Moreover, the characteristic thinking patterns described by Elkind do not seem to be confined to adolescence. For example, research has shown that smokers and ex-smokers develop a personal fable about the risk of health problems as a result of their smoking. Smokers are overly optimistic about their health risks, while ex-smokers believe that quitting and the adoption of a healthy lifestyle have afforded them greater risk reduction than they actually have. This is not limited to teens—the age range in this particular study was from 19 to 74 years of age (Masiero, Lucchiari, & Pravettoni, 2015).

checkpoint can you . . .

- Explain the difference between formal operational and concrete operational thinking, as exemplified by the pendulum problem?
- Identify factors influencing adolescents' development of formal reasoning?
- Evaluate strengths and weaknesses of Piaget's theory of formal operations?

LANGUAGE DEVELOPMENT

Children's use of language generally reflects their level of cognitive development. School-age children are quite proficient in use of language, but adolescence brings further refinements. Vocabulary continues to grow as reading matter becomes more adult. By ages 16 to 18, the average young person knows approximately 80,000 words (Owens, 1996). This is important for academic success; vocabulary knowledge is crucial for reading comprehension (Lesaux, Crosson, Kieffer, & Pierce, 2010).

With the advent of abstract thought, adolescents can define and discuss such abstractions as love, justice, and freedom. They more frequently use such terms as *however, otherwise, anyway, therefore, really*, and *probably* to express logical relationships. They become more conscious of words as symbols that can have multiple meanings, and they take pleasure in using irony, puns, and metaphors (Duthie, Nippold, Billow, & Mansfield, 2008; Katz, Blasko, & Kazmerski, 2004).

Adolescents also become more skilled in social perspective-taking, the ability to tailor their speech to another person's point of view. So, for example, a teen might use simpler words when talking to a child or swear among friends and show deference when speaking to an adult. This ability is essential for skilled conversation.

Language is not static; it is fluid and the words and phrases used by people change over time. These changes are striking in the speech of adolescents, who often develop their own unique terms. Vocabulary may differ by gender, ethnicity, age, geographical region, neighborhood, and type of school (Eckert, 2003) and varies from one clique to another. Teenage slang is part of the process of developing an independent identity separate from parents and the adult world. This specialized vocabulary even extends to electronic communication, with its own rules for spelling, abbreviations, and the use of emoticons and emojis to convey emotional content (Haas, Takayoshi, Carr, Hudson, & Pollock, 2011).

checkpoint can you . . .

- Name two immature aspects of adolescent thought?
- Identify characteristics of adolescents' language development that reflect cognitive advances?

MORAL REASONING: KOHLBERG'S THEORY

As children attain higher cognitive levels, they become capable of more complex reasoning about moral issues. Adolescents are better able than younger children to take another person's perspective, to solve social problems, to deal with interpersonal relationships, and to see themselves as social beings. All of these tendencies foster moral development.

Let's look at Lawrence Kohlberg's theory of moral reasoning, at Carol Gilligan's work on moral development in women and girls, and at research on prosocial behavior in adolescence.

Heinz's Dilemma A woman is near death from cancer. A druggist has discovered a drug that doctors believe might save her. The druggist is charging $2,000 for a small dose—10 times what the drug costs him to make. The sick woman's husband, Heinz, borrows from everyone he knows but can scrape together only $1,000. He begs the druggist to sell him the drug for $1,000 or let him pay the rest later. The druggist refuses, saying, "I discovered the drug and I'm going to make money from it." Heinz, desperate, breaks into the man's store and steals the drug. Should Heinz have done that? Why or why not? (Kohlberg, 1969).

Heinz's problem is the most famous example of Lawrence Kohlberg's approach to studying moral development. Starting in the 1950s, Kohlberg and his colleagues posed hypothetical dilemmas like this one to 75 boys ages 10, 13, and 16 and continued to question them periodically for more than 30 years. Kohlberg came to believe that moral development was a consequence of moral reasoning, which depended heavily on cognitive development. Moreover, he believed that at the heart of every dilemma was the concept of justice—a universal principle.

Kohlberg's Levels and Stages On the basis of thought processes shown by responses to his dilemmas, Kohlberg (1969) described three levels of moral reasoning, each divided into two stages (Table 2):

- *Level I:* **Preconventional morality.** People act under external controls. They obey rules to avoid punishment or reap rewards, or they act out of self-interest. This level is typical of children ages 4 to 10.
- *Level II:* **Conventional morality (or morality of conventional role conformity).** People have internalized the standards of authority figures. They are concerned about being "good," pleasing others, and maintaining the social order. This level is typically reached after age 10; many people never move beyond it, even in adulthood.
- *Level III:* **Postconventional morality (or morality of autonomous moral principles).** People recognize conflicts between moral standards and make their own judgments on the basis of principles of right, fairness, and justice. People generally do not reach this level of moral reasoning until at least early adolescence, or more commonly in young adulthood, if ever.

preconventional morality
First level of Kohlberg's theory of moral reasoning in which control is external and rules are obeyed in order to gain rewards or avoid punishment or out of self-interest.

conventional morality (or morality of conventional role conformity)
Second level in Kohlberg's theory of moral reasoning in which standards of authority figures are internalized.

postconventional morality (or morality of autonomous moral principles)
Third level of Kohlberg's theory of moral reasoning, in which people follow internally held moral principles and can decide among conflicting moral standards.

In Kohlberg's theory, it is the reasoning underlying a person's response to a moral dilemma, not the response itself, that indicates the stage of moral development. Two people who give opposite answers may be at the same stage if their reasoning is based on similar factors.

Some adolescents and even some adults remain at Kohlberg's level I. Like young children, they seek merely to avoid punishment or satisfy their needs. Most adolescents and adults seem to be at level II. They conform to social conventions, support the status quo, and "do the right thing" to please others or to obey the law. Stage 4 reasoning (upholding social norms) is less common but increases from early adolescence into adulthood.

Later, Kohlberg proposed a seventh, "cosmic," stage in which people consider the effect of their actions not only on other people but on the universe as a whole (Kohlberg, 1981; Kohlberg & Ryncarz, 1990).

Evaluating Kohlberg's Theory Kohlberg, building on Piaget, inaugurated a profound shift in the way we look at moral development. Instead of viewing morality solely as the attainment of control over self-gratifying impulses, investigators now study how children and adults base moral judgments on their growing understanding of the social world.

Initial research supported Kohlberg's theory. The American boys that Kohlberg and his colleagues followed through adulthood progressed through Kohlberg's stages in

TABLE 2 Kohlberg's Six Stages of Moral Reasoning

Levels	Stages of Reasoning
Level I: Preconventional morality (ages 4 to 10)	*Stage 1: Orientation toward punishment and obedience.* "What will happen to me?" Children obey rules to avoid punishment. They ignore the motives of an act and focus on its physical form (such as the size of a lie) or its consequences (for example, the amount of physical damage). *Stage 2: Instrumental purpose and exchange.* "You scratch my back, I'll scratch yours." Children conform to rules out of self-interest and consideration for what others can do for them. They look at an act in terms of the human needs it meets and differentiate this value from the act's physical form and consequences.
Level II: Conventional morality (ages 10 to 13 or beyond)	*Stage 3: Maintaining mutual relations, approval of others, the golden rule.* "Am I a good boy or girl?" Children want to please and help others, can judge the intentions of others, and develop their own ideas of what a good person is. They evaluate an act according to the motive behind it or the person performing it, and they take circumstances into account. *Stage 4: Social concern and conscience.* "What if everybody did it?" People are concerned with doing their duty, showing respect for higher authority, and maintaining the social order. They consider an act always wrong, regardless of motive or circumstances, if it violates a rule and harms others.
Level III: Postconventional morality (early adolescence, or not until young adulthood, or never)	*Stage 5: Morality of contract, of individual rights, and of democratically accepted law.* People think in rational terms, valuing the will of the majority and the welfare of society. They generally see these values as best supported by adherence to the law. While they recognize that there are times when human need and the law conflict, they believe it is better for society in the long run if they obey the law. *Stage 6: Morality of universal ethical principles.* People do what they as individuals think is right, regardless of legal restrictions or the opinions of others. They act in accordance with internalized standards, knowing that they would condemn themselves if they did not.

Source: Adapted from Kohlberg, (1969); Lickona, (1976).

sequence, and none skipped a stage. Their moral judgments correlated positively with age, education, IQ, and socioeconomic status (Colby, Kohlberg, Gibbs, & Lieberman, 1983). More recent research, however, has cast doubt on the delineation of some of Kohlberg's stages (Eisenberg & Morris, 2004). A study of children's judgments about laws and lawbreaking suggests that some children can reason flexibly about such issues as early as age 6 (Helwig & Jasiobedzka, 2001).

One reason the ages attached to Kohlberg's levels are so variable is that people who have achieved a high level of cognitive development do not always reach a comparably high level of moral development. A certain level of cognitive development is *necessary* but not *sufficient* for a comparable level of moral development. In other words, just because a person is capable of moral reasoning does not necessarily mean the person actually engages in moral reasoning. Some investigators suggest that moral activity is motivated not only by abstract considerations of justice but also by such emotions as empathy, guilt, and distress and the internalization of prosocial norms (Eisenberg & Morris, 2004; Gibbs, 1991, 1995; Gibbs & Schnell, 1985).

Furthermore, there is not always a clear relationship between moral reasoning and moral behavior. For example, most people would characterize the actions of Pol Pot, the despotic Cambodian leader of the Khmer Rouge, as amoral. From 1974 to 1979, the Khmer Rouge killed 1 million to 3 million Cambodian people. Most people would consider this mass murder to be profoundly evil. But Pol Pot was driven by his belief in an idyllic Communist agrarian society. He believed that the actions he took were in the service of a higher ideal, and the justifications for the actions he took were cognitively complex and well formed. Although this is an extreme example, it is clear that people at postconventional levels of reasoning do not necessarily act more morally than those at lower levels. Other factors, such as specific situations, conceptions of virtue, and concern for others, contribute to moral behavior (Colby & Damon, 1992; Fischer & Pruyne, 2003).



Can you think of a time when you or someone you know acted contrary to personal moral judgment? Why do you think this happened?

Last, Kohlberg's system does not seem to represent moral reasoning in non-Western cultures as accurately as in the Western culture in which it was originally developed (Eisenberg & Morris, 2004). Older people in countries other than the United States do tend to score at higher stages than younger people. However, people in non-Western cultures rarely score above stage 4 (Shweder et al., 2006), suggesting that some aspects of Kohlberg's model may not fit these societies' cultural values. The context in which reasoning occurs affects the type of reasoning people tend to exhibit. For example, an analysis of the moral content in annual letters to stakeholders from chief executive officers (CEOs) of large automobile companies showed the level of moral reasoning to overwhelmingly be conventional in nature at stage 2 despite an average age of 58 years, although CEOs of companies based in Asia were slightly more likely to reason at stage 3 (Weber, 2010).

AN ETHIC OF CARE: GILLIGAN'S THEORY

Do men and women reason in the same fashion? This question was addressed by Carol Gilligan (1982/1993), who asserted that Kohlberg's theory was sexist and oriented toward values more important to men than to women. Gilligan argued that men, Kohlberg included, viewed morality in terms of justice and fairness. Women held a different set of values, however, that placed caring and avoiding harm as higher goals than justice. Kohlberg's typology unfairly categorized women as less morally and cognitive complex because of the exclusive focus on justice (Eisenberg & Morris, 2004).

Research has found little support for Gilligan's claim of a male bias in Kohlberg's stages (Brabeck & Shore, 2003; Jaffee & Hyde, 2000), and she has since modified her position. Generally, gender differences in moral reasoning are small (Jaffee & Hyde, 2000).

PROSOCIAL BEHAVIOR

Prosocial behavior typically increases from childhood through adolescence (Eisenberg & Morris, 2004). Parents play a role in this; parents who are warm, sympathetic, and use prosocial reasoning themselves are more likely to have teens who behave in prosocial ways (Carlo, Mestre, Samper, & Armenta, 2011; Padilla-Walker, Nielson, & Day, 2016). Girls tend to show more prosocial behavior and empathic concern than boys (Landazabal, 2009; Van der Graaf et al., 2014), and this difference becomes more pronounced in adolescence (Eisenberg, Fabes, & Spinrad, 2006). This may be in part because cross-culturally, parents of girls emphasize social responsibility more than parents of boys do. This has been validated in Australia, the United States, Sweden, Hungary, Czech Republic, Bulgaria, and Russia (Flannagan, Bowes, Jonsson, Csapo, & Sheblanova, 1998).

Peers also matter. Although generally most people conceptualize peer pressure as negative, peers may reinforce positive prosocial development in each other (Farrell, Thompson, & Mehari, 2017; Lee, Padilla-Walker, & Memmott-Elison, 2017). Experiments show that peer feedback about the value of prosocial behavior can, depending on whether the peer group is perceived as supporting or disliking such behavior, increase or decrease the occurrence of prosocial behavior (Hoorn, Dijk, Meuwese, Rieffe, & Crone, 2016), and this is particularly true when peers are considered to be high status (Choukas-Bradley, Giletta, Cohen, & Prinstein, 2015).

Volunteering is a common form of prosocial behavior. About half of adolescents engage in some sort of community service or volunteer activity, although adolescents with high SES volunteer more than those with lower SES (Schmidt, Shumow, & Kackar, 2007). Students who do volunteer work tend to be more engaged in their communities than those who do not as adults. In addition, adolescent volunteers tend to have a higher degree of self-understanding and commitment to others (Eccles, 2004) and better academic and civic outcomes (Schmidt et al., 2007). The effects of community service also apply to inner-city, racial minority youth (Chan, Ou, & Reynolds, 2014), suggesting that intervention programs promoting community service might be an important means by which to promote characteristics associated with positive development.

checkpoint can you . . .

- List Kohlberg's levels and stages?
- Evaluate Kohlberg's theory with regard to the role of emotion and socialization, parent and peer influences, and cross-cultural validity?
- Explain the difference between Gilligan's and Kohlberg's standards of moral reasoning?
- Discuss individual differences in prosocial behavior, such as volunteering?

Educational and Vocational Issues

School is a central organizing experience in most adolescents' lives. It offers opportunities to learn information, master new skills, and sharpen old skills; to participate in sports, the arts, and other activities; to explore vocational choices; and to be with friends. It widens intellectual and social horizons. Some adolescents, however, experience school not as an opportunity but as one more hindrance on the road to adulthood.

In the United States, as in all other industrialized countries and in some developing countries as well, more students finish high school than ever before, and many enroll in higher education (OECD, 2004). In the 2016–2017 academic year, the 4-year graduation rate for U.S. public high school students hit a high of 84.6 percent (National Center for Education Statistics, 2019).

Among the 35 member countries of the Organization for Economic Cooperation and Development (OECD, 2008), graduation rates vary—for example, 15 percent in Turkey and 62 percent in Iceland. The United States, with an average of 12.7 years of schooling, is on the high end of this international comparison. However, despite our wealth and technological sophistication, U.S. adolescents remain solidly in the middle with respect to academics. Compared to other countries, U.S. students score average in scientific literacy and reading, and below average in math (OECD, 2016). As in the elementary grades, such factors as parenting practices, socioeconomic status, and the quality of the home environment influence the course of school achievement in adolescence. Other factors include gender, ethnicity, peer influence, quality of schooling, and students' belief in themselves.

Let's look at influences on school achievement and then at young people who drop out. Finally, we'll consider planning for higher education and vocations.

INFLUENCES ON SCHOOL ACHIEVEMENT

In adolescence, such factors as parenting practices, socioeconomic status, and the quality of the home environment influence the course of school achievement. Other factors include gender, ethnicity, peer influence, quality of schooling, and students' belief in themselves.

Student Motivation and Self-Efficacy In Western countries, particularly the United States, educational practices are based on the assumption that students are, or can be, motivated to learn. Educators emphasize the value of intrinsic motivation—the student's desire to learn for the sake of learning—because research has shown this orientation is associated with academic achievement (Cerasoli, Nicklin, & Ford, 2014). Unfortunately, many U.S. students are *not* self-motivated, and motivation often declines as they enter high school (Eccles, 2004; Larson & Wilson, 2004).



Students who take responsibility for their own learning are likely to do well in school.
Purestock/Getty Images

Students high in academic self-efficacy—who believe that they can successfully achieve academic goals—are likely to do well in school (Komarraju & Nadler, 2013). So, for example, after failing a test, a student with high self-efficacy might conclude that he didn't study enough and that to do well in future tests, he should study more. A student with low self-efficacy, by contrast, might conclude that the material was too hard or the test was unfair, a belief system that undermines work ethic and motivation. Similarly, students' beliefs about their ability to self-regulate their learning (Zuffianò et al., 2013) as well as their actual levels of self-discipline (Duckworth & Seligman, 2005) impact academic achievement.

In the United States, where opportunities exist for many children, personal motivation can have a strong effect on how much children learn. Future-oriented cognitions—hopes and dreams about future jobs—are related to greater achievement as well as participation in extracurricular activities. It may be that future-oriented cognitions are helpful in part because they motivate participation in activities that relate to later success (Beal & Crockett, 2010).

But in many cultures, education is based on such factors as duty (India), submission to authority (Islamic countries), and participation in the family and community (sub-Saharan Africa). In the countries of east Asia, students are expected to learn to meet family and societal expectations. Learning is expected to require intense effort, and students who fail or fall behind feel obligated to try again. This expectation may help explain why, in international comparisons in science and math, east Asian students substantially surpass U.S. students. In developing countries, issues of motivation pale in the light of social and economic barriers to education: inadequate or absent schools, the need for child labor to support the family, barriers to schooling for girls, and early marriage (Larson & Wilson, 2004). Thus, as we discuss factors in educational success, which are drawn largely from studies in the United States and other Western countries, we need to remember that they do not apply to all cultures.

Gender Reading tests conducted on 15-year-olds in 72 countries show an advantage for girls, although the difference in scores for girls and boys narrowed between 2009 and 2015. Although gender differences in science are small, boys are more likely to be top performers in all countries with the exception of Finland (OECD, 2016). However, despite having a greater proportion of high performers, boys are more likely than girls to fail to achieve a baseline of proficiency in reading, mathematics, and science (OECD, 2015). Overall, beginning in adolescence, girls do better on verbal tasks that involve writing and language usage; boys do better in activities that involve visual and spatial functions helpful in math and science. An evaluation of SAT results and math scores from 7 million students found few gender differences in math performance (Hyde, Lindberg, Linn, Ellis, & Williams, 2008).

Why might we expect gender differences? As with all aspects of development, research points to interacting biological and environmental contributions. Male and female brains show some differences in structure and organization, and these differences tend to become more pronounced with age. Girls have more gray matter, and the growth of gray matter peaks earlier. Their neurons also have more connections (Halpern et al., 2007). The brain structure of girls appears to better integrate verbal and analytic tasks (which occur in the left hemisphere) with spatial and holistic tasks (which occur in the right hemisphere) (Ingalhalikar et al., 2014).

On average, boys have bigger brains (Ruigrok et al., 2014). Boys also have more connective white matter (Ingalhalikar et al., 2014). They also have more cerebrospinal fluid, which cushions the longer paths of nerve impulses. Boys' brains seem to be optimized for activity within each hemisphere—their brains are more modular and seem to show an advantage for visual and spatial performance (Halpern et al., 2007; Ingalhalikar et al., 2014). Earlier reports about sex differences in the size of the corpus callosum (a band of nerve fibers connecting both hemispheres of the brain) appear to be an artifact of overall brain size (Luders, Toga, & Thompson, 2014).

Social and cultural forces that influence gender differences include the following (Halpern et al., 2007):

- *Home influences:* Across cultures, parents' educational level correlates with their children's math achievement. The amount of parental involvement in children's education affects math performance. Parents' gender attitudes and expectations also have an effect.
- *School influences:* Subtle differences in the way teachers treat boys and girls, especially in math and science classes, have been documented.
- *Neighborhood influences:* Boys benefit more from enriched neighborhoods and are hurt more by deprived neighborhoods.

- *Women's and men's roles* in society help shape girls' and boys' choices of courses and occupations.
- *Cultural influences:* Cross-cultural studies show that the size of gender differences in math performance varies among nations and becomes greater by the end of secondary school. These differences correlate with the degree of gender equality in the society.

Science continues to search for the ways in which boys' and girls' academic abilities differ and the reasons those differences exist. As changes in attitudes and perceptions open opportunities, the consequences of the structural differences seem to be shrinking. The rate of U.S. doctoral degrees in the sciences and math awarded to women is strong evidence: In 1970, only 14 percent of PhDs in biology and 8 percent of PhDs in mathematics and statistics were granted to women. By 2006, the rates rose to 46 and 32 percent, respectively (Hyde & Mertz, 2009). By 2016, 54.1 percent of PhDs in biology and 37.8 percent of PhDs in mathematics and computer science were held by women. Overall, 52.1 percent of doctoral degrees across all fields of study were awarded to women (Okahana & Zhou, 2017).

Family, Ethnicity, and Peer Influences Family and school experiences are subject to a phenomenon referred to as spillover, wherein experiences in different contexts influence each other (Grzywacz, Almeida, & McDonald, 2002). Stress at home has been shown to predict problems with attendance and learning; conversely, problems with attendance and learning contribute to family stress (Flook & Fuligni, 2008).

Does parenting style influence academic performance? *Authoritative parents*, who strike a balance between making demands and being responsive, tend to have teens who do better academically. Both *authoritarian parents*, who tend to use more punishment and harsh control, and *permissive parents*, who seem indifferent to grades, have children who show slightly lower achievement. However, while statistically significant, all of these differences are small to very small (Pinquart, 2016). In other words, they have little predictive value in the real world.

Parental involvement in academic activities is a far better predictor of which teens will do well academically (Castro et al., 2015). Parents who emphasize the value of education, connect academic performance to future goals, and discuss learning strategies have a significant impact on student academic achievement (Hill & Tyson, 2009). Parents' educational level and family income also indirectly affect educational attainment based on how they influence parenting style, sibling relationships, and adolescent academic engagement (Melby, Conger, Fang, Wickrama, & Conger, 2008).

Children of minority status, while sharing many common developmental influences with their majority status peers, are exposed to additional potentially negative influences such as discrimination and racism (Coll et al., 1996). Also, in the United States, minority status is generally correlated with poverty, and socioeconomic status in turn is strongly associated with school achievement. Thus, we might expect ethnicity to be an important factor. This is indeed the case. High school graduation rates in 2015–2016 were highest for Asian Americans (91 percent), followed by whites (88 percent), Hispanics (79 percent), blacks (76 percent). and Native Americans (72 percent) (National Center for Education Statistics, 2018a).

Peer influences on motivation are also important. In one study, Latino and African American adolescents did less well in school than European American students, apparently because of lack of peer support for academic achievement (Steinberg, Dornbusch, & Brown, 1992). On the other hand, Asian American students get high grades and score better than European American students on math achievement tests, apparently because both parents and peers prize achievement (Chen & Stevenson, 1995). Generally, academically engaged students associate with others who are also academically engaged (Véronneau & Dishion, 2011), and, especially for girls, this predicts later performance (Crosnoe, Cavanagh, & Elder, 2003; Riegle-Crumb, Farkas, & Muller, 2006). Moreover, those students who do well tend to be well liked by their peers, and those who do poorly are more likely to be rejected or bullied (Véronneau, Vitaro, Brendgen, Dishion, & Tremblay, 2010; Nakamot & Schwartz, 2010).



One of the issues with comparing historical research with current research is that times change, as can the influence of particular variables. Electronic book readers such as the Kindle are becoming increasingly popular. What might this trend mean for the previous finding that the number of books in the home is correlated with academic achievement?

The School The quality of schooling strongly influences student achievement. A good middle or high school has an orderly, safe environment, adequate material resources, a stable teaching staff, and a positive sense of community. The school culture places a strong emphasis on academics and fosters the belief that all students can learn. It also offers opportunities for extracurricular activities, which keep students engaged and prevent them from getting into trouble after school. Teachers trust, respect, and care about students and have high expectations for them as well as confidence in their own ability to help students succeed (Eccles, 2004).

Adolescents are more satisfied with school if allowed to participate in making rules, if they feel support from teachers and other students (Samdal & Dür, 2000), and if the curriculum and instruction are meaningful and appropriately challenging and fit their interests, skill level, and needs (Eccles, 2004). In part, the positive effects of a school are a function of the unique peer culture—including both how students relate to each other and what they perceive the academic culture of the school to be (Lynch, Lerner, & Leventhal, 2013). High teacher expectations are the most consistent positive predictor of students' goals and interests, and negative feedback is the most consistent negative predictor of academic performance and classroom behavior (Wentzel, 2002).

A decline in academic motivation and achievement often begins with the transition from the intimacy and familiarity of elementary school to the larger, more pressured, and less supportive environment of middle school or junior high school (Eccles, 2004). For this reason, some cities have tried eliminating the middle school transition by extending elementary school to eighth grade or have consolidated some middle schools with small high schools (Gootman, 2007).

checkpoint can you . . .

- Explain how schools in various cultures motivate students to learn?
- Assess the influences of personal qualities, SES, gender, ethnicity, parents, and peers on academic achievement?
- Give examples of educational practices that can help high school students succeed?

Technology In 2013, approximately 78 percent of teens had a cell phone, 23 percent had a tablet computer, and 93 percent had access to a computer at home (Madden, Lenhart, Duggan, Cortesi, & Gasser, 2013). The expansion of technology and the major role it plays in children's lives have affected learning. Teachers often ask students to conduct research online, as well as to access (79 percent) and submit (76 percent) homework and assignments online (Purcell, Heaps, Buchanan, & Fried, 2013). Unfortunately, research indicates that while visual skills have improved as a result of the increased use of computers and video games, critical-thinking and analysis skills have declined. Also, students are spending more time with visual media and less time reading for pleasure (Greenfield, 2009). Reading develops vocabulary, imagination, and induction, skills that are critical to solving more complex problems.

DROPPING OUT OF HIGH SCHOOL

As noted, more U.S. youths are completing high school than ever before. The percentage of those who drop out, known as the status dropout rate, includes all people in the 16- to 24-year-old age group who are not enrolled in school and who have not completed a high school program, regardless of when they left school. In 2016, the status dropout rate for this group was 6.1 percent, and it was higher for boys (7.1 percent) than girls (5.1 percent). Average dropout rates are lower for white students (5.2 percent) than for both blacks (6.2 percent) and Hispanics (8.6 percent) (National Center for Education Statistics, 2018a).

Why are poor and minority adolescents more likely to drop out? Reasons include low teacher expectations, differential treatment of these students, less teacher support than at the elementary level, and the perceived irrelevance of the curriculum to culturally underrepresented groups. The transition to high school for African American and Latino students seems to be most risky for those students transitioning from smaller, more supportive junior high schools with significant numbers of minority peers to larger, more impersonal high schools with fewer minority peers (Benner & Graham, 2009).

There are consequences both for society and for individuals to dropping out. Society suffers when young people do not finish school. Dropouts are more likely to be unemployed or to have low incomes, to end up on welfare, and to become involved with drugs, crime, and delinquency. They also tend to be in poorer health (Laird, Lew, DeBell, & Chapman, 2006; National Center for Education Statistics, 2004).

research in action

TEENS AND MEDIA MULTITASKING

Multitasking is not a new phenomenon. People have always had to pay attention to more than one thing at once. What has changed dramatically, however, is the impact that electronic media have had on multitasking. Adolescents, who have grown up with portable electronic media at their fingertips, are particularly prone to multitasking (Voorveld & van der Goot, 2013). Studies show that more than 25 percent of adolescents' media consumption occurs using at least two media types simultaneously (Rideout et al., 2010).

Teens are likely to media multitask, for example, by combining music with online activities (Voorveld & van der Goot, 2013). Adolescents may believe that they are producing high-quality work while texting with friends or listening to music, but evidence suggests the opposite. Baumgartner and colleagues (2014) found that adolescents who frequently media multitask report more problems in staying focused, inhibiting inappropriate behavior, and switching effectively between tasks. Potential deficits in executive function associated with media multitasking have far-reaching academic implications. Studies have shown an association between media multitasking and poorer academic performance on standardized tests in math and English, as well as decreased working memory capacity (Cain, Leonard, Gabrieli, & Finn, 2016). Students given access to the Internet during class do not process what was presented as well and perform more poorly than students without access (Greenfield, 2009).

Perhaps even more disturbing are statistics that link media multitasking to distracted driving among adolescents. Distractions come in many forms, but the use of cell phones and texting while driving has been implicated in many adolescent accidents, resulting in injuries and deaths. Carter (2014) reports that 92 percent of adolescents engage in distracted driving behaviors and that teenagers have much higher rates of distracted driving crashes than older drivers. In 2015, 42 percent of high school students who drove in the past 30 days reported sending a text or e-mail while driving (Kann et al., 2016). While teenagers are not the only age group to use cell phones while driving, studies show that novice drivers are particularly sensitive to the negative effects of dialing and texting while driving (Klauer et al., 2014). In a study comparing cell phone use while driving and drunk driving, impairments while using a cell phone were determined to be as profound as those associated with driving while drunk (Strayer, Drews, & Crouch, 2006).

what's your view

What are the benefits and risks of teens' media multitasking? What actions can be taken to reduce the number of adolescent deaths associated with distracted driving and cell phone use?



Students learn more when they are asked to read materials in a harder-to-read font. The additional processing required to decode the words helps the material stick better.

Diemand-Yauman, Oppenheimer, & Vaughan, 2011

There are also personal consequences. As young adults, those who successfully complete high school are most likely to obtain postsecondary education, to have jobs, and to be employed (Finn, 2006; U.S. Department of Labor, 2013). For example, in 2017, the unemployment rate for young adults without a high school degree was 13 percent, while those with at least a high school degree had an unemployment rate of 7 percent, and those with a bachelor's degree had a 3 percent unemployment rate (National Center for Education Statistics, 2018b). High school completers are also likely to earn more money. In 2012, the median income of people who did not complete high school was approximately $25,000. However, those with at least a high school degree earned a median income of approximately $46,000. Over a lifetime of work, this results in a difference of $670,000 (Stark & Noel, 2015).

checkpoint can you . . .

- Discuss trends in high school completion and causes and effects of dropping out?
- Explain the importance of active engagement in schooling?

PREPARING FOR HIGHER EDUCATION OR VOCATIONS

How do young people develop career goals? How do they decide whether to go to college and, if not, how to enter the world of work? Let's look at some influences on educational and vocational aspirations. Then we'll examine provisions for young people who do not plan to go to college. We'll also discuss the pros and cons of outside work for high school students.



Students whose strength is in creative thinking frequently don't get a chance to show what they can do. More flexible teaching and career counseling could allow more students to make the contributions of which they are capable.
Jacob Lund/Shutterstock

Influences on Students' Aspirations Self-efficacy beliefs help shape the occupational options students consider and the way they prepare for careers (Bandura, Barbaranelli, Caprara, & Pastorelli, 2001). In addition, parents' values with regard to academic achievement influence adolescents' values and occupational goals (Jodl, Michael, Malanchuk, Eccles, & Sameroff, 2001).

Despite the greater flexibility in career goals today, there are still gender differences in career choices. Women receive more than half of all undergraduate degrees in biology, chemistry, and math. However, they are underrepresented—earning only 20 percent of degrees—in computer science, engineering, and physics (Cheryan, Ziegler, Montoya, & Jiang, 2017). While the reasons for this are varied, one factor is gender stereotyping, which still influences vocational choice. Young men and women in the United States are now equally likely to plan careers in math and science. However, women are still more likely to go into fields such as nursing, social welfare professions, and teaching (Eccles, 2004). Much the same is true in other industrialized countries (OECD, 2004). Another factor may be that those individuals who are high in both mathematical and verbal abilities—of whom more are female—have a wider variety of career options available to them. These individuals are less likely to pursue careers in science, technology, engineering, or mathematical areas (Wang, Eccles, & Kenny, 2013).

The educational system itself may act as a brake on vocational aspirations. Students who can memorize and analyze tend to do well academically. Students whose strength is in creative or practical thinking—areas critical to success in certain fields—rarely get a chance to show what they can do (Sternberg, 1997). Recognition of a broader range of intelligences and more flexible teaching and career counseling could allow more students to meet their educational goals

Guiding Students Not Bound for College Adolescents decide to forgo college for a variety of reasons. Some young adults, who tend to come from low-income families and have low academic achievement, have financial constraints that prevent them from attending college despite their desire to do so. A second smaller group is composed of young people who have the financial means to go to college as well as the academic ability but prefer to begin working and earning money. The remainder of non-college-bound young adults give a wide variety of reasons for their decision not to attend college (Bozick & DeLuca, 2011). Most industrialized countries offer guidance to non-college-bound students. Germany, for example, has an apprenticeship system in which high school students go to school part-time and spend the rest of the week in paid on-the-job training supervised by an employer-mentor.

The United States lacks coordinated policies to help non-college-bound youth make a successful transition from high school to the labor market. Vocational counseling is generally oriented toward college-bound youth. Whatever vocational training programs do exist for high school graduates who do not immediately go on to college tend to be less comprehensive than the German model and less closely tied to the needs of businesses and industries. Most of these young people must get training on the job or in community college courses. Many, ignorant about the job market, do not obtain the skills they need. Others take jobs beneath their abilities. Some do not find work at all (NRC, 1993a).

In some communities, demonstration programs help in the school-to-work transition. The most successful ones offer instruction in basic skills, counseling, peer support, mentoring, apprenticeship, and job placement (NRC, 1993a). In 1994, Congress allocated $1.1 billion to help states and local governments establish school-to-work programs in partnership

with employers. Participating students improved their school performance and graduation rates and, when they entered the labor market, were more likely to find jobs and earned higher wages than students who did not participate (Hughes, Bailey, & Mechur, 2001).

Adolescents in the Workplace In the United States, about 18 percent of students are employed during a given school year (Child Trends Databank, 2016), and the vast majority of adolescents are employed at some time during high school, mostly in service and retail jobs. Researchers disagree over whether part-time work is beneficial to high school students (by helping them develop real-world skills and a work ethic) or detrimental (by distracting them from long-term educational and occupational goals).

How much students work matters: Those who work more than 20 hours a week generally suffer academically and are more likely to drop out of school (Warren & Lee, 2003). However, research suggests that this association is not causal and is a consequence of the fact that those students who are poor achievers may prefer to work more hours (Staff, Schulenberg, & Bachman, 2010). Some data, however, suggest that while working may not affect the academic performance in high school, it may nonetheless lower the probability of going to college (Lee & Orazem, 2010).

For high school students who must or choose to work outside of school, then, the effects are more likely to be positive if they try to limit working hours and remain engaged in school activities. Cooperative educational programs that enable students to work part time as part of their school program may be especially protective (Staff et al., 2004).

checkpoint can you . . .

- Discuss influences on educational and vocational aspirations and planning?

summary and key terms

Adolescence: A Developmental Transition

- Adolescence, in modern industrial societies, is the transition from childhood to adulthood. It lasts from about age 11 until 19 or 20.
- Early adolescence is full of opportunities for physical, cognitive, and psychosocial growth, but also of risks to healthy development. Risky behavior patterns, such as drinking alcohol, drug abuse, sexual and gang activity, and use of firearms, tend to increase throughout the teenage years; but most young people experience no major problems.

adolescence (*321*)

puberty (*321*)

PHYSICAL DEVELOPMENT
Puberty

- Puberty is triggered by hormonal changes. Puberty takes about 4 years, typically begins earlier in girls than in boys, and ends when a person can reproduce; but the timing of these events varies considerably.
- Puberty is marked by two stages: (1) the activation of the adrenal glands and (2) the maturing of the sex organs a few years later.
- During puberty, both boys and girls undergo an adolescent growth spurt. The reproductive organs enlarge and mature, and secondary sex characteristics appear.
- A secular trend toward earlier attainment of adult height and sexual maturity began about 100 years ago, probably because of improvements in living standards.
- The principal signs of sexual maturity are production of sperm (for males) and menstruation (for females).

primary sex characteristics (*323*)

secondary sex characteristics (*323*)

adolescent growth spurt (*323*)

spermarche (*324*)

menarche (*324*)

secular trend (*324*)

The Adolescent Brain

- The adolescent brain is not yet fully mature. It undergoes a second wave of overproduction of gray matter, especially in the frontal lobes, followed by pruning of excess nerve cells. Continuing myelination of the frontal lobes facilitates the maturation of cognitive processing.
- Because the limbic areas of the brain mature first and the frontal lobes mature more slowly, this predisposes adolescents to impulsivity and risk-taking.

Physical and Mental Health

- For the most part, the adolescent years are relatively healthy. Health problems often are associated with poverty or lifestyle.
- Many adolescents do not engage in regular vigorous physical activity.
- Many adolescents do not get enough sleep because the high school schedule is out of sync with their natural body rhythms.
- Concern with body image, especially among girls, may lead to eating disorders.
- Three common eating disorders in adolescence are anorexia nervosa, bulimia nervosa, and binge eating disorder. All can have serious long-term effects. Anorexia and bulimia affect mostly girls and young women. Outcomes for bulimia tend to be better than for anorexia.
- Adolescent substance use has lessened in recent years; still, drug use often begins as children move into middle school.
- Marijuana, alcohol, and tobacco are the most popular drugs with adolescents. All involve serious risks. Nonmedical use of prescription and over-the-counter drugs is an increasing problem.
- The prevalence of depression increases in adolescence, especially among girls.
- Leading causes of death among adolescents include motor vehicle accidents, firearm use, and suicide.

body image (*330*)

anorexia nervosa (*331*)

bulimia nervosa (*332*)

binge eating disorder (*332*)

substance abuse (*333*)

substance dependence (*333*)

binge drinking (*334*)

COGNITIVE DEVELOPMENT

Aspects of Cognitive Maturation

- Adolescents who reach Piaget's stage of formal operations can engage in hypothetical-deductive reasoning. They can think in terms of possibilities, deal flexibly with problems, and test hypotheses.
- Because environmental stimulation plays an important part in attaining this stage, not all people become capable of formal operations; and those who are capable do not always use them.
- Adolescents illustrate their cognitive immaturity in a number of characteristic ways, including the imaginary audience, in which they believe everyone is focused upon them, and the personal fable, in which they believe they are special and not subject to the same rules that govern the rest of the world.
- Vocabulary and other aspects of language development, especially those related to abstract thought, such as social perspective-taking, improve in adolescence. Adolescents enjoy wordplay and create their own dialect.
- According to Kohlberg, moral reasoning is based on a developing sense of justice and growing cognitive abilities. Kohlberg proposed that moral development progresses from external control to internalized societal standards to personal, principled moral codes.
- Kohlberg's theory has been criticized on several grounds, including failure to credit the roles of emotion, socialization, and parental guidance. The applicability of Kohlberg's system to women and girls and to people in non-Western cultures has been questioned.

formal operations (*337*)

hypothetical-deductive reasoning (*338*)

preconventional morality (*341*)

conventional morality (or morality of conventional role conformity) (*341*)

postconventional morality (or morality of autonomous moral principles) (*341*)

Educational and Vocational Issues

- Self-efficacy beliefs, parental practices, cultural and peer influences, gender, and quality of schooling affect adolescents' educational achievement.
- Although most Americans graduate from high school, the dropout rate is higher among poor, Hispanic, and African American students. However, this racial/ethnic gap is narrowing. Active engagement in studies is an important factor in keeping adolescents in school.
- Educational and vocational aspirations are influenced by several factors, including self-efficacy and parental values. Gender stereotypes have less influence than in the past.
- High school graduates who do not immediately go on to college can benefit from vocational training.
- Part-time work seems to have both positive and negative effects on educational, social, and occupational development. The long-term effects tend to be best when working hours are limited.

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chapter 12

Psychosocial Development in Adolescence

outline

The Search for Identity

Sexuality

Relationships with Family, Peers, and Adult Society

Antisocial Behavior and Juvenile Delinquency

learning objectives

Discuss identity formation in adolescence.

Describe adolescent sexuality.

Characterize changes in adolescents' relationships with family and peers.

Describe adjustment problems of adolescents and strategies for intervention and risk reduction.



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did you know?

- Adolescence is a cultural invention, and not all cultures have "teenagers."
- Sex education programs that encourage *both* abstinence and safe sexual practices are more effective in delaying sexual initiation than abstinence-only programs.
- Most adolescents say they have good relationships with their parents.

In this chapter, we turn to psychosocial aspects of the quest for identity. We discuss how adolescents come to terms with their sexuality. We consider how teenagers' burgeoning individuality expresses itself in relationships with parents, siblings, peers, and friends. We examine sources of antisocial behavior and ways of reducing the risks to adolescents to make it a time of positive growth and expanding possibilities.

It takes courage to grow up and become who you really are.

—e. e. cummings, American poet (1894–1962)

The Search for Identity

The search for **identity**—which Erikson defined as a coherent conception of the self, made up of goals, values, and beliefs to which the person is solidly committed—comes into focus during the teenage years. As Erikson (1950) emphasized, a teenager's effort to make sense of the self is part of a healthy, vital process that builds on the achievements of earlier stages and lays the groundwork for coping with the challenges of adulthood.

identity
According to Erikson, a coherent conception of the self, made up of goals, values, and beliefs to which a person is solidly committed.

IDENTITY VERSUS IDENTITY CONFUSION

The chief task of adolescence, said Erikson (1968), is to confront the crisis of **identity versus identity confusion,** or *identity versus role confusion,* so as to become a unique adult with a coherent sense of self and a valued role in society. Identity, according to Erikson, forms as young people resolve three major issues: the choice of an *occupation,* the adoption of *values* to live by, and the development of a satisfying *sexual identity.*

identity versus identity confusion
Erikson's fifth stage of psychosocial development, in which an adolescent seeks to develop a coherent sense of self, including the role she or he is to play in society. Also called *identity versus role confusion.*

fidelity
Sustained loyalty, faith, or sense of belonging that results from the successful resolution of Erikson's identity versus identity confusion psychosocial stage of development.

During middle childhood, children acquire skills needed for success in their culture. At least in Western countries such as the United States, adolescence is a relatively long period of time during which young people begin to take on adult responsibilities but are not fully independent. Erikson believed this time-out period, which he called *psychosocial moratorium,* was ideal for the development of identity and allowed young people the opportunity to search for commitments to which they could be faithful.

Adolescents who resolve the identity crisis satisfactorily develop the virtue of **fidelity:** sustained loyalty, faith, or a sense of belonging to a loved one, friends, or companions. Fidelity also can mean identification with a set of values, an ideology, a religion, a political movement, or an ethnic group (Erikson, 1982). Individuals who do not develop a firm sense of their own identity and do not develop fidelity may have an unstable sense of self, be insecure, and fail to plan for themselves and the future.

Erikson saw this identity or role confusion as the prime danger of this stage. A failure to form a coherent sense of identity can greatly delay reaching psychological adulthood. Some degree of identity confusion is normal. According to Erikson, it accounts for the seemingly chaotic nature of much adolescent behavior and for teenagers' painful self-consciousness. Cliquishness and intolerance of differences, both hallmarks of the adolescent social scene, are defenses against identity confusion.

Erikson's theory describes male identity development as the norm. According to Erikson, a man is not capable of real intimacy until he has achieved a stable identity, whereas women define themselves through marriage and motherhood. As we'll see, this male orientation of Erikson's theory has prompted criticism.



Mastering the challenge of a whitewater course may help this adolescent girl assess her abilities, interests, and desires.
Michael DeYoung/Blend Images

IDENTITY STATUS—CRISIS AND COMMITMENT

crisis
Marcia's term for period of conscious decision making related to identity formation.

commitment
Marcia's term for personal investment in an occupation or system of beliefs.

Through 30-minute, semistructured *identity-status interviews* (Table 1), James E. Marcia (1966, 1980) distinguished four types of identity status: *identity achievement, foreclosure, moratorium,* and *identity diffusion.* The four categories differ according to the presence or absence of **crisis** and **commitment,** the two elements Erikson saw as crucial to forming identity. Marcia defined *crisis* as a period of conscious decision making. Crisis, within the context of Erikson's theories, does not refer to a stressful event such as losing your job or not being able to pay your bills. Rather, it refers to the process of grappling with what to believe and who to be.

Commitment, the other aspect of identity formation, involves a personal investment in an occupation or ideology (system of beliefs). Commitments can be held after they have been deeply considered, after crisis, or can be adopted without much thought put into them. Here is a sketch of young people in each identity status.

identity achievement
Identity status, described by Marcia, that is characterized by commitment to choices made following a crisis, a period spent in exploring alternatives.

- **Identity achievement** (*crisis leading to commitment*). Olivia has resolved her identity crisis. During her crisis period, she devoted much thought and some emotional struggle to major issues in her life. She has made choices and expresses strong commitment to them. For example, in high school, she considered her interests and talents, and decided to become an engineer. She then chose a college on the basis of its engineering and internship program, and she is doing well. Her parents have encouraged her to make her own decisions; they have listened to her ideas and given their opinions without pressuring her. Research in a number of cultures has found people in this category to be more mature and socially competent than people in the other three (Kroger, 2003; Marcia, 1993).

foreclosure
Identity status, described by Marcia, in which a person who has not spent time considering alternatives (that is, has not been in crisis) is committed to other people's plans for his or her life.

- **Foreclosure** (*commitment without crisis*). Isabella has made commitments, not as a result of exploring choices but by accepting someone else's plans for her life. She has not considered whether she believes in her commitments and has uncritically accepted others' opinions. She is happy and self-assured, but she becomes dogmatic when her opinions are questioned. She has close family ties, is obedient, and tends to follow a powerful leader, like her mother, who accepts no disagreement. For example, Isabella's mother, a union leader at a plastics factory, arranged for Isabella to enter an apprenticeship program there. Isabella never considered doing anything else.

moratorium
Identity status, described by Marcia, in which a person is currently considering alternatives (in crisis) and seems headed for commitment.

- **Moratorium** (*crisis with no commitment yet*). Josh is actively grappling with his identity and trying to decide the path he wants his life to take. Should he attend a

TABLE 1 Identity-Status Interview

Sample Questions	Typical Answers for the Four Statuses
About occupational commitment: "How willing do you think you'd be to give up going into _____ if something better came along?"	*Identity achievement.* "Well, I might, but I doubt it. I can't see what 'something better' would be for me." *Foreclosure.* "Not very willing. It's what I've always wanted to do. The folks are happy with it and so am I." *Moratorium.* "I guess if I knew for sure, I could answer that better. It would have to be something in the general area—something related . . ." *Identity diffusion.* "Oh, sure. If something better came along, I'd change just like that."
About ideological commitment: "Have you ever had any doubts about your religious beliefs?"	*Identity achievement.* "Yes, I started wondering whether there is a God. I've pretty much resolved that now. The way it seems to me is . . ." *Foreclosure.* "No, not really; our family is pretty much in agreement on these things." *Moratorium.* "Yes, I guess I'm going through that now. I just don't see how there can be a God and still so much evil in the world. . . ." *Identity diffusion.* "Oh, I don't know. I guess so. But it really doesn't bother me much. I figure that one religion is about as good as another!"

Source: Adapted from Marcia, J. E. "Development and Validation of Ego-Identity Status." *Journal of Personality and Social Psychology* 3, no. 5 (1966): 551–58.

community college or join the army? He is lively, talkative, self-confident, and scrupulous but also anxious and fearful. He is close to his mother but resists her authority. He will probably come out of his crisis eventually with the ability to make commitments and achieve identity.

- **Identity diffusion** (*no commitment, no crisis*). Jayden has not seriously considered options and has avoided commitments. He is unsure of himself and tends to be uncooperative. His parents say it's up to him. He figures he can get some sort of a job and make up his mind about the future when he is ready. People in this category tend to be unhappy and often lonely.

These categories are not stages; they represent the status of identity development at a particular time, and they may change in any direction as young people continue to develop (Marcia, 1979). Also, because our identity is multidimensional, our identity development is as well. For example, a young person may have decided upon a career path but not yet considered political or religious affiliation. When middle-aged people look back on their lives, they most commonly trace a path from foreclosure to moratorium to identity achievement (Kroger & Haslett, 1991). From late adolescence on, as Marcia proposed, more and more people are in moratorium or achievement: seeking or finding their identity. About half of late adolescents remain in foreclosure or diffusion, but when development does occur, it is typically in the direction Marcia described (Kroger, 2003).



Identity formation includes attitudes about religion. Research indicates that 84 percent of U.S. teens aged 13 to 17 believe in God, and about half of them say religion is very important to them. This number declines somewhat as teens age; however, by comparison to European countries, U.S. teens show higher religiosity.

Lippman & McIntosh, 2010

identity diffusion
Identity status, described by Marcia, that is characterized by absence of commitment and lack of serious consideration of alternatives.

GENDER DIFFERENCES IN IDENTITY FORMATION

Some earlier research supports Erikson's view that for women, identity and intimacy develop together. However, some data suggest gender differences may be less important than they were and individual differences may play more of a role now (Archer, 1993; Marcia, 1993). Earlier studies described young women as more competent at intimacy than men (Fischer, 1981). Such research also suggested that intimacy was more closely related to identity formation for women than men (Hodgson & Fischer, 1979). Moreover, a meta-analysis using data from studies conducted in the 1970s and 1980s showed that identity status and intimacy were associated with each other in both men and women but that the relationship was more robust for men (Arseth, Kroger, Martinussen, & Marcia, 2009).

However, more recent research has indicated there are few gender differences in identity status (Kroger, 2003). For instance, longitudinal research a few decades later in the late 1990s to early 2000s on German young adults found no gender differences. While ego identity at age 15 strongly predicted intimacy in romantic relationships at age 25, this was true for both men and women (Beyers & Seiffge-Krenke, 2010). Similarly, other research has failed to find gender differences in the link between adolescent romantic attachment and identity exploration (Kerpelman et al., 2012). Changes in social structure and the increased role of women in the workforce may have led to these further reductions in gender differences.

ETHNIC FACTORS IN IDENTITY FORMATION

For a European American young person growing up in a predominantly white culture, the process of ethnic identity formation is not particularly troublesome. However, for many young people in minority groups, race or ethnicity is central to identity formation. Following Marcia's model, some research has identified four ethnic identity statuses (Phinney, 1998):

1. *Diffused:* Juanita hasn't really thought about her identity. She has done little or no exploration of what her heritage means or what she thinks about it.
2. *Foreclosed:* Caleb has strong feelings about his identity, but those feelings are not really based on any serious exploration of his identity. Rather, he has absorbed the attitudes of other important people in his life. These feelings may be positive or negative.

TABLE 2 Representative Quotations from Each Stage of Ethnic Identity Development

Diffusion	"Well, yeah, my parents are both Latinos, so I guess I probably am too." (Latina female)
Foreclosure	"I am really happy that I am Chinese. My parents have always made me go to Chinese classes and participate in Chinese cultural events so that's just how I've always been." (Chinese male)
Moratorium	"I've heard people say that racism doesn't exist anymore, but I disagree. I've had some experiences that have really made me stop and think. I haven't figured it out yet, but I know that being black is different than being white." (black female)
Achieved	"My parents are first-generation immigrants, and I was born here. When I think about myself, I think I am a mix of their culture, and of American culture too. I think it helps me be flexible in social situations – I know that people are different in many ways, but also the same in many ways." (Latino male)

Source: Adapted from Phinney, 1998, p. 277, Table 2.

3. *Moratorium:* Cho-san has begun to think about what her ethnicity means to her but is still confused about it. She asks questions of others, talks about it with her parents, and thinks a great deal about it.
4. *Achieved:* Diego has spent a good deal of time thinking about who he is and what his ethnicity means within that context. He now understands and accepts his ethnicity.

Table 2 includes representative statements by minority young people in each status. Research with African American teens has shown that young people can be categorized into each of these identity statuses and that the proportions that fall into each category vary by age. As expected, a larger proportion of college students (47 percent) were in identity status than were high school students (27 percent). Across both age groups, those participants who had attained identity achievement status were more likely to report being African American as central to their identity than those in moratorium, foreclosed, or diffused status (Yip, Seaton, & Sellers, 2006).

More recent research, rather than focusing on the categorization of adolescents and young adults into identity statuses, has shifted toward examining longitudinal change in and the consequences of exploration and commitment/belongingness to one's ethnic group (Phinney & Ong, 2007). Exploration of the meaning of ethnicity, which increases in middle adolescence and often reflects the transition to a more ethnically diverse high school, is an important variable (French, Seidman, Allen, & Aber, 2006).

Peers and gender also have an impact on this process. Friends are likely to report similar levels of identity exploration and commitment, especially if they are both ethnic minority members and if they frequently discuss issues of race or ethnicity (Syed & Juan, 2012). Girls may undergo the process of identity formation earlier than boys (Portes, Dunham, & Del Castillo, 2000). For example, one study showed that over a 4-year period, Latina girls went through exploration, resolution, and affirmation of positive feelings about their ethnic identities, whereas boys showed increases only in affirmation (Umana-Taylor, Gonzales-Backen, & Guimond, 2009).

Generally, research has found that developing a sense of ethnic identity is beneficial. Several reviews have found that ethnic identity development has been related to higher self-esteem and better well-being, mental and physical health, and academic outcomes, especially for African American adolescents (Smith & Silvia, 2011; Rivas-Drake et al., 2014). For example, although the effect is stronger for men than for women, increases in racial identity over 1 year have been related to a decreased risk of depressive symptoms (Mandara, Gaylord-Harden, Richards, & Ragsdale, 2009).

Perceived discrimination during the transition to adolescence can interfere with positive identity formation and lead to conduct problems or depression. As an example, perceptions of discrimination are associated with depressive symptoms, alienation, and a drop in academic performance in Chinese American adolescents (Benner & Kim, 2009) and decreases in self-esteem and increases in depression in Asian American, black, and Latino teens (Greene, Way, & Pahl, 2006). However, teens can be buffered from the effects of perceived discrimination by a variety of protective factors, including nurturant, involved parenting; secure attachment with parents; prosocial friends; and strong academic performance (Myrick & Martorell, 2011; Brody et al., 2006).

Cultural socialization includes practices that teach children about their racial or ethnic heritage, promote cultural customs and traditions, and foster racial/ethnic and cultural pride. For example, think about the holidays you celebrate. Participating in those traditions and rituals was part of your cultural socialization, and it impacts identity formation. Adolescents who have experienced cultural socialization tend to have stronger and more positive ethnic identities than those who have not (Juang & Syed, 2010; Hughes et al., 2006). Note that in some cases, cultural socialization is not positive in nature. For example, in some African American families, some ethnic socialization practices involve preparing children to experience oppression and racism or emphasizing the need to exercise caution in interactions with majority-group members (Else-Quest & Morse, 2015).

cultural socialization
Parental practices that teach children about their racial/ethnic heritage and promote cultural practices and cultural pride.

checkpoint can you . . .

- List the three major issues involved in identity formation, according to Erikson?
- Describe four types of identity status found by Marcia?
- Discuss how gender and ethnicity affect identity formation?

Sexuality

Seeing oneself as a sexual being, recognizing one's sexual orientation, and forming romantic or sexual attachments all are parts of achieving *sexual identity.* Awareness of sexuality is an important aspect of identity formation.

During the twentieth century a major change in sexual attitudes and behavior in the United States and other industrialized countries brought more widespread acceptance of premarital sex, homosexuality, and other previously disapproved forms of sexual activity. With widespread access to the Internet, casual sex with fleeting acquaintances met in online chat rooms or singles' meeting sites has become more common. Cell phones, e-mail, and instant messaging make it easy for adolescents to arrange hookups with disembodied strangers. All of these changes have brought increased concerns about sexual risk-taking. On the other hand, the AIDS epidemic has led many young people to abstain from sexual activity outside of committed relationships or to engage in safer sexual practices.

sexual orientation
Focus of consistent sexual, romantic, and affectionate interest, either heterosexual, homosexual, or bisexual.

SEXUAL ORIENTATION AND IDENTITY

It is in adolescence that a person's **sexual orientation** generally becomes more clear: whether that person will consistently be sexually attracted to persons of the other sex (*heterosexual*), of the same sex (*homosexual*), or of both sexes (*bisexual*). And, as with other important areas of development, teens may hold varying identity statuses as they form their sexual identity. The prevalence of homosexual orientation varies widely. Depending on whether it is measured by sexual or romantic *attraction or arousal* or by sexual *behavior* or sexual *identity,* the rate of homosexuality in the U.S. population ranges from 1 to 21 percent (Savin-Williams, 2006).

Many young people have one or more homosexual experiences, but isolated experiences or even occasional attractions or fantasies do not determine sexual orientation. In a national survey, 3 percent of 18- to 19-year-old boys and 8 percent of girls in that age group reported being gay, lesbian, or bisexual,



Attitudes toward sexuality have liberalized in the United States in the past 50 years. This trend includes more open acceptance of sexual activity and a decline in the double standard by which males are freer sexually than females.
Ryan McVay/Photodisc/Getty Images

Most people experience their first crush at about 10 years of age, a process that appears to be related to the maturation of the adrenal glands. For those who will later identify as homosexual, this first crush is often on a member of the same sex.

Herdt & McClintock, 2000

Homosexual teens are at risk for depression and suicide largely due to contextual variables such as bullying and a lack of acceptance. In 2010, columnist and author Dan Savage created a YouTube video that went viral and has now resulted in the "It Gets Better" campaign. In this video, teens are assured that happiness and hope are a distinct possibility for the future—that, indeed, it does get better.

but 4 percent of the boys and 12 percent of the girls reported same-sex sexual behaviors (Guttmacher Institute, 2019). Social stigma may bias such self-reports, underestimating the prevalence of homosexuality and bisexuality. Although there is increasing acceptance in the United States, African American, Hispanic, and older adults are more likely to hold negative views of homosexuality (Glick, Cleary, & Golden, 2015; Brown, 2017).

Origins of Sexual Orientation Much research on sexual orientation has focused on efforts to explain homosexuality. Although it once was considered a mental illness, several decades of research have found no association between homosexual orientation and emotional or social problems—apart from those apparently caused by societal treatment of homosexuals (APA, n.d.; Meyer, 2003; C. J. Patterson, 1992, 1995a, 1995b). These findings led the psychiatric profession in 1973 to stop classifying homosexuality as a mental disorder.

Sexual orientation seems to be at least partly genetic (Diamond & Savin-Williams, 2003). For example, research has found stretches of DNA on chromosomes 7, 8, 10, and 28 that appear to be involved (Mustanski et al., 2005; Sanders et al., 2015). Twin studies have led to similar conclusions about genetic influences. Researchers have found the concordance rates of monozygotic (identical) twins is always higher than that of dizygotic (fraternal) twins. However, despite having the exact same copy of genes, identical twins are not perfectly concordant for sexual orientation (Ngun & Vilain, 2014). This implies that nongenetic factors must also play a part. One large twin study found that genes explained about 34 percent of the variation in men and 18 percent in women (Långström, Rahman, Carlström, & Lichtenstein, 2008). But what of the remaining influence? What are the environmental experiences that might impact sexual orientation?

It is important to note that when discussing environmental influences, researchers are not referring to older, discredited theories about domineering mothers, absent fathers, or sexual abuse as causal factors in the development of homosexual orientation (Ngun & Vilain, 2014). Rather, environmental experiences refer, most commonly, to the 9 months of prenatal influences in the womb. Those experiences have shaped the brain in significant ways that may affect later sexual orientation.

One environmental influence on development involves biological correlates of family structure. The more older biological brothers a man has, the more likely he is to be gay (Blanchard, 2017). Each older biological brother increases the chances of homosexuality in a younger brother by 33 percent (Bogaert, 2006). Furthermore, there are indications that male babies who will later identify as gay are more likely to weigh less at birth and have mothers who experience miscarriages (VanderLaan, Blanchard, Wood, Garzon, & Zucker, 2015; Skorska, Blanchard, VanderLaan, Zucker, & Bogaert, 2017). These phenomena may indicate a cumulative immunelike response to the presence of successive male fetuses in the womb.

Another variable that has been implicated in sexual orientation is the 2D:4D ratio. This ratio—that of the pointer finger to the ring finger—is, through a quirk of development, affected by hormone exposure in utero. A lower 2D:4D ratio indicates high prenatal androgen exposure and is more typical of men than women. Interestingly, one meta-analysis showed that lesbian women had a significantly more masculinized 2D:4D ratio when compared to heterosexual women, suggesting androgen exposure in utero affected their sexual orientation. Gay men, by contrast, did not appear to have a different 2D:4D ratio than heterosexual men (Grimbos, Dawood, Buriss, Zucker, & Puts, 2010). Other research with girls who have a condition called congenital adrenal hyperplasia (CAH) also speaks to the influence of prenatal hormone exposure. Girls with CAH, who are exposed to higher than average levels of androgens in utero, are more likely to later identify as lesbian or bisexual (Bao & Swaab, 2010).

Imaging studies have found similarities of brain structure and function between homosexuals and heterosexuals of the other sex. While correlational, they are intriguing. Brains of gay men and straight women are more symmetrical, whereas in lesbians

and straight men, the right hemisphere is slightly larger. Also, in gays and lesbians, connections in the amygdala, which is involved in emotion, are more typical of the other sex (Savic & Lindström, 2008). One researcher reported a difference in the size of the hypothalamus, a brain structure that governs sexual activity, in heterosexual and gay men (LeVay, 1991). In brain imaging studies on pheromones, odors that attract mates, the odor of male sweat activated the hypothalamus in gay men much as it did in heterosexual women. Similarly, lesbian women and straight men reacted more positively to female pheromones than to male ones (Savic, Berglund, & Lindström, 2005, 2006).

checkpoint can you . . .

- Summarize research findings regarding origins of sexual orientation?
- Discuss homosexual identity and relationship formation?

Homosexual, Bisexual, and Transgender Identity Development Most gay, lesbian, and bisexual youth begin to identify as such between the ages of 12 and 17 years (Calzo, Masyn, Austin, Jun, & Corliss, 2017). Gay, lesbian, and bisexual youth who are unable to establish peer groups that share their sexual orientation may struggle with the recognition of same-sex attractions (Bouchey & Furman, 2003), although the Internet has increasingly provided an anonymous and accessible means for young adults to explore their sexuality (Harper, Serrano, Bruce, & Bauermeister, 2016).

Gay and lesbian youth who experience rejection and low support for their sexual orientation from their parents after coming out are more likely to have difficulty accepting their sexual identity (Bregman, Malik, Page, Makynen, & Lindahl, 2013). Youth who do not successfully integrate their sexual identity in their self-concept are at risk for issues with anxiety, depression, or conduct problems (Rosario, Schrimshaw, & Hunter, 2011). Other teens rejected by their parents upon coming out may adopt a negative view of their sexuality (Bregman et al., 2013). Family rejection is associated with low self-esteem depression, substance abuse, and suicidal ideation (Ryan, Russell, Huebner, Diaz, & Sanchez, 2010), perhaps because parents' negative views about homosexuality are incorporated into their self-image (Baiocco et al., 2016).

Transgender is a term that refers to individuals whose biological sex at birth and gender identity are not the same. Those people who seek medical assistance to permanently transition to their preferred gender are generally referred to as *transsexual*, and still others use terms such as *genderqueer* to refer to a wide range of variable identities that may be neither fully male nor fully female (Haas et al., 2010). Forming a gender identity for people who do not fit the traditional binary is a complex issue. Because being transgender is relatively rare—approximately 0.3 percent of the population (Gates, 2011)—it is likely many transgender children and youth do not have access to transgender adult models to base their understanding on in the same way homosexual children do. Moreover, because the very concept is controversial, it is often not discussed in school-based sexual education programs (Boskey, 2014). Still, most transgender children from a young age know something is different, even if it takes them a while to figure it out. For example, in a retrospective study of transgender adolescents, all reported feeling different from other people at an average age of 7½ years but not coming to a full realization of being transgender until 13 to 15 years of age (Grossman, D'Augelli, Howell, & Hubbard, 2005).

Like gay and lesbian youth, transgender youth are at significantly elevated risk for a host of negative outcomes, and indeed, their risk appears to be even higher. And like homosexual youth, these outcomes appear to be driven by stigma, rejection, and a lack of social support. For instance, transgender youth are more likely to be bullied, and this bullying is in turn associated with an elevated risk of suicide attempts (Goldblum et al., 2012). Transgender youth are also at elevated risk of sexual victimization, violence, depression, anxiety, and substance abuse (Johns et al., 2019; Borgogna, McDermott, Aita, & Kridel, 2018; Grossman, D'Augelli, & Frank 2011). Parental rejection, which is common, appears to be a particularly important risk factor (Grossman & D'Augelli, 2007; Grossman et al., 2005).

Finding a sense of community is a protective factor and has been related to less fearfulness, a decreased risk of suicidality, a sense of comfort, and increases in resilience (Testa, Jimenez, & Rankin, 2014; Bariola et al., 2015). A sense of community is

particularly powerful when combined with a well-developed gender identity. In one study, people with a strong sense of their transgender identity who also had a strong sense of belonging to a transgender community showed positive effects on well-being, self-esteem, and life satisfaction (Barr, Budge, & Adelson, 2016).

SEXUAL BEHAVIOR

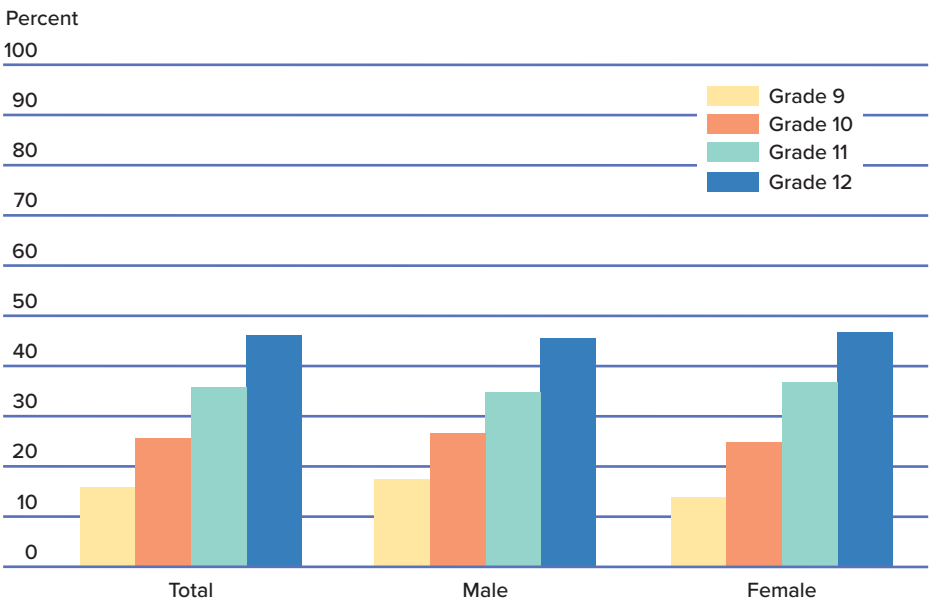
According to national surveys, 39.5 percent of high school students have had sexual intercourse (Kann et al., 2018), and 65 percent of young people have had sex by age 18 (Guttmacher Institute, 2018b). Slightly over 85 percent of high school students identify themselves as heterosexual, 2.4 percent identify as gay or lesbian, 8 percent as bisexual, and 4.2 percent as unsure of their sexual identity (Kann et al., 2018). Teenage boys historically have been more likely to be sexually experienced than teenage girls; however, trends are shifting. In 2015, 45.4 percent of 12th grade boys and 46.5 percent of girls in that age group reported being sexually active (Child Trends Databank, 2017; Figure 1). The median age for girls to first have sex is 17.8 years, and boys follow shortly thereafter with a median age of 18.1 years (Finer & Philbin, 2014).

African Americans tend to begin sexual activity earlier than white youth (Kaiser Family Foundation, Hoff, Greene, & Davis, 2003). While Latino boys are also likely to have sex at an earlier age, Latino girls tend to have sex slightly later than their non-Latino white counterparts (Finer & Philbin, 2014).

Sexual Risk-Taking Two major concerns about adolescent sexual activity are the risks of contracting sexually transmitted infections (STIs) and, for heterosexual activity, of pregnancy. Most at risk are young people who start sexual activity early, have multiple partners, do not use contraceptives regularly, and have inadequate information—or misinformation—about sex (Meade & Ickovics, 2005; Abma et al., 1997). Other risk factors are living in a socioeconomically disadvantaged community, substance use, antisocial behavior, and association with deviant peers. Parental monitoring can help reduce these risks (Centers for Disease Control, 2017c; Baumer & South, 2001; Capaldi, Stoolmiller, Clark, & Owen, 2002).

Why do some adolescents become sexually active at an early age? Various factors, including early entrance into puberty, poverty, poor school performance, lack of academic

FIGURE 1
Percentage of Students in Grades 9 through 12 Who Report They Are Sexually Active



Source: Child Trends Databank, 2015.

and career goals, a history of sexual abuse or parental neglect, and cultural or family patterns of early sexual experience, may play a part (Klein & AAP Committee on Adolescence, 2005).

Generally, an involved and engaged relationship between teens and parents is associated with a decreased risk of early sexual activity. Participating in regular family activities predicts declines in teenaged sexual activity (Coley, Votruba-Drzal, & Schindler, 2009), and more parent-child communication is associated with delayed sexual intercourse (Parkes, Henderson, Wight, & Nixon, 2011). Teens who have supportive relationships with their parents are more likely to delay intercourse and to use safe sex practices when they finally do so (Deptula, Henry, & Schoeny, 2010). Teenagers who have close, warm relationships with their mothers are also likely to delay sexual activity, especially if they perceive that their mothers would disapprove (Jaccard & Dittus, 2000; Sieving, McNeely, & Blum, 2000). Warm and accepting parenting may be particularly important for girls (Kincaid, Jones, Sterrett, & McKee, 2012). For those teens in two-parent families, having fathers who know more about their friends and activities is associated with delays in sexual activity (Coley et al., 2009), whereas the absence of a father, especially early in life, is a predictor of early sexual activity (Ellis et al., 2003).

One proposed protective factor is a sense of meaning in life, which is theorized to provide protection against health risk behaviors. Meaning in life has been associated with a decreased risk of unsafe sexual activity, but only in adolescent women (Brassai, Piko, & Steger, 2011). However, religiosity, which for many people provides a sense of meaning and community, has repeatedly been associated with decreased risk (Haglund & Fehring, 2010; Abma, Martinez, & Copen, 2010).

The relationship between religiosity and decreased risk of sexual activity may in part be driven by peers. Peer group norms exert a powerful influence on adolescent behavior, and religious teens are less likely to be friends with peers who have positive views of sexual activity (Landor, Simons, Simons, Brody, & Gibbons, 2011). Young people often feel under pressure to engage in activities they do not feel ready for. Teens are more likely to have sex and to take risks while having sex if they believe their peers are also having and approve of sex or are pressuring them to have sex (Van de Bongardt, Reitz, Sandfort, & Deković, 2015). As a teen's number of close friends who initiate sex grows, the likelihood the teen will initiate sex also rises (Ali & Dwyer, 2011).

Adolescents in the United States and Europe have similar levels of sexual activity, but the United States has far higher levels of teen pregnancy. The reason? U.S. teens are less likely to use birth control.

Sedgh et al., 2015

Use of Contraceptives The use of contraceptives among sexually active teenage girls has increased since the 1980s (Guttmacher Institute, 2017a) and includes the pill and new hormonal and injectable methods or combinations of methods (CDC, 2012b). Teens who, in their first relationship, delay intercourse, discuss contraception before having sex, or use more than one method of contraception are more likely to use contraceptives consistently throughout that relationship (Manlove, Ryan, & Franzetta, 2003). By contrast, adolescent girls who do not use contraception during their first sexual encounter are twice as likely to become teenage mothers (Martinez & Abma, 2015). One nationwide study found that 13.8 percent of currently sexually active teens did not use any form of birth control during their last sexual encounter (Kann et al., 2018).

The best safeguard for sexually active teens is regular use of condoms, which give some protection against STIs as well as against pregnancy. Slightly over 80 percent of teenage girls and almost 80 percent of teenage boys who are having sex for the first time use a condom (Abma & Martinez, 2017). This does not necessarily ensure continued use, however. While condoms are still the most common form of contraception used, almost half of adolescent females and about a third of adolescent males report not using a condom during their last sexual encounter (Martinez & Abma, 2015). Approximately 5.8 percent of adolescent women use a long-term reversible method such as an intrauterine implant (Abma & Martinez, 2017). Adolescents who start using prescription contraceptives often stop using condoms, in some cases not realizing that they leave themselves unprotected against STIs (Klein & AAP Committee on Adolescence, 2005).

Condoms have been in use for at least 400 years.

checkpoint can you . . .

- Cite trends in sexual activity among adolescents?
- Identify factors that increase or decrease the risks of sexual activity?

SEXUALLY TRANSMITTED INFECTIONS (STIs)

sexually transmitted infections (STIs) Infections and diseases spread by sexual contact.

Sexually transmitted infections (STIs) are diseases spread by sexual contact. Globally, more than 1 million STIs are acquired each day (World Health Organization, 2016). Teens and young adults age 15 to 24 years acquire half of all new STIs (Centers for Disease Control, 2018f). Rates in the United States are higher than in other developed nations, although the majority of cases are found in developing countries (Advocates for Youth, 2010).

In the United States, an estimated 19.7 million new STIs are diagnosed each year. Approximately 65 million Americans have an uncurable STI (Wildsmith, Schelar, Peterson, & Manlove, 2010). An estimated 3.2 million adolescent girls in the United States—about 1 in 4 of those ages 14 to 19—has at least one STI (Forhan et al., 2008; Centers for Disease Control, 2018f). The chief reasons for the prevalence of STIs among teenagers include early sexual activity, multiple partners, failure to use condoms or to use them regularly and correctly, and, for females, a tendency to have sex with older partners (Centers for Disease Control, 2000b; Forhan et al., 2008). Additionally, there are often barriers to sexual health services such as lack of transportation to clinics, inability to pay, conflict between school and clinic hours, and concerns about confidentiality (Centers for Disease Control, 2016e). Despite the fact that teens are at higher risk for contracting STIs, they perceive their own personal risk as low (Wildsmith et al., 2010).

STIs in adolescent girls are most likely to develop undetected. In a *single* unprotected sexual encounter with an infected partner, a girl runs a 1 percent risk of acquiring HIV, a 30 percent risk of acquiring genital herpes, and a 50 percent risk of acquiring gonorrhea (Alan Guttmacher Institute, 1999). Although teenagers tend to view oral sex as less risky than intercourse, a number of STIs, especially pharyngeal gonorrhea, can be transmitted in that way (Remez, 2000).

The most common STI, accounting for about half of all STI infections diagnosed in 15- to 24-year-olds each year, is human papilloma virus (HPV), or genital warts, the leading cause of cervical cancer in women (Weinstock, Berman, & Cates, 2004). Among girls with three or more partners, the risk jumps to 50 percent (Forhan et al., 2008). There are approximately 40 types of HPV, a number of which have been identified as the leading cause of cervical cancer in women.

In 2006, a vaccine that targets the types of HPV that cause most cases of cervical cancer and genital warts became available. The Centers for Disease Control (2016d) recommends routine vaccination for all female adolescents and young adults starting at age 11 or 12. In 2010, only 32 percent of adolescent girls had received the recommended three doses (Markowitz et al., 2013). Rates are even lower in adolescent boys; in 2013, only 13.9 percent of teen boys received the entire series (Lu et al., 2015). In 2017, approximately half of teens received the entire series, and 66 percent received the first shot (Centers for Disease Control, 2018g).

Some parents avoid vaccinating their children out of a fear it might lead to increased sexual activity. However, research has shown that vaccination for HPV does not lead to more or riskier sexual behavior in adolescents (Mayhew et al., 2014). Additionally, parental concerns about the safety of the vaccine are also unfounded, as multiple, large-scale studies have shown little to no evidence of adverse side effects or safety risks (Chao et al., 2012; Lu, Kumar, Castellsagué, & Giuliano, 2011; Gee et al., 2011). Moreover, HPV incidence since the introduction of the vaccine has dropped sharply, indicating a high level of protection is conferred by the vaccine (Markowitz et al., 2013).

The most common *curable* STIs are chlamydia and gonorrhea. These diseases, if undetected and untreated, can lead to severe health problems, including, in women, pelvic inflammatory disease (PID), a serious abdominal infection. The rates of three STIs have recently increased (Figure 2). In 2016–2017, the reported rate of chlamydia rose by 7.5 percent in 15- to 19-year-olds. After a period of decline, rates of syphilis (9.8 percent) and gonorrhea (15.5 percent) both rose during the same time period (Centers for Disease Control, 2018f). Both gonorrhea and chlamydia are currently treated with antibiotics. There are growing concerns that antibiotic resistance will eventually result in an inability to successfully treat gonorrhea (Kirkcaldy, 2016; Centers for Disease Control, 2018h).



According to Piaget, teens perceiving low personal risk is an example of adolescent egocentrism. Piaget called this the personal fable. Teens often seem to behave as if they believe that bad things won't happen to them because their "personal story" is different and unique.

Genital herpes simplex is a chronic, recurring, often painful, and highly contagious disease. It can be fatal to a person with a deficiency of the immune system or to the newborn infant of a mother who has an outbreak at the time of delivery. There are two variants: herpes simplex virus type 1 (HSV-1), which causes cold sores, and herpes simplex virus type 2 (HSV-2), which causes genital sores. Teens today are less likely to have been infected with HSV-1 because of public health education efforts such as the discouraging of shared cosmetics. However, their lack of exposure to this virus means they have not had the opportunity to form HSV-1 antibodies, which may result in a higher risk of HSV-2 if they are exposed when they become sexually active. (Bradley, Markowitz, Gibson, & McQuillan, 2013).

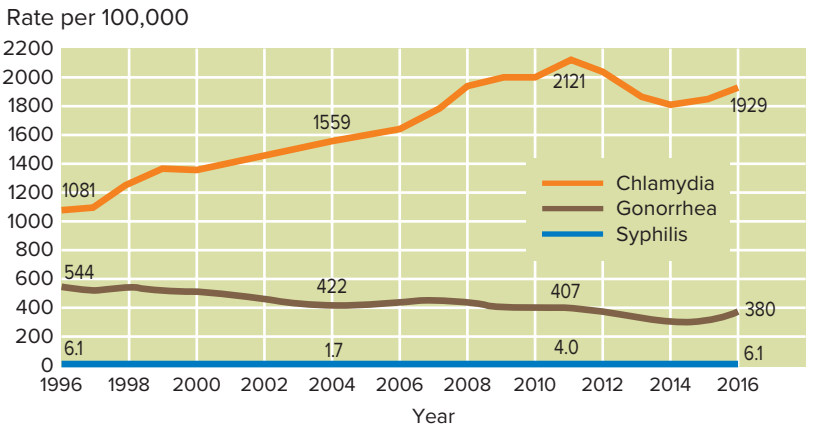


FIGURE 2
Chlamydia, Gonorrhea, and Syphilis Rates for Adolescents Aged 15 to 19

Sources: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention. "Sexually Transmitted Disease Surveillance, 2000–2016." Atlanta, GA, 2001–2017. https://www.cdc.gov/std/stats/default.htm.

Hepatitis B is a virus that affects the liver, causing both acute and chronic issues that can lead to cirrhosis, liver cancer, and death. Hepatitis B has been affecting humans for at least 4,500 years, as evidence of its presence has been found in the bones of ancient humans (Mühlemann et al., 2018). Currently, it affects an estimated 257 million people globally (World Health Organization, 2018d), and in 2012, there were approximately 847,000 infected people in the United States (Roberts et al., 2016). Rates have dropped sharply as a result of the availability, for more than 20 years, of a preventive vaccine.

Also common among young people is trichomoniasis, a parasitic infection that is most commonly transmitted during sexual activity but may be passed along by moist towels and swimsuits (Weinstock et al., 2004). An estimated 3.7 million U.S. citizens are infected, although the majority of people show no symptoms. Trichomoniasis can be easily treated with medication such as metronidazole or tinidazole (Centers for Disease Control, 2017d).

The human immunodeficiency virus (HIV), which causes acquired immune deficiency syndrome, AIDS, is transmitted through bodily fluids, usually by sharing intravenous drug needles or by sexual contact with an infected partner. The virus attacks the body's immune system, leaving a person vulnerable to a variety of fatal diseases. Symptoms of AIDS include extreme fatigue, fever, swollen lymph nodes, weight loss, diarrhea, and night sweats. There were 1.8 million new HIV infections worldwide in 2017, representing a 36 percent decline from 2000. As of now, AIDS is incurable, but increasingly, the related infections that kill people are being stopped with antiviral therapy (World Health Organization, 2018h).

Globally, estimates are 36.9 million people were living with HIV/AIDS worldwide in 2017. Of those, approximately 1.8 million were young people between the ages of 10 and 19. Moreover, 250,000 teens 15 to 19 years were newly infected with HIV that same year (World Health Organization, 2018c).

In the United States at the end of 2015, slightly over 60,000 young adults were living with HIV. In 2017 6,416 young adults between the ages of 20 and 24, received a new HIV diagnosis, and most contracted the virus through sexual contact (Centers for Disease Control, 2019f). This represents a promising decline from 2010; however, while about half of young adults are diagnosed, only around 40 percent receive HIV medical care, and roughly a quarter have a suppressed viral load (a sign of successful management of the disease) (Centers for Disease Control, 2018i).

Comprehensive sex and STI/HIV education is critical to promoting responsible decision making and controlling the spread of STIs. Evidence for the positive impact of such programs is strong: More than 60 percent of programs that emphasized abstinence and condom use delayed and/or reduced sexually activity and increased the use of condoms

checkpoint
can **you** . . .

- Identify and describe the most common sexually transmitted infections?
- List risk factors for developing an STI during adolescence, and identify effective prevention methods?

or contraceptives. Further, the programs did not increase sexual activity. In contrast, programs that emphasize abstinence-only have shown little evidence of affecting sexual behavior (Kirby & Laris, 2009). Unfortunately, fewer than half of schools teach all 19 sexual health topics recommended by the Centers for Disease Control, and the percentage of schools that are required to provide HIV prevention information is declining (Centers for Disease Control, 2018i).

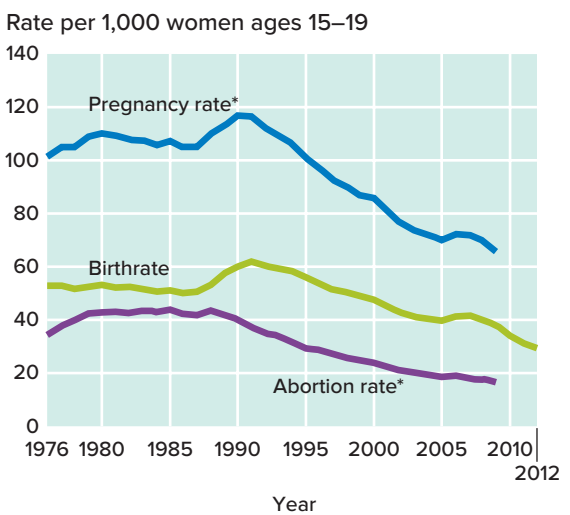
TEENAGE PREGNANCY AND CHILDBEARING

Estimates are that 21 million teenage girls in developing regions of the world become pregnant each year, as do an additional 2 million girls under the age of 15 years. Moreover, an approximate 3.9 million girls aged 15 to 19 years receive an unsafe abortion (World Health Organization, 2018e).

Pregnancy rates vary widely across countries for which data are available. With respect to the developed world, the United States has higher rates of teen pregnancy than other similar countries despite comparable rates of teenage sexual activity. For example, the rate of teenage birth and pregnancy is six times higher than that of Switzerland and more than twice as high as France (Lindberg, Maddow-Zimet, & Boonstra, 2016).

Birthrates for U.S. teenagers peaked in 1957 at 96.3 births per 1,000 women and have fallen dramatically since then to 18.8 births per 1,000 women in 2013 (Ventura, Hamilton, & Mathews, 2014; Martin, Hamilton, Osterman, Driscoll, & Drake, 2018; see Figure 3). The declines reflect a variety of different factors, including, most importantly, increased use of contraception (Lindberg, Santelli, & Desai, 2016). The declines also have accompanied steady decreases in early intercourse and in sex with multiple partners (Martin et al., 2017). The declines do not reflect increased use of abortion (Kost & Henshaw, 2013).

More than half (61 percent) of pregnant teenagers in the United States have their babies (Kost, Maddow-Zimet, & Arpaia, 2017). Sixty-seven percent of teens who carry the pregnancies to term are between the ages of 18 and 19 years, and 31 percent are 15 to 17 years of age, with 2 percent of live births accounted for by teens under the age of 15 (National Center for Health Statistics, 2009a). Overall, 24 percent of adolescents choose to abort (Kost et al., 2017), the lowest percentage recorded since the legalization of abortion in 1973 (Santelli & Melnikas, 2010). Fifteen percent of teen pregnancies end in miscarriage or stillbirth (Kost et al., 2017).



*Data not available for 2010–2012.

FIGURE 3
Pregnancy, Birth, and Abortion Rates for U.S. Teenagers Ages 15 to 19

Source: Centers for Disease Control and Prevention (CDC). Pregnancy rates for U.S. women continue to drop., 2013b, Figure 3.

Although declines in teenage pregnancy and childbearing have occurred among all population groups, birthrates have fallen most sharply among black teenagers. Still, black and Hispanic girls are more likely to have babies than white, American Indian, or Asian American girls (Martin et al., 2012).

Seventy-five percent of pregnant teenagers describe their pregnancies as unintended, and 50 percent of teen pregnancies occur within 6 months of sexual initiation (Kost et al., 2017; Klein & AAP Committee on Adolescence, 2005). Research suggests contributing factors include having been physically or sexually abused and/or exposed to parental divorce or separation, domestic violence, substance abuse, or a household member who was mentally ill or engaged in criminal behavior, and growing up fatherless (Madigan, Wade, Tarabulsy, Jenkins, & Shouldice, 2014; Hillis et al., 2004; Ellis et al., 2003). Teenage fathers tend to have limited financial resources, poor academic performance, and high dropout rates. Many teenage parents are themselves products of adolescent pregnancy (Campa & Eckenrode, 2006).

Outcomes of Teenage Pregnancy Teenage pregnancies often have poor outcomes. Many of the mothers are impoverished and poorly educated, and some are drug users. Many do not eat properly, do not gain

enough weight, and get inadequate prenatal care or none at all. Their babies are likely to be premature or dangerously small and are at heightened risk of other birth complications (Jeha, Usta, Ghulmiyyah, & Nassar, 2015; Wen et al., 2007). They are also at heightened risk for health and academic problems, abuse and neglect, and developmental disabilities that may continue into adolescence (Children's Defense Fund, 2004; Menacker, Martin, MacDorman, & Ventura, 2004).

Teenage unwed mothers and their families are likely to suffer financially. Child support laws are spottily enforced, court-ordered payments are often inadequate, and many young fathers cannot afford the payments. In addition, teenage mothers are likely to drop out of school and to have repeated pregnancies and are less likely to go to college. They and their partners may lack the maturity, skills, and social support to be good parents. Their children, in turn, tend to have developmental and academic problems, to be depressed, to engage in substance abuse and early sexual activity, to engage in gang activity, to be unemployed, and to become adolescent parents themselves (Basch, 2011; Klein & AAP Committee on Adolescence, 2005; Pogarsky, Thornberry, & Lizotte, 2006).



MTV's Teen Mom franchise, originally criticized for glamorizing teen pregnancy, may instead be partially responsible for the recent declines in teenage motherhood (Kearney & Levine, 2014).
DFree/Shutterstock

Poor outcomes of teenage parenting are far from inevitable, however. Several long-term studies find that, two decades after giving birth, most former adolescent mothers are not on welfare; many have finished high school and secured steady jobs; and they do not have large families. Comprehensive adolescent pregnancy and home visitation programs seem to contribute to good outcomes (Basch, 2011; Klein & AAP Committee on Adolescence, 2005), as does contact with the father (Howard, Lefever, Borkowski, & Whitman, 2006) and involvement in a religious community (Carothers, Borkowski, Lefever, & Whitman, 2005).

Sex Education and Pregnancy Prevention Adolescents get their information about sex primarily from friends, parents, sex education in school, and the media (Kaiser Family Foundation et al., 2003). Adolescents who can talk about sex with older siblings as well as with parents are more likely to have positive attitudes toward safer sexual practices (Kowal & Pike, 2004). However, approximately 22 percent of teen girls and 30 percent of teen boys report that their parents do not talk to them about any sexual or reproductive health topics (Lindberg, Maddow-Zimet, & Boonstra, 2016).

Many teenagers get much of their "sex education" from the media, which present a distorted view of sexual activity, associating it with fun, excitement, competition, or violence and rarely showing the risks of unprotected sex. Surprisingly, teens report more exposure to sexual media from television, movies, and music than they do from the Internet (Ybarra, Strasburger, & Mitchell, 2014). Teens who watch highly sexual television content are twice as likely to experience a pregnancy compared to those with a lower level or no exposure (Chandra et al., 2008). Additionally, teens exposed to sexually explicit content—including pornography and erotica—are more likely to have oral sex and sexual intercourse at earlier ages (Brown & L'Engle, 2009).

From 2011 to 2013, approximately 80 percent of teens received formal sexual education—generally at a school, church, or community center—on preventing STIs or how to say no to sex. However, only 55 percent of males and 60 percent of females received information on the use of birth control methods (Lindberg, Maddow-Zimet, & Boonstra, 2016). Programs that encourage abstinence but also discuss pregnancy prevention and safer sexual practices—known as comprehensive sexual education—have been found to delay sexual initiation and increase contraceptive use (AAP Committee on Psychosocial Aspects of Child and Family Health and Committee on Adolescence, 2001). However, since 1998, federal- and state-funded sex education programs stressing abstinence until marriage as the best option have been common.

Some school programs promoted abstinence as the *only* option, even though most abstinence-only courses have not been found to delay sexual activity (AAP Committee on Psychosocial Aspects of Child and Family Health and Committee on Adolescence, 2001; Satcher, 2001; Trenholm et al., 2007). Abstinence-based courses, even when they have been found to reduce some sexual activity, do not reduce pregnancy rates or sexually transmitted infections. This may be because abstinence-only programs do not impact whether or not teens use safe sex practices such as condoms (Chin et al., 2012). Thus, if teens do have sex, they are less likely to be protected. Likewise, pledges to maintain virginity have shown little impact on sexual behavior other than a *decrease* in the likelihood to take precautions during sex (Rosenbaum, 2009).

In 2010, Congress withdrew financial support for abstinence-only programs and shifted toward evidence-based models. Thus, comprehensive sexual education programs were funded and have been credited with the declines in teen pregnancy rates, which hit historic lows (Guttmacher Institute, 2018a). However, under the Trump administration, federal funding for abstinence education programming is again on the rise, and comprehensive sexual education programs previously demonstrated to be effective are being defunded (Guttmacher Institute, 2017). In April 2018, a funding opportunity announcement was made for $83 million to be dispersed to as many as 345 two-year grants to new abstinence-only programs (U.S. Department of Health and Human Services, 2018). The effect on adolescent pregnancy rates remains to be seen, but previous research suggests that such programs will result in the erosion of the recent gains made in combating teen pregnancy.

Comprehensive sexual education programs have also been shown to be effective in preventing pregnancy and disease across a number of countries (Fonner, Armstrong, Kennedy, O'Reilly, & Sweat, 2014). Unfortunately, policies promoting abstinence programs have not only undermined the quality of the information taught in the United States, but also in foreign aid programs. These policies have harmed both family planning and HIV prevention programs in other countries (Santelli et al., 2017).

By contrast, Europe's industrialized countries that provide universal, comprehensive sex education for their young adults have teen pregnancy and birthrates many times lower than the United States, despite similar levels of sexual activity (Guttmacher Institute, 2013). An important component of pregnancy prevention in European countries is access to reproductive services. For example, contraceptives are provided free to adolescents in many countries.

The problem of teenage pregnancy requires a multifaceted solution. It must include programs and policies to encourage postponing or refraining from sexual activity, but it also must recognize that many young people do become sexually active and need education and information to prevent pregnancy and STIs. It requires attention to underlying factors that put teenagers and families at risk—reducing poverty, school failure, behavioral and family problems, and expanding employment, skills training, and family life education (CDC, 2013c)—and it should target those young people at highest risk (Klein & AAP Committee on Adolescence, 2005). Comprehensive early intervention programs for preschoolers and elementary school students have reduced teenage pregnancy (Lonczak, Abbott, Hawkins, Kosterman, & Catalano, 2002; Schweinhart et al., 1993).



Do you favor or oppose programs that provide contraceptives to teenagers?

checkpoint can **you** . . .

- Summarize trends in teenage pregnancy and birthrates?
- Discuss risk factors, problems, and outcomes connected with teenage pregnancy?
- Describe educational programs that can prevent teenage pregnancy?

Relationships with Family, Peers, and Adult Society

Age becomes a powerful bonding agent in adolescence. Adolescents spend more time with peers and less with family. Even as adolescents increasingly turn toward peers to fulfill many of their social needs, they still look to parents for a secure base from which they can try their wings.

adolescent rebellion
Pattern of emotional turmoil, characteristic of a minority of adolescents, that may involve conflict with family, alienation from adult society, reckless behavior, and rejection of adult values.

THE MYTH OF ADOLESCENT REBELLION

The teenage years have been called a time of **adolescent rebellion.** Yet full-fledged rebellion is relatively uncommon even in Western societies. Most young people feel close to and

positive about their parents, share similar opinions on major issues, and value their parents' approval (Blum & Rinehart, 2000; Offer & Church, 1991). Teenage rebellion, rather than being normative, is more likely to be associated with variables such as abusive, indifferent, or neglectful parenting (McDermott & Barik, 2014). The relatively few deeply troubled adolescents tend to come from disrupted families and, as adults, continue to have unstable family lives and to reject cultural norms. Those raised in homes with a positive family atmosphere tend to come through adolescence with no serious problems and, as adults, to have solid marriages and lead well-adjusted lives (Offer, Kaiz, Ostrov, & Albert, 2002).

Still, adolescence can be a tough time for young people and their parents. Family conflict, depression, and risky behavior are more common than during other parts of the life span (Arnett, 1999; Petersen, 1993). Family conflict can have a significant impact on emotional distress, especially for girls and teens with foreign-born parents (Chung, Flook, & Fuligni, 2009).



Contrary to popular belief, most adolescents are not ticking time bombs. Those raised in homes with a positive family atmosphere tend to come through adolescence with no serious problems.
Hero Images/Getty Images

Negative emotions and mood swings are most intense during early adolescence. By late adolescence, emotionality tends to become more stable (Larson, Moneta, Richards, & Wilson, 2002). Recognizing that adolescence may sometimes be tumultuous may help parents and teachers put trying behavior in perspective. But adults who assume that adolescent turmoil is always normal and necessary may fail to heed the signals of the relatively few young persons who need special help.

checkpoint can you . . .

- Assess the extent of storm and stress during the teenage years?

ADOLESCENTS AND PARENTS

Most adolescents report good relations with their parents (Gutman & Eccles, 2007). Still, adolescence brings special challenges. Just as adolescents feel tension between dependency on their parents and the need to break away, parents want their children to be independent yet find it hard to let go.

Individuation and Family Conflict If you were like most teens, you probably listened to different music from your parents, dressed in a different style of clothing, and felt it was reasonable to keep certain things private from them. This process, called **individuation** by psychologists, begins in infancy and continues throughout adolescence. It involves the struggle for autonomy and differentiation, or personal identity. An important aspect of individuation is carving out boundaries of control between self and parents (Nucci, Hasebe, & Lins-Dyer, 2005), and this process may entail family conflict. Somewhat paradoxically, a warm, interconnected relationship with parents can help teens individuate successfully (Ponappa, Bartle-Haring, & Day, 2014).

individuation
Adolescents' struggle for autonomy and personal identity.

Both family conflict and positive identification with parents are highest at age 13 and then diminish through age 17, when they stabilize or increase somewhat. This shift reflects increased opportunities for independent adolescent decision making (Gutman & Eccles, 2007). Parents of young adolescents must strike a delicate balance between too much freedom and too much intrusiveness during this process. For instance, seventh- and eighth-grade students are at elevated risk for problem behaviors because of decreased parental monitoring and involvement, which allows the behavior of antisocial peers to exert increased influence (Van Ryzin, Stormshak, & Dishion, 2012). By 11th grade, those young people who see themselves as having a great deal of autonomy tend to spend more time in unsupervised socializing with peers, again increasing risk. But too little autonomy can also have negative effects. Those students who perceive

window on the world

CULTURE AND DISCRETIONARY TIME

One way to measure changes in adolescents' relationships with the important people in their lives is to see how they spend their discretionary time. Cultural variations in time use reflect varying cultural needs, values, and practices (Verma & Larson, 2003).

Young people in tribal or peasant societies spend most of their time producing necessities of life and have less time for socializing than adolescents in technologically advanced societies (Larson & Verma, 1999). In some postindustrial societies such as Korea and Japan, where the pressures of schoolwork and family obligations are strong, adolescents have relatively little free time. To relieve stress, they spend their time in passive pursuits, such as watching television and "doing nothing" (Verma & Larson, 2003). In some disadvantaged communities, such as can be found in Malaysia, media such as video games and the Internet, take up an increasing amount of discretionary time and have replaced physical activities such as sports and games. While not ideal, they do seem to offer some protection from antisocial behaviors such as smoking, drinking, drug use, and the illegal racing that is otherwise a common occurrence (Rahim, Kadir, Mahmud, Mohamed, & Kee, 2011). In India's family-centered culture, middle-class urban eighth graders spend 39 percent of their waking hours with family, compared with 23 percent for U.S. eighth graders, and report being happier when with their families than U.S. eighth graders do. For these young people, the task of adolescence is not to separate from the family but to become more integrated with it. Similar findings have been reported in Indonesia, Bangladesh, Morocco, and Argentina (Larson & Wilson, 2004).

In comparison, U.S. adolescents have a good deal of discretionary time. Approximately half of teens' waking hours outside of school are spent in discretionary activities (Larson & Verma, 1999). Americans spend a great deal of this time on electronic media or interacting with friends, increasingly of the other sex, and less of this time, in comparison to other countries, on homework, (Larson, 2001; Rideout, Foehr, & Roberts, 2010). Some students participate in extracurricular activities such as organized sports, community work, or school clubs. In general, participation in these activities is associated with positive academic outcomes, a decrease in risk for internalizing and externalizing behavior, less alcohol and drug use, and increases in civic engagement following graduation from high school (Fredericks & Eccles, 2010; Sharp, Tucker, Baril, Van Gundy, & Rebellon, 2015).

Ethnicity may affect family connectedness. In some research, African American teenagers, who may look on their families as havens in a hostile world, tended to maintain more intimate family relationships and less intense peer relations than white teenagers (Giordano, Cernkovich, & DeMaris, 1993). Teens from Mexican and Chinese families, particularly immigrant families, reported a stronger sense of family obligation and assistance and spent more time on activities that carried out those obligations (Hardway & Fuligni, 2006). Asian, Latino, and European American teens all tend to show higher levels of happiness when they participate in activities that help the family (Telzer & Fuligni, 2009). For some ethnic and cultural groups, providing assistance to the family is associated with connectedness and is thus beneficial.

what's your view

How do you spend your free time? What do you think this says about what you value?

checkpoint can you . . .

- Identify and discuss age and cultural differences in how young people spend their time?

their parents as highly intrusive in their personal lives are also more likely to be influenced by negative peer interactions (Goldstein, Davis-Kean, & Eccles, 2005).

Despite common beliefs about adolescence being a time of great rebellion and chaos, family arguments most often concern control over everyday personal matters—chores, schoolwork, dress, money, curfews, dating, and friends—rather than issues of health and safety or right and wrong (Steinberg, 2005). The emotional intensity of these conflicts—often out of all proportion with the subject matter—may reflect the underlying individuation process.

There are also cultural differences. One primary distinction is that drawn between collectivistic and individualistic societies. Research in this area shows that connectedness between teens and parents is higher in collectivistic countries such as India, Saudi Arabia, and Algeria than in individualistic Western countries such as France, Poland, and Argentina. In collectivistic cultures, emphasis is placed more on family than on individual desires (Dwairy & Achoui, 2010). In cultures like these, the developmental goal during adolescence is less about establishing independence away from the family and more about establishing interdependence with the family and strengthening emotional bonds with family members (Bornstein & Putnick, 2018).

Family relations can affect mental health. Family conflict predicts multiple adjustment problems, including depression, anxiety, conduct problems, and problems with peers (Gutman & Eccles, 2007; Cummings, Koss, & Davies, 2015), and it tends to increase over time in harsh, coercive, or hostile families (Rueter & Conger, 1995), especially for girls. Additionally, adolescent maltreatment has been linked to criminal offenses and violent crime, alcohol and drug use, risky sexual behavior, and suicidal thoughts (Thornberry, Henry, Ireland, & Smith, 2010).

Alternatively, healthy family interactions have a positive effect. Family conflict tends to go down over time in warm, supportive families (Rueter & Conger, 1995). In addition, autonomy support on the part of parents is associated with more adaptive self-regulation of negative emotions and academic engagement (Roth, Assor, Niemiec, Ryan, & Deci, 2009), and positive family identification is related to less depression (Gutman & Eccles, 2007). Adolescents who are given more decision-making opportunities report higher self-esteem than those who are given fewer such opportunities (Gutman & Eccles, 2007). Last, both individuation and family connectedness during adolescence predict well-being in middle age (Bell & Bell, 2005).



What issues caused the most conflict in your family when you were a teenager, and how were they resolved?

Parenting Styles and Parental Authority Authoritative parenting continues to foster healthy psychosocial development (Baumrind, 2005; Hoskins, 2014). Authoritative parents insist on important rules, norms, and values but are willing to listen, explain, and negotiate. They exercise appropriate control over a child's conduct (*behavioral control*) but not over the child's feelings, beliefs, and sense of self (*psychological control*) (Steinberg & Darling, 1994). So, for example, they might ground their teenage son for breaking a rule, but they would not insist that the teen agree with them about the wisdom of the broken rule. Generally, behavioral control is preferable. Psychological control and harsh control can harm adolescents' psychosocial development and mental health (Steinberg, 2005) and are associated with externalizing problems (Pinquart, 2017). For example, withdrawal of love as a control strategy is associated with an increase in resentment toward parents and a decrease in teens' ability to self-regulate negative emotions (Roth et al., 2009). Parents who are psychologically controlling tend to be unresponsive to their children's growing need for *psychological autonomy,* the right to their own thoughts and feelings (Steinberg, 2005). By contrast, parents who are open to new experiences themselves are more likely to allow their teens greater freedom (Denissen, van Aken, & Dubas, 2009).

Research indicates that parents who provide both structure and autonomy help teens develop rules of conduct, psychosocial skills, and good mental health (Gray & Steinberg, 1999). Problems arise when parents overstep what adolescents perceive as appropriate bounds of legitimate parental authority. The existence of a mutually agreed personal domain in which authority belongs to the adolescent has been found in various cultures and social classes from Japan to Brazil (Nucci et al., 2005). When teens feel their parents are trying to dominate their behavior, and particularly their psychological experience, their emotional health suffers.

The original model of parenting styles has been critiqued on the grounds it is primarily unidirectional. In other words, it considered the effect of parenting on adolescents but minimized the effect that teens' behaviors had on parenting. For example, a rebellious and confrontational adolescent is likely to elicit a far different set of parenting behaviors than will a compliant and cooperative teen. There is indeed evidence that many of the effects of parenting on teen behavior are bidirectional (Pinquart, 2017). Additionally,

some research suggests that adolescents may actually exert a stronger effect on their parents' behavior than parenting exerts on their behavior (Kerr, Stattin, & Özdemir, 2012), perhaps via their own genetically influenced personality traits (Klahr & Burt, 2014).

Parental Monitoring and Adolescents' Self-disclosure Part of monitoring involves knowing what a teen is up to. Young people's growing autonomy and the shrinking areas of perceived parental authority redefine the types of behavior adolescents are expected to disclose to parents (Smetana, Crean, & Campione-Barr, 2005; Table 3). Both adolescents and parents see *prudential* issues, behavior related to health and safety (such as smoking, drinking, and drug use), as most subject to disclosure, followed by *moral* issues (such as lying), *conventional* issues (such as bad manners or swearing), and *multifaceted,* or borderline, issues (such as seeing an R-rated movie), which lie at the boundary between personal matters and one of the other categories. Both adolescents and parents see *personal* issues (such as how teens spend their time and money) as least subject to disclosure. However, for each type of behavior, parents tend to want more disclosure than adolescents are willing to provide, although this discrepancy diminishes with age (Smetana, Metzger, Gettman, & Campione-Barr, 2006). Importantly, adolescent disclosure to parents is predictive of delinquency; those teens who disclose more are less likely to engage in problem behaviors (Keijsers, Branje, VanderValk, & Meeus, 2010).

Teens are more likely to disclose information when parents maintain a warm, responsive family climate and provide clear expectations without being overly controlling (Soenens, Vansteenkiste, Luyckx, & Goossens, 2006)—in other words, when parenting is authoritative. This link between warmth and disclosure has been found in various ethnic groups in the United States, including Chinese, Mexican American, and European American youth (Yau, Tausopoulos-Chan, & Smetana, 2009). Adolescents, especially girls, tend to have closer, more supportive relationships with their mothers than with their fathers (Smetana et al., 2006), and girls confide more in their mothers (Yau et al, 2009). Moreover, relationship quality seems to matter more in girls' willingness to confide in their parents. In other words, boys' secret keeping depends less on relationship warmth than does that of girls' (Keijsers et al., 2010).

Family Structure and Atmosphere Conflict in the home can affect the process of individuation, and changes in marital distress or conflict predict corresponding changes in adolescents' adjustment (Cui, Conger, & Lorenz, 2005). Divorce can affect this

TABLE 3 Items Used to Assess Perceived Areas of Parental versus Adolescent Authority

Moral Items	Conventional Items	Prudential Items	Multifaceted Items	Multifaceted Friendship	Personal Items
Stealing money from parents	Not doing assigned chores	Smoking cigarettes	Not cleaning bedroom	When to start dating	Sleeping late on weekends
Hitting siblings	Talking back to parents	Drinking beer or wine	Getting ears pierced with multiple holes	Staying over at a friend's house	Choosing how to spend allowance money
Lying to parents	Using bad manners	Doing drugs	Staying out late	Seeing friends whom parents don't like	Choosing own clothes or hairstyles
Breaking a promise to parents	Cursing	Having sex	Watching cable TV	Seeing friends rather than going out with family	Choice of music

Source: Adapted from Smetana, Crean, and Campione-Barr, 2005.

process as well. Adolescents whose parents later divorced showed more academic, psychological, and behavioral problems before the breakup than peers whose parents did not later divorce (Sun, 2001).

Adolescents living with their continuously married parents tend to have significantly fewer behavioral problems than those in other family structures (single-parent, cohabiting, or stepfamilies). Divorce negatively impacts outcomes in part via its influence on the paternal relationship. Teens whose parents were still married reported a close relationship with their father 48 percent of the time, whereas those whose parents were divorced reported being close to their father only 25 percent of the time (Scott, Booth, King, & Johnson, 2007). High-quality involvement by a nonresident father helps a great deal, but not as much as the involvement of a father living in the home (Carlson, 2006).

Adolescents, especially boys, from single-parent families are at higher risk for problem behaviors such as substance abuse or aggression. However, this risk can be mitigated by other family structures. For example, parental monitoring (Griffin, Botvin, Scheier, Diaz, & Miller, 2000) and mother's educational level, family income, and quality of the home environment (Ricciuti, 2004) have been associated with a reduction in risk.

Adolescents in cohabiting families, like younger children, tend to have greater behavioral and emotional problems than adolescents in married families (Brown, 2004). However, a better comparison group may be that of adolescents in stepparent families. Some of the data on cohabitation are driven by family instability—a documented negative influence on development—rather than cohabitation per se. Adolescents in stepparent families have also experienced family instability and thus may be considered a more appropriate comparison group. When compared to teens in married stepparent families, a recent review suggested that adolescents in cohabitating families are similar in outcomes. They have similar rates of delinquency, substance abuse, risky sexual activity, academic outcomes, physical health, and emotional well-being (Manning, 2017).

Adolescents from families headed by gay or lesbian parents do not appear to show differences in a wide variety of outcomes, including cognitive development, gender identity, and adjustment problems (Fedewa, Black, & Ahn, 2015). Rather, as with traditional two-parent families, the quality of the relationship—not the sexual orientation of the parents—is the key variable influencing outcomes (Wainright & Patterson, 2006).

Mothers' Employment and Economic Stress The impact of a mother's work outside the home may depend on how many parents are present in the household. Single mothers may find that work affects how much time and energy is left to spend with children or monitor their activities. For example, in one study, mothers who worked at night spent less time with their teen children, had lower-quality home environments, and were less close to their children. These variables, in turn, were related to an increase in risky adolescent behaviors (Han, Miller, & Waldfogel, 2010). Additionally, maternal employment has repeatedly been associated with a less healthy nutritional environment in the home (Bauer, Hearst, Escoto, Berge, & Neumark-Sztainer, 2012) and an increased risk of overweight (Miller, 2011; Morrissey, 2013).

The type of after-school care and supervision is important. Those teens who are on their own, away from home, tend to become involved in alcohol and drug use and in misconduct in school, especially if they have an early history of problem behavior (Coley, Morris, & Hernandez, 2004). Participation in organized after-school activities can serve as a protective factor (Mahatmya & Lohman, 2011; Sharp et al., 2015).

As discussed earlier, a major problem in many single-parent families is lack of money. For example, teens are more likely to drop out of school and show declines in self-esteem and mastery if their mothers have unstable employment or are out of work for 2 years (Kalil & Ziol-Guest, 2005). Job displacement—where employees lose their jobs due to organizational changes such as restructuring, downsizing, or relocating—has also been associated with declines in educational attainment and well-being in adolescents from single-parent families (Brand & Simon Thomas, 2014). Family economic hardship during adolescence affects adult well-being in part because it is stressful, and that stress interferes with family relationships and affects children's educational and occupational attainments (Sobolewski & Amato, 2005).

checkpoint can you . . .

- Identify factors that affect conflict with parents and adolescents' self-disclosure?
- Discuss the impact on adolescents of parenting styles and of marital status, mothers' employment, and economic stress?



Sibling relationships become more equal as younger siblings approach or reach adolescence and the relative age difference diminishes. Even so, younger siblings still look up to their older siblings and may try to emulate them.
Kristy-Anne Glubish/Design Pics/Getty Images

ADOLESCENTS AND SIBLINGS

Changes in sibling relationships in many ways mirror the changes we see in the relationships of adolescents and their parents. As adolescents spend more time with peers, they spend less time with siblings. Generally, and perhaps as a result of this, adolescents tend to be less close to siblings than to friends and are less influenced by them. This distance grows across adolescence (Laursen, 1996). Moreover, as children move through adolescence, their relationships with their siblings become progressively more equal (Campione-Barr, 2017).

Sibling conflict declines across middle adolescence. Research has shown that sisters report more intimacy than brothers or mixed pairs. Mixed-sex siblings become less intimate between middle childhood and early adolescence, but more so in middle adolescence, a time when most young people become more interested in the other sex (Kim, McHale, Osgood, & Crouter, 2006). Teens who have opposite-sex siblings report increases in their perceived romantic competence from early adolescence into adulthood (Doughty, Lam, Stanik, & McHale, 2015).

Sibling relationships also interact with parent-child relations and the parents' marital relationship. For example, in one study, siblings were more intimate if their mother was warm and accepting. Parent-child conflict was associated with sibling conflict. However, when fathers became less happy in their marriage, siblings became closer and quarreled less (Kim et al., 2006). Additionally, research has shown that differential treatment, in which teens perceive a parent as favoring their sibling, is associated with both externalizing and internalizing behavior problems (Buist, Dekovic, & Prinzie, 2013).

Siblings can exert positive or negative effects on each other. Older siblings may influence a younger one to smoke, drink, or use drugs (Pomery et al., 2005; Rende, Slomkowski, Lloyd-Richardson, & Niaura, 2005). Younger siblings hanging out with an antisocial older brother are at serious risk for adolescent antisocial behavior, drug use, sexual behavior, and violence (Snyder, Bank, & Burraston, 2005; Solmeyer, McHale, & Crouter, 2014). While generally a warm relationship is protective and contributes to good outcomes, at times an emotionally close sibling relationship can lead to an increased risk of a child modeling the antisocial behavior of a delinquent sibling (Dirks, Persram, Recchia, & Howe, 2015).

However, siblings can also be protective. In single-mother homes, a warm and nurturing relationship with an older sister tended to prevent a younger sister from engaging in substance use and risky sexual behavior (East & Khoo, 2005). A recent meta-analysis supports the strong connection between warm relationships with little conflict and healthier psychological adjustment in siblings (Buist et al., 2013). For example, when siblings show increases in warmth and decreases in conflict over time, this predicts a decrease in depressive symptoms (Harper, Padilla-Walker, & Jensen, 2016).

If you have one or more brothers or sisters, did your relationships with them change during adolescence?

checkpoint
can **you** . . .

- Identify typical changes in sibling relationships during adolescence and factors that affect these relationships?

As an adolescent, were you part of a clique or crowd? If so, how did it affect your social relationships and attitudes?

ADOLESCENTS AND PEERS

An important influence in adolescence is the peer group. The peer group is a source of affection, sympathy, understanding, and moral guidance; a place for experimentation; and a setting for achieving autonomy and independence from parents. It is a place to form intimate relationships that serve as rehearsals for adult intimacy.

In childhood, most peer interactions are *dyadic,* or one-to-one, though larger groupings begin to form in middle childhood. As children move into adolescence, the peer social system becomes more diverse. *Cliques*—structured groups of friends who do things together—become more important. A larger type of grouping, the *crowd,* which does not normally exist before adolescence, is based not on personal interactions but on reputation, image, or identity. Crowd membership is a social construction: for example, the jocks, the nerds, or the stoners. All three levels of peer groupings may exist simultaneously, and some may overlap in membership, which may change over time. Both clique and crowd affiliations tend to become looser as adolescence progresses (B. B. Brown & Klute, 2003).

The influence of peers normally peaks at ages 12 to 13 and declines during middle and late adolescence. Risk-taking, especially in early adolescence, is higher in the company of peers than when alone (Gardner & Steinberg, 2005), even when potential negative consequences are made clear (Smith, Chein, & Steinberg, 2014). For example, at age 13 or 14, popular adolescents may engage in mildly antisocial behaviors, such as trying drugs or sneaking into a movie without paying, to demonstrate to their peers their independence from parental rules (Allen, Porter, McFarland, Marsh, & McElhaney, 2005). However, attachment to peers in early adolescence is not likely to forecast real trouble unless the attachment is so strong that the young person is willing to give up obeying household rules, doing schoolwork, and developing his or her own talents in order to win peer approval and popularity (Fuligni, Eccles, Barber, & Clements, 2001).

Friendships The intensity and importance of friendships and the amount of time spent with friends are probably greater in adolescence than at any other time in the life span. Friendships tend to become more reciprocal, more equal, and more stable, although many friendships are still fleeting. Higher-quality friendships are more stable (Hiatt, Laursen, Mooney, & Rubin, 2015). Those that are less satisfying become less important or are abandoned. Often, differences in such areas as peer acceptance, physical aggression, school competence, and especially sex predict friendship dissolution (Hartl, Laursen, & Cillessen, 2016).

Greater intimacy, loyalty, and sharing with friends mark a transition toward adultlike friendships. Adolescents begin to rely more on friends than on parents for intimacy and support, and they share confidences more than younger friends do (Hartup & Stevens, 1999; Nickerson & Nagle, 2005). Girls' friendships tend to be more intimate than boys', with frequent sharing of confidences (B. B. Brown & Klute, 2003). Intimacy with same-sex friends increases during early to midadolescence, after which it typically declines as intimacy with the other sex grows (Laursen, 1996).

The increased intimacy of adolescent friendship reflects cognitive as well as emotional development. Adolescents are now better able to express their private thoughts and feelings and consider another person's point of view. The capacity for intimacy is related to psychological adjustment and social competence, and adolescents who are more intimate with their friends feel closer to and have less conflict with them (Chow, Ruhl, & Buhrmester, 2013).

Adolescents with high-quality friendships have a high opinion of themselves, do well in school, are sociable, and are less likely to be hostile, anxious, or depressed (Berndt & Perry, 1990; Hartup & Stevens, 1999; Hiatt et al., 2015). They



The increased intimacy of adolescent friendship reflects cognitive as well as emotional development. Closer intimacy means a greater ability and desire to share emotions and feelings.
Mauritius/Pixtal/age fotostock

There are indications that administering oxytocin, a hormone involved in social affiliation, results in better social cognitive abilities, but only for those people who are deficient in this hormone to start with.

Bartz, 2010

It is true that those around you influence your propensity to take risks, but it is also true that some people, by virtue of their genetic makeup, are more likely to take risks. Researchers have recently found that mutations linked to the production of dopamine are involved in sensation-seeking.

Derringer et al., 2011

also tend to have established strong bonds with parents (Brown & Klute, 2003). This may be part of a more general process. When adolescents have high-quality friendships, those friendships tend to be deeply embedded within their other supportive social relationships, including other friends, romantic partners, and family members (Flynn, Felmlee, & Conger, 2017). A bidirectional process seems to be at work: Good relationships foster adjustment, which in turn fosters good relationships.

Social Media and Electronic Interaction The explosion of online communication technologies such as e-mail, social networking sites, and text messaging has changed the way many adolescents communicate. As a group, adolescents are the primary users of these technologies. More than 99 percent of teens use the Internet (Van den Eijnden, Meerkerk, Vermulst, Spijkerman, & Engels, 2008), 88 percent of teens use the Internet daily for interaction and communication with their peers (Pew Research Center, 2012), and 88 percent report using at least one social media site (Pew Research Center, 2018). Adolescents who are active users of social media sites, especially if they are not guarded about their personal privacy, are more vulnerable to online harassment and cyberbullying (Ang, 2015).

In general, screen-based media usage is related to poorer physical health, quality of life, and quality of family relationships (Iannotti, Kogan, Janssen, & Boyce, 2009). However, what type of media is used appears to be important. For example, studies indicate that instant messaging (van den Eijnden et al., 2008) and video game usage (Mathers et al., 2009) are associated with depression, while television is associated with obesity, socio-emotional problems, and lower self-esteem (Russ, Larson, Franke, & Halfon, 2009). Additionally, some people can develop problematic Internet usage, a condition akin to addiction, in which continued Internet and electronic use can impact everyday functioning, relationships, and overall well-being (Akin, 2012). Men, perhaps because of their generally greater interest in video games and online gaming, are at higher risk of developing addiction-related behaviors, although there are some indications that when women do develop similar difficulties, they may be more profoundly affected (Anderson, Steen, & Stavropoulos, 2017).

However, not all access to the Internet is harmful. As access to the Internet increased and technology became more sophisticated and easy to use, studies began to show that at times online communication can stimulate rather than reduce social connectedness (Kraut et al., 2002). For example, studies have found instant messaging can have a positive effect on relationship quality in adolescence (Valkenburg & Peter, 2009), and social competence in lonely adolescents can be strengthened using the Internet to communicate with others and experiment with their identities (Valkenburg & Peter, 2008). This has been particularly true for sexual minority youth, possibly because they often have difficulty finding partners or safe supportive places in which to be themselves in real life (Korchmaros, Ybarro, & Mitchell, 2015).

Individuals often become unusually intimate in an online environment and feel free to express themselves. Because adolescents connect self-disclosure with quality friendships, this is linked to friendship quality and formation (Valkenburg & Peter, 2009), which in turn elevates social connectedness and well-being. However, there is a dark side to this. One aspect of online communication that enhances intimacy—anonymity—has made it appealing for electronic bullies. This in conjunction with limited contextual cues, especially for teens whose parents do not monitor their child's online activities, increases the risk of

cyberbullying (Ang, 2015). Estimates for prevalence rates across middle and high school vary widely, with cyberbullying perpetration reported from 1 to 41 percent, victimization from 3 to 72 percent, and cyberbully/victim rates from 2.3 percent to 16.7 percent (Selkie, Fales, & Moreno, 2016). Most studies on cyberbullying have been conducted in North America, but cross-cultural work also shows variable estimates across different countries, with countries such as Canada (23.8 percent) and China (23 percent) showing higher median prevalence rates and countries such as Australia (5 percent), Sweden (5.2 percent), and Germany (6.3 percent) having lower levels (Brochado, Soares, & Fraga, 2017).

Romantic Relationships Romantic relationships are a central part of most adolescents' social worlds. With the onset of puberty, most heterosexual boys and girls begin to think about and interact more with members of the other sex. Romantic relationships tend to become more intense and intimate across adolescence. By age 16, adolescents interact with and think about romantic partners more than about parents, friends, or siblings (Bouchey & Furman, 2003).

Typically, romantic relationships move from mixed groups or group dates to one-on-one romantic relationships that, unlike other-sex friendships, are described as involving passion and a sense of commitment (Lantagne & Furman, 2017). While teens practice interacting with the opposite sex within the context of friendships, opposite-sex friends are unlikely to become romantic partners. Rather, romantic partners tend to come from different friendship networks (Kreager, Molloy, Moody, & Feinberg, 2016). Boys appear to be less confident than girls about these early romantic relationships (Giordano, Longmore, & Manning, 2006).

Early adolescents think primarily about how a relationship might affect their status in the peer group and pay little attention to attachment or support needs (Bouchey & Furman, 2003). By midadolescence, most young people have had at least one exclusive partner lasting for several months to about a year, and the effect of the choice of partner on peer status tends to become less important. Not until late adolescence or early adulthood, though, do romantic relationships begin to serve the full gamut of emotional needs that such relationships can serve and then only in relatively long-term relationships (Furman & Wehner, 1997).

Relationships with parents may affect the quality of romantic relationships. For example, those teens who have a good relationship with their parents as teens have higher self-esteem and better relationship quality as young adults (Johnson & Galambos, 2014). Additionally, parental divorce and marital conflict is associated with poorer relationship quality in teens, expressed as low commitment and high conflict (Cui & Fincham, 2010; Cui, Fincham, & Durtschi, 2011).

Dating Violence Dating violence is a significant problem in the United States. The three common forms of dating violence are:

Physical—when a partner is hit, pinched, shoved, or kicked.

Emotional—when a partner is threatened or verbally abused.

Sexual—when a partner is forced to engage in a nonconsensual sex act.

Statistics indicate that about 10 percent of students have been victims of teen dating violence, including both physical and sexual abuse, but the rate is almost certainly underreported. When analyses are limited to only those students who were dating in the previous year, almost 21 percent of girls and 10.4 percent of boys reported experiencing some form of teen dating violence (Vagi, Olsen, Basile, & Vivole-Kantor, 2015). The rates for emotional abuse are even higher: As many as 3 in 10 adolescents report being verbally or psychologically abused (Halpern, Young, Waller, Martin, & Kupper, 2003). White students generally report lower levels of teen dating violence than African American or Hispanic students (Vagi et al., 2015).

In addition to the physical harm caused by this type of abuse, teens who are victims of dating violence are more likely to do poorly in school and to engage in risky behaviors

research in action

TEEN DATING AND TECHNOLOGY

Adolescent dating is a normative development in many Western cultures. Teenagers encounter a variety of romantic experiences, including mutually acknowledged relationships, fantasies, one-sided attractions, and nonrelational sexual involvement. As with other social relationships, technology is playing an increasingly large role in adolescent romantic relationships (Vaterlaus, Tulane, Porter, & Beckert, 2017).

While the majority of teens meet romantic partners in school, some teenagers develop online relationships. Teenagers with online romantic partners fall into two camps: those who are popular offline, and those with difficulty forming offline relationships. LGBTQ adolescents have been identified as especially likely to initiate online relationships, possibly because of a lack of partners or safe, supportive spaces in which to be themselves in real life (Korchmaros, Ybarra, & Mitchell, 2015).

Information on social media sites is often used to "check out" new romantic interests, gauge and signal interest in potential partners, and initiate communication (Subrahmanyam & Greenfield, 2008; Van Ouystel, Van Gool, Walrave, Ponnet, & Peeters, 2016). Adolescents also report "signaling" romantic interest by liking older photos and using embedded private messaging tools as a less intimidating means of initiating further communication (Van Ouystel et al., 2016). Once a relationship is established, social media may also be used to communicate daily, to convey affection, to argue, to publicly broadcast relationship status, and to break and make up (Vaterlaus et al., 2017; Van Oustel et al., 2016). Adolescents report uploading joint photos of themselves as a couple to indirectly broadcast a relationship, rather than making an official status change (Van Ouystel et al., 2016).

More problematically, electronic communication can also be used for the exchange of sexually charged conversation or explicit photographs, often referred to as "sexting." A large cross-national meta-analysis of 34 studies including more than 110,000 respondents from the United States, Europe, Canada, Australia, South Africa, and South Korea suggested that about 14.8 percent of teens at an average age of approximately 15 years engaged in sexting (Madigan, Ly, Rash, Van Ouytsel, & Temple, 2018). Adolescents who do so tend to be sexually active and intend to share photos privately with a romantic partner (Kletke, Hallford, & Mellor, 2014). Sexting has been linked with other risky behaviors, such as higher substance use, having concurrent sexual partners, and having more current sexual partners (Ybarra & Mitchell, 2014).

what's your view

How do you think social media, text messaging, and other technologies have affected the nature of adolescent dating? Do you think sexting is a form of adolescent risk-taking?

checkpoint can you . . .

- List several functions of the peer group in adolescence, and discuss the role of peer influence?
- Identify important features of adolescent friendships?
- Trace developmental changes in romantic relationships?

such as drug and alcohol use. These students are also subject to eating disorders, depression, and suicide. Girls are disproportionately victims of severe violence (Mulford & Giordano, 2008).

Risk factors that may predict violence include substance abuse, conflict and/or abuse in the home, and living in neighborhoods with high rates of crime and drug use (Child Trends, 2010a, 2010b). Additionally, attitudes about the acceptability of violence within relationships, poor family relationship quality, mental health problems, and the use of aggressive media also predict violence (Vagi et al., 2013). Peers are a particularly important influence. A recent meta-analysis found that a variety of peer behaviors, but especially peer dating violence, peers' aggressive and/or antisocial behavior, and being victimized by peers, were all significantly related to both dating violence perpetration and victimization (Garthe, Sullivan, & McDaniel, 2017).

Unhealthy relationships can last a lifetime as victims carry patterns of violence into future relationships. Adolescent dating violence is a predictor of adult partner violence (Exner-Cortens, Eckenrode, Bunge, & Rothman, 2017).

Antisocial Behavior and Juvenile Delinquency

What influences young people to enage in—or refrain from—violence or other antisocial acts? By what processes do antisocial tendencies develop? What determines whether a juvenile delinquent will grow up to be a hardened criminal?



Teens who drop out of high school cost society approximately $240,000 in lost tax revenue, increased use of social services, and greater likelihood of being on welfare or incarcerated. In October 2008, approximately 30 million 16- to 24-year-olds were not in school and had not earned a high school diploma. This represents approximately 8 percent of eligible teens.

Chapman et al., 2010

BIOLOGICAL INFLUENCES

Antisocial behavior tends to run in families. Analyses of many studies have concluded that genes influence 40 to 56 percent of the variation in antisocial behavior within a population and 60 to 65 percent of the variation in aggressive antisociality (Ferguson, 2010; Tackett, Krueger, Iacono, & McGue, 2005). Genes alone, however, are not predictive of antisocial behavior. Research suggests that although genetics influences delinquency, environmental influences including family, friends, and school affect gene expression (Guo, Roettger, & Cai, 2008; Silberg, Maes, & Eaves, 2012).

Neurobiological deficits, particularly in the portions of the brain that regulate reactions to stress, may help explain why some children become antisocial adolescents. As a result of these neurological deficits, children may not receive or heed normal warning signals to restrain impulsive or reckless behavior (van Goozen, Fairchild, Snoek, & Harold, 2007). For example, they tend to have abnormal or blunted responses to events that generally evoke fear in others (Marsh et al., 2011).

Part of this abnormal physiological profile may involve arousal processes. Specifically, individuals who have low arousal levels may be prone to antisocial behaviors as a form of sensation seeking to achieve arousal levels that a typical person experiences. In support of this, high frontal EEG power (which is associated with low brain arousal) is associated with adolescent aggressive antisocial behavior in male twins (Niv et al., 2015). Low heart rate has also been found to be repeatedly associated with antisocial behavior in both men and women (Portnoy & Farrington, 2015; Hammerton et al., 2018).

Attentional processes may also be involved. Children with attention-deficit/hyperactivity disorder (ADHD) are at higher risk for the development of comorbid conduct disorder (CD) and depression that contribute to antisocial behavior (Drabick, Gadow, & Sprafkin, 2006). There is some dispute about whether or not ADHD by itself is a direct risk factor for the development of antisocial behavior, although more recent research does seem to indicate this is the case (Storebø & Simonsen, 2016).

Also, findings of an MRI investigation of empathetic response have indicated youth with aggressive conduct disorders have atypical responses to seeing others in pain (Decety, Michalaska, Akitsuki, & Lahey, 2009). Moreover, those individuals who have traits associated with psychopathy seem to have reduced gray matter volume in the anterior rostral prefrontal cortex and temporal poles, areas involved in the processing of empathy, moral reasoning, and emotions such as shame and guilt (Gregory et al., 2012).

A crucial variable appears to be the age at which antisocial behavior begins. Researchers have identified two types of antisocial behavior: an early-onset type, beginning by age 11, which tends to lead to chronic juvenile delinquency in adolescence, and a milder, late-onset type, beginning after puberty, which tends to arise temporarily in adolescence. Late-onset adolescents tend to commit relatively minor offenses (Schulenberg & Zarrett, 2006) and tend to come from families with standard family backgrounds (Collins, Maccoby, Steinberg, Hetherington, & Bornstein, 2000). Evidence suggests that early-onset offenders are likely different from very early on and seem to be more strongly influenced by biological factors. For example, such adolescents show poor impulse control, are aggressive, and tend not to think about their future (Barker, Oliver, & Maughan, 2010; Monahan, Steinberg, Cauffman, & Mulvey, 2009).

ENVIRONMENTAL INFLUENCES

Parents of children who become chronically antisocial may have failed to reinforce good behavior in early childhood and may have been harsh or inconsistent in their discipline (Coie & Dodge, 1998; Snyder, Cramer, Afrank, & Patterson, 2005; Neppl, Dhalewadikar, & Lohman, 2016). The children may get payoffs for antisocial behavior: When they act up, they may gain attention or get their own way. When constant criticism, angry coercion, or rude, uncooperative behavior characterizes parent-child interactions, the child tends to show aggressive behavior problems, which worsen the parent-child relationship (Buehler, 2006). However, when parents show high warmth and low hostility, even delinquent teens tend to reduce their problematic behavior and behave more positively (Williams & Steinberg, 2011). Teens who are open with their parents and disclose information are less likely to engage in antisocial acts (Criss et al., 2015), although it may very well be the case that teens who are engaging in acts their parents would not approve of are less likely to disclose.

Antisocial adolescents tend to have antisocial friends, and their antisocial behavior increases when they associate with each other (Monahan, Steinberg, Cauffman, & Mulvey, 2009). The way antisocial teenagers talk, laugh, or smirk about rule-breaking and nod knowingly among themselves seems to constitute a sort of "deviancy training" (Dishion & Tipsord, 2011). Not all children respond in the same way, however. Teens who are genetically predisposed to antisocial behavior respond more strongly to maladaptive peer group norms than other children (Brendgen, Girar, Vitaro, Dionne, & Boivin, 2015). These adolescents then continue to elicit ineffective parenting, which then predicts delinquent behavior and association with deviant peer groups (Simons, Chao, Conger, & Elder, 2001; Tolan, Gorman-Smith, & Henry, 2003). Notably, peer influences can also be positive. For example, exposure to altruistic peers can buffer adolescents against the negative effects of violent or dangerous neighborhoods (Criss, Smith, Morris, Liu, & Hubbard, 2017; Rious & Cunningham, 2018).



What are the chances this young man will become a hardened criminal? Teenagers who don't have positive alternatives are more likely to adopt antisocial lifestyles.
Rubberball/Getty Images

Family economic circumstances also influence the development of antisocial behavior. Poor children are more likely than other children to commit antisocial acts, and those whose families are continuously poor tend to become more antisocial with time (Macmillan, McMorris, & Kruttschnitt, 2004). Even within individual children, those whose families rose in and out of poverty showed more delinquent behavior when their families had less money than when they were financially well off (Rekker et al., 2015). When families rise from poverty while a child is still young, the child is no more likely to develop behavior problems than a child whose family was never poor (Macmillan et al., 2004). Boys, but not girls, who live in poor neighborhoods that border wealthier areas are at greater risk of antisocial behaviors than boys who live in areas of concentrated poverty, perhaps as a result of the feelings of unfairness the obvious social disparities may bring about (Odgers, Donley, Caspi, Bates, & Moffitt, 2015).

Weak neighborhood social organization in a disadvantaged community can influence delinquency through its effects on parenting behavior and peer deviance (Chung & Steinberg, 2006) as well as on norms about antisocial or violent acts (Stewart & Simons, 2010). For example, exposure to community violence and living in a dangerous community are strong predictors of future antisocial behavior (Slatterly & Meyers, 2014; Criss et al., 2017). By contrast, collective efficacy—the strength of social connections within a neighborhood and the extent to which residents monitor or supervise each other's children—can positively influence outcomes (Odgers et al., 2009).

LONG-TERM PROSPECTS

The vast majority of young people who engage in juvenile delinquency do not become adult criminals (Kosterman, Graham, Hawkins, Catalano, & Herrenkohl, 2001). Delinquency peaks about age 15 and then declines. However, teenagers who do not see

positive alternatives or who come from dysfunctional families are more likely to adopt a permanently antisocial lifestyle (Schulenberg & Zarrett, 2006).

Those most likely to persist in violence are those who had early antisocial influences. For example, teens who show antisocial behavior before the age of 15 are at higher risk of death, substance abuse, self-inflicted harm, crime, and poverty (Samuelson, Hodgins, Larsson, Larm, & Tengström, 2010). In one study, 75 percent of individuals who were delinquent at age 14 remained so at high or moderate levels through age 29 (Brooks, Lee, Finch, Brown, & Brook, 2013). Another key variable is school performance. Academic problems, school suspensions, and truancy in childhood and adolescence are strongly associated with violent criminal offending in early adulthood (Katsiyannis, Thompson, Barrett, & Kingree, 2012). Least likely to persist are boys and girls who were early school achievers (Kosterman, Graham, Hawkins, Catalano, & Herrenkohl, 2001) or who had positive childhood experiences (Kosterman et al., 2011).

PREVENTING AND TREATING DELINQUENCY

Because juvenile delinquency has roots early in childhood, so should preventive efforts that attack the multiple factors that can lead to delinquency. Adolescents who have taken part in well-designed early childhood intervention programs are less likely to get in trouble than their equally underprivileged peers (Piquero et al., 2016; Reynolds, Temple, Ou, Arteaga, & White, 2011). Effective programs target high-risk urban children and last at least 2 years during the child's first 5 years. They influence children directly, through high-quality day care or education, and at the same time indirectly, by offering families assistance and support geared to their needs (Yoshikawa, 1994; Loeber, Farrington, & Petechuk, 2003).

These programs operate on Bronfenbrenner's mesosystem by affecting interactions between the home and the school or child care center. The programs also go one step further, to the exosystem, by creating supportive parent networks and linking parents with such community services as prenatal and postnatal care and educational and vocational counseling (Yoshikawa, 1994; Zigler, Taussig, & Black, 1992; Reynolds et al., 2011).

Once children reach adolescence, especially in poor, crime-ridden neighborhoods, interventions need to focus on spotting troubled adolescents and preventing gang recruitment (Tolan, Gorman-Smith, & Henry, 2003). Successful programs boost parenting skills through better monitoring, behavioral management, and neighborhood social support. For example, research has shown that in early adolescence, maintaining appropriate levels of control and nurturing a close and positive relationship has protective effects against teenage antisocial behaviors later in adolescence, especially for mothers (Vieno, Nation, Pastore, & Santinello, 2009).

Programs such as teen hangouts and summer camps for behaviorally disturbed youth can be counterproductive because they bring together groups of deviant youth who tend to reinforce each other's deviancy. Similarly, programs such as Scared Straight, in which at-risk teens visit prisons and speak with inmates, tend to result in higher levels of delinquency and thus have fallen out of favor (Petrosino, Turpin-Petrosino, Hollis-Peel, & Lavenberg, 2013). Moving juveniles through the juvenile court system rather than diversion programs (such as counseling referrals) also tends to increase future offending (Petitclerc, Gatti, Vitaro, & Tremblay, 2013; Petrosino, Guckenburg, & Turpin-Petrosino, 2013). More effective programs—scouts, sports, and church activities—integrate deviant youth into the nondeviant mainstream. Structured, adult-monitored, or school-based activities after school, on weekend evenings, and in summer, when adolescents are most likely to be idle and to get in trouble, can reduce their exposure to settings that encourage antisocial behavior (Dodge, Dishion, & Lansford, 2006).

Fortunately, the great majority of adolescents do not get into serious trouble. Those who show disturbed behavior can—and should—be helped. With love, guidance, and support, adolescents can avoid risks, build on their strengths, and explore their possibilities as they approach adult life.

checkpoint can **you** . . .

- Explain how parental, peer, and neighborhood influences may interact to promote antisocial behavior and delinquency?
- Identify characteristics of programs that have been successful in preventing or stopping delinquency and other risky behavior?

summary and key terms

The Search for Identity

- A central concern during adolescence is the search for identity, which has occupational, sexual, and values components. Erik Erikson described the psychosocial conflict of adolescence as *identity versus identity confusion*. The virtue that should arise from this conflict is *fidelity*.
- James Marcia, in research based on Erikson's theory, described four identity statuses: identity achievement, foreclosure, moratorium, and identity diffusion.
- Researchers differ on whether girls and boys take different paths to identity formation. Although some research suggests that girls' self-esteem tends to fall in adolescence, later research does not support that finding.
- Ethnicity is an important part of identity. Minority adolescents seem to go through stages of ethnic identity development much like Marcia's identity statuses.

identity (*353*)
identity versus identity confusion (*353*)
fidelity (*353*)
crisis (*354*)
commitment (*354*)
identity achievement (*354*)
foreclosure (*354*)
moratorium (*354*)
identity diffusion (*355*)
cultural socialization (*357*)

Sexuality

- Sexual orientation appears to be influenced by an interaction of biological and environmental factors and to be at least partly genetic.
- Because of lack of social acceptance, the course of homosexual identity and relationship development may vary.
- Teenage sexual activity involves risks of pregnancy and sexually transmitted infections. Adolescents at greatest risk are those who begin sexual activity early, have multiple partners, do not use contraceptives, and are ill-informed about sex.
- Regular condom use is the best safeguard for sexually active teens.
- Comprehensive sex education programs delay sexual initiation and encourage contraceptive use. Abstinence-only programs have not been as effective.
- STIs are most likely to develop undetected in girls.
- Teenage pregnancy and birthrates in the United States have declined.
- Teenage childbearing often has negative outcomes. Teenage mothers and their families tend to suffer ill health and financial hardship, and the children often suffer from ineffective parenting.

sexual orientation (*357*)
sexually transmitted infections (STIs) (*362*)

Relationships with Family, Peers, and Adult Society

- Although relationships between adolescents and their parents are not always easy, full-scale adolescent rebellion is unusual. For the majority of teens, adolescence is a fairly smooth transition. For the minority who seem more deeply troubled, it can predict a difficult adulthood.
- Adolescents spend an increasing amount of time with peers, but relationships with parents continue to be influential.
- Conflict with parents tends to be greatest during early adolescence. Authoritative parenting is associated with the most positive outcomes.
- Effects of family structure and maternal employment on adolescents' development may depend on such factors as economic resources, the quality of the home environment, and how closely parents monitor adolescents' whereabouts.
- Relationships with siblings tend to become more distant during adolescence, and the balance of power between older and younger siblings becomes more equal.
- The influence of the peer group is strongest in early adolescence. The structure of the peer group becomes more elaborate, involving cliques and crowds as well as friendships.
- Friendships, especially among girls, become more intimate, stable, and supportive in adolescence.
- Social media and electronic communication can be used in positive ways to establish social connections and increase intimacy, but they can also lead to negative effects, such as addiction-like behaviors or bullying.
- Romantic relationships meet a variety of needs and develop with age and experience.

adolescent rebellion (*366*)

individuation (*367*)

Antisocial Behavior and Juvenile Delinquency

- Chronic delinquency generally stems from early-onset antisociality. It is associated with multiple, interacting risk factors, including ineffective parenting, school failure, peer and neighborhood influence, and low socioeconomic status. Programs that attack risk factors from an early age have had success.

Design elements: (Butterfly Icon): Stockbyte/Getty Images; (World Icon): janrysavy/Getty Images

part 6
EMERGING AND YOUNG ADULTHOOD

chapter 13

Physical and Cognitive Development in Emerging and Young Adulthood

outline

Emerging Adulthood

PHYSICAL DEVELOPMENT

Health and Fitness

Sexual and Reproductive Issues

COGNITIVE DEVELOPMENT

Perspectives on Adult Cognition

Moral Reasoning

Education and Work

learning objectives

Describe the transition from adolescence to adulthood.

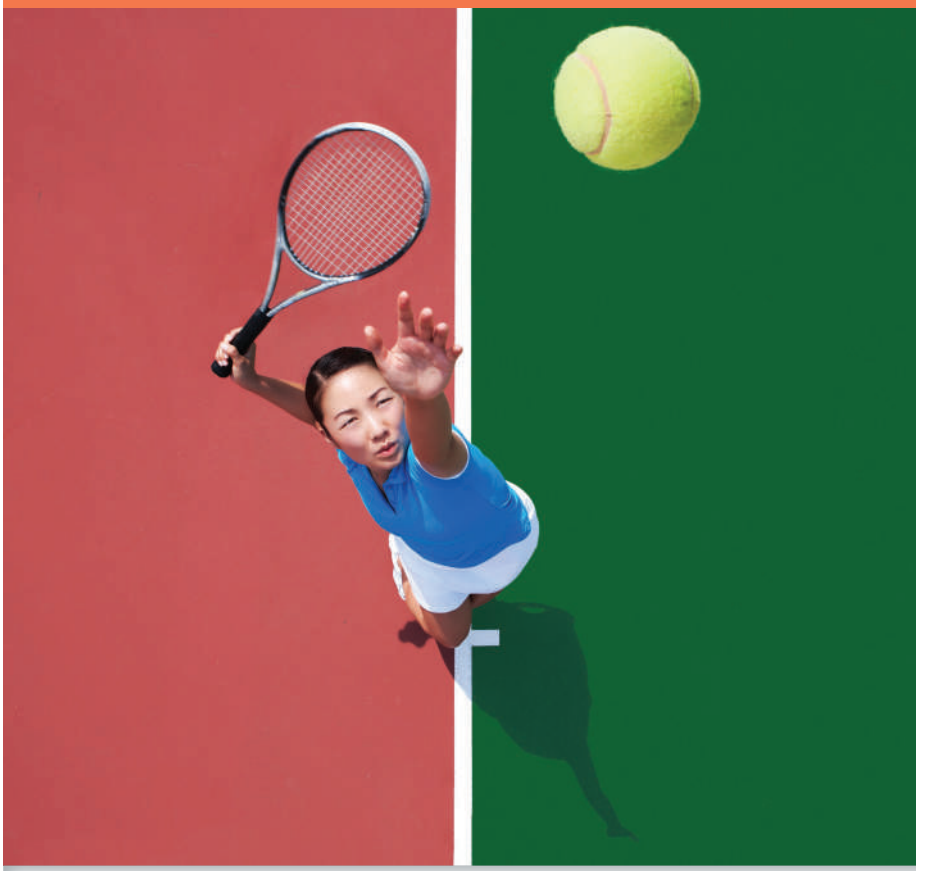
Summarize physical development in young adults.

Discuss sexuality in young adults.

Characterize cognitive changes in early adulthood.

Identify examples of the roles of experience, culture, and gender in adult moral development.

Explain how emerging adults make the transitions to higher education and work.



nycshooter/Vetta/Getty Images

did you know?

- U.S. adults ages 20 to 40 are the most likely to be poor and the least likely to have health insurance.
- The tendency to engage in reflective thinking seems to emerge between ages 20 and 25.
- For both immediate and long-term cognitive benefits, going to college—any college—is more important than which college a person attends.

In this chapter, we look at emerging and young adults' physical functioning and factors that can affect health, fitness, sexuality, and reproduction. We discuss features of their cognition and how education can stimulate its growth. We examine moral development. Finally, we discuss entering the world of work.

Good habits formed at youth make all the difference.

—Aristotle

Emerging Adulthood

When does a person become an adult? For most laypeople, three criteria define adulthood: (1) accepting responsibility for oneself, (2) making independent decisions, and (3) becoming financially independent (Arnett, 2006). In industrialized countries, the achievement of these goals takes longer and follows far more varied routes than in the past. Before the mid-twentieth century, a young man just out of high school typically would seek a stable job, marry, and start a family. For a young woman, the usual route to adulthood was marriage, which occurred as soon as she found a suitable mate.

Since the 1950s, the technological revolution has made higher education or specialized training increasingly essential. The typical ages of first marriage and first childbirth have shifted sharply upward as both women and men pursue higher education or vocational opportunities and as cohabitation, single parenthood, and gay and lesbian relationships became more socially acceptable (Furstenberg, Rumbaut, & Setterstein, 2005; Lundberg & Pollack, 2014; Daugherty & Copen, 2016). Today the road to adulthood may be marked by multiple milestones—entering college (full- or part-time), working (full- or part-time), moving away from home, getting married, and having children—and the order and timing of these transitions vary (Schulenberg, O'Malley, Bachman, & Johnston, 2005; Elzinga & Liefbroer, 2007).

Thus, some developmental scientists suggest that, for the many young people in industrialized societies, the late teens through the mid- to late twenties has become a distinct period of the life. This period of the life span is known as **emerging adulthood,** and it represents a period of time during which young adults can figure out who they are and what they want to be. In essence, it is a time during which young people are no longer adolescents but have not yet settled into adult roles (Arnett, 2000, 2004, 2006; Furstenberg et al., 2005). Although the uncertainty and turmoil that can mark this process can be distressing, overall most young people have a positive view of their future and look forward to their adult lives (Arnett, 2007a).

As we look more closely at the varied paths of emerging adults, it is important to note that this exploratory process is not shared by all young adults in the world. It is largely tied to development in Western countries, especially among relatively affluent young people.



What criteria for adulthood do you consider most relevant? Do you think those criteria are influenced by the culture in which you live or grew up?

emerging adulthood
Proposed transitional period between adolescence and adulthood commonly found in industrialized countries.

checkpoint can you . . .

- Explain how entrance to adulthood has changed in industrialized societies?

PHYSICAL DEVELOPMENT

Health and Fitness

Young adults in the United States generally enjoy the benefits of good health, but they increasingly suffer from a range of health-related risks tied to modern lifestyles. In the following section, we review some of the more important influences.

HEALTH STATUS AND HEALTH ISSUES

Health may be influenced by genes, but behavioral factors—what young adults eat, how physically active they are, and whether they smoke, drink, or use drugs—contribute greatly to health and well-being. Moreover, these environmental factors can result in epigenetic

changes in the expression of particular genes that can have lifelong consequences (Motta, Bonzini, Grevendonk, Iodice, & Bollati, 2017). The habits that young adults develop during this time in the life span tend to become ingrained over time and are highly predictive of the likelihood they will experience good health at older ages (Liu et al., 2012).

Approximately 96 percent of adults aged 19 to 24 years of age in the United States report that they are in good to excellent health. (National Center for Health Statistics, 2017a). Accidents are the leading cause of death for young Americans age 20 to 44 (Centers for Disease Control, 2017f). Still, mortality rates for this group as a whole have been nearly cut in half in the past 50 years (Kochanek, Murphy, Anderson, & Scott, 2004). The health issues of these years mirror those of adolescence; however, rates of injury, homicide, and substance use peak at this time. Lower socioeconomic status is consistently, although not invariably, associated with poor health (Braveman, Cubbin, Egerter, Williams, & Pamuk, 2010), and additional disparities are conferred by living in rural versus urban areas of the United States (Caldwell, Ford, Wallace, Wang, & Takahashi, 2016). Race, too, matters. Whites and Asians are the most likely to be in good health, although whites' health tends to decline as they age into adulthood. The worst health prognosis is generally found for Native Americans, followed by African Americans. Latinos generally occupy a middle position (Harris, Gordon-Larsen, Chantala, & Urdy, 2006).

In the past, young people generally aged out of many social service programs such as Medicaid, Children's Health Insurance Program, or support systems in place within the school system. At the same time, many moved away from home and began living independently. Emerging and young adults thus had the highest poverty rate and the lowest level of health insurance of any age group, and they often had no regular access to health care (Callahan & Cooper, 2005; Park, Mulye, Adams, Brindis, & Irwin, 2006). The implementation of the Affordable Care Act in 2010–including both an individual mandate and the provision allowing children up to age 26 to remain on their parents' insurance–resulted in sharp rises in health care access, health care utilization, and reported health indicators in young adults (Barbaresco, Courtemanche, &Oi, 2015; Antwi, Moriya, & Simon, 2015; Sommers, Gunja, Finegold & Musco, 2015). However, in December 2017, the Trump administration effectively repealed the individual mandate requiring all adults to purchase health insurance or pay a tax penalty by reducing the penalty to $0. The Congressional Budget Office estimated this change, which took effect in January 2019, would result in 4 million fewer insured people in 2019, and 13 million fewer insured people by 2027 as well as a 10 percent yearly increase in premiums for people in the insured market (Congressional Budget Office, 2017). In response to this, five states independently passed individual mandates requiring their residents to purchase health insurance, and seven additional states are actively considering passing similar legislation (National Conference of State Legislators, 2018; Pak, 2019). The end result of these actions on health insurance coverage on a national level remains to be seen.



Wakeboarding takes strength, energy, endurance, and muscular coordination. Most young adults, like this young man, are in prime physical condition.
Digital Vision/Getty Images

GENETIC INFLUENCES ON HEALTH

Mapping the human genome has enabled us to examine more clearly the genetic roots of many disorders. The expression of any disorder–obesity, certain cancers, asthma–is the product of an interaction between genes and environment (Ritz et al., 2017).

For example, we can examine the role of genetic influences in the development of depression. A number of genetic variants put people at elevated risk. For instance, one variant responds to family environment. When raised in a supportive family environment, a child with that variant is at no additional risk when compared to a child without the variant. However, in the absence of a supportive family, depression risk is elevated (Taylor, Lehman, Kiefe, & Seeman, 2006). Similarly, genetic variants have been found to elevate risk for child maltreatment, the death of a parent early in life, and stressful life events in adulthood (Uher, 2014; Agid et al., 1999; Caspi et al., 2003).

The mechanism of action of many of the genetic influences on depression is likely via their influence on neurobiological factors. In other words, genes that affect the action of hormone receptors, stress response systems, and synaptic plasticity may influence a person's ability to respond adaptively to stressful events. This sensitivity may then make that person more sensitive to the influence of environmental stress, especially early in development (Hornung & Heim, 2014). In an environment low in stress, that sensitivity might not be expressed. Thus, it is not the gene in isolation nor is it the environment in isolation that leads to depression. Rather, it is the interaction of the two that is key.

BEHAVIORAL INFLUENCES ON HEALTH AND FITNESS

The link between behavior and health illustrates the interrelationship among physical, cognitive, and emotional aspects of development. What people know about health affects what they do, and what they do affects how they feel. Yet *knowing* about good (and bad) health habits is not enough. Personality, emotions, and social surroundings often outweigh what people know they should do and lead them into unhealthful behavior. In the next section, we look at both direct and indirect influences on health.



The average American eats fast food about twice a week.

Pereira et al., 2005



What specific things could you do to have a healthier lifestyle?

Diet and Nutrition What people eat and how much they move their bodies affect how they look, how they feel, and how likely they are to get sick and even die. Worldwide, poor diets and a lack of physical activity are among the leading causes of preventable diseases, overweight, and obesity (World Health Organization, 2018f). In the United States, estimates are that half of premature deaths could be prevented via modifiable lifestyle factors, including improvements in diet and exercise, and quitting smoking (Yoon, Bastion, Anderson, Collins, & Jaffee, 2014).

The World Health Organization recommends a Mediterranean-style diet rich in fruits, vegetables, whole grains, and unsaturated fats. This type of diet is associated with reduced risk for a wide variety of cancers (Cuoto et al., 2011). In a 15-year longitudinal study of 18- to 30-year-olds, those who ate plenty of fruits, vegetables, and other plant foods were less likely to develop high blood pressure than those who ate a diet heavy in meat (Steffen et al., 2005). Of course, it may also be the case that those who eat such a diet choose to live overall healthier lives (Boffetta et al., 2010).

Obesity/Overweight Worldwide trends indicate obesity is on the rise. Since 1975, the global obesity rate has nearly tripled. In 2016, there were 1.9 billion overweight adults, 650 million of whom were obese. Much of this increase can be attributed to unintended consequences of globalization, including increases in the availability of nutrient-poor, high-calorie processed foods and urbanization of the environment. While many countries now must address twin scourges of overweight and infectious diseases and undernutrition, overweight and obesity are linked to more deaths globally than underweight (UNICEF/WHO/World Bank Group, 2019, Figure 1).

In the United States, the average man or woman is more than 24 pounds heavier than in the early 1960s but is only about 1 inch taller (Flegal, Carrol, Ogden, & Curtin, 2010). Almost 40 percent of men and women 20 years and older were obese in 2016. If overweight and obesity are considered together (BMI greater than 25), some 71.6 percent of the United States population meets the criteria (Fryar, Carroll, & Ogden, 2018b).

What explains the obesity epidemic? Experts point to an increase in snacking (Zizza, Siega-Riz, & Popkin, 2001), availability of inexpensive fast foods, supersized portions, labor-saving technologies, high-fat diets including highly processed foods, and sedentary recreational pursuits, such as television and computers (Centers for Disease Control, 2017g; Pereira et al., 2005). As in childhood and adolescence development, an inherited tendency toward obesity may interact with environmental and behavioral factors (Choquet & Meyre, 2011; Albuquerque, Stice, Rodríguez-López, Manco, & Nóbrega, 2015).

Obesity carries risks of high blood pressure, heart disease, stroke, diabetes, gallstones, arthritis and other muscular and skeletal disorders, and some cancers, and it

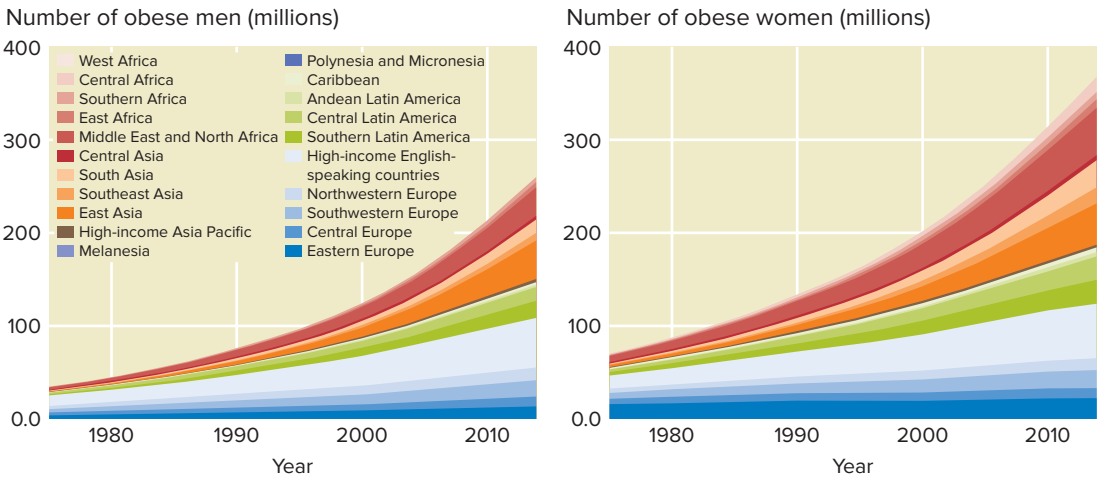


FIGURE 1

Global Trends in Body Mass Index, 1975–2015

Worldwide, obesity is growing. In 1975, approximately 34 million men and 71 million women were medically obese. In 2014, that number rose to 266 million men and 375 million women.

Source: NCD Risk Factor Collaboration. "Trends in Adult Body-Mass Index in 200 Countries from 1975 to 2014: A pooled Analysis of 1698 Population-Based Measurement Studies with 19.2 Million Participants." *The Lancet* 387, no. 10026 (2016): 1377–1396.

diminishes quality and length of life (USDHHS, 2013; Gregg et al., 2005; Ogden, Carroll, McDowell, & Flegal, 2007). In addition to physical consequences, obesity also carries a risk of psychosocial consequences. People who are overweight or obese are more likely to experience stigma, low self-esteem, body dissatisfaction, and depression (Williams, Mesidor, Winters, Dubbert, & Wyatt, 2015; Papadopoulous & Brennan, 2015; Tomiyama, 2014). Obesity also impacts health care costs. Estimates are that obesity costs the United States approximately $190 billion a year in health care–related costs, or some 21 percent of total health care expenditures (Hruby & Hu, 2015).

Lifestyle changes (dietary change plus exercise) or drug treatments have sustained weight loss targets for 2 or more years (Powell, Calvin, & Calvin, 2007), but such losses are difficult for many people to sustain for longer periods of time. However, research with animal models suggests that calorie restriction, and the attendant weight maintenance of a thinner frame, is associated with increased health and longevity over the life span (Bodkin, Alexander, Ortmeyer, Johnson, & Hansen, 2003; Omodei & Fontana, 2011). While many people are successful in initial dieting efforts and are able to lose weight, maintenance of weight loss is difficult and complicated by both environmental and physiological factors (Greenway, 2015). Still, successful long-term weight loss is possible (Ramage, Farmer, Apps Eccles, & McCargar, 2013; Dombrowski, Knittle, Avenell, Araujo-Soares, & Sniehotta, 2014; Montesi et al., 2016). However, only about 1 in 6 people is able to successfully lose and keep off 10 percent of their body weight (Kraschnewski et al., 2010).

Another option available for weight loss for obese adults is bariatric surgery. Bariatric surgery is any surgery that is carried out to induce weight loss, and it generally involves rerouting or removing parts of the stomach or small intestine. Bariatric surgery results in more consistent and sustained weight loss and a reduction in risk for obesity-related disease in most adults than diet or lifestyle changes. However, it does carry risks, and 10 to 17 percent of adults experience complications as a result of the surgery (Chang et al., 2014). Generally, bariatric surgery is an effective route only for the most obese adults (Williams et al., 2015). Current trends suggest that obesity and overweight will continue to be major health risk factors in the coming years.

Eating Disorders While eating too much and gaining excessive weight is the more common nutritional issue, eating disorders that focus on attempts to keep weight low

also are a problem in many countries, especially developed ones such as the United States (Qian et al., 2013). Overall, lifetime prevalence rates of eating disorders are low, somewhere between 0.3 and 0.6 percent (Favaro, Ferrara, & Santonastaso, 2004), but this still represents a substantial amount of pain and suffering, especially since many of those suffering from eating disorders fail to get treatment (Campbell & Peebles, 2013). Although some success has been found with the use of cognitive behavioral therapies in the treatment of eating disorders, success rates are low (Wilson, Grilo, & Vitousek, 2007). The most common of the eating disorders are anorexia nervosa and bulimia nervosa.

Physical Activity People who are physically active reap many benefits. Aside from helping to maintain a healthy body weight, physical activity builds muscles; strengthens heart and lungs; lowers blood pressure; protects against heart disease, stroke, diabetes, several cancers, and osteoporosis (a thinning of the bones that is most prevalent in middle-age and older women); relieves anxiety and depression; and lengthens life (Reiner, Niermann, Jekauc, & Woll, 2013; Bernstein et al., 2005; NCHS, 2004). Moreover, research suggests that exercise is also related to cognitive functioning and that a healthy body is one of the variables related to the establishment and maintenance of a healthy mind (Guiney, Lucas, Cotter, & Machado, 2015; Kramer, Erickson, & Colcombe, 2006). Additionally, exercise, including both structured and unstructured as well as varying levels of intensity, appears to be an effective tool to help manage depression, anxiety, and stress (Hearing et al., 2016; Meyer, Koltyn, Stegner, Kim, & Cook, 2016; Anderson, Moon, & Flood, 2018).

Even moderate exercise has health benefits. Incorporating more physical activity into daily life—for example, by walking instead of driving short distances—can be as effective as structured exercise with respect to health benefits. However, maintaining a healthy weight generally requires both physical activity and diet changes. Specifically, weight loss generally requires calorie restriction (Swift et al., 2018).

Unfortunately, although people are aware of the need to monitor their weight and establish healthy habits, this is easier said than done. Generally, adults ages 18 to 64 should engage in 75 to 150 minutes of aerobic exercise (depending on intensity levels) and muscle-strengthening activities, preferably spread across a week for substantial health benefits. Additional health benefits are gained by engaging in more than 300 minutes of physical activity a week, including muscle-strengthening activities on 2 or more days a week (Centers for Disease Control, 2019c). Despite the fact that the minimum guidelines represent less than half an hour a day of exercise, only 51.6 percent of Americans meet these guidelines, and 15.2 percent report no physical activity at all (Centers for Disease Control, 2014b).

Stress Despite the generally positive experiences of most emerging adults, the dynamics of this stage in life can lead to increases in perceived stress (Arnett, 2005; Brougham, Zail, Mendoza, & Miller, 2009). A growing body of research suggests that our psychological health affects our physical health, and that high levels of chronic stress are related to a host of physical and immunological impairments (Ho, Neo, Chua, Cheak, & Mak, 2010).

There are individual differences in how young adults handle stress (Howland, Armeli, Feinn, & Tennen, 2017). In some cases, stress may lead young adults to engage in risky behaviors such as drinking or smoking to manage that stress (Pedersen, 2017; White et al., 2006; Rice & Van Arsdale, 2010), behaviors that have consequences for their health. Also, stressed-out college students are more likely to eat junk food and less likely to



Stressed out? Having a good laugh over a bad day might be helpful. Although the research is still equivocal, there are indications that humor can be an effective strategy for managing stress. So laugh a little bit!

Moran & Hughes, 2006

checkpoint can you . . .

- Summarize the typical health status of young adults in the United States and identify the leading cause of death in young adulthood?
- Tell how some dietary factors can affect the likelihood of cancer and heart disease?
- Give reasons for the obesity epidemic?



Incorporating more activity into daily life, say, by biking to work instead of driving, can be as effective as structured exercise.
LarsZ/Shutterstock

window on the world

INTERNET USE AROUND THE WORLD

As the world changes, our risks have also changed. Research shows a new global health challenge is emerging: too much Internet use. In 2008, global statistics for the average Internet use for adults was 2.7 hours per day. By 2017, that number had more than doubled to 5.9 hours per day (Meeker, 2018). In Britain, where research shows 78 percent of adults use the Internet daily (Office for National Statistics, 2015), a study indicated too much Internet and social media use causes a decline in physical human contact. This decline is associated with difficulties with basic social skills and appropriate emotional reactions, as well as a short attention span and poor self-control (Paton, 2012). A Swedish study looking at mobile phone use showed that those with high levels of use on their mobile phones reported sleep disturbances and symptoms of depression (Thomee, Harenstam, & Hagberg, 2011). Both studies indicated the risk of negative health factors increased with use of more than an hour per day.

As the use of technology spreads beyond the borders of the developed world, we can expect to see the influence of this new risk spread. Currently, the world's most vulnerable developing countries are on track to achieve universal Internet and mobile phone access by 2020 (United Nations, 2018). Although this is vital to modernization efforts, the introduction of these technologies is a double-edged sword.

what's your view

What do your Internet habits look like? Are there things you need to change to live a healthier life?

exercise (Hudd et al., 2000), they tend to have poor quality or insufficient sleep (Lund, Reider, Whiting, & Prichard, 2010), and their grades and health tend to suffer (Leppink, Odlaug, Lust, Christenson, & Grant, 2016).

There are gender differences in how young adults typically manage stress. Generally, coping has been split into two broad categories. Emotion-focused coping consists of attempts to manage the emotions associated with experiencing a particular event by such tactics as refusing to think about an issue or reframing the event in a positive light. Problem-focused coping involves addressing an issue head-on and developing action-oriented ways of managing and changing a bad situation (Lazarus & Folkman, 1984). College-age women are also more likely to use emotion-focused strategies than are college-age men (Crăciun, 2013; Nolen-Hoeksema & Aldao, 2011). Moreover, at the same time, college-age women experience overall higher levels of stress (Brougham, Zail, Mendoza, & Miller, 2009).

Sleep Many emerging and young adults often go without adequate sleep. Among college students, family life stress, together with academic stress, is associated with high levels of insomnia (Lund et al., 2010). In a recent study of more than 1,300 undergraduate college students, 47 percent reported mild insomnia and 22.5 percent reported moderate to severe insomnia (Gress-Smith, Roubinov, Andreotti, Compas, & Luecken, 2015). Our heavy phone usage and Internet habits may be another factor related to sleep problems (see Window on the World).

Sleep deprivation affects not only physical health but cognitive, emotional, and social functioning as well. The primary cognitive consequence of a lack of sleep is impaired attention and vigilance (de Bruin, van Run, Staaks, & Meijer, 2017; Kerkhof & Van Dongen, 2010; Lim & Dinges, 2010). However, there are also consequences for verbal learning (Horne, 2000), some aspects of memory (Lowe, Safati, & Hall, 2017), high-level decision making (Harrison & Horne, 2000a), inhibitory processes (Anderson & Platten, 2011), and speech articulation (Harrison & Horne, 1997).

Chronic sleep deprivation (less than 6 hours of sleep each night for three or more nights) can seriously worsen cognitive performance (Van Dongen, Maislin, Mullington, & Dinges, 2003). Finally, sleep deprivation has been linked to depression (Murphy & Peterson, 2015; Gress-Smith et al., 2015), and insomnia and sleep disturbances also are related to the risk of postpartum depression (Bhati & Richards, 2015). Sleep deprivation can be dangerous on the road. Indeed, performance impairments related to even partial sleep deprivation have been shown to be similar to those found after drinking alcohol (Elmenhorst et al., 2009).

Adequate sleep improves learning of complex motor skills and consolidates previous learning (Tucker et al., 2017). Compared to adults who did not sleep well the previous night, adults who had a good night's sleep were more engaged with their work the next day (Kühnel, Zacher, De Bloom, & Bledow, 2017). Even a short nap can prevent burnout—oversaturation of the brain's perceptual processing systems (Mednick et al., 2002).



Poor cognitive performance due to sleep deprivation is why pulling an all-nighter for an exam is a bad idea.

Smoking Smoking is the leading preventable cause of death, illness, and impoverishment worldwide, linked not only to lung cancer but also to increased risks of heart disease, stroke, and chronic lung disease. Tobacco kills more than 7 million people each year and will eventually kill half of all users. Exposure to passive, or secondhand, smoke is also dangerous, and approximately 890,000 of the deaths are the results of nonsmokers' exposure to secondhand smoke (World Health Organization, 2019a).



Because smoking is addictive, it is hard to quit despite awareness of health risks. Smoking is especially harmful to African Americans, whose blood metabolizes nicotine rapidly, heightening their risk of lung cancer.
Ryan McVay/Photodisc/Getty Images

Approximately 80 percent of the 1.1 billion smokers in the world can be found in low- and middle-income countries. High taxes on tobacco, the most cost-effective means by which to discourage use, have been instituted in only 32 countries, representing about 10 percent of the global population (World Health Organization, 2019a).

Smoking is linked to approximately 1 out of every 5 American deaths, amounting to more than 480,000 deaths a year. Approximately 15.8 percent of men and 12.2 percent of women over age 18 in the United States are current smokers. Smoking rates are higher in whites (15.2 percent) and African Americans (14.9 percent) and lower in Hispanic adults (9.9 percent) (Centers for Disease Control, 2019d). In recent years, e-cigarettes have become more popular, and estimates are that 2.8 percent of adults smoke e-cigarettes (Centers for Disease Control, 2018).

People start smoking for a variety of reasons; however, the primary reason they continue to do so even when they would prefer to stop is the addictive nature of nicotine, a substance found in tobacco. A tendency to addiction may be genetic (Ware & Munafò, 2015; Lerman et al., 1999; Sabol et al., 1999). The link between genetic susceptibility and likelihood of addiction is strongest for those who begin to smoke at a young age (Weiss et al., 2008). Smoking is strongly associated with socioeconomic level as well; those adults earning less than $35,000 are almost 3 times more likely to smoke than those earning more than $100,000 (Centers for Disease Control, 2019d).

Giving up smoking reduces the risks of heart disease, cancer, and stroke (USDHHS, 2010). Nicotine chewing gum, nicotine patches, and nicotine nasal sprays and inhalers, especially when combined with counseling, can help addicted persons taper off gradually and safely (Cepeda-Benito, Reynoso, & Erath, 2004). Replacing cigarettes with e-cigarettes shows promise as well (Siegel, Tanwar, & Wood, 2011). Although e-cigarettes are still harmful, they are less so than cigarettes. The use of drugs that help manage cravings without the provision of nicotine also can be helpful (Centers for Disease Control, 2018g; Gonzalez et al., 2006).

Quitting smoking is difficult, and many smoking cessation programs have low success rates. However, fewer than one-third of smokers who try to quit use proven smoking cessation therapies, and only 1 in 10 manage to quit over the course of a year (Babb, 2017). However, medication can increase the 6-month success rate to approximately 25 to 33 percent (American Cancer Society, 2011), and overall, almost 60 percent of U.S. adults who had ever smoked have quit (Babb, 2017).

Alcohol Use The United States is a drinking society, and alcohol use peaks in emerging adulthood. Among adults ages 18 to 25, approximately 56 percent reported drinking

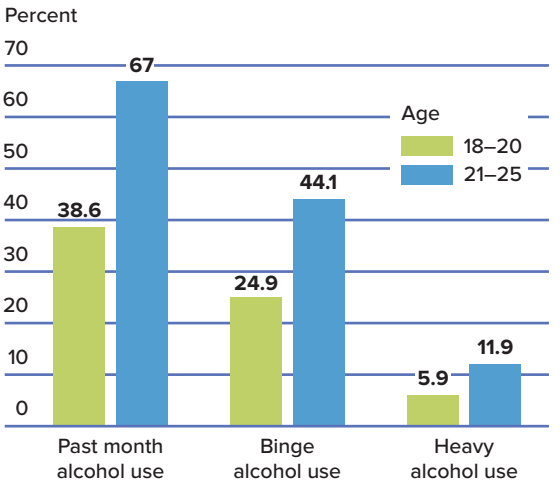


FIGURE 2
Current (Past Month) Alcohol Use, Binge Drinking, and Heavy Alcohol Use among Full-Time College Students Ages 18 to 25

Source: SAMHSA, 2018.

alcohol in the past month (SAMHSA, 2017; Figure 2), and almost 32 percent of men and 19 percent of women had an episode of binge drinking in the past year (Clarke, Norris, & Schiller, 2017).

College is a prime time and place for drinking, and college students tend to drink more frequently and more heavily than their noncollegiate peers. In 2017, nearly 54 percent of full-time college students ages 18 to 22 had used alcohol in the past month as compared to slightly over 48 percent of their noncollegiate peers. Moreover, 9.7 percent of college students drank heavily, and 34.8 percent engaged in binge drinking (SAMHSA, 2017). Although light to moderate alcohol consumption is not harmful (Ruitenberg et al., 2002), heavy drinking over the years may lead to cirrhosis of the liver, other gastrointestinal disorders (including ulcers), pancreatic disease, certain cancers, heart failure, stroke, damage to the nervous system, psychoses, and other medical problems (NIAAA, 2017; Fuchs et al., 1995).

Alcohol use is associated with other risks characteristic of emerging adulthood, such as traffic accidents, crime, HIV infection (Leigh, 1999), illicit drug and tobacco use (Hingson, Heeren, Winter, & Wechsler, 2005), and the likelihood of committing sexual assault (Brecklin & Ullman, 2010). Academic consequences are common for college students (NIAAA, 2016). One-third of vehicle fatalities are alcohol related, and estimates are that there are 121 million alcohol-impaired driving events on an annual basis (Jewett, Shults, Banerjee, & Bergen, 2015).

Risky drinking is defined as consuming more than 14 drinks a week or 4 drinks on any single day for men and more than 7 drinks a week or 3 drinks on any single day for women. Approximately 1 out of 4 people are risky drinkers, at risk for alcoholism and liver disease, as well as physical, mental, and social problems as a result of their drinking (NIAAA, 2016).

Individual variables affect the likelihood of alcohol consumption. For example, race and ethnicity can affect drinking patterns. The group reporting the highest consumption of alcohol is Native Americans, followed by whites, and the lowest levels of use are reported by Central Americans, African Americans, and Asian Americans (Wallace et al., 2005). Gender affects consumption patterns as well, with females generally consuming less alcohol overall as well as having lower levels of binge drinking (NIAAA, 2016).

risky drinking
Consuming more than 14 drinks a week or 4 drinks on any single day for men, and more than 7 drinks a week or 3 drinks on any single day for women.

checkpoint can **you** . . .

- Cite the benefits of exercise?
- Explain why sleep deprivation is harmful?
- Discuss trends and risks involved in smoking and alcohol use?

INDIRECT INFLUENCES ON HEALTH

Apart from the things people do, or refrain from doing, that affect their health directly, there are indirect influences on health. Among these are income, education, and race/ethnicity. Relationships also seem to make a difference, as do the paths young people take into adulthood.

Socioeconomic Status and Race/Ethnicity The connection between socioeconomic status (SES) and health has been widely documented (Williams, Priest, & Anderson, 2016). Higher-income people rate their health as better and live longer than lower-income people (NCHS, 2017b). Education is important too. The less schooling people have had, the greater the chance that they will develop and die from communicable diseases, injuries, or chronic ailments, or that they will become victims of homicide or suicide (NCHS, 2017; Pamuk, Makuc, Heck, Reuben, & Lochner, 1998). Socioeconomic circumstances in both childhood and adulthood are important determinants of risk for cardiovascular disease, and, even more so, of stroke (Galobardes, Smith, & Lynch, 2006).

This does not mean that income and education *cause* good health; instead, they are related to environmental and lifestyle factors that tend to be causative. In other words, their influences are indirect. Better-educated and more affluent people tend to have healthier diets and better preventive health care and medical treatment. They exercise more, are less likely to be overweight, smoke less, are less likely to use illicit drugs, and are more likely to use alcohol in moderation (NCHS, 2017; SAMHSA,

2017). Moreover, the less affluent are more likely to live close to a polluting facility (Mohai, Lantz, Morenoff, House, & Mero, 2009) and show elevated levels of lead and other toxins in their blood (Bellinger, 2008).

Because many minorities in the United States also tend to have a lower SES, their health issues stem from that rather than from minority status per se (Kiefe et al., 2000). Thirty-nine percent of African American men and 43 percent of African American women aged 20 years and older suffer from high blood pressure (CDC, 2011a). African Americans also are more likely to be diagnosed with diabetes and more likely to eventually die from the disease as well (Kirk et al., 2006). African Americans are over 60 percent more likely than white people to die in young adulthood, in part because young African American men are far more likely to be victims of homicide (NCHS, 2017).



Living in poverty, as do this mother and her daughter who share a room in a shelter, can affect health through poor nutrition, substandard housing, and inadequate health care.
David Wells/The Image Works

Relationships and Health Social relationships seem to be vital to health and well-being. Research has identified at least two interrelated aspects of the social environment that can promote health: *social integration* and *social support* (Cohen, 2004).

Social integration is active engagement in a broad range of social relationships, activities, and roles. Social integration has repeatedly been associated with lower mortality rates (Holt-Lunstad, Smith, & Layton, 2010; Holt-Lunstad, Smith, Baker, Harris, & Stephenson, 2015). People with wide social networks and multiple social roles are more likely to survive heart attacks and less likely to be anxious or depressed than people with more limited social networks and roles (Cohen, Gottlieb, & Underwood, 2000) and are even less susceptible to colds (Cohen, Janicki-Deverts, Turner, & Doyle, 2015). In addition, it appears that online social networking sites, such as Facebook, can provide some of those benefits via online interaction and support (Hobbs, Burke, Christakis, & Fowler, 2016; Ellis, Steinfield, & Lampe, 2007). Some of these processes may be mediated by stress hormones such as cortisol. In other words, the beneficial effects of social integration may in part be due to the decreases in stress levels that strong social ties can engender (Grant, Hamer, & Steptoe, 2009).

Social support refers to material, informational, and psychological resources derived from the social network on which a person can rely for help in coping with stress. In highly stressful situations, people who are in touch with others may be more likely to eat and sleep sensibly, get enough exercise, and avoid substance abuse, and are less likely to be distressed, anxious, depressed, or even to die (Cohen, 2004; Thoits, 2011).

Because marriage offers a readily available system for both social integration and social support, it is not surprising that marriage tends to benefit health (Robles, Slatcher, Trombello, & McGinn, 2014). Married people, particularly in young adulthood, tend to be healthier physically and psychologically than those who are never-married, cohabiting, widowed, separated, or divorced (Schoenborn, 2004). Dissolving a marriage or a cohabitation tends to have negative effects on physical or mental health or both—but so, apparently, does remaining in a bad relationship (Wu & Hart, 2002). People in an unhappy marriage have poorer health than single adults, and even a supportive network of friends and family does not buffer this effect (Holt-Lunstad, Birmingham, & Jones, 2008).

checkpoint
can you . . .

- Point out differences in health and mortality that reflect income, education, and race/ethnicity?
- Discuss how relationships may affect physical and mental health?



This happily married couple is the picture of good health. Although there is a clear association between relationships and health, it's not clear which is the cause and which the effect.
Don Hammond/Design Pics

MENTAL HEALTH PROBLEMS

The emerging adult transition brings an end to the relatively structured years of high school. The freedom to make life decisions and choose diverse paths is often liberating, but the responsibility to rely on oneself and to become financially self-supporting can be overwhelming (Schulenberg & Zarrett, 2006). Let's look at some specific disorders that can occur in young adulthood: alcoholism, drug abuse, and depression.

Alcoholism Alcohol abuse and dependence are the most prevalent substance disorders, reported by 6.2 percent of the U.S. adult population (NIAAA, 2018). Alcohol dependence, or **alcoholism,** is a long-term physical condition characterized by compulsive drinking that a person is unable to control. The heritability of a tendency to alcoholism is about 50 percent (Verhulst, Neale, & Kendler, 2015). Alcoholism, like other addictions, such as getting hooked on smoking, seems to result from long-lasting changes in patterns of neural signal transmission in the brain. Exposure to the addictive substance (in this case, alcohol) creates a euphoric mental state accompanied by neurological changes that produce feelings of discomfort and craving when it is no longer present. From 6 to 48 hours after the last drink, alcoholics experience strong physical withdrawal symptoms (anxiety, agitation, tremors, elevated blood pressure, and sometimes seizures). Alcoholics, like drug addicts, develop a tolerance for the substance and need more and more to get the desired high (NIAAA, 1996).

alcoholism
Chronic disease involving dependence on use of alcohol, causing interference with normal functioning and fulfillment of obligations.

Treatment for alcoholism may include detoxification (removing all alcohol from the body), hospitalization, medication, individual and group psychotherapy, and referral to a support organization, such as Alcoholics Anonymous. Although not a cure, treatment can give alcoholics new tools to cope with their addiction and lead productive lives.

Drug Use and Abuse Use of illicit drugs peaks at ages 18 to 25; 24.2 percent of this age group report using illicit drugs during the past month. As young adults settle down and take responsibility for their future, they generally tend to cut down on drug use. Usage rates drop sharply during the twenties and then continue to decline, albeit more slowly as people enter later adulthood and old age (SAMHSA, 2017). While some people can use drugs on an occasional basis without developing an addiction or dependence, others will develop a substance use disorder. Although alcohol is the most common substance use disorder, both prescription and illicit drugs also carry risks. The most common habit-forming drugs include marijuana and prescription painkillers, followed by cocaine and heroin (Lipari & Van Horn, 2017).

As in adolescence, marijuana is by far the most popular illicit drug among young adults. In 2017, 20.8 percent of 18- to 25-year-olds had used marijuana within the previous month (SAMHSA, 2017). In general, although a substantial proportion of young adults will experiment with alcohol, cigarettes, or marijuana, a much smaller proportion will try other drugs such as ecstasy, methamphetamines, or heroin, and an even smaller number will become chronic and heavy users of illegal drugs (Johnston, O'Malley, Bachman, & Schulenberg, 2009). However, despite the relatively moderate prevalence numbers for heavy abuse, drug abuse still results in significant costs to the user personally and to society at large. The National Drug Intelligence Center (2011) estimates that the use of illegal drugs costs society approximately $193 billion yearly.

There is a strong association between substance use disorders and drug and alcohol dependence and mood (depression) or anxiety disorders (Lai, Cleary, Sitharthan, & Hunt, 2015). Moreover, there is a relationship between the occurrence of personality disorders and the abuse of both illegal drugs and alcohol (Grant et al., 2007). The causal relationship here is unclear. It may be that the use of illegal drugs puts young people at risk for the development of a variety of psychopathologies. Alternatively, it could be the case that those people who suffer from psychological distress self-medicate and thus are more prone to addiction and other risky behaviors.

Depression Adolescence and emerging adulthood appear to be sensitive periods for the onset of depressive disorders. Starting about age 13, rates of depression begin to rise,

first in girls and then in boys. Rates continue to increase through adolescence and early adulthood, with the early gender difference peaking in adolescence and then declining somewhat in adulthood (Salk, Hyde, & Abramson, 2017; Salk, Petersen, Abramson, & Hyde, 2016). Depression can be characterized in a number of different ways. Depressive mood is an extended period of sadness. Depressive syndrome is an extended period of sadness along with a variety of other symptoms such as crying and feelings of worthlessness or hopelessness. A major depressive disorder, by contrast, is a clinical diagnosis with a specific set of symptoms, is considered to be the most serious, and generally requires medical intervention. People who are diagnosed with major depressive disorder often have depressed or irritable moods for most of the day, every day, show reduced interest in and enjoyment of previously pleasurable activities, often either gain or lose significant amounts of weight, have difficulties sleeping too little or too much, and often show a variety of cognitive biases and maladaptive recurrent thoughts (American Psychiatric Association, n.d.).

Childhood-or-adolescent-onset depression and adult-onset depression seem to have different origins and developmental paths. Adolescents who are depressed, and whose depression carries over into adulthood, tend to have had significant childhood risk factors, such as neurological or developmental disorders, dysfunctional or unstable families, and childhood behavioral disorders. They may have difficulty negotiating the transition to emerging adulthood. For some of them, on the other hand, emerging adulthood represents a new start, a chance to find new social roles and settings more conducive to mental health. The adult-onset group tend to have had low levels of childhood risk factors and to possess more resources to deal with the challenges of emerging adulthood, but the sudden decline in structure and support that accompanies adult life may throw them off course (Schulenberg & Zarrett, 2006).

Generally, young women are more likely to suffer from a major depressive episode, and this difference in prevalence becomes particularly acute after the onset of puberty (Wasserman, 2006; Allen, Latham, Barrett, Sheeber, & Davis, 2016). Women are also more likely than men to show atypical symptoms, to have an additional psychopathology along with their depressive disorders, and to attempt (but not succeed in) suicide (Gorman, 2006). In addition, women and men may respond to antidepressants differently, with women showing a greater likelihood of adverse drug reactions (Franconi, Brunelleschi, Steardo, & Cuomo, 2007).

checkpoint can you . . .

- Discuss mental health problems common in emerging and young adulthood?

Sexual and Reproductive Issues

Sexual and reproductive activities are often a prime preoccupation of emerging and young adulthood. These natural and important functions may involve physical concerns. Three such concerns are disorders related to menstruation, sexually transmitted infections (STIs), and infertility.

SEXUAL BEHAVIOR AND ATTITUDES

What are the recent trends in sexual behaviors in young adults? Today almost all never-married, noncohabitating U.S. adults–81.5 percent–have had vaginal intercourse before marriage (Copen, Chandra, & Febo-Vazquez, 2016). Increasingly, American adults agree with statements about the acceptability of premarital sex for adults over the age of 18 and cohabitation (Daugherty & Copen, 2016). According to a nationally representative in-person survey of men and women ages 18 to 44 years, 86.2 percent of women and 87.4 percent of men have had oral sex, 35.9 percent of women and 42.3 percent of men have had anal sex, and 94.2 percent of women and 92 percent of men have had vaginal intercourse (Copen et al., 2016).



Kissing occurs in over 90 percent of cultures. When kissing, men tend to prefer wetter kisses using more tongue. Men might want to think about this—research has shown that 66 percent of women can be put off by a bad kisser.

Hughes, Harrison, & Gallup, 2007

Additionally, acceptability of homosexual unions is growing, especially in younger cohorts and in women (Daugherty & Copen, 2016). Women (17.4 percent) are also more likely than men (6.2 percent) to report same sex contact. With respect to sexual orientation, 1.3 percent of women and 1.9 percent of men reported they were homosexual, and 5.5 percent of women and 2 percent of men reported they were bisexual (Copen et al., 2016).

Emerging adults tend to have more sexual partners than in older age groups, but they have sex less frequently. People who become sexually active during emerging adulthood tend to engage in fewer risky behaviors—those that may lead to STIs or unplanned pregnancies—than those who began in adolescence (Lefkowitz & Gillen, 2006). The most common contraceptives are the birth control pill, female sterilization, and condoms. There has been a recent rise in the use of the IUD and a decline in the use of male sterilization (Kavanaugh & Jerman, 2018).

Casual sex (hooking up) is fairly common, especially on college campuses. Sexual assaults on women are also a problem in this age group. Both are often associated with other, nonsexual risky behaviors such as drinking and drug use (Santelli, Carter, Orr, & Dittus, 2007). College students, in particular, are becoming less judgmental and more open-minded about sexual activity. However, a double standard still exists: Men are expected to have more sexual freedom than women (Kreager, Staff, Gauthier, Lefkowitz, & Feinberg, 2016).

By emerging adulthood, most lesbian, gay, bisexual, and transgender persons are clear about their sexual identity. Indeed, the median age at which gay, lesbian, and bisexual adults report suspecting they might not be heterosexual is at about 12 years of age, and the median age they report knowing for sure is 17 years of age (Pew Research Center, 2013a). In general, more recent generations in the United States are coming out at an earlier age, and men are more likely to come out at an earlier age (by approximately 2 years) than women. Ethnic minority youth are equally likely to be open about their sexual orientation to their friends, but they are more likely to keep this information secret from their parents (Grov, Bimbi, Nanin, & Parsons, 2006).

SEXUALLY TRANSMITTED INFECTIONS (STIs)

Sexually transmitted infections, also known as sexually transmitted diseases (STDs), are illnesses that are transmitted by having sex. Because people can carry infections for years without displaying signs of active disease, STI is becoming the preferred term. By far, the highest rates of STIs in the United States are among emerging adults ages 18 to 25 (Centers for Disease Control, 2018f). An estimated 1 in 4 persons who have been sexually active, but nearly half of new STI cases, is in that age group, and many do not get medical diagnosis and care (Lefkowitz & Gillen, 2006). The risk has been rising—for four years in a row, chlamydia, gonorrhea, and syphilis all showed increases in prevalence (Centers for Disease Control, 2017h, 2018j). Morever, the risk is higher among certain ethnic groups. For example, there are elevated rates of STIs for African American (Hallfors, Iritani, Miller, & Bauer, 2006; Kaplan, Crespo, Huguet, & Marks, 2009), and Latino/a young adults (Kaplan et al., 2009).

The number of people living with HIV has risen in every region of the world since 2002, with the steepest increases in East and Central Asia and Eastern Europe. Still, sub-Saharan Africa remains by far the worst affected (UNAIDS/WHO, 2004). Globally, 36.9 million people are infected with HIV, and 1.8 million adults were newly infected in 2017. Infection can theoretically occur with any transmission of body fluids, although some activities are clearly riskier than others. Populations most at risk include men who have sex with other men, people who share contaminated hypodermic needles, prison populations, sex workers and their clients, and transgender individuals (World Health Organization, 2018h).

In the United States, 1.1 million people have HIV, and estimates are that approximately 15 percent do not know their status. African Americans have the highest rates of infection at 43 percent, with non-Hispanic white and Hispanic populations equal at 26 percent and Asians presenting the lowest rates at 2 percent. Most HIV infection in

the United States is via male-to-male sexual contact (Centers for Disease Control, 2018k). With highly active antiviral therapy, death rates of persons diagnosed with HIV have dropped dramatically, and their average life span has increased to more than 35 years (Bhaskaran et al., 2008; Lohse et al., 2007).

A variety of interventions have been used to try to stem the tide of HIV infections. Unfortunately, interventions providing information, education, and peer interventions have not generally been successful. However, interventions providing male circumcision (which reduces risk of transmission), pre-exposure prophylaxis (a vaccine reducing risk of transmission), and the provision of condoms and needle and syringe exchange programs have shown more success (Krishnaratne, Hensen, Cordes, Enstone, & Hargreaves, 2016).

MENSTRUAL DISORDERS

Premenstrual syndrome (PMS) is a disorder that produces physical discomfort and emotional tension for up to 2 weeks before a menstrual period. Symptoms may include fatigue, headaches, swelling and tenderness of the breasts, swollen hands or feet, abdominal bloating, nausea, cramps, constipation, food cravings, weight gain, anxiety, depression, irritability, mood swings, tearfulness, and difficulty concentrating or remembering (ACOG, 2015). Cross-culturally, women report PMS at a rate of about 50 percent, with a range of 10 to 98 percent (Direkvand-Moghadam, Sayehmiri, Delpisheh, & Kaikhavandi, 2014).

premenstrual syndrome (PMS)
Disorder producing symptoms of physical discomfort and emotional tension for up to 2 weeks before a menstrual period.

The cause of PMS is not fully understood, but it appears to be a response to normal monthly surges of the female hormones estrogen and progesterone as well as to levels of the male hormone testosterone and of serotonin, a brain chemical (Biggs & Demuth, 2011). Smoking and alcohol consumption may put women at increased risk for the development of PMS (Bertone-Johnson, Hankinson, Johnson, & Manson, 2008; del mar Fernández, Saulyte, Inskip, & Takkouche, 2018). Caffeine, which women are sometimes counseled to avoid, does not appear to be associated with PMS (Purdue-Smithe, Manson, Hankinson, & Bertone-Johnson, 2016).

The symptoms of PMS can sometimes be alleviated through aerobic exercise, eating frequent small meals, a diet high in complex carbohydrates and low in salt, and regular sleep routines. Calcium, magnesium, and vitamin E supplements may help. Medications may relieve specific symptoms—for example, a diuretic for bloating and weight gain (ACOG, 2015).

PMS may include the presence of cramps, but it is not the same thing. PMS can be confused with *dysmenorrhea* (painful menstruation, or cramps). Cramps tend to affect younger women, whereas PMS is more typical in women in their thirties or older. Dysmenorrhea is caused by contractions of the uterus, which are set in motion by prostaglandin, a hormonelike substance; it can be treated with prostaglandin inhibitors, such as ibuprofen (Wang et al., 2004). Dysmenorrhea is estimated to affect up to 90 percent of women, and approximately 15 percent experience severe symptoms (Mannix, 2008).

infertility
Inability to conceive a child after 12 months of sexual intercourse without the use of birth control.

INFERTILITY

An estimated 6 percent of U.S. women age 15 to 44 years old experience **infertility:** the inability to conceive a baby after 12 months of intercourse in the absence of birth control methods. Moreover, approximately 12 percent of women have difficulty carrying a pregnancy to term (Centers for Disease Control, 2019e). Worldwide, about 1 in 4 couples has difficulty getting pregnant or maintaining a pregnancy to term (Marscarenhas, Flaxman, Boerma, Vanderpoel, & Stevens, 2012).

Women's fertility begins to decline in their late twenties, with substantial decreases during their thirties. By their forties, many women are not able to become pregnant without the use of assisted reproductive technology (ART). Men's fertility is less affected by age but begins to decline in the late thirties (Dunson, Colombo, & Baird, 2002).



Delayed childbearing, use of fertility drugs, and assisted reproductive techniques such as in vitro fertilization increase the likelihood of multiple, usually premature, births.
Shutterstock

Approximately 30 percent of couples are unable to become parents, and they show worse mental health outcomes than those couples who do succeed (Gameiro & Finnigan, 2017).

The most common cause of infertility in men is production of too few sperm. In some instances, an ejaculatory duct may be blocked, preventing the exit of sperm, or sperm may be unable to swim well enough to reach the cervix (O'Flynn O'Brien, Varghese, & Agarwal, 2010).

In women, the common causes of infertility include the failure to produce ova or to produce normal ova; mucus in the cervix, which might prevent sperm from penetrating it; or a disease of the uterine lining, which might prevent implantation of the fertilized ovum. A major cause of declining fertility in women after age 30 is deterioration in the quality of ova (Centers for Disease Control, 2019e). However, the most common cause is blockage of the fallopian tubes, preventing ova from reaching the uterus. In about half of these cases, the tubes are blocked by scar tissue from sexually transmitted infections (King, 1996). In addition, some women suffer from physical disorders affecting fertility, such as polycystic ovarian syndrome (Franks, 2009) or primary ovarian insufficiency (Welt, 2008).

In both men and women, modifiable environmental factors are related to infertility. For example, overweight men and women (Centers for Disease Control, 2019e; Sallmen, Sandler, Hoppin, Blair, & Day, 2006; Maheshwari, 2010) are more likely to have issues with fertility. Smoking also appears to have a strong negative effect on fertility. Other factors, such as psychological stress, high levels of caffeine and alcohol consumption, and exposure to environmental pollutants have been implicated, but the evidence for their negative effects is less strong (Hoffman, Davies, & Norman, 2007).

Sometimes hormone treatment, drug therapy, or surgery may correct the problem. For couples struggling with infertility, science today offers several alternative ways to parenthood; these are discussed in Research in Action.

checkpoint can you . . .

- Summarize trends in sexual behavior and attitudes among emerging and young adults?
- Discuss the spread of STIs and ways to control them?
- Discuss the symptoms and likely causes of PMS and ways to manage it?
- Identify common causes of male and female infertility?

COGNITIVE DEVELOPMENT

Perspectives on Adult Cognition

reflective thinking
Type of logical thinking that becomes more prominent in adulthood, involving continuous, active evaluation of information and beliefs in the light of evidence and implications.

Developmentalists have studied cognition from a variety of perspectives. Here, we address different perspectives on cognition in young adulthood.

BEYOND PIAGET: NEW WAYS OF THINKING IN ADULTHOOD

Piaget believed that the pinnacle of cognitive development was formal operations thought. However, some developmental scientists maintain that changes in cognition extend beyond that stage. One line of neo-Piagetian theory and research concerns higher levels of *reflective thinking,* or abstract reasoning. Another line of investigation deals with *post-formal thought,* which combines logic with emotion and practical experience in the resolution of ambiguous problems.

Why is it so much more irritating to listen to a cell phone conversation than a conversation between two physically present people? Well, as we only hear half the conversation, it takes more work to interpret and understand this "halfalogue"—which is why it's more distracting

Emberson, Lupyan, Goldstein, & Spivey, 2010

Reflective Thinking **Reflective thinking** was first defined by the American philosopher and educator John Dewey (1910/1991) as "active, persistent, and careful consideration" of information or beliefs. Reflective thinkers continually question facts, draw inferences, and make connections. In other words, they frequently and spontaneously engage in critical thinking. Building on Piaget's stage of formal operations, reflective thinkers can also create complex intellectual systems that reconcile apparently conflicting ideas or considerations—for example, by putting together various theories of human development into a single overarching theory that explains many different kinds of behavior (Fischer & Pruyne, 2003).

IN VITRO FERTILIZATION

Assisted reproductive technologies (ARTs) offer hope for those who experience infertility. While various techniques are available, in vitro fertilization (IVF) is the most common approach, accounting for 99 percent of ARTs (Centers for Disease Control, 2017i). With IVF, women receive fertility drugs to stimulate ova (egg) production. Ova are surgically removed, fertilized with sperm in a laboratory dish, put in a special culture, and monitored for growth. Approximately 3 to 5 days later, the largest and healthiest fertilized eggs—known as blastocysts—are then implanted in the uterus. If successful, the blastocyst continues to grow and divide, and pregnancy occurs.

Generally, more fertilized eggs are produced than are used during one cycle. Unused eggs may be frozen and stored for later implantation. Fresh embryo transfers have greater IVF success rates, but frozen-thawed embryo transfers have begun to approach these rates in recent years (Wong, Mastenbroek, & Repping, 2014). More recently, women have also been employing cryopreservation, or egg freezing, to extend their years of fertility. Eggs are harvested with the intention of conceiving a child at a later date with the help of IVF (Brezina & Zhao, 2012).

IVF success rates are not very high. In 2015, approximately 30 percent of IVF procedures using fresh, nondonor eggs resulted in pregnancy (Centers for Disease Control, 2017i). Transfer of multiple embryos increases the odds of IVF success, but also carries risks to mother and baby, including multiple births, preterm delivery, and pregnancy complications (Reddy, Wapner, Rebar, & Tasca, 2007). Thus, many advocates support single embryo transfers coupled with subsequent frozen-thawed embryo transfers for infertile couples wanting multiple children, and many countries pose restrictions on the number of embryos transferred per IVF cycle (Brezina & Zhao, 2012).

Assisted reproduction can result in a tangled web of legal and ethical dilemmas. Who retains ownership of frozen embryos in the event that a couple breaks up? What should be done with "leftover" embryos? Additionally, many people object to the creation and/or destruction of embryos in a laboratory on religious grounds. In many ways, our legal system has to play catch up with these new ethical dilemmas created by modern reproductive technologies.



If you or your partner were infertile, would you seriously consider or undertake in vitro fertilization? Why or why not?

At approximately 20 to 25 years of age, the brain forms new neurons, synapses, and dendritic connections, and the cortical regions that handle higher-level thinking become fully myelinated. A rich and stimulating environment can stimulate the development of thicker, denser, cortical connections. These physical changes in the brain allow more complex thinking to occur. Although almost all adults develop the *capacity* for becoming reflective thinkers, few attain optimal proficiency in this skill, and even fewer can apply it consistently to various kinds of problems. For many adults, college education stimulates progress toward reflective thinking (Fischer & Pruyne, 2003).

Postformal Thought Research and theoretical work since the 1970s suggest that mature thinking is more complex than Piaget described, and that it encompasses more than just the capacity for abstract thought. This higher stage of adult cognition, which tends to emerge in early adulthood, is sometimes called **postformal thought.** As with reflective thinking, exposure to higher education is often a catalyst for the development of this ability (Labouvie-Vief, 2006).

Postformal thought is characterized by the ability to deal with inconsistency, contradiction, and compromise. Life is messy and complex, and some people are better able to deal with its inherent uncertainty. Thus postformal thinking is in some way as much a personality style as it is a mode of thinking.



Ever see seminars or classes offered that claim to be able to help you think with your right brain and therefore release your creative juices more effectively? Although it sounds nice, unfortunately, there doesn't seem to be any scientific basis for these types of claims. A review of 72 neuro-imaging studies showed no relationship between creativity and right brain activation.

Dietrich & Kanso, 2010

postformal thought
Mature type of thinking that relies on subjective experience and intuition as well as logic and allows room for ambiguity, uncertainty, inconsistency, contradiction, imperfection, and compromise.

Another characteristic of postformal thought is its flexibility. At times, formal logical thought is the appropriate tool to solve a problem. But other times, especially in ambiguous circumstances, the fruits of experience can help us understand a situation more effectively. Postformal thought draws on intuition and emotion as well as logic to help people cope with situations such as social dilemmas, which are often less clearly structured and are fraught with emotion (Berg & Klaczynski, 1996; Sinnot, 2003).

Postformal thought is also relativistic. Immature thinking tends to be black and white—there is one right answer and one wrong one. Relativistic thought, by contrast, acknowledges that there may be more than one valid way of viewing an issue and that the world is made up of shades of gray. This allows adults to transcend a single logical system (such as an established political system and ideology) and reconcile or choose among conflicting ideas when each of these ideas may have a valid claim as the truth (Sinnott, 2003). Relativistic thinking often develops in response to events or interactions that open up unaccustomed ways of looking at things and challenge a simple, polarized view of the world. Research has found a progression toward postformal thought throughout young and middle adulthood (Blanchard-Fields & Norris, 1994).

SCHAIE: A LIFE-SPAN MODEL OF COGNITIVE DEVELOPMENT

K. Warner Schaie's life-span model of cognitive development (1977-1978; Schaie & Willis, 2000) looks at the developing uses of cognition within a social context. These goals shift from acquisition of information and skills (*what I need to know*) to practical integration of knowledge and skills (*how to use what I know*) to a search for meaning and purpose (*why I should know*). The seven stages are as follows:

1. *Acquisitive stage* (childhood and adolescence). Children and adolescents acquire information and skills mainly for their own sake or as preparation for participation in society. For example, a child might read about dinosaurs out of pure interest in the topic.
2. *Achieving stage* (late teens or early twenties to early thirties). Young adults no longer acquire knowledge merely for its own sake; they use what they know to pursue goals, such as career and family. For example, a young adult might take a college class as preparation for a career in a particular area.
3. *Responsible stage* (late thirties to early sixties). Middle-age people use their minds to solve practical problems associated with responsibilities to others, such as family members or employees. For example, an adult might figure out a more efficient way to complete a task at work.
4. *Executive stage* (thirties or forties through middle age). People in the executive stage are responsible for societal systems (such as governmental or business organizations) or social movements. They deal with complex relationships on multiple levels. For example, an adult might mediate a disagreement between two coworkers so the office runs more smoothly.
5. *Reorganizational stage* (end of middle age, beginning of late adulthood). People who enter retirement reorganize their lives and intellectual energies around meaningful pursuits that take the place of paid work. A retired adult, for example, might decide to volunteer at a local botanical garden.
6. *Reintegrative stage* (late adulthood). Older adults may be experiencing biological and cognitive changes and tend to be more selective about what tasks they expend effort on. They focus on the purpose of what they do and concentrate on tasks that have the most meaning for them. For example, a person feeling the effects of age on her joints might decide to take a daily walk rather than a run for health.
7. *Legacy-creating stage* (advanced old age). Near the end of life, once reintegration has been completed (or along with it), older people may create instructions for the disposition of prized possessions, make funeral arrangements, provide oral histories, or write their life stories as a legacy for their loved ones. An older adult might, for instance, complete an advance directive and distribute that to his children.

checkpoint
can **you** . . .

- Differentiate between reflective and postformal thinking?
- Tell why postformal thought may be especially suited to solving social problems?
- Identify Schaie's seven stages of cognitive development?

STERNBERG: INSIGHT AND KNOW-HOW

Alix, Barbara, and Courtney applied to graduate programs at Yale University. Alix had earned almost straight A's in college and had scored high on the Graduate Record Examination (GRE). Barbara's grades were fair, and her GRE scores were low by Yale's standards, but her letters of recommendation enthusiastically praised her exceptional research and creative ideas. Courtney's grades, GRE scores, and recommendations were good but not among the best.

Alix and Courtney were admitted to the graduate program. Barbara was not admitted but was hired as a research associate and took graduate classes on the side. Alix did very well for the first year or so, but less well after that when asked to develop independent research ideas. Barbara confounded the admissions committee by doing outstanding work. Courtney's performance in graduate school was only fair, but she had the easiest time getting a good job afterward (Trotter, 1986).

This vignette illustrates that doing well in life involves more than just exam grades. The triarchic theory of intelligence is comprised of three elements: *componential, experiential,* and *contextual knowledge* (Sternberg, 1985, 1987). Alix's analytical abilities illustrated componential knowledge, which helped her sail through examinations and do well in situations in which academic rigor was important. She scored very well on traditional psychometric tests, which are highly predictive of academic success. However, componential knowledge such as this is not always sufficient to do well in life. Also important are experiential elements (how insightful or creative a person is) and contextual knowledge (the practical aspect of intelligence).

In graduate school, where original thinking is expected, Barbara's superior experiential intelligence—her fresh insights and original ideas—began to shine. So did Courtney's practical, contextual intelligence. Courtney knew her way around. She chose hot research topics, submitted papers to the right journals, and knew when and how to apply for jobs.

An important aspect of practical intelligence is **tacit knowledge:** "inside information," "know-how," or "savvy" that is not formally taught or openly expressed. Tacit knowledge is commonsense knowledge of how to get ahead—how to win a promotion or cut through red tape. It is not well correlated with measures of general cognitive ability, but it may be a better predictor of managerial success (Sternberg, Grigorenko, & Oh, 2001).

Tacit knowledge may include *self-management* (knowing how to motivate oneself and organize time and energy), *management of tasks* (knowing how to write a term paper or grant proposal), and *management of others* (knowing when and how to reward or criticize subordinates) (E. A. Smith, 2001). Sternberg's method of testing tacit knowledge in adults is to compare a test-taker's chosen course of action in hypothetical, work-related situations (such as how best to angle for a promotion) with the choices of experts in the field and with accepted rules of thumb. Tacit knowledge, measured in this way, seems to be unrelated to IQ and predicts job performance better than do psychometric tests (Herbig, Büssing, & Ewert, 2001; Sternberg, Wagner, Williams, & Horvath, 1995).



We remember more events from our young adult years than at any other point in the life span, a phenomenon known as the reminiscence bump.

Janssen, Murre, & Meeter, 2007

tacit knowledge
Sternberg's term for information that is not formally taught but is necessary to get ahead.

checkpoint can you . . .

- Tell why Sternberg's three kinds of intelligence may be especially applicable to adults?

EMOTIONAL INTELLIGENCE

Peter Salovey and John Mayer (1990) coined the term **emotional intelligence (EI).** It refers to four related skills: the abilities to *perceive, use, understand,* and *manage,* or regulate, emotions—our own and those of others—so as to achieve goals. Emotional intelligence enables a person to harness emotions to deal more effectively with the social environment. It requires awareness of the type of behavior that is appropriate in a given social situation. While mean scores for these four categories differ by country, the test is valid cross-culturally (Karim & Weisz, 2010).

To measure emotional intelligence, psychologists use the Mayer-Salovey-Caruso Emotional Intelligence Test (MSCEIT) (Mayer, Salovey, & Caruso, 2002), a 40-minute battery of questions that generates a score for each of the four abilities, as well as a total score. The test includes such questions as, "Tom felt anxious and became a bit stressed when he thought about all the work he needed to do. When his supervisor brought him an additional project, he felt (a) overwhelmed, (b) depressed, (c) ashamed, (d) self-conscious, or (e) jittery."

emotional intelligence (EI)
Salovey and Mayer's term for the ability to understand and regulate emotions; an important component of effective, intelligent behavior.

Generally, we think of the capacity to empathize with others as a good thing. But what if you work in a job where you frequently see people in pain? Research has shown that doctors suppress this empathic response, allowing them to focus on treatment more effectively.

Decety, Yang, & Cheng, 2010

Emotional intelligence affects the quality of personal relationships. Studies have found that college students who score high on the MSCEIT are more likely to report positive relationships with parents and friends (Lopes, Salovey, & Straus, 2003), that college-age men who score high on the MSCEIT engage in less drug and alcohol use and score higher on well-being measures (Brackett, Mayer, & Warner, 2004; Lanciano & Curci, 2015), and that close friends of college students who score well on the MSCEIT rate them as more likely to provide emotional support in time of need (Lopes et al., 2004). College-age couples in which both partners scored high on the MSCEIT reported the happiest relationships, whereas couples who scored low were unhappiest (Brackett, Cox, Gaines, & Salovey, 2005). Generally, women score higher on emotional intelligence than do men (Lanciano & Curci, 2015).

In what kinds of situations would emotional intelligence be most useful? Give specific examples. Do the same for reflective thought, postformal thought, and tacit knowledge.

Emotional intelligence also affects effectiveness at work. Among a sample of employees of a Fortune 500 insurance company, those with higher MSCEIT scores were rated higher by colleagues and supervisors on sociability, interpersonal sensitivity, leadership potential, and ability to handle stress and conflict. High scores also were related to higher salaries and more promotions (Lopes, Grewal, Kadis, Gall, & Salovey, 2006).

Ultimately, acting on emotions often comes down to a value judgment. Is it smarter to obey or disobey authority? To inspire others or exploit them? "Emotional skills, like intellectual ones, are morally neutral. . . . Without a moral compass to guide people in how to employ their gifts, emotional intelligence can be used for good or evil" (Gibbs, 1995, p. 68). Let's look next at the development of that "moral compass" in adulthood.

checkpoint can you . . .

- Explain the concept of emotional intelligence and how it is tested?

Moral Reasoning

In Kohlberg's theory, moral development of children and adolescents is closely tied to cognitive maturation. Young people advance in moral judgment as they shed egocentrism and become capable of abstract thought. In adulthood, however, moral judgments become more complex.

Recall that Kohlberg broke moral development into three stages. In the final stage, postconventional morality, Kohlberg believed that people became capable of fully principled moral reasoning, and that they made moral decisions on the basis of universal principles of justice. Kohlberg argued that most people did not reach this level until their twenties, if at all (Kohlberg, 1973). He believed that the acquisition of this style of thinking was primarily a function of experience. In particular, when young people encounter values that conflict with their own (as might happen in college or foreign travel) and when they are responsible for the welfare of others (as in parenthood), their development of moral reasoning abilities increases.

There is some support for the view that experience may lead adults to reevaluate their criteria for what is right and wrong. Students who attend church are less likely to cheat on a task than those who attend church less regularly (Bloodgood, Turnley, & Mudrack, 2008). On the other hand, people exposed to war (Haskuka, Sunar, & Alp, 2008) or who suffer from post-traumatic stress disorder as a result of combat experience (Taylor, 2007) show a reduced tendency to reach Kohlberg's higher levels of moral reasoning. In short, personal experiences can affect the likelihood of engaging in certain types of moral reasoning.

Shortly before his death, Kohlberg proposed an additional seventh state of moral reasoning. He believed it was possible for people to achieve "a sense of unity with the cosmos, nature or God," which enabled them to see moral issues from "the standpoint of the universe as a whole" (Kohlberg & Ryncarz, 1990, pp. 191, 207). Rather than seeing morality as tied to justice, adults at this stage might instead reflect on the question, "Why be moral?"

CULTURE AND MORAL REASONING

Culture affects the understanding of morality. Cultures like the United States tend to focus on individual autonomy, whereas cultures like China are more concerned with group dynamics and harmony. This may help explain some of the cultural differences in moral reasoning. Whereas Kohlberg's system is based on justice, the Chinese ethos leans toward conciliation and harmony. In Kohlberg's format, respondents make an either-or decision based on their own value system. In Chinese society, people faced with moral dilemmas are expected to discuss them openly, be guided by community standards, and try to find a way of resolving the problem to please as many parties as possible. In the West, even good people may be harshly punished if, under the force of circumstances, they break a law. The Chinese are unaccustomed to universally applied laws; they are taught to abide by the decisions of a wise judge (Dien, 1982).

This example illustrates a wider critique leveled at Kohlberg's approach. Kohlberg believed that certain cultures were more likely to provide opportunities for people to attain the highest levels of moral reasoning (Jenson, 1997). This underlying belief in the superiority of a particular worldview has been criticized as being too narrow, and as being biased toward Western cultural norms of individuality and a nonreligious mind-set. For example, many cultures provide moral dictates focused on divine authority and tradition, and there is no reason for these beliefs to be viewed as morally inferior or as reflecting a less sophisticated form of reasoning (Shweder et al., 2006). Similarly, who is to say that caring for justice is morally superior to caring for others?



Have you ever observed or had an experience with a person from another culture that revealed cultural differences in moral principles?

GENDER AND MORAL REASONING

Carol Gilligan was bothered by what she perceived as a male bias in Kohlberg's approach. She believed that women's central dilemma was the conflict between their needs and the needs of others rather than the principles of abstract justice and fairness delineated by Kohlberg. Women's moral reasoning was not less complex than men's, she argued, it merely had a different focus.

In her research, Gilligan (1982/1993) interviewed 29 pregnant women about their decision to continue or end their pregnancies. As with Kohlberg, the key feature was not the particular decision each woman made, but rather the reasoning behind that decision. What Gilligan found was that the women in her research saw morality in terms of selfishness versus responsibility, which was generally understood as an obligation to exercise care and avoid hurting others. Gilligan concluded that women were more concerned with their responsibilities to others than about independently derived abstract ideals.

Research on her views has been equivocal. Some research has found, contrary to Kohlberg's predictions, that women reason at a higher level than men (Eisenberg, Hofer, Sulik, & Liew, 2014). Other research has not found consistent gender differences in moral reasoning (Brabeck & Shore, 2003). Still others argue that although women are more likely to think in terms of care and men in terms of justice, these differences are small (Blakemore, Berenbaum, & Liben, 2009). It is interesting, however, that in brain imaging studies (Harenski, Antonenko, Shane, & Keihl, 2008), women showed more activity in areas of the brain associated with care-based reasoning (the posterior, anterior cingulate, and anterior insula), and men showed more activity in areas of the brain associated with justice-based processing (superior temporal sulcus). Still, the weight of evidence does not appear to back up Gilligan's assertions (Walker, 1995).



Which, if either, do you consider to be higher moral priorities: justice and rights, or compassion and responsibility?

checkpoint can you . . .

- Give examples of the roles of experience and culture in adult moral development?
- State Gilligan's original position on gender differences in moral development, and summarize research findings on the subject?

Education and Work

Unlike young people in past generations, who typically could expect to move directly from school to work and financial independence, many emerging adults today do not have a clear career path. Some alternate between education and work; others pursue both at the same time. Most of those who do not enroll in postsecondary education, or do not finish, enter



College enrollments in the United States are at an all-time high. More than 2 out of 3 high school graduates go right to college.
Oleksii Didok/Shutterstock

the job market, but many return later for more schooling (Furstenberg et al., 2005; Hamilton & Hamilton, 2006; NCES, 2005b). Some, especially in the United Kingdom, take a year off from formal education or the workplace—a *gap year*—to gain new skills, do volunteer work, travel, or study abroad (Jones, 2004). Many enter nondegree credential or work experience programs (McFarland et al., 2018). And some combine college with marriage and child rearing (Fitzpatrick & Turner, 2007). Many emerging adults who are in school or living in their parents' homes are financially dependent (Schoeni & Ross, 2005).

THE COLLEGE TRANSITION

College is an increasingly important path to adulthood, though it is only one such path and, until recently, not the most common one (Montgomery & Côté, 2003). Between 1975 and 2017, the proportion of U.S. high school graduates who went straight into a 2- or 4-year college grew from about half (51 percent) to more than two-thirds (67 percent) (McFarland et al., 2017).

Fewer than one-third of young adults have basic knowledge of interest rates, inflation, and risk diversification. Going to college helps: Higher education is associated with increases in financial literacy.

Lusardi, Mitchell, & Curto, 2009

College courses and even complete degree or certificate programs are now widely available by *distance learning,* in which courses are delivered via mail, e-mail, the Internet, or other technological means. About 6.35 million students took at least one online course during the fall of 2016, representing a third of all students (Seaman, Allen, & Seaman, 2018). In fact, online enrollment is now growing faster than traditional higher education enrollment numbers (Allen & Seeman, 2010). Colleges also are increasingly experimenting with hybrid courses, which utilize a mixture of both online and in person techniques. In general, research seems to suggest that learning outcomes are similar for online, hybrid, and traditional students, although a wide variety of variables can affect outcomes (Tallent-Runnels et al., 2006).

Some colleges, including Stanford University and MIT, have offered massive, open, online courses (MOOCs) that allow any person with an Internet connection to take the course for free. Although such courses show promise, especially with respect to opening avenues of affordable knowledge in far-flung locales, they also suffer from high rates of attrition and are subject to cheating (Daniel, 2012).

Despite increases in tuition and fees, data by the College Board suggests that long-term benefits of going to college still exist and are in fact growing.

Baum, Ma, & Payea, 2010

Gender, Socioeconomic Status, and Race/Ethnicity U.S. undergraduate college enrollment reached a high in 2010 and then decreased by 7 percent to 16.9 million students in 2016. This number is projected to increase by 3 percent through 2027 (McFarland et al., 2017). In a reversal of the traditional gender gap, women now make up a larger percentage (56 percent) of the student population, despite male enrollment increasing at a faster rate (19 percent as compared to 15 percent) (McFarland et al., 2017; Synder, de Brey, & Dillow, 2016). By comparison, in 1970, women made up only 42 percent of those earning bachelor's degrees (NCES, 2009a). Similarly, women have higher postsecondary enrollment rates than men in most European countries, as well as in Australia, Canada, New Zealand, Japan, and the Russian Federation (Buchmann & DiPrete, 2006; Sen, Partelow, & Miller, 2005). Since the mid-1980s, more U.S. women have earned associate's, bachelor's, and master's degrees than men, and since 2005–2006, this has also become true for doctoral degrees (Snyder et al., 2016).

Still, gender differences are evident within some fields at the highest educational levels (Halpern et al., 2007) and, following graduation, within jobs in science, technology, engineering, and math (STEM) (Funk & Parker, 2018). In the United States, women remain more likely than men to major in traditionally women's fields, such as education,

nursing, English literature, and psychology, and not in math and science (Wang & Degol, 2017; Beede et al., 2011). Even so, women have made gains in almost every field, with math-intensive fields the only remaining where women have not attained equal or greater graduation rates with men (Wang & Degol, 2017). In explaining the persistent disparities between men and women, a variety of factors appears to be important. Some researchers have pointed to cognitive differences in men and women at the upper end of the mathematical, visual, and spatial ability range or to the more varied choices available to those women who are both mathematically and verbally skilled (Halpern et al., 2007; Wang, Eccles, & Kenny, 2013). Other explanations center on women's interests and preferences, including those around work and family balance (Wang & Degol, 2017). The influence of gender stereotypes has also been proposed as important (Miller, Eagly, & Linn, 2015). Last, attention has also been drawn to women's persistent reports of gender discrimination in those fields in which the largest disparities between men and women can be found (Pew Research Center, 2018).

Socioeconomic status and race/ethnicity affect access to postsecondary education. In 2017, 78 percent of high school students from the highest family income quartile enrolled in college shortly after finishing high school. By contrast, only 46 percent of high school students from the lowest family income quartile enrolled in college during a similar time period (Cahalan, Perna, Yamashita, Wright, & Santillan, 2018). In the 2015–2016 academic year, the average net price of attendance at a four-year college or university for a full-time undergraduate at a public institution was $13,400. Private, nonprofit institutions were roughly double the cost at $26,300, and private, for-profit institutions cost an average of $22,300 (McFarland et al., 2018). From the 2004–2005 academic year to the 2014–2015 academic year, prices for tuition, room, and board rose 33 percent at public institutions and 26 percent at private, not-for-profit institutions (Snyder, de Brey, & Dillow, 2016), making the attainment of higher education increasingly difficult for low- and middle-income families. Thus, many students from more modest circumstances are likely to work while attending college, which often serves to slow their progress (Dey & Hurtado, 1999). In addition, students from wealthier families are less likely to drop out of college before graduating (Hamilton & Hamilton, 2006).

Currently, the six-year graduation rate is approximately 60 percent; however, the rate differs by ethnicity. The highest graduation rate is that of Asian students (74 percent) followed by white, mixed race (60 percent), Hispanic (54 percent), Pacific Islander (51 percent), African-American (40 percent), and Native American/Alaska Native (39 percent) students (NCES, 2019a). Minority college participation has risen at all levels. More than 71 percent of Hispanics and 50 percent of blacks who finished high school in 2016 went directly to college (NCES, 2019b). The percentage of college students who are minorities is rising, primarily due to increased numbers of Latinos, Pacific Islanders, and Asian Americans (NCES, 2009b). It is likely, given the current demographic composition of the United States, that this trend will continue.

Adjusting to College Many freshmen feel overwhelmed by the demands of college. Family support seems to be a key factor in adjustment, both for students commuting from home and for those living on campus. Specifically, a secure adult attachment relationship appears to aid adjustment (Credé & Niehorster, 2012; Montgomery & Côté, 2003). Personal characteristics matter as well. Students who have high academic self-efficacy and self-esteem and who are adaptable, conscientious, agreeable, extraverted, and more likely to use problem-focused coping strategies tend to adjust best and get the most out of college (Credé & Niehorster, 2012; Krumrei-Mancuso, Newton, Kim, & Wilcox, 2013). Also important is being able to build a strong social and academic network among peers and instructors (Credé & Niehorster, 2012; Montgomery & Côté, 2003). In fact, relatively cost-effective peer support interventions can significantly ease the transition to college (Mattanah et al., 2010). Adjustment to college is an important variable as it is strongly related to academic achievement and college retention (Credé & Niehorster, 2012).



Is social media good for you? It depends. Studies show that lurking-looking at other people's posts but rarely commenting—is associated with jealousy, social comparison, and declines in wellbeing. However, actively engaging with other is more likely to increase social connectedness and wellbeing

Veryduyn et al., 2014



The future looks bright for this young man. Today many colleges offer support and facilities for students with disabilities. A college education is often the key to a successful career and a healthy, satisfying life.
Sean Cayton/The Image Works

Cognitive Growth in College College can be a time of intellectual discovery and personal growth (Montgomery & Côté, 2003). Students change in response to (1) the curriculum, which offers new insights and new ways of thinking; (2) other students who challenge long-held views and values; (3) the student culture, which is different from the culture of society at large; and (4) faculty members, who provide new role models. In terms of both immediate and long-term benefits, going to college—any college—is more important than which college a person attends (Montgomery & Côté, 2003).

Many students come to college with rigid ideas about the world. They tend to believe there is a "right" answer that can be found and defended. As they begin to encounter a wider range of ideas and viewpoints, they are forced to examine their assumptions about the "truth." As students gain more experience and think more deeply and from a greater wealth of accumulated knowledge, they begin to realize that much of knowledge and many values are somewhat relative. They realize that different individuals or cultures may hold different values than they do and thus see the world in different ways.

How do they decide what to believe? Ultimately, students achieve what has been called commitment within relativism. At this point, students decide for themselves, ideally, what they want to believe. They give credence to the inherent uncertainty of belief but feel confident in their choices and values and trust in their own opinions (Perry, 1970).

What drives this change? Overall, exposure to diversity, especially with respect to race (often the most salient dimension), leads to increases in cognitive complexity. This influence is strongest when it takes the form of interpersonal interactions rather than, for example, coursework or workshops (Bowman, 2010; Bowman, 2013). For example, discussions that include participants from more diverse races produce greater novelty and complexity of ideas than all-white discussions (Antonio et al., 2004). This has implications for affirmative action and enrollment decisions. Some have argued that a diverse group of students and high academic quality are competing priorities (Bowman, 2010). Research suggests, by contrast, a different story. Those campuses with more diverse student bodies tend to show greater amounts of interracial friendships rather than continued or increased segregation (Fischer, 2008). This integration then contributes to academic achievement and intellectual gains (Gurin, Dey, Gurin, & Hurtado, 2003).

Completing College Although college entrance has become more common in the United States, finishing college has not. Only 40 percent of young people who start college have received a degree after 4 years. This does not mean that the rest drop out. A growing number of students remain in college more than 5 years or switch from two-year to four-year institutions. After 6 years, graduation rates are approximately 60 percent (McFarland et al., 2018).

Whether a person completes college may depend not only on motivation, academic aptitude and preparation, and ability to work independently, but also on social integration and social support: employment opportunities, financial support, suitability of living arrangements, quality of social and academic interactions, and the fit between what the college offers and what the student wants and needs. Intervention programs for at-risk students have improved college attendance rates by creating meaningful bonds between students and teachers, finding opportunities for students to work while in college, providing academic assistance, and helping students see how college can move them toward a better future (Montgomery & Côté, 2003).

checkpoint
can **you** . . .

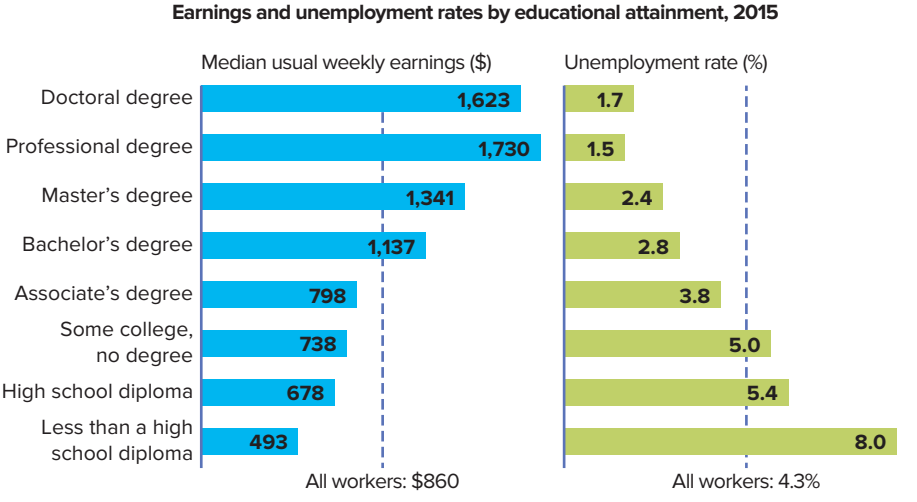
- Discuss factors affecting who goes to college and who finishes?
- Tell how college can affect cognitive development?

ENTERING THE WORLD OF WORK

By their midtwenties, most emerging adults are either working or pursuing advanced education or both (McFarland et al., 2018). Those who enter the workforce face a rapidly changing picture. The nature of work is changing, and work arrangements are becoming more varied and less stable. Where previous generations of employees often could expect to remain at a company from their start date until retirement, that pattern of employment is becoming increasingly rare. More and more adults are self-employed, working at home, telecommuting, on flexible work schedules, or acting as independent contractors. These changes, together with a more competitive job market and the demand for a highly skilled workforce, make education and training more vital than ever before (Corcoran & Matsudaira, 2005).

Higher education expands employment opportunities and earning power, decreases the chance of unemployment (Figure 3), and enhances long-term quality of life for adults worldwide (McFarland et al., 2018; Centre for Educational Research and Innovation, 2004). In the United States in 2017, adults age 25 to 34 who had a master's or higher degree and who were working full-time had a median income of $65,000, a full 26 percent higher than those with a bachelor's degree ($51,800) and 62 percent higher than those who had completed high school but had not attended college ($32,000) (NCES, 2019c). Moreover, for adults without sufficient education, unemployment rates are high. Young adults with a bachelor's degree or higher had an employment rate of 86 percent in 2017, while those who had not completed high school had an employment rate of 56 percent (NCES, 2018a). These challenges may make it difficult to earn enough to establish an independent household. A cross-national survey in Belgium, Canada, Germany, and Italy found a decline in economic self-sufficiency among 18- to 34-year-old men and among women in their early twenties between the mid-1980s and 1995–2000 (Bell, Burtless, Gornick, & Smeeding, 2007). And workers in their twenties, especially their early twenties, tend to be concentrated in low-wage, low-skilled positions and frequently change jobs (Hamilton & Hamilton, 2006).

Although income differentials between male and female workers exist at all levels of educational attainment, these gaps have narrowed considerably. Still, the median earnings of young men are higher than those of young women at every educational level (NCES, 2019c). In 1979, women earned 62 percent of what men did. In 2017, women earned 82 percent of men's income, and this gender gap in wages is greater for older women than for younger women (U.S. Bureau of Labor Statistics, 2017). Moreover, a report by the American Association of University Women (2007) found that the earnings gap increases during the 10 years after graduation. Furthermore, one-fourth of the pay gap is unexplained by such factors as hours, occupations, and parenthood, suggesting that it stems from gender discrimination.



Note: Data are for persons age 25 and over. Earnings are for full-time wage and salary workers.

Combining Work and Schooling In 2014, about 41 percent of full-time college students and 80 percent of part-time college students worked while attending college (Kena et al., 2016). While part-time work has been found to have either few or positive effects on

FIGURE 3

Expected Lifetime Earnings by Educational Level: United States, 2015

Even considering the cost of an education, higher educational levels mean more lifetime earnings.

Source: Vilorio, Dennis. "Education matters." Career Outlook. U.S. Bureau of Labor Statistics, March 2016.

academic performance as long as a student does not work more than 15 hours a week, working more than 20 hours a week tends to have a negative impact (Pascarella, Edison, Nora, Hagedorn, & Terenzini, 1998) and is associated with a failure to graduate. Generally, there is a trade-off such that the more time students spend working, the less time they spend on academic pursuits (Greene & Maggs, 2015).

Working during college may also affect the likelihood of attending graduate programs. Although grants and loans are available to some students, many students must work to help support their educational aspirations. Such work cuts into the time they have available to engage in other activities, such as participation in research groups, unpaid internships, and volunteer work. These activities are optional but allow students a more competitive application into graduate school. Therefore, although work itself may not be detrimental to an undergraduate education, it may be related to difficulties meeting criteria for graduate programs.

Cognitive Growth at Work Do people change as a result of the kind of work they do? Some research says yes: people seem to grow in challenging jobs, the kind that are becoming increasingly prevalent today. This research has revealed a reciprocal relationship between the **substantive complexity** of work—the degree of thought and independent judgment it requires—and a person's flexibility in coping with cognitive demands (Kohn, 1980).

substantive complexity
Degree to which a person's work requires thought and independent judgment.

A great deal of development in the frontal lobes occurs in young adulthood (Luciana, 2010). Magnetic resonance imaging shows that the most frontward part of the frontal lobes has a special function and plays a major role in problem solving and planning. This portion of the brain springs into action when a person needs to put an unfinished task on hold and shift attention to another task. It permits a worker to keep the first task in working memory while attending to the second—for example, to resume reading a report after being interrupted by the telephone (Koechlin, Basso, Pietrini, Panzer, & Grafman, 1999). Other aspects of brain development also influence why, as young people enter adulthood, they become less likely to take risks and are better able to control their behaviors (Luciana, 2010).

Cognitive growth need not stop at the end of the workday. According to the **spillover hypothesis,** cognitive gains from work carry over to nonworking hours. Studies support this hypothesis: substantive complexity of work strongly influences the intellectual level of leisure activities (Kohn, 1980; K. Miller & Kohn, 1983).

spillover hypothesis
Hypothesis that there is a carryover of cognitive gains from work to leisure that explains the positive relationship between activities in the quality of intellectual functioning.

Smoothing the Transition to the Workplace What does it take to achieve a successful transition from school to work? A review of the literature points to four key factors: (1) competence (in general and at work); (2) personal characteristics such as initiative, flexibility, purposefulness, and a sense of urgency; (3) positive personal relationships; and (4) links between schooling and employment (Blustein, Juntunen, & Worthington, 2000).

Some developmental scientists (Furstenberg et al., 2005; Settersten, 2005) suggest measures to strengthen the links between work and educational institutions, especially community colleges:

- Improve dialogue between educators and employers.
- Modify school and work schedules to adapt to the needs of working students.
- Let employers help design work-study programs.
- Increase availability of temporary and part-time work.
- Relate better what students learn at work and in school.
- Improve training of vocational guidance counselors.
- Make better use of study and support groups and tutoring and mentoring programs.
- Provide scholarships, financial aid, and health insurance to part-time as well as full-time students and employees.

checkpoint can you . . .

- Summarize recent changes in the workplace?
- Discuss the impact of combining work and schooling?
- Explain the relationship between substantive complexity of work and cognitive development?
- List proposals for easing the transition to the workplace?

summary and key terms

Emerging Adulthood

- For many young people in advanced technological societies, entrance into adulthood is not clearly marked; it takes longer and follows more varied routes than in the past. Some developmental scientists suggest that the late teens through the midtwenties has become a transitional period called emerging adulthood.
- Emerging adulthood consists of multiple milestones or transitions, and their order and timing varies. Passage of these milestones may determine when a young person becomes an adult.

emerging adulthood (*383*)

PHYSICAL DEVELOPMENT

Health and Fitness

- Physical and sensory abilities are typically at their peak in emerging and young adulthood.
- Accidents are the leading cause of death in this age group.
- The mapping of the human genome is enabling the discovery of genetic bases for certain disorders.
- Lifestyle factors such as diet, obesity, exercise, sleep, smoking, and substance use or abuse can affect health, survival, and may have epigenetic consequences for the regulation of when genes turn on and off.
- Good health is related to higher income and education. African Americans and some other minorities tend to be less healthy than other Americans. Although much of this is due to SES, there also are indications that people of different ethnicities might respond differently to some environmental influences on health.
- Social relationships, especially marriage, tend to be associated with physical and mental health.
- Mental health is generally good in early adulthood, but certain conditions, such as depression, become more prevalent. Alcohol abuse and alcoholism are the most common substance disorders.

risky drinking (*390*)

alcoholism (*392*)

Sexual and Reproductive Issues

- Almost all U.S. young adults have sexual relations before marriage.
- Sexually transmitted infections, menstrual disorders, and infertility can be concerns during young adulthood.
- The highest rates of STIs in the United States are among emerging adults, particularly among young women.
- The most common cause of infertility in men is a low sperm count; the most common cause in women is blockage of the fallopian tubes.
- Infertile couples now have many options for assisted reproduction. These techniques involve ethical and practical issues.

premenstrual syndrome (PMS) (*395*)

infertility (*395*)

COGNITIVE DEVELOPMENT

Perspectives on Adult Cognition

- Some investigators propose distinctively adult forms of cognition beyond formal operations. Reflective thinking emphasizes complex logic; postformal thought involves intuition and emotion as well.
- Schaie proposed seven stages of age-related cognitive development: acquisitive (childhood and adolescence), achieving (young adulthood), responsible and executive (middle adulthood), and reorganizational, reintegrative, and legacy-creating (late adulthood).
- According to Sternberg's triarchic theory of intelligence, the experiential and contextual elements become particularly important during adulthood. Tests that measure tacit knowledge can be useful complements to traditional intelligence tests.
- Emotional intelligence plays an important part in life success.

reflective thinking (*396*)

postformal thought (*398*)

tacit knowledge (*399*)

emotional intelligence (EI) (*399*)

Moral Reasoning

- According to Kohlberg, moral development in adulthood depends primarily on experience, though it cannot exceed the limits set by cognitive development. Experience may be interpreted differently in various cultural contexts, and not all cultures support Kohlberg's more advanced stages of moral development.
- Gilligan initially proposed that women have an ethic of care, whereas Kohlberg's theory emphasizes justice. However, later research, including her own, has not supported a distinction between men's and women's moral outlook.

Education and Work

- A majority of emerging adults now go to college. More women than men now go to college, and an increasing percentage pursue advanced degrees even in traditionally male-dominated fields. Minority participation is growing. Many students enter college, but fewer graduate with a degree.
- College students' thinking tends to progress from rigidity to flexibility to freely chosen commitments.
- Research has found a relationship between substantive complexity of work and cognitive growth.
- Changes in the workplace call for higher education or training. Higher education greatly expands workplace opportunities and earnings.
- The transition to the workplace could be eased through measures to strengthen vocational education and its links with work.

substantive complexity (*406*)

spillover hypothesis (*406*)

Design elements: (Butterfly Icon): Stockbyte/Getty Images; (World Icon): janrysavy/Getty Images

chapter 14

Psychosocial Development in Emerging and Young Adulthood

outline

Emerging Adulthood: Patterns and Tasks

Personality Development: Four Views

Foundations of Intimate Relationships

Marital and Nonmarital Lifestyles

Parenthood

When Marriage Ends

learning objectives

Describe identity development and the relationship with parents in emerging adulthood.

Summarize theoretical perspectives on adult personality development.

Identify key aspects of intimate relationships and love.

Characterize marital and nonmarital lifestyles.

Discuss parenthood and the pressures on dual-income families.

Identify trends in divorce and remarriage.



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did you know?

- Historically and across cultures, marriages arranged by either parents or professional matchmakers are the most common means of finding a mate.
- In 1970, only 4 percent of women 35 to 44 years of age made more money than their husband; by 2015, this number had increased to 38 percent.
- Half of young parents say they have too little time with their children, according to national surveys.

Personal choices made in emerging and young adulthood establish a framework for the rest of life. In this chapter, we examine the choices that frame personal and social life: adopting a sexual lifestyle; marrying, cohabiting, or remaining single; having children or not; and establishing and maintaining friendships.

The great challenge of adulthood is holding on to your idealism after you lose your innocence.

—Bruce Springsteen

Emerging Adulthood: Patterns and Tasks

VARIED PATHS TO ADULTHOOD

Paths to adulthood are more varied now than they have ever been (Arnett, 2014). Before the 1960s, young people in the United States typically finished school, left home, got a job, got married, and had children, in that order.

For many young people today, emerging adulthood is a time of experimentation before assuming adult roles and responsibilities. A young man or woman may get a job and an apartment and revel in the single life. A young married couple may move in with parents while they finish school or get on their feet. Finding stable work and developing long-term romantic relationships may be postponed until the thirties or even later. What influences affect these varied paths to adulthood?

Paths to Adulthood Individual paths to adulthood are influenced by such factors as gender, academic ability, early attitudes toward education, race and ethnicity, expectations in late adolescence, and social class. Traditionally, adulthood was defined by markers such as moving out of the family home, marriage, children, full-time employment, or the establishment of a career. However, as the social context in the United States changed, so did the pathway from childhood to adulthood. While there are many ways to reach adulthood, research has identified three primary pathways that increasingly characterize the trajectory of young adulthood in the United States (Scales et al., 2016).



What path have you taken, or are you taking, toward adulthood? Do you have friends who took other paths?

The first group includes those young adults who begin families early and generally do not go to college. Early marriage and family formation are associated with poverty and substance use (Oesterle, Hawkins, Hill, & Bailey; 2010; Oesterle, Hawkins, & Hill, 2011). Early parenthood, in particular, limits future prospects (Boden, Fergussson, & Horwood, 2008; Dariotis, Pleck, Astone, & Sonenstein, 2011), especially for women who do not marry (Assini-Meytin & Green, 2015; Driscoll, 2014). However, not all consequences of teen pregnancy are negative. Sometimes a pregnancy can become a catalyst for change. Some young mothers who choose to carry an unintended pregnancy to term report fewer sexual partners and less substance use when compared to women who terminated an unintended pregnancy or to women who had never been pregnant (Gomez-Scott & Cooney, 2014).

The second group includes those young adults who delay children until young adulthood but who, rather than investing in college, move into full-time work. When compared to college graduates, these young adults bear more children by their thirties, work more hours, reach an income plateau, and depend more on government aid (Mitchell & Syed, 2015).

The third group involves emerging adults of both sexes who delay parenthood and other traditional markers of adulthood in pursuit of educational or career goals (Oesterle et al., 2010; Eliason, Mortimer, & Vuolo, 2015). This group tends to start in the

checkpoint can you . . .

- Give examples of various paths to adulthood?
- Discuss influences on paths young people take to adulthood?

most privileged place and have the most positive outcomes. In a longitudinal study that followed a nationally representative sample of high school seniors each year since 1975, emerging adults with the highest well-being were those who were not yet married, had no children, attended college, and lived away from their childhood home (Schulenberg et al., 2005).

IDENTITY DEVELOPMENT IN EMERGING ADULTHOOD

Adolescence is a time of great change, from the developing body to the changing brain to developing the new social roles thrust upon young people as they move toward independence. Erikson saw the search for identity as a lifelong task focused largely on this stage of the life span. Emerging adulthood offers a moratorium, or time out, from developmental pressures and allows young people the freedom to experiment with various roles and lifestyles. However, it also represents a turning point during which adult role commitments gradually crystallize. In postindustrialized countries today, the active search for identity is more and more likely to extend into emerging adulthood (Côté, 2006).

recentering
Process that underlies the shift to an adult identity.

Recentering **Recentering** is a name for the process that underlies the shift to an adult identity. It is the primary task of emerging adulthood. Recentering is a three-stage process in which power, responsibility, and decision making gradually shift from the family of origin to the independent young adult (Tanner, 2006):

- At *stage 1,* the beginning of emerging adulthood, the individual is still embedded in the family of origin, but expectations for self-reliance and self-directedness begin to increase. So, for example, a young adult might still live at home and attend high school but would be expected to schedule and monitor his own activities during nonschool hours.
- In *stage 2,* during emerging adulthood, the individual remains connected to but no longer embedded within the family of origin. So, for example, an undergraduate student might live in a college dorm but still be supported financially by her parents as she attends school. Temporary, exploratory involvements in a variety of college courses, jobs, and intimate partners mark this stage. Toward its end, the individual is moving toward serious commitments and gaining the resources to support them.
- In *stage 3,* usually by age 30, the individual moves into young adulthood. This stage is marked by independence from the family of origin (while retaining close ties to it) and commitment to a career, a partner, and possibly children. Here, a young adult might be settling into a career or marriage and live independently but still remain close to his or her parents and family of origin.

The Contemporary Moratorium A fragmented, postindustrial society offers many emerging adults little guidance and less pressure to grow up (Heinz, 2002), and not everyone is equally up to the task (Côté, 2006). Identity status research has found that only about a third of Western youth seem to go through what Marcia named the *moratorium* status, a self-conscious crisis that ideally leads to a resolution and identity achievement status. Approximately 15 percent seem to regress during emerging adulthood, and about half show no significant changes (Kroger, Martinussen, & Marcia, 2009). Rather than actively and thoughtfully exploring their identity, many young adults seem to do little active, conscious deliberation, instead taking a passive (diffused) approach or taking the lead from their parents (foreclosure). Nevertheless, about 3 out of 4 eventually settle on some sort of occupational identity by the end of their twenties. Identity confusion persists for 10 to 20 percent, who lack what Erikson called *fidelity:* faith in something larger than themselves (Côté , 2006).

Ethnic and Cultural Factors in Identity Exploration The approach to the study of identity development was conceptualized within the United States, with its emphasis upon individualism and personal autonomy. In a culture such as this, identity achievement status is adaptive and beneficial. However, in countries where the emphasis is on collectivism and focused more strongly on group membership, this model may not apply in the same fashion. For example, in a study conducted with China, Taiwan, Japan, and the United States, identity was accepted without much distress, exploration, or questioning in the less Westernized samples, yet still held a great deal of interpersonal meaning (Berman, You, Schwartz, Teo, & Mochizuki, 2011). While we might find this strategy—foreclosure—less adaptive in the United States, it may confer benefits in a different cultural context (Cheng & Berman, 2012).

Identity exploration is also different for racial/ethnic minorities within the bounds of the United States than for the majority white population. Ethnic identity can be defined as one's identity as a member of a particular ethnic group (Phinney, 2003) and it is part of the wider social identity of an individual (Tajfel, 1981). For majority group youth, this process is often taken for granted. However, minority youth must come to understand themselves both as part of an ethnic group and as part of the wider, diverse society, and ideally to have a positive view of both the minority and majority cultures in which they live. Multiracial young people have the added challenge of figuring out where they fit in. Still, many reach a resolution that leads to identity achievement, as in the following:

> When I was younger I felt I didn't belong anywhere. But now I've just come to the conclusion that . . . that's just the way I am . . . and my home is inside myself . . . I no longer feel the compulsion to fit in 'cause if you're just trying to fit in you never do. (Alipuria, 2002, p. 143)

As might be expected, the formation of an achieved and positive ethnic identity has wide repercussions, including positive outcome effects on depression, perceived stress, coping, social competence, self-esteem, well-being, internalizing and externalizing symptomatology, academic achievement, and attitudes and health risks. These effects are generally small to moderate in size but have been found across a multitude of studies, especially for African American adults (Rivas-Drake et al., 2014a; Rivas-Drake et al., 2014b; Smith & Silva, 2011). Because a secure ethnic identity involves positive feelings about both one's own personal identity (Yip, 2014) and the wider culture (Phinney, 1989), it is not surprising to find that secure ethnic identity is also related to greater acceptance of other groups (Phinney, Ferguson, & Tate, 1997). Presumably, then, such feelings might result in more positive interactions between different groups and reductions in discrimination (Phinney, Jacoby, & Silva, 2007). Moreover, a strong sense of ethnic identity may help young adults weather discrimination and stereotyping (Schwartz, Zamboanga, Luyckx, Meca, & Ritchie, 2013). Such resilience may be necessary, as young adults become more independent and strike out on their own.



What are some examples in your community of ethnic identity influencing interactions between groups?

checkpoint can you . . .

- **Define *recentering* and summarize its three stages?**
- **Discuss identity status research on emerging adults in postindustrial societies?**
- **Explain why identity development of racial/ethnic minorities is complex?**

DEVELOPING ADULT RELATIONSHIPS WITH PARENTS

As young people leave home, they must complete the negotiation of autonomy begun in adolescence and redefine their relationship with their parents as one between adults. Parents who are unable to acknowledge this change may slow their children's development (Aquilino, 2006).



Although emerging adults may no longer rely on parents for basic sustenance, they still benefit from parental companionship and social support.
Jupiterimages/Thinkstock/Alamy Stock Photo

Influences on Relationships with Parents Even though they are no longer children, emerging adults still need parental acceptance, empathy, and support, and attachment to the parents remains a key ingredient of well-being (Lindell & Campione-Barr, 2017). Financial support from parents, especially for education, enhances emerging adults' chances of success in adult roles (Aquilino, 2006; Terriquez & Gurantz, 2015).

Positive parent-child relationships during early adolescence predict warmer and less conflicted relationships with both parents when the children reach age 26 (Belsky, Jaffee, Hsieh, & Silva, 2001). When emerging adults have parents who are closely involved, warm, and loving, they have higher levels of self-worth (Nelson, Padilla-Walker, & Nielson, 2015). Generally, parents and young adult children get along best when the young adult is following a normative life course but has deferred the responsibility of parenthood until other adult roles are well established (Belsky, Jaffee, Caspi, Moffitt, & Silva, 2003).

The quality of the parent-adult child relationship may be affected by the relationship between the mother and father (Aquilino, 2006). When the young adult becomes "caught in the middle" between two conflictual parents, there can be negative consequences (Amato & Afifi, 2006; Cunningham & Waldock, 2016). For example, one study showed that such situations resulted in higher levels of internalizing symptoms and depressive thoughts 3 years later (Buehler & Welsh, 2009). This relationship goes both ways; parents of disruptive young adults may also experience increased distress as a result of their child's actions (McClelland & McKinney, 2016), particularly given the shifting balance of power as young adults become more independent and are less subject to parental control.

Failure to Launch Economic and social changes in the United States—including automation, globalization, and technological change—have made it more difficult for young adults to establish an economically viable independent household (Hill & Holzer, 2007). Fifty-three percent of American adults age 21 to 37 receive financial assistance from a parent, guardian, or family member, with 37 percent receiving such assistance on a monthly basis. Approximately one-third (35.3 percent) live with their parents (Country Financial Security Index, 2018).

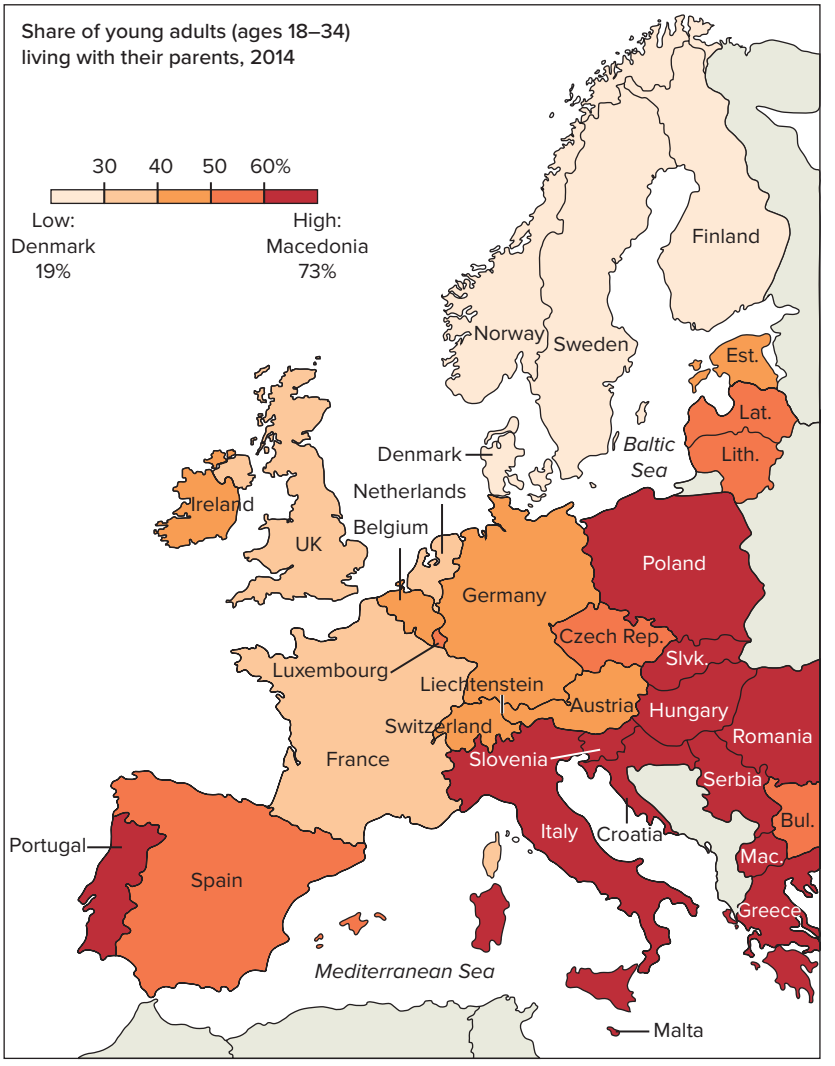
The view that these young adults who "fail to launch" and do not move out of their parents' homes are selfish slackers who refuse to grow up is largely inaccurate (Arnett, 2007b). Rather, they are forced to remain dependent out of economic concerns and the need to obtain training or schooling to a greater degree than previous generations. Indeed, the average age at which young adults enter the workplace has risen in past decades, and when compared to previous generations, they do not reach the same earning levels until later in life (Carnevale, Hanson, & Gulish, 2013). While staying in the family home can afford the opportunity to continue to work on occupational advancement, it also can result in threats to autonomy and independence for young adults (Burn & Szoeke, 2016). For example, African Americans, Hispanics, and those with household incomes less than $50,000 a year, who are less likely to receive parental assistance, believe financial independence should begin at ages 16 to 18 years (Country Financial Security Index, 2018).

The trend for emerging adults to live in the parents' home also exists in other countries. Across much of Europe, as well as in Hong Kong, the global financial crisis, weak employment and wages, and high housing costs have led to an increase in the proportion of emerging adults remaining in the parental home (Lennartz, Arundel, & Ronald, 2016; Victor, 2015; see Figure 1). In Japan, where children generally live with their parents until they marry, the average age at which young adults marry has risen sharply (Newman, 2008). Economic projections suggest that this trend will continue (Seiffge-Krenke, 2016).

checkpoint
can **you** . . .

- **Explain how relationships with parents affect adjustment to adulthood and how emerging adults renegotiate their relationships with their parents?**
- **Discuss the trend of young adults living in the parental home?**

Many young Europeans live with their parents, especially in southern and eastern Europe.



Note: In Iceland and Cyprus, not shown, 36% and 53% of young adults lived with their parents in 2014, respectively.

FIGURE 1
Share of European Young Adults (18-34 Years) Living with Their Parents, 2014.

For the first time in the modern era, living with parents edges out other living arrangements for 18-to 34-year-olds.

Source: DeSilver, D. *In the U.S. and Abroad, More Young Adults are Living with Their Parents.* Washington, DC: Pew Research Center, 2016.

Personality Development: Four Views

What is personality? The answer depends in part on how we study and measure it. Four approaches to adult psychosocial development are represented by *normative-stage models,* the *timing-of-events model, trait models,* and *typological models* (Table 1).

NORMATIVE-STAGE MODELS

At what age should people marry? Have children? Decide on a career? Every culture has norms about the "right" time for major life events to occur. **Normative-stage models** are theoretical approaches that hold that adults follow a basic sequence of age-related psychosocial changes. The changes are normative in that they are common for most members of a population at a particular time. However, what is normative is dependent upon the expectations about the timing of life events in that particular cultural group.

normative-stage models
Theoretical models that describe psychosocial development in terms of a definite sequence of age-related changes.

TABLE 1 Four Views of Personality Development

Models	Questions Asked	Methods Used	Change or Stability
Normative-stage models	Does personality change in typical ways at certain periods throughout the life course?	In-depth interviews, biographical materials	Normative personality changes having to do with personal goals, work, and relationships occur in stages.
Timing-of-events model	When do important life events typically occur? What if they occur earlier or later than usual?	Statistical studies, interviews, questionnaires	Nonnormative timing of life events can cause stress and affect personality development.
Trait models	Do personality traits fall into groups, or clusters? Do these clusters of traits change with age?	Personality inventories, questionnaires, factor analysis	Personality changes substantially until age 30, more slowly thereafter.
Typological models	Can basic personality types be identified, and how well do they predict the life course?	Interviews, clinical judgments, Q-sorts, behavior ratings, self-reports	Personality types tend to show continuity from childhood through adulthood, but certain events can change the life course.

intimacy versus isolation
Erikson's sixth stage of psychosocial development, in which young adults either form strong, long-lasting bonds with friends and romantic partners or face a possible sense of isolation and self-absorption.

Erikson: Intimacy versus Isolation One normative-stage model is Erikson's psychosocial approach. The normative crisis of young adulthood is **intimacy versus isolation.**

Recall that Erikson argued that successful resolution of a psychosocial crisis puts people in a good position to successfully address the next one. The psychosocial crisis in adolescence, according to Erikson, is identity formation. He believed that young people who develop a strong sense of self during adolescence are in a better position, in early adulthood, to fuse their identity with that of another. In other words, knowing who you are and what you want makes it more likely you will end up with a compatible partner who fulfills your needs.

Why is intimacy a trait to strive for? According to Erikson, if adults cannot make deep personal commitments to others, they risk becoming overly isolated and self-absorbed. The process of forming a sense of intimacy is important as well. Intimate relationships demand sacrifice and compromise. As young adults work to resolve conflicting demands for intimacy and competitiveness, they develop an ethical sense, which Erikson considered a marker of adulthood.



Young adults who have a strong sense of self are likely to be ready for the demands of an intimate relationship, according to Erikson.
David Lok/Purestock/SuperStock

Resolution of this stage results in the virtue of love: mutual devotion between partners who have chosen to share their lives and have children. Erikson believed that a failure to fulfill what he believed to be a natural procreative urge has negative consequences for development. Quite rightly, his theory can be criticized for excluding single, celibate, homosexual, and childless people from his blueprint of healthy development.

Moreover, research has indicated that men and women may follow different developmental trajectories. For example, identity status achievement for men appears to be related to initiation of relationships, whereas for women it is more strongly related to the stability of relationships (Kahn, Zimmerman, Csikszentmihalyi, & Getzels, 2014). Additionally, at least early in marriages, women tend to report higher intimacy than do men, which has implications for the health of the marriage later (Boden, Fischer, & Niehuis, 2010).

Last, the early work on normative life stages was based on small groups of men and women born in the

1920s, 1930s, and 1940s. Today, young adults follow much more diverse developmental paths and, as a result, may develop differently than did the people in these studies. In addition, the findings of normative-stage research may not apply to other cultures, some of which have very different patterns of life-course development.

Despite these critiques, normative-stage research has nonetheless had an impact on the field and has drawn attention to the idea that human beings continue to change and develop throughout their lives. Psychologists, drawing on the work of Erikson, have identified developmental tasks that need to be accomplished for successful adaptation to each stage of life (Roisman, Masten, Coatsworth, & Tellegen, 2004). Among the typical developmental tasks of young adulthood are leaving the childhood home for advanced schooling, work, or military service; developing new and more intimate friendships and romantic relationships; and developing self-reliance and independence (Arnett, 2004; Scharf, Mayseless, & Kivenson-Baron, 2004).

TIMING-OF-EVENTS MODEL

Instead of looking at adult personality development purely as a function of age, the **timing-of-events model** (Neugarten, Moore, & Lowe, 1965; Neugarten & Neugarten, 1987) holds that the course of development depends on when certain events occur in people's lives. **Normative life events** (also called *normative age-graded events*) are those that typically happen at certain times of life—such events as marriage, parenthood, grandparenthood, and retirement. According to this model, people usually are keenly aware of both their timing and the **social clock**—their society's norms or expectations for the appropriate timing of life events.

timing-of-events model
Theoretical model of personality development that describes adult psychosocial development as a response to the expected or unexpected occurrence and timing of important life events.

normative life events
In the timing-of-events model, commonly expected life experiences that occur at customary times.

social clock
Set of cultural norms or expectations for the times of life when certain important events, such as marriage, parenthood, entry into work, and retirement, should occur.

If events occur on time, development proceeds smoothly. If not, stress can result. Stress may come from an unexpected event (such as losing a job), an event that happens off time (being widowed at age 35), or the failure of an expected and wanted event to occur at all (being unable to have a child). Personality differences influence the way people respond to life events and may even influence their timing. For example, a resilient person is likely to experience an easier transition to adulthood and the tasks and events that lie ahead than an overly anxious person.

The typical timing of events varies from culture to culture and from generation to generation. Indeed, more recent cohorts of young adults are completing the developmental tasks of this period at later ages than were previously normative, indicating that the timing of the social clock in U.S. culture has shifted somewhat in recent years (Arnett, 2010).

The rise in the average age when adults first marry in the United States (U.S. Census Bureau, 2018) and the trend toward delayed first childbirth (Martin, Hamilton, Osterman, Driscoll, & Drale, 2018) are two examples of events for which timing has shifted. A timetable that seems right to people in one cohort or cultural group may not seem so to the next.

Since the mid-twentieth century, the social clocks in many Western societies have become more widely age-graded. Today people are more accepting of 40-year-old first-time parents and 40-year-old grandparents, 50-year-old retirees and 75-year-old workers, 60-year-olds in jeans and 30-year-old college presidents. This widened range of age norms undermines the predictability on which the timing-of-events model is based.

The timing-of-events model has made an important contribution to our understanding of adult personality by emphasizing the individual life course and challenging the idea of universal, age-related change. However, its usefulness may well be limited to cultures and historical periods in which norms of behavior are stable and widespread.

TRAIT MODELS: COSTA AND MCCRAE'S FIVE FACTORS

When most people are asked to describe themselves, they often provide a list of adjectives. They might describe themselves as shy or outgoing, as friendly or neurotic, or as honest

trait models
Theoretical models of personality development that focus on mental, emotional, temperamental, and behavioral traits, or attributes.

five-factor model
Theoretical model of personality, developed and tested by Costa and McCrae, based on the "Big Five" factors underlying clusters of related personality traits: openness to experiences, conscientiousness, extraversion, agreeableness, neuroticism.



Do you have a blog? If so, the words you use may reflect how you would score on the Big Five measures. People who are high on neuroticism are likely to use words associated with negative emotions and have a fondness for the word "irony." Extraverted people use positive words and are more likely to use the word "drinks" and less likely to use the word "computer." Open people use lots of prepositions and long words as well as, oddly, the word "ink." Conscientious people like the word "completed," and agreeable people favor "wonderful" and aren't particularly fond of "porn."

Yarkoni, 2010

and hardworking. All of these descriptions focus on what psychologists call *traits*. **Trait models** are psychological models that focus on the measurement and examination of these different traits. One of the best known of these models is Paul T. Costa and Robert R. McCrae's **five-factor model** (Figure 2) consisting of factors, or dimensions, that seem to underlie five groups of associated traits, known as the "Big Five." They are (1) openness to experience (O), (2) conscientiousness (C), (3) extraversion (E), (4) agreeableness (A), and (5) neuroticism (N).

Continuity and Change in the Five-Factor Model Do people change or stay the same? Overall, average personality changes are small (Cobb-Clark & Schurer, 2012). In analyses of longitudinal and cross-sectional samples of U.S. men and women, Costa and McCrae (1994a, 1994b, 2006; Costa et al., 1986; McCrae, 2002; McCrae, Costa, & Busch, 1986) found considerable continuity within people.

The observation that people's personalities, on average, remain similar does not mean no change occurs (Roberts & Mroczek, 2008). There is normative developmental change in all five dimensions between adolescence and age 30, with much slower change thereafter. Change is almost exclusively in a positive direction, with increases in social dominance (assertiveness, a facet of extraversion), conscientiousness, emotional stability, and agreeableness (Soto, John, Gosling, & Potter, 2011; Roberts et al., 2006a; Borghuis et al., 2017). There also tend to be decreases in neuroticism, extraversion, and openness to experience (McCrae et al., 2000; Specht, Egloff, & Schmukle, 2011; Borghuis et al., 2017).

The Big Five factors appear to be linked to various aspects of health and well-being. Big Five traits have been associated with marital satisfaction (Gattis, Berns, Simpson, & Christensen, 2004), parent-infant relationships (Kochanska, Friesenborg, Lange, & Martel, 2004), work-family conflict (Wayne, Musisca, & Fleeson, 2004), and personality disorders. With respect to specific factors, openness to experience has been related to verbal intelligence and creative achievement (DeYoung, Quilty, Peterson, & Gray, 2014; Kaufman et al., 2016) as well as better health (Strickhouser, Zell, & Krizan, 2017). Conscientiousness has been linked most strongly with health-related behaviors that contribute to long life (Bogg & Roberts, 2013; Strickhouser et al., 2017). People low in extraversion are prone to agoraphobia (fear of open spaces) and social phobias (Bienvenu et al., 2001), while those high in extraversion tend to be high in well-being (Soto, 2015) but are more likely to engage in more substance use (Atherton, Robins, Rentfrow, & Lamb, 2014). Agreeableness has been associated with less negative responses to stress; however, it also appears associated to greater declines in positive affect following a stressor (Leger, Charles, Turiano, & Almeida, 2016). Last, people high in neuroticism tend to be subject to anxiety and depression (Bienvenu et al., 2001) and are more likely to be dependent on drugs and low in well-being (Valero et al., 2014; Soto, 2015).

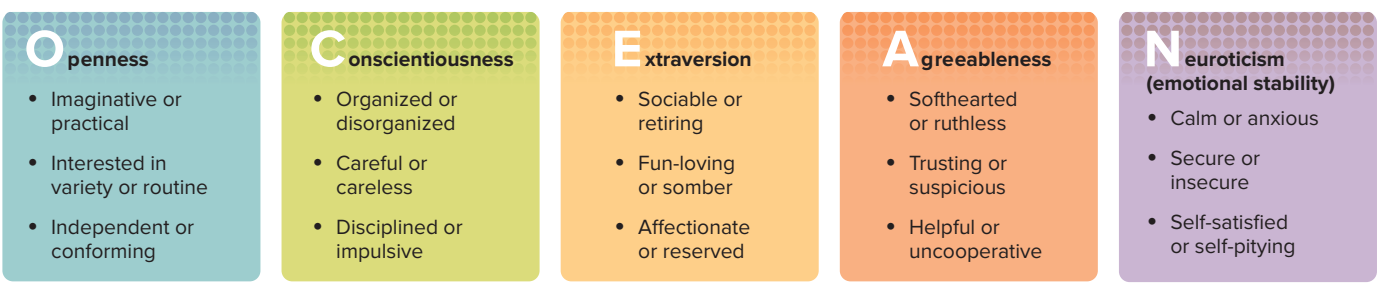


FIGURE 2
Costa and McCrae's Five Factors of Personality

Each factor, or dimension, of personality represents a cluster of related traits. Use the acronym OCEAN to remember the main five: openness, conscientiousness, extraversion, agreeableness, and neuroticism.

Evaluating the Five-Factor Model One of the great strengths of the scientific approach is that theories are modified and updated when new data are unearthed. Costa and McCrae's body of work originally made a powerful case for continuity of personality, especially after age 30. More recent research has eroded that conclusion, and Costa and McCrae have now modified their perspective and acknowledge that change occurs throughout the life span.

Some of this personality change may occur because of the influence of life experiences. There is growing evidence for this position. While onetime events appear to have little influence on personality change, long-term stressors such as chronic health problems do appear to exert an influence (Elkins, Kassenboehmer, & Schurer, 2017). Positive events matter too; people with successful, satisfying careers in young adulthood tend to show disproportionate increases in emotional stability and conscientiousness over time (Roberts & Mroczek, 2008). Moreover, getting married, divorced, or having a baby can also affect levels of the Big Five traits (Specht et al., 2011). Last, heritability estimates for personality decline with age, suggesting increasingly important environmental influences (Briley & Tucker-Drob, 2017).

It is important to remember that while life events affect personality, personality also affects the probability of particular events occurring. People high in agreeableness are more likely to lose their jobs, highly extraverted people are more likely to move in with a partner, and women high in neuroticism are more likely to marry (Specht et al., 2011). Moreover, effects are interactive. For example, adolescents who are sociable and affable tend to rise faster in their early careers; in turn, those who are in higher-status, more satisfying jobs tend to become more sociable and affable over time (Roberts, Caspi, & Moffitt, 2003).



Facebook profiles are more likely to reflect actual individual differences in the Big Five factors of personality than an idealized version of who you are. This is most true for extraversion and openness, and least true for neuroticism. So be careful what you write!

Back et al., 2010

TYPOLOGICAL MODELS

Jack Block (1971; Block & Block, 2006) was a pioneer in the **typological approach.** Typological research seeks to complement and expand trait research by looking at personality as a functioning whole.

typological approach
Theoretical approach that identifies broad personality types, or styles.

Researchers have identified three personality types: *ego-resilient, overcontrolled,* and *undercontrolled.* These three types differ in **ego resiliency,** or adaptability under stress, and **ego control,** or self-control. *Ego-resilient* people are well-adjusted: self-confident, independent, articulate, attentive, helpful, cooperative, and task-focused. *Overcontrolled* people are shy, quiet, anxious, and dependable; they tend to keep their thoughts to themselves and to withdraw from conflict, and they are the most subject to depression. *Undercontrolled* people are active, energetic, impulsive, stubborn, and easily distracted. Ego resiliency interacts with ego control to determine whether or not behavior is adaptive or maladaptive. For example, underrcontrol can lead to creativity and resourcefulness or, if it is excessive, to externalizing and antisocial behaviors. By the same token, overcontrol can help make a person highly focused and planful, or it can lead to an inflexible and inhibited style of behavior. More extreme forms of either overcontrol or undercontrol are generally associated with low levels of ego resilience (Kremen & Block, 1998). These or similar personality types seem to exist in both sexes, across cultures and ethnic groups, and in children, adolescents, and adults (Caspi, 1998; Hart, Hofmann, Edelstein, & Keller, 1997; Pulkkinen, 1996; Robins, John, Caspi, Moffitt, & Stouthamer-Loeber, 1996; van Lieshout, Haselager, Riksen-Walraven, & van Aken, 1995).

ego resiliency
Dynamic capacity to modify one's level of ego-control in response to environmental and contextual influences.

ego control
Self-control and the self-regulation of impulses.

Many of the positive effects of ego resilience are likely due to its association with positive emotions and self-efficacy beliefs, which are themselves associated with positive outcomes. For example, ego resiliency has been associated with self-efficacy beliefs and the expression of positive emotions during adolescence and early adulthood (Alessandri, Eisenberg, Vecchione, Caprara, & Milioni, 2016). In turn, positive emotions have been found to be predictive of ego resiliency (Vulpe & Dafinoiu, 2012; Milioni, Alessandri, Eisenberg, & Caprara, 2016). Additionally, ego resiliency has been associated with perceptions of support from both family and friends (Alessandri et al., 2016; Taylor, Doane, & Eisenberg, 2014) and is predicted by effortful control (Alessandri et al., 2014).



Which of the models presented here seems to you to most accurately describe psychosocial development in adulthood?

checkpoint can **you** . . .

- **Compare four theoretical approaches to adult psychosocial development?**

Foundations of Intimate Relationships

People with larger amygdalae—a part of the brain involved in emotions—tend to have larger social circles.

Bickart, Wright, Duatoff, Dickerson, & Feldman, 2010

Erikson saw the development of intimate relationships as the crucial task of young adulthood. The need to form strong, stable, close, caring relationships is a powerful motivator of human behavior.

Intimate relationships require self-awareness; empathy; the ability to communicate emotions, resolve conflicts, and sustain commitments; and, if the relationship is potentially a sexual one, sexual decision making. Such skills are pivotal as young adults decide whether to marry or form intimate partnerships and to have or not to have children (Lambeth & Hallett, 2002).

Let's look at two expressions of intimacy in young adulthood: friendship and love.

FRIENDSHIP

Young adults generally have the largest friendship networks; however, friendships during this time are often less stable than in either adolescence or later adulthood, primarily because people in emerging adulthood relocate more frequently (Wrzus, Zimmermann, Mund, & Neyer, 2015; Collins & Van Dulmen, 2006). Nonetheless, many young adults manage to maintain high-quality, committed, long-distance friendships (Johnson, Becker, Craig, Gilchrist, & Haigh, 2009), sometimes using social networking sites to keep in touch across geographical distance (Subrahmanyam, Reich, Waecheter, & Espinoza, 2008). But regardless of whether the friendships are virtual or not, they tend to center on work and parenting activities, sharing confidences, and advice.

fictive kin
Friends who are considered and behave like family members.

Young single adults tend to rely on friendships to fulfill their social needs more than young married adults or young parents do. Over the course of young adulthood, the number of friends and the amount of time spent with them gradually decrease, presumably as leisure time decreases and responsibility to others increases. For example, having a child is associated with a sharp decrease in the size of the friendship network (Wrzus, Hänel, Wagner & Neyer, 2013). Still, friends remain important. People with friends tend to have a sense of well-being–although it is unclear if friendship causes well-being or if people who feel good about themselves have an easier time making friends (Myers, 2000).



Intimate relationships involve self-awareness, empathy, and the ability to communicate. Such skills are pivotal as young adults decide whether to marry or form partnerships.
Creatas/Getty Images

Women typically have more intimate friendships than men do (Hall, 2011). Women are more likely to share confidences with friends (Rosenbluth & Steil, 1995), to talk with their friends about marital problems, and to receive advice and support (Helms, Crouter, & McHale, 2003). Men, by contrast, are more likely to share information and activities (Rosenbluth & Steil, 1995). However, when men do share intimate details, as with women, this results in increased closeness (Bowman, 2009).

Close, supportive friendships are sometimes incorporated into family networks. These types of friends are known as **fictive kin**–they are treated as family members despite a lack of blood relationship. For example, fictive kinship relationships often develop for gay and lesbian people who have straight friends of the opposite sex, particularly if those friends are unmarried or have an unconventional lifestyle (Muraco, 2006). Single adults without children are also more likely to develop stronger fictive kin relationships than are married adults with families (Casper, Marquardt, Roberto, & Buss, 2016).

In recent years, young adults' use of social networking sites has increased dramatically. The number of young adults using such sites has increased by 78 percent since 2005. Currently, 90 of adults age 18 to

29 years use social media, with broad similarities in usage patterns between racial and ethnic groups and gender (Perrin, 2015).

Some people have argued that such sites can be harmful and that online relationships can interfere with the formation of high-quality friendships in real life (McPherson, Smith-Lovin, & Brashears, 2006). It is true studies have found the use of social media is associated with negative effects on well-being, depression, and negative body image (Kross et al., 2013; Primack et al., 2017; Holland & Tiggemann, 2016). However, other research has found social networking sites carry advantages. For example, recent research indicates that social networking sites are often used to maintain and strengthen ties to others (Hampton, Goulet, Rainie, & Purcell, 2011; Subrahmanyam et al., 2008; Manago, Taylor, & Greenfield, 2012), and they are related to increased participation in political discussion and activities (Boulianne, 2015; Skoric, Zhu, Goh, & Pang, 2016). They have also been associated with increases in perceived social support, decreases in stress and loneliness, and better health outcomes (Nabi, Prestin, & So, 2013; Deters & Mehl, 2013; Korda & Itani, 2013). How do we reconcile these conflicting findings? It may be that *how* people use social networking sites determines their effects. Some people use electronic communication as a means by which to augment their interactions with others. This type of usage can serve to increase connections to others and thus promote well-being. However, some people use electronic communication as a means by which to avoid social isolation, in which case social media may be displacing face-to-face interactions and have negative effects on well-being (Ahn & Shin, 2013).



Like tearjerkers? Well, such movies may have an unintended effect. Women's tears have been shown to lead to lower levels of sexual arousal in men. Researchers believe that close contact sends an olfactory chemical message to the man's brain, and the message the tears are sending is "back off."

Gelstein et al., 2011

LOVE

Most people like love stories, including their own. According to Robert J. Sternberg's **triangular theory of love** (1995, 1998b, 2006), the way love develops *is* a story. The lovers are its authors, and the story they create reflects their personalities and their conceptions of love.

triangular theory of love
Sternberg's theory that patterns of love hinge on the balance among three elements: intimacy, passion, and commitment.

Thinking of love as a story may help us see how people select and mix the elements of the plot. According to Sternberg (1986, 1998a, 2006), the three elements, or components, of love are intimacy, passion, and commitment. *Intimacy,* the emotional element, involves self-disclosure, which leads to connection, warmth, and trust. For example, new lovers might share stories of their childhood or their hopes for the future. *Passion,* the motivational element, is based on inner drives that translate physiological arousal into sexual desire. Passion might include feelings of sexual attraction, intrusive thoughts of the romantic partner, or sexual activity itself. *Commitment*, the cognitive element, is the decision to love and to stay with the beloved. So, for example, commitment might include a decision to make the relationship exclusive or to marry. The degree to which each of the three elements is present determines what type of love people feel (Table 2).

As adolescents move into adulthood, they tend to feel an increasing amount of intimacy, passion, and commitment in their romantic relationships (Sumter, Valkenburg, & Peter, 2013). Their formation of a sense of identity achievement seems to affect the quality of romantic relationships. For example, identity achievement status in young adults is associated with stronger feelings of companionship, worth, affection, and emotional support within romantic relationships (Barry, Madsen, Nelson, Carrol, & Badger, 2009). This supports Erikson's (1973) assertions that the formation of a secure sense of identity is necessary for the establishment of high-quality intimate relationships.

While they are more alike than different, men and women show modest differences in intimacy, passion, and commitment within their romantic relationships. Generally, women report greater intimacy in their relationships, while men report greater passion. Levels of commitment, however, appear to be similar in both genders (Sumter et al., 2013). The length of the relationship affects the dynamics of the relationship. Generally, passion is higher at the beginning of the relationship and declines over time as commitment increases (Ahmetoglu, Swami, & Chamorro-Pemuzic, 2010).

checkpoint can you . . .

- **List skills that promote and maintain intimacy?**
- **Identify characteristic features of friendship in young adulthood?**
- **Identify the three components of love, according to Sternberg?**

TABLE 2 Patterns of Loving

Type	Description
Nonlove	All three components of love—intimacy, passion, and commitment—are absent. This describes most interpersonal relationships, which are simply casual interactions.
Liking	Intimacy is the only component present. There is closeness, understanding, emotional support, affection, bondedness, and warmth. Neither passion nor commitment is present.
Infatuation	Passion is the only component present. This is "love at first sight," a strong physical attraction and sexual arousal, without intimacy or commitment.
Empty love	Commitment is the only component present. Empty love is often found in long-term relationships that have lost both intimacy and passion, or in arranged marriages.
Romantic love	Intimacy and passion are both present. Romantic lovers are drawn to each other physically and bonded emotionally. They are not, however, committed to each other.
Companionate love	Intimacy and commitment are both present. This is a long-term, committed friendship, often occurring in marriages in which physical attraction has died down but in which the partners feel close to each other and have made the decision to stay together.
Fatuous love	Passion and commitment are present without intimacy. This often leads to a whirlwind courtship in which a couple make a commitment without allowing themselves the time to develop intimacy. This kind of love usually does not last.
Consummate love	All three components are present in this "complete" love. It is easier to achieve it than to hold on to it.

Source: Based on Sternberg, 1986.

Marital and Nonmarital Lifestyles

In many Western countries, today's rules for socially acceptable lifestyles are more flexible than they were during the first half of the twentieth century. People marry later, if at all; more people have children outside of marriage, if at all; and more people end their marriages. Some people remain single, some remarry, and others live with a partner of either sex. All in all, there is no such thing as a "typical" marriage or family.

In this section, we look more closely at marital and nonmarital lifestyles. In the next section we examine parenthood.

More and more, people are using online sites to meet potential dates and romantic partners. But can we trust what people say? For the most part, it seems we can, but people do tend to lie about (in order) weight, age, and height.

Toma, Hancock, & Ellison, 2008



Venus Williams is just one of many African American women who remain single through young adulthood.
Cameron Spencer/Getty Images

SINGLE LIFE

The proportion of young adults age 18 to 34 who have not yet married sharply increased over the past decades, from 41 percent in 1978 to 71 percent in 2018 (U.S. Census Bureau, 2018a). In 1960, the age at first marriage was 20 years for women and 23 years for men. In 2017, this number rose to 28.1 years for women and 29.9 years for men (U.S. Census Bureau, 2019). This decline in marriage has occurred across all age groups but is most prominent in young adults (Cohn, Passel, Wang, & Livingston, 2011). The trend is particularly pronounced among African Americans (Wang & Parker, 2014). Between 1970 and 2007, there has been a significant decline in the marriage rate in almost all countries (Figure 3).

Some young adults stay single because they have not found the right mate; others are single by choice. More women today are self-supporting, and there is less social pressure

to marry. At the same time, many single adults are postponing marriage and children due to economic instability (Cohn, 2018), a desire to coordinate career goals with long-term relationship goals (Shulman & Connolly, 2013), or a desire for self-fulfillment. Some enjoy sexual freedom. Some find the lifestyle exciting. Some just like being alone. And some postpone or avoid marriage because of fear that it will end in divorce.

Since the 1960s, Americans have become more sexually permissive. They are likely to have more sexual partners, have casual sex, and be more accepting of premarital sex (Twenge, Sherman, & Wells, 2015). One pattern that has become increasingly common is that of "friends with benefits" (FWB). FWB relationships are relationships in which there is a blend of friendship and physical intimacy, but little commitment. Men are more likely to seek out FWB out of a desire for sexual activity, whereas women are more likely to express a desire for an emotional connection and for the relationship to eventually progress to a committed romantic relationship (Lehmiller, VanderDrift, & Kelly, 2011; Gusarova, Fraser, & Alderson, 2012). Given these different motivations, it is perhaps not surprising that women report greater levels of deception in FWB relationships (Quirk, Owen, & Fincham, 2014). Despite this, both men and women generally report positive emotions about their FWB relationships, although men are more likely to do so (Owen & Fincham, 2011). As a whole, young adults in such relationships do not appear to be at greater risk of psychological distress than their counterparts in committed romantic relationships (Eisenberg, Ackard, Resnick, & Neumark-Sztainer, 2009).

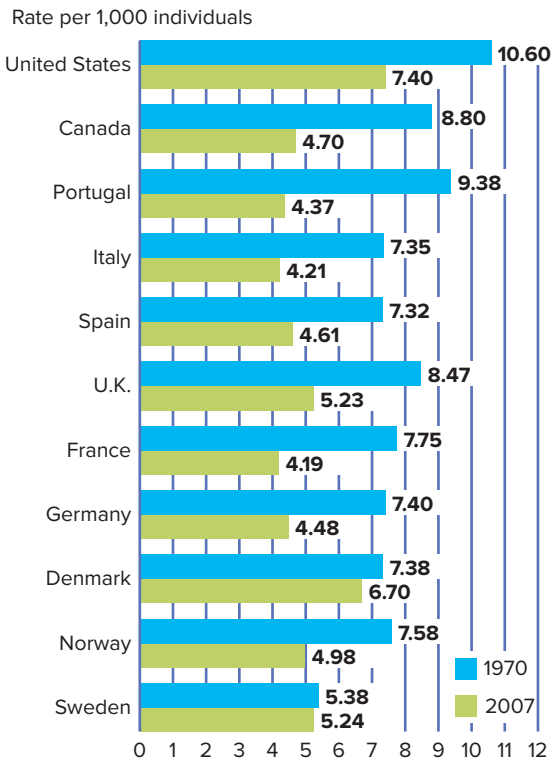


FIGURE 3
Marriage Rates by Country, 1970 and 2007

Source: National Healthy Marriage Resource Center, n.d.

GAY AND LESBIAN RELATIONSHIPS

Forty-five years ago, same-sex couples were not legally recognized in any country (Saez, 2011). However, shifting attitudes have led to great changes. In January 2019, same-sex marriage became legal in Austria, raising the number of countries in which gay and lesbian adults can marry to 27. Most countries are in Western Europe (Italy and Switzerland are exceptions) and the Americas, where acceptance of homosexuality is high (Masci & DeSilver, 2017; Masci, Sciupac, & Lipka, 2017).



Should gays and lesbians be allowed to marry? Adopt children? Be covered by a partner's health care plan?

However, much discrimination still exists. Countries in Asia and Africa tend to be less tolerant of homosexuality (McGee, 2016). In Russia, it is a crime to distribute "propaganda of nontraditional sexual relationships among minors." Same-sex relations between men are banned in some areas of Indonesia, Malaysia, Myanmar, and much of the African continent, and in Brunei, Mauritania, Sudan, and parts of Nigeria, such acts are punishable by death (Council on Foreign Relations, 2017).

In the United States, greater social acceptance of homosexuality has led to more gay and lesbian adults coming out of the closet and living openly. Approximately 87 percent of Americans know someone who is gay or lesbian, and about half report a close family member or friend is gay or lesbian (Drake, 2013). It may be that the increasing openness with which gay and lesbian people are living their lives is affecting public opinion. Those who are close to a gay or lesbian person are more likely to be supportive of gay marriage and antidiscrimination laws (Neidorf & Morin, 2011), and a current high of 67 percent of Americans now support gay marriage (McCarthy, 2018).

Beliefs about gay marriage exist in concert with political orientation; however, the striking partisan divisions of the past have lessened. In 2012, approximately 69 percent of Democrats supported same-sex marriage. By contrast, only 32 percent of Republicans supported it (Pew Research Center, 2012). However, 6 years later, 44 percent of Republicans supported gay marriage (McCarthy, 2018). Religion also plays a role. Of those people who characterize themselves as unaffiliated with any religion, 85 percent support gay marriage. While religiously affiliated people are less likely to endorse gay marriage, the number that are in favor of it has also increased. For example, in 2007, approximately

14 percent of white evangelical Christians were in favor of gay marriage. In 2017, that number rose to 35 percent. In addition, age has been implicated in the debate, with younger generations becoming increasingly accepting of same-sex marriage (Pew Research Center, 2017).

In the United States, gays and lesbians struggled for decades to obtain legal recognition of their unions. They argued that same-sex marriage offered benefits that civil unions did not (Herek, 2006; King & Bartlett, 2006). Research supported their assertion: Gay and lesbian people in those states that had legalized gay marriage and who were thus able to marry showed lower levels of depression, stress, and internalized homophobia, and they felt they had more meaning in their lives (Riggle, Rotosky, & Riggle, 2010). On June 26, 2015, the U.S. Supreme Court legalized gay marriage, ruling that bans on same-sex marriage were unconstitutional. Prior to the Supreme Court decision, approximately 8 percent of gay, lesbian, bisexual, or transgender people were married to a same-sex partner. Currently, this number has risen to slightly over 10 percent (Gallup News, 2017), or some 1.1 million American adults (Romero, 2017).

In most ways, gay and lesbian relationships mirror heterosexual relationships. Gay and lesbian couples tend to be at least as satisfied with their relationships as heterosexual couples (Farr, Forssell, & Patterson, 2010). The factors that predict the quality of both homosexual and heterosexual relationships—personality traits, perceptions of the relationship by the partners, ways of communicating and resolving conflicts, and social support—are similar (Kurdek, 2005, 2006). Indeed, committed same-sex relationships are hardly distinguishable in quality from committed heterosexual relationships (Roisman, Clausell, Holland, Fortuna, & Elieff, 2008). Just as with heterosexual relationships, support from family and friends is related to how well and how long the relationship lasts (Kurdek, 2008). Likewise, variables related to breakups are similar and include poor relationship quality and infidelity (Balsam, Rothblum, & Wickham, 2017).

Differences between gay and lesbian couples and heterosexual couples have also emerged from research (Kurdek, 2006). First, gay and lesbian couples are more likely than heterosexual couples to negotiate household chores on a more egalitarian basis. Second, they tend to resolve conflicts in a more positive atmosphere than heterosexual couples do. Third, gay and lesbian relationships tend to be less stable than heterosexual relationships, perhaps due to the lack of institutional supports (Pope, Murray, & Mobley, 2010). With respect to relationship dissolution, lesbian couples are more likely to divorce than gay couples (Balsam et al., 2017).

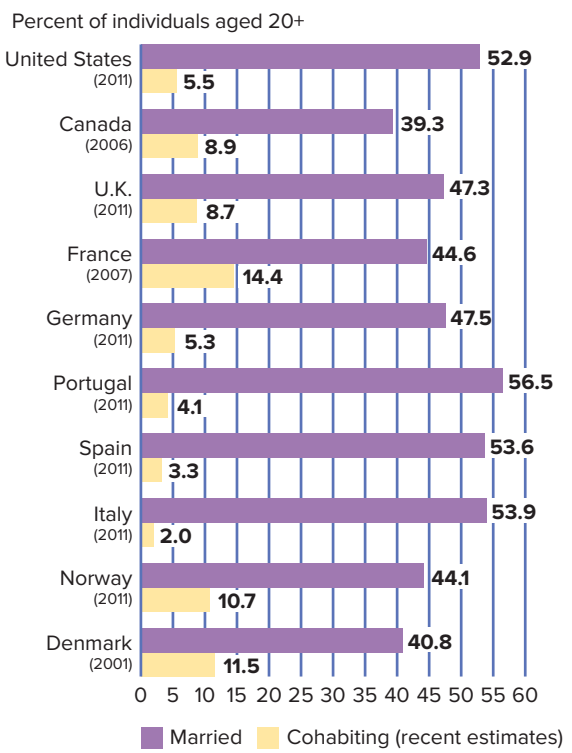


FIGURE 4
Marriage and Cohabitation Rates of Individuals Aged 20+ by Country

Source: Organisation for Economic Co-operation and Development,. *Cohabitation Rate and Prevalence of Other Forms of Partnership* [data report], 2013.

COHABITATION

Cohabitation is an increasingly common lifestyle in which an unmarried couple involved in a sexual relationship live together.

International Comparisons The prevalence of cohabitation varies widely across countries (see Figure 4). For example, within the Americas, rates are relatively low in Mexico and the United States, and higher in Central America, the Caribbean, and Amazonian areas (Lopez-Gay et al., 2014). Surveys in 14 European countries, Canada, New Zealand, and the United States also found wide variations in cohabitation rates, ranging from more than 14 percent in France to less than 2 percent in Italy (Organization for Economic Cooperation and Development, 2013). In Japan, cohabitation rates are relatively high at 15 percent (Raymo, Iwasawa, & Bumpass, 2009).

There is some evidence that attitudes regarding cohabitation are changing, with younger adults across a variety of countries showing greater acceptance for cohabitation and other marital alternatives (Treas,

Lui, & Gubernskaya, 2014). Not surprisingly, the patterns of cohabitation are changing as well. In many countries, including China, Spain, and Canada, more recent cohorts are cohabitating at higher rates than older adults (Yu & Xie, 2015; Dominguez-Folgueras & Castro-Martin, 2013; Le Bourdais & Lapierre-Adamcyk, 2004).

Cohabitation in the United States In 2016, an estimated 9 million unmarried couples were living together in the United States, about half of whom were under the age of 35 (Stepler, 2017). While the cohabitation numbers dipped slightly in 2016, perhaps due to the increased availability of marriage for gay and lesbian couples (U.S. Census Bureau, 2016), cohabitation is now more common in adults age 18 to 24 years than marriage. In 2018, the cohabitation rate for adults age 18 to 24 years was 9 percent and was even higher for adults 25 to 34 years of age at 15 percent (Gurrentz, 2018). The overall increase in cohabitation in the United States has occurred among all racial/ethnic groups and at all educational levels, but people with less education are more likely to cohabit than those with higher education (Seltzer, 2004; Manning, 2013; Gurrentz, 2018). Cohabiters also are likely to be less religious, less traditional, less confident in their relationships, more accepting of divorce, more negative and aggressive in their interactions with their romantic partners, and less effective communicators (Jose, O'Leary, & Moyer, 2010).

Beliefs about cohabitation, cohabitation patterns, and the stability of cohabitation vary among racial/ethnic groups. Couples who cohabitate, on average, are younger, black, and less religious (Pew Research Centers, 2007a). Perhaps for economic reasons, black and Hispanic couples are less likely than non-Hispanic white couples to regard cohabitation as a trial marriage and more likely to regard it as a substitute for marriage (Phillips & Sweeney, 2005; Manning, Smock, & Fettro, 2016). White couples who cohabit are more likely than other groups to end the relationship; their children have almost 10 times the risk of going through a parental separation (Osborne, Manning, & Smock, 2007). Older and younger adults show a distinct difference in their views of the morality of cohabitation, with younger adults much more likely to think living together without being married is not wrong (Pew Research Center, 2012).

Cohabiting relationships tend to be less satisfying and less stable than marriages (Binstock & Thornton, 2003; Heuveline & Timberlake, 2004; Seltzer, 2004). Generally, the lowest relationship quality is reported by cohabitators without plans to marry or in relationships in which one partner wishes to marry and the other does not (Brown, Manning, & Payne, 2017; Willoughby & Belt, 2016). Another common stressor involves divergent expectations about the division of household labor; cohabitating couples in this situation are highly likely to break up (Hohmann-Marriott, 2006).

Rates of serial cohabitation, especially in disadvantaged groups, rose by almost 40 percent in the late 1990s and early 2000s (Lichter, Turner, & Sassler, 2010). Cohabitation after divorce is more common than premarital cohabitation and may function as a form of remarriage mate selection. However, postdivorce cohabitation, especially with serial partners, greatly delays remarriage and contributes to instability in a new marriage (Xu, Hudspeth, & Bartkowski, 2006).

Some research suggests that cohabiting couples who later marry tend to have unhappier marriages and greater likelihood of divorce than those who wait to live together until marriage (Bramlett & Mosher, 2002; Dush, Cohan, & Amato, 2003). However, some cohabitators do not seem to be at higher risk of marital dissolution (Teachman, 2003). These cohabitors may want to marry but put it off until they feel their economic circumstances permit it (Smock, Manning & Porter, 2005) and view cohabitation as a step along the way to marriage rather than as a replacement for it (Manning, Longmore, & Giordano, 2007). Thus, it appears there may be fundamental differences in types of cohabiting couples, with those couples who eventually marry having more stable and happier relationships than those who do not, perhaps as a result of a stronger initial commitment to the relationship (Jose et al., 2010).

Although U.S. family law currently gives cohabitors few of the legal rights and benefits of marriage, the argument has been made that this situation should change in order



From your experience or observation, is it a good idea to cohabit before marriage? Why or why not? Does it make a difference if children are involved?

checkpoint can you . . .

- State reasons why people remain single?
- Compare gay and lesbian relationships with heterosexual relationships?

to provide relationship partners as well as any resulting children legal protection in the event of relationship dissolution (Waggoner, 2016). Other countries, including the United Kingdom, Australia, Canada, and New Zealand, have enacted legislation giving committed cohabitating couples rights similar to married couples (Waggoner, 2015).

MARRIAGE

Marriage in the United States has been affected by demographic and economic changes in the population. For example, more recent cohorts of young women are likely to have attained a higher educational level than previous generations of women and are generally more economically successful. For many couples, this has altered the dynamics of marriage. Specifically, in 1970, only 4 percent of women 35 to 44 years of age made more money than their husbands, but by 2015, this number increased to 38 percent (Murray-Close & Heggeness, 2018). One consequence is that marriage is now associated with increases in economic security for both men and women (Cohn & Fry, 2010). Religious beliefs are also an influence. Religious people are more likely to endorse earlier marriage (Fuller, Frost, & Burr, 2015), to marry at earlier ages (Uecker & Stokes, 2008), and to view marriage as central to their lives (Willoughby, Hall, & Goff, 2015).

The Meaning of Marriage In 2016, almost 111 million adults in the United States were not married (U.S. Census Bureau, 2019b). In all, half of Americans over the age of 18 are unmarried, representing a drop of 8 percentage points since 1990 (Geiger & Livingston, 2019).

Most young adults plan to marry, but only when they feel ready, and they see getting on their feet financially and establishing themselves in stable jobs or careers as formidable obstacles (Cohn, 2018; Kefalas, Furstenberg, & Napolitano, 2005). This orientation toward marriage includes about 80 percent of young adults and is more characteristic of young adults from urban environments. Rural Americans, by contrast, are more likely to see marriage as an inevitable step toward adulthood, to marry early, and to hold traditional views on marriage (Kefalas, Fursternberg, Carr, & Napolitano, 2011).

Almost 90 percent of Americans say love is the most important reason to marry, followed closely by making a lifelong commitment and companionship (Geiger & Livingston, 2019). They also expect space for individual interests and pursuits, and put a heavy emphasis on friendship and compatibility (Kefalas et al., 2005). Indeed, the vast majority of adults in the United States today view the primary purpose of marriage as "the mutual happiness and fulfillment of adults," rather than as being based on parenting and children (Pew Research Center, 2007a). American adults are more likely to marry someone of a different race or ethnicity, or who practices a different ethnicity, than they are to marry someone from a different political party (Geiger & Livingston, 2019).



This mass wedding in India, organized by social workers for members of impoverished families, is an example of the variety of marriage customs around the world.
Vishal Owe/EPA/Shutterstock

Entering Matrimony For the reasons just mentioned—as well as because of the increasing enrollment in higher education—the typical marrying age has risen in industrialized countries. Thirty to 50 years ago, most people married in or before their early twenties. In the United States in 2018, the median age of first-time bridegrooms was 29.9 and of first-time brides, 28.1 (U.S. Census Bureau, 2018b). In most of the European Union states, the age at first marriage increased in the last decade by approximately 4 years. Currently, most of the population, with the exception of adults in Poland, Lithuania, and Sweden, marry after 30 years of age. Generally, the average age at which men marry is older than that of women (Corselli-Nordblad & Gereoffy, 2015).

Historically and across cultures, the most common way of selecting a mate has been through arrangement, either by the parents or by professional matchmakers. Generally, one of the primary

beliefs about the role of marriage is focused on the union of two families, rather than on love between two individuals. Given this orientation, it is perhaps not surprising to find that couples in arranged marriages have very different expectations of their spouses. There are decreased expectations of intimacy and love, and responsibility and commitment are emphasized. However, despite these variations in beliefs about what marriage should look like, couples in arranged marriages appear to be equally happy in their relationships (Regan, Lakhanpal, & Anguiano, 2012; Myers, Madathil, & Tingle, 2005). In many cultures, the Western ideal of a relationship based on love and personal attraction seems to have changed the nature of arranged marriage, with "semi-arranged" marriages becoming more and more common (Naito & Gielen, 2005). In these situations, parents are heavily involved in the process of finding a marriage partner, but the young adult holds veto power over potential spouses.

The transition to married life brings major changes in sexual functioning, living arrangements, rights and responsibilities, attachments, and loyalties. Among other tasks, marriage partners need to redefine the connection with their original families, balance intimacy with autonomy, and establish a fulfilling sexual relationship.

Sexual Activity after Marriage Estimates are that approximately 20 to 25 percent of marriages experience infidelity, with a 2 to 4 percent annual prevalence rate peaking in the summer (Fincham & May, 2017). Extramarital activity is more prevalent among younger adults and husbands than among wives (T. W. Smith, 2003; Labrecque & Whisman, 2017). Certain personality factors are predictive; individuals high in neuroticism and low in agreeableness and conscientiousness are more likely to engage in infidelity (Fincham & May, 2017; Zare, 2011). Extramarital relations are most likely to occur with a close personal friend, neighbor, co-worker, or long-term acquaintance, although men are somewhat more likely to have an affair with a casual acquaintance (Labrecque & Whisman, 2017). Generally, extramarital activity occurs early in the relationship; marriages that last for long periods of time show decreasing risk (DeMaris, 2009). More than half of those engaging in extramarital sex will divorce or separate from their partner (Allen & Atkins, 2012).

Young adults of both sexes have become less permissive in their attitudes toward extramarital sex (Twenge, Sherman, & Wells, 2015). These beliefs are not limited to the United States. Across 40 nations, adults agreed that it was morally unacceptable for an adult to have an extramarital affair, with the vast majority listing infidelity as a greater wrong than gambling, homosexuality, premarital sex, and abortion. The only country in which adults did not agree with this assessment was France, where only 47 percent of adults found infidelity immoral (Poushter, 2014).

The changing landscape of technology has led to increased use of the Internet as a means by which to initiate an extramarital affair (Hertlein & Piercy, 2006). While different couples define electronic acts of infidelity differently, they generally include such actions as viewing or participating in pornography, sending or receiving sexually explicit photographs or videos, engaging in sexual activity while online or on the telephone, or messaging inappropriately intimate or sexual content to a person other than the spouse. While online acts of infidelity at times do not consist of actual physical contact, they can nonetheless be perceived as betrayals and result in similar negative consequences for the marital relationship (Whitty, 2003), including a loss of trust, psychological distress, and trauma (Schneider, Weiss, & Samenow, 2012).



Only about a third of married couples have sex at least twice a week.

Laumann & Michael, 2000

Marital Satisfaction Married people tend to be happier than unmarried people, though those in unhappy marriages are less happy than those who are unmarried or divorced (Ben-Zur, 2012; Myers, 2000). Generally, husbands and wives report similar levels of marital satisfaction (Jackson, Miller, Oka, & Henry, 2014). Marital happiness is positively affected by increased economic resources, equal decision making, nontraditional gender attitudes, and support for the norm of lifelong marriage. Marital happiness is negatively affected by premarital cohabitation, extramarital affairs, wives' job demands, and wives' longer working hours. Increases in husbands' share of housework appear to

window on the world

POPULAR WEDDING TRADITIONS ACROSS CULTURES

Most cultures have long-standing wedding traditions. Often these traditions were designed to ward off evil spirits and bring luck and good fortune to the new couple. Special clothing, symbolic elements, and traditional rites are usually part of the ceremony.

Brides wear white in much of Europe and America. Wearing white is symbolic of the purity and virginity of the bride. This tradition began when Queen Victoria wore a white gown to her wedding in 1840. Before this, white was worn as a symbol of mourning, and red was the most popular color to be married in (Smithsonian, 2014). In China, brides still wear red, which is considered to be a symbol of good luck and good fortune (Traditional Chinese Weddings, 2014).

In traditional West African weddings, couples would jump a broom together as a symbol of the joining of two families and the couple starting their new life together. This ritual has become a popular part of many African American couples' weddings today as a means of showing respect for their ancestors (African Wedding Traditions, 2013).

One of the most common traditions is to throw rice, oats, wheat, beans, peas, or other seeds at the new couple as they exit the ceremony. It symbolizes new life, fertility, and prosperity for the couple. Other things are used today such as birdseed, confetti, or bubbles. This tradition has been seen in Greece, France, Germany, Czechoslovakia, Spain, Italy, the United States, and numerous other countries (Monger, 2013).

The wedding veil is also a common tradition. Its ancient purpose is to ward off evil spirits by hiding the bride. This was combined with dressing the bridesmaids similarly to the bride to confuse and deter evil spirits. The tradition was also used in arranged marriages in Middle Eastern cultures to hide the bride from her new husband until after the ceremony so he could not change his mind if he did not like what he saw (Monger, 2013). Variations of this tradition include traditional Chinese brides wearing a full red veil to hide their face while being escorted to the ceremony under a red umbrella to ward off evil spirits and encourage fertility and prosperity for the new couple (Traditional Chinese Weddings, 2014).

A wedding reception or party is also common across most cultures. Depending on religion, status, and custom, these can include speeches, a toast, dancing, and traditional wedding foods. This is a time for friends and family to celebrate with the new couple. Length and formality of the reception can vary. For example, in India, the celebration will go on for several days, whereas in Russia, the reception lasts 2 hours (Monger, 2013).

what's your view

Have you thought about getting married and the traditions that you might follow one day? Where do you think these traditions come from, and what is their meaning?

lower marital satisfaction among husbands but improve it among wives (Amato, Johnson, Booth, & Rogers, 2003). In fact, "sharing household chores" is viewed as very important to marital success by approximately 62 percent of American respondents (Pew Research Center, 2007b).

For most couples, sex impacts relationship quality. The frequency of sex, sexual satisfaction, and marital satisfaction are closely related to and predict each other (McNulty, Wenner, & Fisher, 2016). Americans have sex less often than media images suggest, and married people have sex more often than singles, though not as often as cohabitors. However, married couples report more emotional satisfaction from sex than single or cohabiting couples (Waite & Joyner, 2000). What may be more important than the actual amount of sex a married couple has is whether or not they both desire roughly similar levels of sexual activity. High discrepancy with respect to the desire for sexual activity is associated with lower relationship satisfaction, lower relationship stability, and greater conflict (Willoughby, Farero, & Busby, 2014).

Another factor underlying marital satisfaction may be a difference in what the man and woman expect from marriage. Women tend to place more importance on emotional expressiveness than men do (Lavee & Ben-Ari, 2004). Empathy, validation, and caring are related to feelings of intimacy and better relationship quality (Sullivan, Pasch, Johnson, & Bradbury, 2010). Men's efforts to express positive emotion to their wives, to pay attention to the dynamics of the relationship, and to set aside time for activities focused on building the relationship are important to women's perceptions of marital quality (Wilcox & Nock, 2006).

People who marry and stay married, especially women, tend to become better off financially than those who do not marry or who divorce (Hirschl, Altobelli, & Rank, 2003; De Vaus, Gray, Qu, & Stanton, 2017). However, a large difference in wage earning potential between spouses is associated with decreases in happiness (Stutzer & Frey, 2006).

checkpoint can you . . .

- Identify several benefits of marriage?
- Discuss differences between traditional views of marriage and the way emerging and young adults view it today?
- Note cultural differences in methods of mate selection and historical changes in marrying age?
- Cite findings on sexual relations in and outside of marriage?
- Identify factors in marital satisfaction?

Parenthood

People in industrial societies typically have fewer children today than in earlier generations, and they start having them later in life, in many cases because they spend their emerging adult years getting an education and establishing a career. In 2016, the average age of first births in the United States rose to 26.8 years (Martin et al., 2018; see Figure 5), and the percentage of women who give birth for the first time later in life has increased dramatically. The rise has been most dramatic for women in their forties, whose birthrate rose 19 percent from 2007 to 2016 (National Center for Health Statistics, 2017).

A woman's age at first birth varies with ethnic and cultural background. In 2017, Asian American women had their first babies at an average age of 30.3, whereas American Indian and Alaska Native women gave birth for the first time, on average, at 23.3 years. Black women had their first child at 24.9 years, Hispanic women at 24.8 years of age, and white women had their first child at 27.6 years (Martin et al., 2018).

In 2017, 39.8 percent of U.S. births were to unmarried women, a decline from the historic high of 41 percent in 2009 (Martin et al., 2018). The U.S. fertility rate is higher than that in several other developed countries, such as Japan and the United Kingdom, where the average age at first birth is about 29 (Martin, Ruble, & Szkrybalo, 2002; van Dyk, 2005).

At the same time, an increasing proportion of U.S. couples remain childless. The percentage of households with children fell from 45 percent in 1970 (Fields, 2004) to approximately 28.7 percent in 2016 (Schondelmyer, 2017). The aging of the population as well as delays in marriage and childbearing may help explain these data, but some couples undoubtedly remain childless by choice. Some see marriage primarily as a way to enhance their intimacy, not as an institution dedicated to the bearing and raising of children (Popenoe & Whitehead, 2003). Others may be discouraged by the financial burdens of parenthood and the difficulty of combining parenthood with employment. Better child care and other support services might help couples make truly voluntary decisions.



Both mothers and fathers prefer to hold babies on the left side of their bodies.

Scola & Vauclair, 2010

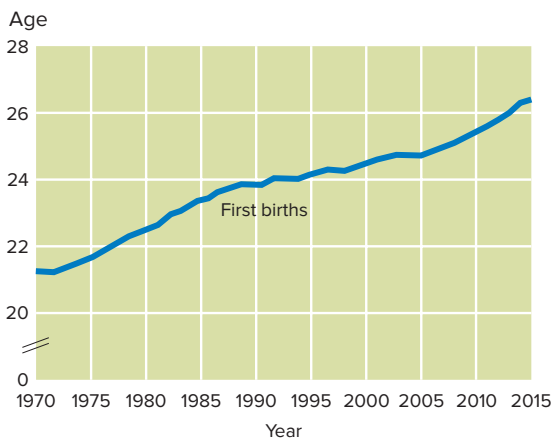


FIGURE 5

Mean Age of Mother at First Birth: United States

Many women today start families at a later age than in their parents' generation, raising the average age at first birth.

Source: National Center for Health Statistics, 2016.

MEN'S AND WOMEN'S INVOLVEMENT IN PARENTHOOD

Most mothers now work outside the home. The labor force participation rate for mothers with children under the age of 6 years is 65.1 percent, a number that rises to 75.7 percent when mothers with children age



Celebrating a child's birthday is one of the many joys of parenthood.
image100/VCG/Corbis/Getty Images

7 to 17 years are included (U.S. Bureau of Labor Statistics, 2018). Despite working outside the home, women spend more time on child care than their counterparts did in the 1960s, when 60 percent of children lived with a breadwinner father and a stay-at-home mother (Bianchi, Robinson, & Milkie, 2006). Today, only about 20 percent of children live in such families (Livingston, 2018). Yet married mothers spent 12.9 hours a week on child care in 2000 compared with 10.6 hours in 1965, and single mothers spent 11.8 hours a week on child care as compared with 7.5 hours in 1965 (Bianchi et al., 2006).

What about fathers? Generally, most fathers are not as involved as mothers are (Yeung, Sandberg, Davis-Kean, & Hofferth, 2001). However, the amount of time fathers spend with their children has gone up. For example, married fathers spent more than twice as much time with child care (6.5 hours) and housework (9.7 hours) in 2000 than they did in 1965 (Bianchi et al., 2006). By 2011, the time spent with their children on a weekly basis rose to 7.3 hours per week (Parker & Wang, 2013). On weekends, as their children get older, the time fathers spend with their children is more equal to that of mothers (Yeung et al., 2001). And, although they are vastly outnumbered by mothers, there has been an uptick in the number of stay-at-home fathers, who now account for 7 percent of stay-at-home parents (Livingston, 2018).

The impacts of having children are also indirect. In addition to time spent in child care itself, fathers living with dependent children are less likely to be involved in their own independent social activities. However, they are more likely to be engaged in school-related activities, church groups, and community service organizations. The result of this is generally positive—the most involved fathers also report the highest levels of satisfaction (Eggebeen & Knoester, 2001).

PARENTHOOD AND MARITAL SATISFACTION

Having children doesn't just change fathers' lives, it changes their physiology. Fathers who are involved in a pregnancy show decreased levels of testosterone over the course of the pregnancy.

Berg & Wynne-Edwards, 2001

How does parenthood affect the relationship between marriage partners? Results are mixed. Some studies show that marital satisfaction typically declines during the child-raising years—and the more children, the greater the decline. Moreover, mothers of young infants tend to feel the effects most strongly. For example, only 38 percent of new mothers report high marital satisfaction compared with 62 percent of childless wives (Twenge, Campbell, & Foster, 2003).

Why do these declines occur? New parents are likely to experience stressors that can affect their health and state of mind. Taking care of newborn babies is difficult and often comes with sleep deprivation, uncertainty, and isolation. Nighttime crying, for example, is associated with a decrease in marital satisfaction in the 1st year of the child's life (Meijer & van den Wittenboer, 2007). If the woman was working outside the home and is now staying home, the burden of housework and child care may fall mostly on her. Indeed, the division of household tasks is a common issue among new parents (Schulz, Cowan, & Cowan, 2006). Many couples find their relationship becoming more "traditional" following the birth of a child, with the woman often engaging in the bulk of caregiving and housekeeping (Cox & Paley, 2003). The perceptions of unfairness and inequity that result from this process can damage the marital relationship (Dew & Wilcox, 2011).

However, the picture is not all bad. Other studies tell a different story and have found no differences in marital satisfaction in the first year of marriage for couples that do and do not have children (McHale & Huston, 1985). Some data indicate that parents have greater happiness, positive emotions, and meaning in life than nonparents (Nelson, Kushlev, English, Dunn, & Lyubomirsky, 2013).

It is likely that different families respond in different ways to the birth of a child, and couples who had a healthy relationship prior to the birth of a child will adjust

more adaptively. For instance, one study identified seven unique family system trajectories that shaped the responses of parents to the birth of a child. Cohesive families, who were high in warmth and low in conflict, showed increases in autonomy and intimacy in the first year following the birth. By contrast, family systems with dysfunctional relationships showed exacerbation of maladaptive patterns over time (Lindblom et al., 2014). Similarly, other research has shown that whether or not a couple was happy prior to a pregnancy, whether or not a pregnancy was planned, the age of parents, and the parents' attachment relationship affect marital satisfaction after the birth of a child (Lawrence, Rothman, Cobb, Rothman, & Bradbury, 2008; Nelson, Kushlev, English, Dunn, & Lyobomirsky, 2013; Kohn et al., 2012). Factors outside the home matter as well. A good work-life balance, and the consequent reduction in stress, is also associated with less of a decline in marital satisfaction following the birth of a child (van Steenbergen, Kluwer, & Karney, 2011). Moreover, parents who participate in professionally led couples discussion groups about parenting issues and relationships, beginning in the last trimester of pregnancy, report significantly smaller declines in satisfaction (Schulz et al., 2006).

checkpoint
can you . . .

- Describe trends in family size and age of parenthood?
- Compare men's and women's attitudes toward and exercise of parental responsibilities?
- Discuss how parenthood affects marital satisfaction?

DUAL-INCOME FAMILIES

In married family life of the past, men were traditionally viewed as the main providers, and women, if they worked, as secondary providers. These traditional gender roles are changing. In the United States today, slightly over 61.9 percent of married families with children have two working parents (Bureau of Labor Statistics, 2018), and in nearly half of those families, mothers are employed full time (Livingston, 2018). Although a gender gap in income still exists, women are nonetheless providing an increasingly large percentage of family income. For example, in 2003, 25 percent of working wives earned *more* than their husbands (Bureau of Labor Statistics, 2005). By 2015, that number had risen to 38 percent (Murray-Close & Heggeness, 2018).

How does having two working parents affect families? Generally, combining work and family roles is good for both men's and women's mental and physical health and has positive effects on the strength of their relationship (Barnett & Hyde, 2001). However, juggling multiple roles—partner, parent, and employee—is often difficult. Working couples face extra demands on time and energy, conflict between work and family, possible rivalry between spouses, and anxiety and guilt about meeting children's needs. The family role is most demanding, especially for women, when children are young (Milkie & Peltola, 1999; Warren & Johnson, 1995), and the career role is most demanding when a worker is getting established or being promoted. Therefore, the benefits of these multiple roles depend on how many roles each partner carries, the demands of each role, the success or satisfaction the partners derive from their roles, and the extent to which the couples hold traditional or nontraditional attitudes about gender roles (Barnett & Hyde, 2001; Voydanoff, 2004). While both men and women say balancing work and family is difficult, women report more difficulty with this challenge and say they take care of more responsibilities related to children (Livingston, 2018).

For those parents who are not able to establish a satisfactory work-family balance, negative effects may snowball. The more hours worked, the greater the negative effect on work-family balance (McNamara, Pitt-Catsouphes, Matz-Costa, Brown, & Valcour, 2013). Negative effects can spill over either from work to family or from family to work, although work stress seems to affect family life to a greater degree (Ford, Heinen, & Langkamer, 2007; Schulz, Cowan, Cowan, & Brennan, 2004). To cope with this, new parents may cut back on working hours, refuse overtime, or turn down jobs that require excessive travel to increase family time and reduce stress (Barnett & Hyde, 2001; Becker & Moen, 1999; Crouter & Manke, 1994). Or a couple may make a trade-off, trading a career for a job or trading off whose work takes precedence depending on shifts in career opportunities and family responsibilities. Women are more likely to do the scaling back, which usually occurs during the early years of child rearing (Becker & Moen, 1999; Gauthier & Furstenberg, 2005).

checkpoint
can **you** . . .

- **Identify benefits and drawbacks of a dual-earner household?**

Cross-cultural studies have suggested that the general relationship between work-family balance and well-being holds across countries. However, the effects are stronger in individualistic cultures than collectivistic cultures and in cultures that are more egalitarian with respect to gender roles (Haar, Russo, Suñe, & Ollier-Malaterre, 2014). To lessen the pressures on dual-income families, most countries have adopted workplace protection for such families (Heymann, Siebert, & Wei, 2007). Fathers in 65 countries—but not in the United States—get *paid* paternity leave. (The U.S. Family and Medical Leave Act of 1993 grants 12 weeks of *unpaid* leave.) At least 34 countries—but not the United States—set a maximum length for the workweek. In the United States, approximately 48 percent of workers in the private sector do not have paid leave to care for themselves, and even more lack paid leave to care for other family members such as children. Moreover, even of those who are legally entitled to take family leave, 78 percent do not because they cannot afford to do so (Quamie, 2010). The United States is the only industrialized nation without paid maternity leave, although California, New Jersey, New York, and Rhode Island have adopted paid family leave plans at the state level.

When Marriage Ends

In the United States, the average marriage that ends in divorce does so after 7 or 8 years (Kreider, 2005). Divorce, more often than not, leads to remarriage with a new partner and the formation of a stepfamily, which includes children born to or adopted by one or both partners before the current marriage.

DIVORCE

The highest divorce rates in the United States are in Nevada, so reconsider that Vegas wedding!

National Center for Health Statistics, 2009b

The U.S. divorce rate has decreased sharply since 1970 and was approximately 2.9 adults per 1,000 people in 2017 (Centers for Disease Control, 2018l). About 1 in 5 U.S. adults has been divorced (Kreider, 2005).

Divorce rates vary depending on the age of the cohort examined. The sharpest drop in divorce has occurred among younger cohorts—those born since the mid-1950s (U.S. Census Bureau, 2007b). However, the divorce rate for adults over the age of 35 years has doubled in the past 20 years (Kennedy & Ruggles, 2014). Education matters too. College-educated women, who previously were the most permissive about divorce, have become less so, whereas women with lower educational levels have become more permissive and thus more likely to divorce (Martin & Parashar, 2006). Age at marriage is another predictor of whether a union will last. The decline in divorce may reflect higher educational levels as well as the later age of first marriages, both of which are associated with marital stability (Popenoe & Whitehead, 2004). It also may reflect the rise in cohabitation, which, if it ends, does not end in divorce (Kennedy & Ruggles, 2013). Teenagers, high school dropouts, and nonreligious persons have higher divorce rates (Bramlett & Mosher, 2002; Popenoe & Whitehead, 2004). The rates of marital disruption for black women remain higher than for white or Latino women (Bulanda & Brown, 2007; Sweeney & Phillips, 2004), and overall, divorce rates are higher for African Americans (Amato, 2010). In addition, interracial couples, particularly those involving white females with Asian or black males, are more likely to divorce than same-race couples (Bratter & King, 2008).

When considering affairs, men are less likely to break up with a woman who had a homosexual rather than a heterosexual affair. For women, on the other hand, a homosexual affair on the part of their male partner is more likely to end the relationship.

Confer & Cloud, 2011

Why Do Marriages Fail? Looking back on their marriages, 130 divorced U.S. women who had been married an average of 8 years showed remarkable agreement on the reasons for the failure of their marriages. The most frequently cited reasons were incompatibility and lack of emotional support; for more recently divorced, presumably younger, women, this included lack of career support. Spousal abuse was third, suggesting that intimate partner violence may be more frequent than is generally realized (Dolan & Hoffman, 1998; see Research in Action). Other common risk factors for divorce include premarital cohabitation (Tach & Halpern-Meekin, 2009) and infidelity (Balsam, Rothblum, & Wickham, 2017; Hall & Fincham, 2006).

INTIMATE PARTNER VIOLENCE

Intimate partner violence (IPV) is the infliction of physical, sexual, or psychological harm by a current or former partner or spouse. Approximately 27 percent of women and 11 percent of men in the United States have experienced some form of physical violence, sexual violence, or stalking by an intimate partner (Centers for Disease Control, 2017j). The true extent of IPV is difficult to ascertain because victims are often too afraid or ashamed to disclose to others or make an official report to legal authorities.

Women disproportionately experience multiple forms and more severe levels of IPV in individual relationships and across the life span (Centers for Disease Control, 2017j). Male-to-female partner violence is more repetitive and is more likely to result in injury or death (Caetano, Shafer, & Cunradi, 2001). More than one-third of female homicides are perpetrated by a current or former intimate partner. Conservative estimates suggest that women are roughly 6 times more likely than men to die at the hands of an intimate partner, with homicide typically occurring as a culmination of a long history of abuse (Stock et al., 2013).

Comparatively, there are far fewer studies examining male IPV victimization. In research studies, men disclose both physical and psychological abuse. Psychological violence was especially likely to go unreported, including threats of blackmail, financial harm, or taking children away. With physical abuse, their partners were especially likely to use objects to inflict injury. Embarrassment and fear of ridicule are among the chief reasons men do not disclose IPV. Serious physical assault incidents were much more likely to be reported to the police, who may not believe the claims or take them seriously (Drijber, Rejinders, & Ceelen, 2013).

Same-sex relationships are also affected by IPV. Same-sex IPV rates are similar to those in heterosexual relationships (Edwards, Sylaska, & Neal, 2015). National studies indicate lifetime prevalence of physical violence, rape, or stalking by an intimate partner as comparable among heterosexual and gay men. Bisexual women have a significantly higher prevalence of physical violence, rape, or stalking by an intimate partner than either heterosexual or lesbian women (Black et al., 2011). Although these rates indicate IPV occurrence, much less is known about specific risk factors and patterns of IPV perpetration among sexual minority couples (Edwards et al., 2015).



Which individual or psychological factors do you think relate to perpetration and victimization of intimate partner violence? What can be done on an individual and societal level to help protect victims?

Economic resources and work are also related to divorce risk. However, effects vary with respect to gender. Husbands' unemployment is associated with a greater risk of divorce (Killewald, 2016). For wives, the relationship is more complex. Risks associated with wives' employment are most notably those linked to tension over the division of labor (Ruppaner, Brandén, & Turunen, 2018), a relationship that increases with the number of hours worked by wives. Additionally, greater economic independence means that when they do wish to leave a marriage, women are more able to do so. However, wives' work also has positive effects on marriage stability via the increased income and subsequent reductions in economic concerns generated when women work (Amato, 2010).

Generally, couples are more likely to stay married if they have children (Bernardi & Martínez-Pastor, 2011). However, instead of staying together "for the sake of the children," some embattled spouses conclude that exposing children to continued parental conflict does greater damage (Eisenberg, 1998).

Divorce breeds more divorce. Adults with divorced parents are more likely to expect that their marriages will not last (Glenn & Marquardt, 2001) and to become divorced themselves than those whose parents remained together (Shulman et al., 2001). However, this process may be affected by a subsequent parental marriage. Young adults who had remarried parents currently modeling a high-quality relationship in their second marriage

were not more likely to get a divorce themselves, suggesting that current influences play a strong role in relationships (Yu & Adler-Baeder, 2007).



Divorce can be catching. People who have others in their social network who are divorcing are more likely to get divorced themselves.

McDermott, Fowler, & Christakis, 2009

Adjusting to Divorce Ending even an unhappy marriage can be painful for both partners, especially when there are young children in the home. Issues concerning custody and visitation often force divorced parents to maintain contact with each other, and these contacts may be stressful (Williams & Dunner-Bryant, 2006). However, by the same token, a positive coparenting relationship following a divorce can be protective for both children and parents (Lamela, Figueiredo, Bastos, & Feinberg, 2016).

Divorce tends to reduce long-term well-being, especially for the partner who did not initiate the divorce or does not remarry (Amato, 2010; Amato, 2000). Especially for men, divorce can have negative effects on physical or mental health or both (Wu & Hart, 2002). Women are more likely than men to experience a sharp reduction in economic resources and living standards after separation or divorce (De Vaus, Gray, Qu, & Stantaon, 2017; Kreider & Fields, 2002; Williams & Dunne-Bryant, 2006); however, women in unhappy marriages benefit more from the dissolution of the relationship than men in unhappy marriages (Waite, Luo, & Lewin, 2009). People who were—or thought they were—happily married tend to react more negatively and adapt more slowly to divorce (Lucas et al., 2003). On the other hand, when a marriage was highly conflicted, its ending may improve well-being in the long run (Amato, 2000).

An important factor in adjustment is emotional detachment from the former spouse. People who argue with their ex-mates experience more distress. An active social life, both at the time of divorce and afterward, helps, as does social support (Amato, 2000; Thabes, 1997; Barutçu, Yildirim, & Demir, 2015). Finding a new partner, in particular, is associated with well-being following a divorce (Symoens, Bastaits, Mortelmans, & Bracke, 2013).

REMARRIAGE AND STEPPARENTHOOD

Remarriage, said the essayist Samuel Johnson, "is the triumph of hope over experience." Evidence for the truth of that statement is that remarriages are more likely than first marriages to end in divorce (Adams, 2004).

Approximately 20 percent of U.S. marriages are remarriages for both bride and groom, and about 8 percent of newly married adults have been married 3 times or more. However, remarriage rates vary depending on the age group being examined. While rates for older adults are relatively high, rates for younger adults have dropped in recent decades. For example, in 1960, 72 percent of young adults who had divorced or widowed were remarried again by the age of 35. In 2013, only 42 percent of adults age 35 and younger remarried under the same circumstances (Livingston, 2014).

Men and women living with children from a previous relationship are most likely to form a new union with someone who also has resident children, thus forming a his-and-hers stepfamily (Goldscheider & Sassler, 2006). Families in which both parents bring children into the marriage are marked by higher levels of conflict (Heatherington, 2006). Remarriages are more likely than first marriages to end in divorce (Adams, 2004).

The more recent the current marriage and the older the stepchildren, the harder stepparenting seems to be. Women, especially, seem to have more difficulties in raising stepchildren than in raising biological children, perhaps because women generally spend more time with the children than men do (MacDonald & DeMaris, 1996). The conflict experienced by stepparents can be mitigated with healthy and open communication between the two partners (Pace, Shafer, Jensen, & Larson, 2015). The stepfamily, as any family, has the potential to provide a warm, nurturing atmosphere for children.

checkpoint can you . . .

- Give reasons for the decrease in divorce since 1981?
- Discuss factors in adjustment to divorce?
- Discuss factors in adjustment to remarriage and stepparenthood?

summary and key terms

Emerging Adulthood: Patterns and Tasks

- Emerging adulthood is often a time of experimentation before assuming adult roles and responsibilities. Such traditional developmental tasks as finding stable work and developing long-term romantic relationships may be postponed until the thirties or even later.
- Paths to adulthood may be influenced by such factors as gender, academic ability, early attitudes toward education, expectations in late adolescence, social class, and ego development.
- Identity development in emerging adulthood may take the form of recentering, the gradual development of a stable adult identity. For racial/ethnic minorities, the task of identity formation may be accelerated.
- Emerging adulthood offers a moratorium, a period in which young people are free from pressure to make lasting commitments.
- A measure of how successfully emerging adults handle the developmental task of leaving the childhood home is their ability to maintain close but autonomous relationships with their parents.
- Remaining in the parental home is increasingly common among emerging and young adults, who do so often for financial reasons. This can complicate the negotiation of an adult relationship with parents.

recentering (*412*)

Personality Development: Four Views

- Four theoretical perspectives on adult personality development are normative-stage models, the timing-of-events model, trait models, and typological models.
- Normative-stage models hold that age-related social and emotional change emerges in successive periods sometimes marked by crises. In Erikson's theory, the major issue of young adulthood is intimacy versus isolation.
- The timing-of-events model, advocated by Neugarten, proposes that adult psychosocial development is influenced by the occurrence and timing of normative life events. As society becomes less age-conscious, however, the social clock has less meaning.
- The five-factor model of Costa and McCrae is organized around five groupings of related traits: neuroticism, extraversion, openness to experience, conscientiousness, and agreeableness. Current studies find that each of these traits changes during young adulthood and to some extent throughout life.
- Typological research, pioneered by Jack Block, has identified personality types that differ in ego-resiliency and ego-control. These types seem to persist from childhood through adulthood.

normative-stage models (*415*)
intimacy versus isolation (*416*)
timing-of-events model (*417*)
normative life events (*417*)
social clock (*417*)
trait models (*418*)
five-factor model (*418*)
typological approach (*419*)
ego resiliency (*419*)
ego control (*419*)

Foundations of Intimate Relationships

- Young adults seek intimacy in relationships with peers and romantic partners. Self-disclosure is an important aspect of intimacy.
- Most young adults have friends but have increasingly limited time to spend with them. Women's friendships tend to be more intimate than men's.
- Many young adults have friends who are considered fictive kin or psychological family.
- According to Sternberg's triangular theory of love, love has three aspects: intimacy, passion, and commitment.

fictive kin (*420*)

triangular theory of love (*421*)

Marital and Nonmarital Lifestyles

- Today, more adults than in the past postpone marriage or never marry. The trend is particularly pronounced among African American women and people from lower socioeconomic classes.
- Reasons for staying single include career opportunities, travel, sexual and lifestyle freedom, a desire for self-fulfillment, women's greater self-sufficiency, reduced social pressure to marry, financial constraints, fear of divorce, difficulty in finding a suitable mate, and lack of dating opportunities or of available mates.
- The ingredients of long-term satisfaction are similar in homosexual and heterosexual relationships.
- Gays and lesbians in the United States are fighting for rights other people enjoy, such as the right to marry.
- With the new stage of emerging adulthood and the delay in age of marriage, cohabitation has increased and has become the norm in some countries.
- Cohabitation can be a trial marriage, an alternative to marriage, or, in some places, almost indistinguishable from marriage. Cohabiting relationships in the United States tend to be less stable than marriages.
- Marriage (in a variety of forms) is universal and meets basic economic, emotional, sexual, social, and child-raising needs.
- Mate selection and marrying age vary across cultures. People in industrialized nations now marry later than in past generations.
- Men's and women's differing expectations may be important factors in marital satisfaction.

Parenthood

- Today women in industrialized societies are having fewer children and having them later in life, and an increasing number choose to remain childless.
- Fathers are usually less involved in child raising than mothers, but more so than in previous generations.
- Marital satisfaction typically declines during the childbearing years.
- In most cases, the burdens of a dual-earner lifestyle fall most heavily on the woman.
- Family-friendly workplace policies may help alleviate marital stress.

When Marriage Ends

- Divorce rates in the United States have fallen from their high in 1981. Among the likely reasons are increasing educational levels, the delay in age of marriage, and the rise in cohabitation.
- Adjusting to divorce can be painful. Emotional distance from the ex-spouse is a key to adjustment.
- Many divorced people remarry within a few years, but remarriages tend to be less stable than first marriages.
- Stepfamilies may go through several stages of adjustment.

Design elements: (Butterfly Icon): Stockbyte/Getty Images; (World Icon): janrysavy/Getty Images

part 7
MIDDLE ADULTHOOD

chapter 15

Physical and Cognitive Development in Middle Adulthood

outline

Middle Age: A Social Construct

PHYSICAL DEVELOPMENT

Physical Changes

Physical and Mental Health

COGNITIVE DEVELOPMENT

Measuring Cognitive Abilities in Middle Age

The Distinctiveness of Adult Cognition

Creativity

Work and Education

learning objectives

Explain how midlife is changing and define *middle adulthood*.

Discuss physical changes in middle adulthood.

Characterize health and well-being in middle age.

Identify cognitive changes in middle adulthood.

Describe creative achievement and the relationship between creativity and age.

Discuss trends in work, retirement, and education in middle adulthood.



Digital Vision/Alamy Stock Photo

did you know?

- One-third of Americans in their seventies think of themselves as middle-aged.
- Positive personality traits are related to good health and long life.
- Middle-aged people who engage in complex work tend to show stronger cognitive performance than their peers.

In this chapter, we examine physical changes during midlife as well as physical, sexual, and mental health issues. We look at factors that affect intelligence, thought processes, and creativity. Finally, we look at work, retirement, and educational pursuits.

I believe that everyone else my age is an adult whereas I am merely in disguise.

—Margaret Atwood

Middle Age: A Social Construct

We described adolescence as a stage of life that ultimately is a social construct. The same is true of midlife (Cohen, 2012). The term *midlife* first came into the dictionary in 1895 (Lachman, 2004) as life expectancy began to lengthen. Today, in industrial societies, middle adulthood is considered to be a distinct stage of life with its own societal norms, roles, opportunities, and challenges. However, some traditional societies, such as upper-caste Hindus in rural India (Menon, 2001) and the Gusii in Kenya, do not recognize a middle stage of adulthood at all.

We define *middle adulthood* in chronological terms as the years between ages 40 and 65, but this definition is arbitrary. There is no consensus on when midlife begins and ends. In 2017, slightly under 84.4 million people in the United States, or 26 percent of the population, were between the ages of 45 and 64 years (U.S. Census Bureau, 2018). This represents an increase of 12 percent since 2006 (Administration for Community Living, 2018).

The Midlife in the United States (MIDUS) study, a comprehensive survey of a national sample of 7,189 adults ages 25 to 75, has enabled researchers to study factors that influence health, well-being, and productivity in midlife (Brim, Ryff, & Kessler, 2004). According to the MIDUS data, most middle-aged people are in good physical, cognitive, and emotional shape and feel good about the quality of their lives (Lachman, Teshale, & Agrigoroaei, 2015; Fleeson, 2004; see Figure 1).

However, the experience of middle age varies with health, gender, race/ethnicity, socioeconomic status, cohort, and culture, as well as with personality, marital and parental status, and employment (Lachman, 2004). For example, high levels of psychological well-being over time predict health indices such as blood lipid profiles (cholesterol and fat levels), high blood pressure, insulin resistance, cardiovascular health, obesity, and chronic health conditions (Radler, Rogotti, & Ryff, 2018; Boylan & Ryff, 2015). However, social status matters too. Other research has shown that psychological factors such as well-being and a sense of personal control exert their effects most strongly when people are low in education or social status. When people have plentiful resources, they tend to do well regardless of whether or not they feel they are doing well or in control. But when they are low in resources, their personal characteristics can buffer them from emerging health crises of midlife (Ryff, Radler, & Friedman, 2015; Turiano, Chapman, Agriogoraoaei, Infurna, & Lachman, 2014).

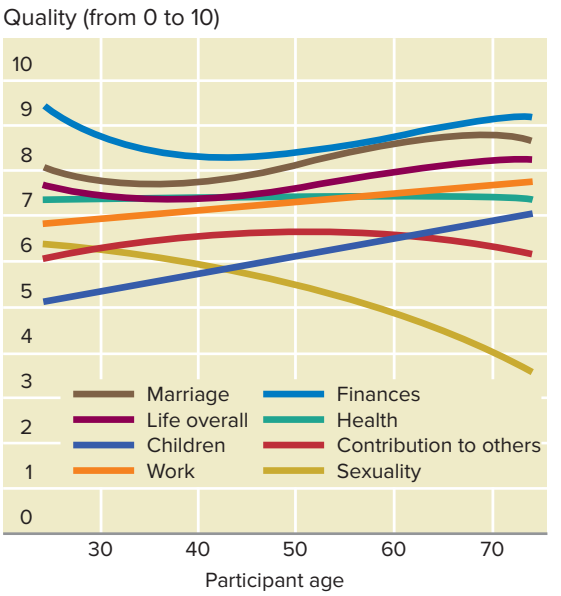
Middle age is marked by growing individual differences and a multiplicity of life paths (Lachman, 2004). Some



Many middle-aged people are at the peak of their careers, enjoying a sense of freedom, responsibility, and control over their lives and making important contributions to social betterment. Bono, lead singer for the rock band U2, is a philanthropist who has done exactly that. As cofounder and spokesperson for ONE Campaign, he has helped with many causes, especially those related to AIDS and poverty in African countries.
Rene Macura/AP Images

FIGURE 1
How U.S. Adults of Various Ages Rate Aspects of Their Quality of Life and Overall Quality of Life

Source: Fleeson, 2004; data from MacArthur Foundation Research Network on Successful Midlife Development (the MIDUS National Survey).



middle-aged people can run marathons, others get winded climbing a flight of stairs. Some feel a stable sense of control over their lives, others feel overwhelmed handling weighty responsibilities and multiple demanding roles: running households, departments, or enterprises; launching children; and perhaps caring for aging parents or starting new careers. Others, having made their mark and raised their children, have an increased feeling of freedom and independence (Lachman, 2001). Middle age can be a time of decline and loss, or it can be a time of mastery, competence, and growth.

checkpoint can **you** . . .

- Cite individual differences in the experience of middle age?

PHYSICAL DEVELOPMENT

Physical Changes

Although some physiological changes are direct results of biological aging and genetic makeup, behavioral and lifestyle factors dating from youth can affect the likelihood, timing, and extent of physical change.

SENSORY AND PSYCHOMOTOR FUNCTIONING

People perceive their hands to be shorter and fatter than they actually are.

Longo & Haggard, 2010

From young adulthood through the middle years, sensory and motor changes are almost imperceptible—until one day a 45-year-old man realizes that he cannot read a book without eyeglasses, or a 60-year-old woman has to admit that she is not as quick on her feet as she was. With increasing age, it is common for adults to experience a variety of perceptual declines, including hearing and visual difficulties (Pleis & Lucas, 2009).

Age-related visual problems occur mainly in five areas: near vision, dynamic vision (reading moving signs), sensitivity to light, visual search (locating a car in a parking lot), and speed of processing visual information (Kline & Scialfa, 1996). You may have seen older people using reading glasses or holding books or newspapers as far out as possible with one arm when trying to focus. As people age, they have difficulty focusing on near objects, a condition known as **presbyopia.** The incidence of **myopia** (nearsightedness) also increases throughout middle age (Rosenthal & Fischer, 2014). Overall, approximately 12 percent of adults age 45 to 64 experience declines in their vision (Pleis & Lucas, 2009). By the age of 65, 36.6 percent of adults will have some sort of visual disability (Rosenthal & Flscher, 2014).

How do people adjust to these changes? Middle-aged people often need brighter lighting to see well. Because of changes in the eye, they need about one-third more brightness to compensate for the loss of light reaching the retina (Troll, 1985). Reading glasses, bifocals, and trifocals are also used to aid the eye in focusing on objects.

Age-related, gradual hearing loss is known as **presbycusis.** It is rarely noticed earlier in life, but it generally speeds up and becomes noticeable in the fifties (Merrill & Verbrugge, 1999). Presbycusis generally begins with higher-pitched sounds less important for understanding speech and gradually extends into lower pitches. Hearing loss is

presbyopia
Age-related, progressive loss of the eyes' ability to focus on nearby objects due to loss of elasticity in the lens.

myopia
Nearsightedness.

presbycusis
Age-related, gradual loss of hearing, which accelerates after age 55, especially with regard to sounds at higher frequencies.

generally mild until late in life. At ages 40 to 49, approximately 7 percent of adults have mild to moderate hearing loss, a number that rises to slightly under 13 percent by 50 to 59 years of age. Thus, in midlife, hearing loss does not cause significant distress or impairment to the vast majority of adults. However, by ages 70 to 79, when over 50 percent of adults have mild to moderate hearing loss and some adults begin to show profound or total hearing loss (Goman & Lin, 2016), it becomes a significant factor. The loss of the ability to hear speech effectively can isolate adults, leading to loneliness and depression (Ciorba, Bianchini, Pelucci, & Pastore, 2012).

What factors affect hearing loss? Gender matters; hearing loss proceeds more quickly in men than in women (Ozmeral, Eddins, Frisina, & Eddins, 2016). Prevalence is higher among Hispanics and non-Hispanic white adults than among African Americans (Goman & Lin, 2016). However, the most important factor in hearing loss is environmental noise. Estimates are that, worldwide, 16 percent of hearing loss in adults can be attributed to noise experienced at a work site (Nelson, Nelson, Concha-Barrientos, & Fingerhut, 2005). While hearing protectors such as earplugs have decreased the impact of occupational noise, "social noise" (including concerts and personal music players) has increased (Sliwinska-Kowalska & Davis, 2012).



Though strength and coordination may decline, many middle-aged people who remain active show benefits in both psychological and physical health.
Ronnie Kaufman/Blend Images LLC

Sensitivity to taste and smell generally begins to decline in midlife (Stevens, Cain, Demarque, & Ruthruff, 1991). Approximately 13.5 percent of adults over the age of 40 years have problems with their sense of smell, 17.3 percent with their sense of taste, and 2.2 percent with both smell and taste (Liu, Zong, Doty, & Sun, 2016). By the age of 80, over 75 percent of adults show declines (Doty, 2018). These declines are more common in men, African Americans, people who consume large amounts of alcohol, and adults with cardiovascular disease (Liu et al., 2016).

As the taste buds become less sensitive and the number of olfactory cells diminishes, foods may seem more bland (Merrill & Verbrugge, 1999). Additionally, the use of medicines used to treat many diseases of aging can also have a negative effect on the gustatory senses (Imoscopi, Inelmen, Sergi, Miotto, & Manzato, 2012), as can smoking (Vennemann, Hummel, & Berger, 2008). These declines have implications for quality of life and are associated with Alzheimer's and Parkinson's diseases and mortality risk (Doty, 2018).

Staying physically active has wide-ranging positive effects on almost every body system, including physical health markers such as reduced cardiovascular risk, psychological markers such as decreased risk of depression, and cognitive markers such as decreased risk of dementia (Bauman, Merom, Bull, Buchner, & Fiatarone Singh, 2016). The more people do, the more they *can* do, and the longer they can do it for.

Some loss of muscle strength is usually noticeable by age 45; 10 to 15 percent of maximum strength may be gone by 60. This is partly due to a loss of muscle fiber, which is replaced by fat (Guralnik, Butterworth, Wadsworth, & Kuh, 2006; Schaap, Koster, & Visser, 2012). Additionally, changes in the skeletal muscle fiber itself lead to decrements in the ability to shorten quickly and forcefully (Brocca et al., 2017), and the fibers lose some of their ATP-producing capacity with age, thus producing less molecular energy (Porter et al., 2015). Still, impairment is not inevitable; strength training and a high protein diet can protect against these declines (Bradlee, Mustafa, Singer, & Moore, 2017; Francis et al., 2017).

Basal metabolism is the minimum amount of energy, typically measured in calories, that your body needs to maintain vital functions while resting. As people age, the amount of energy needed to maintain the body goes down, particularly after age 40. So, for example, older people often put on weight later in life despite no change in eating or exercise habits (Merrill & Verbrugge, 1999). Weight gain in early adulthood is predictive of major chronic diseases later (Zheng et al., 2017). However, staying active can help adults maintain current weight, retain physical skills, and slow declines.

basal metabolism
Use of energy to maintain vital functions.

Manual dexterity, especially for men and in the nondominant (in this study, the left) hand, generally becomes less efficient with age (Vasylenko, Gorecka, & Rodríguez-Aranda,

2018). Simple reaction time (as in pressing a button when a light flashes) slows very little until about age 50, but choice reaction time (as in pressing one of four numbered buttons when the same number appears on a screen) slows gradually throughout adulthood (Woods, Wyma, Yund, Herron, & Reed, 2015; Der & Deary, 2006). When a vocal rather than a manual response is called for, age differences in simple reaction time are substantially less (S. J. Johnson & Rybash, 1993).

THE BRAIN AT MIDLIFE

In general, the aging brain can be described in two ways: as working more slowly and as having difficulty juggling multiple tasks (Zanto & Gazzaley, 2014). This general process affects multiple tasks across many different areas–from understanding complex language to driving a car skillfully to learning new skills. What these disparate tasks have in common is the necessity to quickly process complex information and pay attention to relevant stimuli while simultaneously ignoring irrelevant stimuli. In particular, the ability to ignore distractions gradually declines with age, which makes multitasking increasingly challenging (Madden & Langley, 2003; Stevens, Hasher, Chiew, & Grady, 2008).

One set of researchers noted this distractibility during their brain scans of younger and older adults. They realized the performance of the older adults was being disrupted by the banging and clanging of the MRI machine.

Stevens et al., 2008

Why do these changes occur? Physical changes in the aging brain contribute to the declines in functioning. With increasing age, there is a decrease in the volume of gray matter (Fjell et al, 2009; Chee et al., 2009). Myelin, the fatty sheath that lines nerve axons and helps impulses move more quickly through the brain, also begins to break down with age (Lu et al., 2013; Chopra et al., 2018; Salami, Eriksson, Nilsson, & Nyberg, 2012). The specific location and extent of these changes in the gray and white matter are associated with the severity of processing slowdown and the area of cognition in which it occurs (Eckert, 2011; Hong et al, 2015). For example, people who show atrophy in the left insula, an area of the brain associated with speech production, are more likely to experience the tip-of-the-tongue phenomenon, in which a person knows he knows a word but cannot access it (Shafto et al., 2007).

Although some declines are likely, declines are neither inevitable nor necessarily permanent. In the past, it was believed that education helped slow the declines associated with age. However, although education is associated with higher IQ and superior performance on a variety of cognitive tasks, it does not appear to delay declines in processing speed or cognitive functioning. Rather, adults with a high level of education start off ahead and hence may function at a higher level for a longer period of time (Zahodne et al., 2011; Lenehan, Summers, Saunders, Summers, & Vickers, 2015; Ritchie, Bates, Der, Starr, & Deary, 2013).

Two factors that do seem to be important are keeping both body and mind busy. Although effects sizes are small, meta-analyses have found that physical activity and fitness are associated with higher white and gray matter volume (Sexton et al., 2016; Erickson, Leckie, & Weinstein, 2014). Moreover, physical activity in midlife is positively associated with cognitive function during midlife itself, as well as with protection against future cognitive declines (Cox et al., 2016; Sofi et al., 2011). Last, reviews of both aerobic exercise and resistance training interventions have shown they are effective in improving attention, processing speed, executive function and memory, although effects are generally modest in size (Smith et al., 2010; Chang, Pan, Chen, Tsai, & Huang, 2012).

Another way to keep your brain sharp? Google it. Older adults asked to surf the web showed significant activation in areas of the brain related to reasoning and decision making. This effect was strongest for experienced surfers, but the researchers argued that even technologically unsophisticated adults should benefit.

Small, Moody, Siddarth, & Bookheimer, 2009

A busy mind is also important. Adults who read and write on a regular basis or who work in a cognitively stimulating environment are more likely to retain their cognitive functions (Cortrena, Branco, Cardoso, Wong, & Fonseca, 2016; Smart, Gow, & Deary, 2014). There is also some evidence that meditation affords cognitive benefits to middle-aged adults and may help offset declines (Gard, Hölzel, & Lazar, 2014). Cognitive interventions and mental stimulation have also been shown to be effective in improving functioning (Lampit, Hallock, & Valenzuela, 2014).

Even if declines do occur, knowledge based on experience can compensate for the physical changes. For example, middle-aged adults are better drivers than younger ones (McFarland, Tune, & Welford, 1964). More experienced drivers are better at anticipating

potential hazards before they become dangerous, shifting their gaze around the environment, while novice drivers tend to stare straight ahead and respond only to clear and imminent hazards (Borowsky, Shinar, & Oron-Gilad, 2010). Similarly, 60-year-old typists are as efficient as 20-year-olds (Spirduso & MacRae, 1990), and skilled industrial workers in their forties and fifties are often more productive than younger workers and in fact tend to be more conscientious and careful (Salthouse & Maurer, 1996).

STRUCTURAL AND SYSTEMIC CHANGES

Changes in appearance may become noticeable during the middle years. By the fifth or sixth decade, the skin may become less taut and smooth as the layer of fat below the surface becomes thinner, collagen molecules more rigid, and elastin fibers more brittle. Hair may become thinner due to a slowed replacement rate, and grayer as production of melanin, the pigmenting agent, declines. Middle-aged people tend to gain weight as a result of accumulation of body fat and lose height due to shrinkage of the intervertebral disks (Merrill & Verbrugge, 1999; Whitbourne, 2001).



Research suggests it's the quantity and depth of your wrinkles, not their location, that makes you appear older.

Aznar-Casanova, Torro-Alves, & Fukusima, 2010

Bone density normally peaks in the twenties or thirties. From then on, people typically experience some bone loss as more calcium is absorbed than replaced, causing bones to become thinner and more brittle. Bone loss accelerates in the fifties and sixties; it occurs twice as rapidly in women as in men, sometimes leading to osteoporosis (Merrill & Verbrugge, 1999; Whitbourne, 2001). Smoking, alcohol use, and a poor diet earlier in adulthood tend to speed bone loss; it can be slowed by aerobic exercise, resistance training with weights, increased calcium intake, and vitamin C (Whitbourne, 2001; Yoon, Maalouf, & Sakhaee, 2012). Lower childhood socioeconomic level and adult educational attainment have been linked to lower bone mass density in late adulthood. This association may exist because stress, which is higher in people of low socioeconomic status, is damaging to bone health (Crandall et al., 2012).

Large proportions of middle-aged and even older adults show little or no decline in organ functioning (Gallagher, 1993). In some, however, heart disease begins to emerge in the late forties or early fifties. Arterial walls may become thicker and more rigid. The heart may begin to pump more slowly and irregularly in the midfifties; and by 65, it can lose up to 40 percent of its aerobic power. **Vital capacity**—the maximum volume of air the lungs can draw in and expel—may begin to diminish at about age 40 and can drop by as much as 40 percent by age 70 (Merrill & Verbrugge, 1999; Whitbourne, 2001). The body temperature of older people is lower, and they are less able to maintain an appropriate body temperature in extremely hot or cold environments (Blatteis, 2012). Sleep is also affected by age; middle-aged adults are less likely to fall asleep in the daytime, need less sleep to maintain alertness, and show reductions in slow wave sleep at night when compared to adolescents and emerging adults (Dijk, Groeger, Stanley, & Deacon, 2010).

vital capacity
Amount of air that can be drawn in with a deep breath and expelled.

checkpoint can you . . .

- Summarize changes in sensory and motor functioning and body structure and systems that may begin during middle age?
- Identify factors that contribute to individual differences in physical condition?

SEXUALITY AND REPRODUCTIVE FUNCTIONING

Sexuality is not only a hallmark of youth. Although both sexes experience losses in reproductive capacity sometime during middle adulthood—women become unable to bear children and men's fertility begins to decline—sexual enjoyment continues throughout adult life. (See Table 1.)

Menopause and Its Meanings **Menopause** takes place when a woman permanently stops ovulating and menstruating and can no longer conceive a child; it is generally considered to have occurred one year after the last menstrual period. This happens, on average, at about age 50 to 52, with most women experiencing it between 45 and 55 (Avis & Crawford, 2006).

Menopause is not a single event; it is a process called the *menopausal transition.* It begins with **perimenopause,** also known as the *climacteric.* During this time, a woman's production of mature ova begins to decline, and the ovaries produce less estrogen. Menstruation becomes less regular, with less flow than before, and there is a longer time

menopause
Cessation of menstruation and of ability to bear children.

perimenopause
Period of several years during which a woman experiences physiological changes of menopause; includes first year after end of menstruation; also called *climacteric.*

TABLE 1 Changes in Human Reproductive Systems during Middle Age

	Female	Male
Hormonal change	Drop in estrogen and progesterone	Drop in testosterone
Symptoms	Hot flashes, vaginal dryness, urinary dysfunction	Undetermined
Sexual changes	Less intense arousal, frequent and quicker orgasms	Less frequent erections, longer recovery between erections, risk of erectile dysfunction
Reproductive capacity	Ends	Some decrease in fertility

TABLE 2 Symptoms of Menopause and Aging

Symptom
Hot flashes, night sweats
Vaginal dryness, painful intercourse
Sleep disturbances
Mood disturbances (depression, anxiety, irritability)
Urinary incontinence
Cognitive disturbances (e.g., forgetfulness)
Somatic symptoms (back pain, tiredness, stiff or painful joints)
Sexual dysfunction

Source: NCCAM, 2008.

between menstrual periods. Eventually, menstruation ceases altogether. The menopausal transition generally begins in the midthirties to midforties, and can take approximately 3 to 5 years.

Symptoms Most women experience some symptoms during the menopausal transition. Some have no symptoms at all, and racial/ethnic variations exist (see Table 2).

Most commonly reported are hot flashes and night sweats, sudden sensations of heat that flash through the body due to erratic changes in hormone secretion that affect the temperature control centers in the brain. Hot flashes are associated with anxiety, depression, and an increased risk for heart disease (Fu, Gibson, Mendes, Schembri, & Huang, 2018; Thurston et al., 2017). They are experienced by up to 80 percent of menopausal women and are the most common reason for which women seek medical attention related to menopause. The average duration of symptoms is over 5 years, although African American women, highly stressed women, and women of low educational status may experience them for longer (Col, Guthrie, Politi, & Dennerstein, 2009; Avis et al., 2015).

Some women find intercourse painful because of thinning vaginal tissues and inadequate lubrication (NIH, 2005). Water-soluble lubricants may help relieve this problem. Sexual issues can also be alleviated with marital therapy for postemenopausal women and their husbands (Tiznobeck, Mirmolaei, Momenimovahed, Kazemnejad, & Taheri, 2017). In addition, some women of menopausal age may experience mood disturbances, such as irritability, nervousness, tension, and depression (Gracia & Freeman, 2018; NIH, 2005).



Women of menopausal age report many different symptoms. Physical exercise may alleviate some of them.
Ty Milford/Aurora Open/Getty Images

All in all, the research suggests that some of the symptoms of menopause may be related to other natural changes of aging (National Center for Complementary and Alternative Medicine [NCCAM], 2008). They also may reflect societal views of women and of aging (see Window on the World).

Treatment of Menopausal Symptoms Menopause hormone therapy (MHT) appears to be the most effective intervention for night sweats, hot flashes, and deterioration of the urinary tract and vagina. MHT may also help address other symptoms such as joint and muscle pains, mood swings, problems with sleep, and sexual dysfunction. However, the use of MHT should be the lowest dose possible and considered within the context of other life and health variables, including diet, exercise, family and personal history, and the use of cigarettes and alcohol. Women

window on the world

CULTURAL DIFFERENCES IN MENOPAUSE

Many women accept hot flashes, night sweats, and mood disturbances as normal accompaniments of menopause. Yet women in some cultures rarely or never experience these symptoms. The reasons for the cultural differences are complex and include genetic differences, diet and lifestyle differences, and perceptual differences about aging and what menopause means within the culture (Scheid, 2007).

Attitudes toward menopause vary greatly across cultures. Aging is less feared in the East than the West; it is often seen as a welcome event, bringing respect as an elder and newfound freedom from reproduction and taboos of uncleanliness. In many Asian cultures, such as Japan, Singapore, Taiwan, and China, there are no specific terms for "hot flash," although people recognize that there are changes and distinctions among body states. Muscle and joint pains are often reported but are not often interpreted as being related to menopause (Scheid, 2007). In some cultures, such as that of Mayan women in Mexico or the indigenous women in Australia, menopausal symptoms are rare, with many noting only the cessation of menses (Jones, Jurgenson, Katzenellenbogen, & Thompson, 2012).

This may be why reported prevalence rates vary across cultures. For instance, women from the United States, United Kingdom, and Canada report more numerous and severe menopause symptoms than women from other European countries, while women from Sweden and Italy report the fewest (Minkin, Reiter, & Maamari, 2015). Previous research indicated that American and Canadian samples also reported more symptoms than Japanese samples (Lock, 1993), although recent data cast doubt upon whether or not this is still currently the case (Mueck & Ruan, 2017; Islam, Bell, Rizvi, & Davis, 2017).

Even within the United States itself, different racial and ethnic groups experience menopause differently. For instance, while 75 percent of women experience some hot flashes, the prevalence varies widely. The prevalence of hot flashes is 18 percent in Japanese Americans, 21 percent in Chinese Americans, 35 percent in Hispanic Americans, 46 percent in African Americans, and 53 percent in Caucasian women (Tepper et al., 2016).

Research shows that this universal biological event has major variations. A woman's perceptions about menopause as well as her diet, her overall health, her activity levels, and her culture all play a role in her experiences with menopausal symptoms.

what's your view

What do you think might explain cultural differences in women's experience of menopause? What is a greater influence—changing biology or beliefs about aging—and why?

using MHT should also undergo a yearly health assessment, since the use of hormones is not without risks (Baber, Panay, & Fenton, 2016). Most notably, hormone therapy increases the risk of cardiac disease, dangerous blot clots, stroke, and bone loss, especially for women over the age of 60 or women who use hormones for extended periods of time (Pinkerton et al., 2017).

Because of these risks, many women prefer not to use hormone therapy. In this event, selective serotonin reuptake inhibitors–typically taken for depression–may be used (De Villiers et al., 2016). The antihypertensive clonidine, the anticonvulsive drug gabapentin, and soy isoflavones (a class of phytoestrogens found in legumes and beans) have also been found to be somewhat effective (Li, Xu, Wu, Zhao, & Zheng, 2016).

Changes in Male Sexual Functioning Men remain fertile throughout the life span and do not go through menopause in the same dramatic fashion as do women. Men do have a biological clock, however, and they also experience age-associated changes. Starting at about age 30, testosterone levels begin to decline at a rate of about 1 percent a year, although there are wide individual variations (Asthana et al., 2004; Lewis, Legato,

research in action

ANDROPAUSE AND TESTOSTERONE REPLACEMENT THERAPY

Testosterone replacement therapies (TRT) have been used by men for decades to address midlife declines in testosterone, sometimes called *andropause*. Many men seek these treatments, in part because of aggressive marketing by manufacturers. A recent study estimates that testosterone supplements sales increased 65 percent from 2009 to 2013, with 40- to 60-year-old men accounting for roughly 70 percent of prescriptions (Baillargeon, Urban, Ottenbacher, Pierson, & Goodwin, 2013). It has also become common to encounter advertisements for herbal supplements and over-the-counter "medications" marketed to help men regain youthful vitality, athletic performance, and sexual virility.

The U.S. Food and Drug Administration (FDA) issues stark warnings to consumers interested in boosting aging males' testosterone levels. Testosterone supplements were originally developed for men who produce no endogenous testosterone, and the FDA neither approves nor recommends these products for use to ward off the effects of male aging (U.S. Food and Drug Administration, 2016). A major fear is that testosterone supplementation may further increase men's risk for cardiovascular events, stroke, or death (Garnick, 2015). It is true that studies have shown benefits of TRT's use among middle-aged men in terms of improved sexual function (Corona et al., 2017), decreased frequency of nighttime urination, better sleep quality (Shigehara et al., 2015), and reduced body fat (Fui et al., 2016). However, many studies use small, nonrandomized samples that do not assess long-term treatment risks (U.S. Food and Drug Administration, 2016).

Recent studies have considered these criticisms when examining potential risks. Anderson and colleagues (2015) followed men undergoing testosterone supplementation for a period of 3 years. Results showed that supplementation to reach typical testosterone levels was associated with reduced cardiovascular event rates. However, men with the highest levels of supplementation had a greater risk for stroke. Similarly, Wallis and colleagues (2016) conducted a 5-year longitudinal study of men undergoing TRT. Results showed lower mortality rates and fewer cardiovascular events and prostate cancer diagnoses. However, shorter treatment regimens were associated with higher levels of risk. A recent meta-analysis returned inconclusive results when looking specifically at long-term stroke risk (Loo, Chen, Yu, Azoulay, & Renoux, 2017), suggesting the jury is still out with respect to the use of these supplements over longer periods.

Currently, men with untreated prostate or breast cancer are advised to avoid TRT (Osterberg, Bernie, & Ramasamy, 2014). Every drug is a balance of costs and benefits, and TRT is no different. The question is whether the short-term benefits outweigh the potential for health risks potentially leading to an early death.



Do you think andropause is analogous to the changes that women undergo in menopause? What advice would you give to a middle-aged man interested in taking testosterone replacement supplements?

& Fisch, 2006). Although men can still father children, sperm count declines with age. Moreover, the genetic quality of their sperm declines as well, and advanced paternal age has been implicated as a source of birth defects (Almeida, Rato, Sousa, Alves, & Oliveira, 2018; Yatsenko & Turek, 2018).

Men's changing hormone levels affect more than just their sexual organs. The decline in testosterone has been associated with reductions in bone density and muscle mass (Asthana et al., 2004) as well as decreased energy, lower sex drive, overweight, emotional irritability, and depressed mood. Low testosterone has also been linked to diabetes and cardiovascular disease and has been theorized to increase mortality (Lewis et al., 2006; Kelly & Jones, 2014; Johnson, Nachtigall, & Stern, 2013; Fui, Dupuis, & Grossmann, 2014).

erectile dysfunction
Inability of a man to achieve or maintain an erect penis sufficient for satisfactory sexual performance.

Many men suffer no ill effects from declines in testosterone production, but some middle-aged and older men experience erectile dysfunction (ED; commonly called impotence). **Erectile dysfunction** is defined as a persistent inability to achieve or maintain an erect enough penis for satisfactory sexual performance. A recent review of international

studies on ED found widely divergent estimates across different countries; however, all countries showed increases in ED with age. Overall, in men younger than 40 years, the prevalence rates were from 1 to 10 percent. From 40 to 49 years, prevalence rates across countries were 2 to 15 percent and rose to 20 to 40 percent in the decade from 60 to 69 years. By the seventies and eighties, nearly all countries showed prevalence rates from 50 to 100 percent (McCabe et al., 2016). In the United States, approximately 61 percent of 40- to 69-year-olds and more than 77 percent of men over the age of 70 have ED (Wagle, Carrejo, & Tan, 2012).

There are multiple potential causes for ED. Diabetes, obesity, hypertension, high cholesterol, depression, neurological disorders, and many chronic diseases have been implicated. In addition, alcohol and drug use, as well as smoking, may contribute. Poor sexual techniques, lack of knowledge, unsatisfying relationships, anxiety, and stress may be contributing factors as well (Rosen & Kupelian, 2016; Sartorius et al., 2012). Treatment guidelines state that clinicians should first counsel men to institute lifestyle modifications to improve health, which then may also improve ED. If this is ineffective, then Sildenafil (Viagra) and other similar testosterone therapies can be prescribed (Burnett et al., 2018). If there is no apparent physical problem, psychotherapy or sex therapy (with the support and involvement of the partner) may help (NIH, 1992).

Sexual Activity Myths about sexuality in midlife—for example, the idea that satisfying sex ends at menopause—have sometimes become self-fulfilling prophecies. Advances in health care and more liberal attitudes toward sex are making people more aware that sex can be a vital part of life during middle and late adulthood.

The single most important factor determining sexual activity is the presence of a partner. Married and cohabitating women have a roughly 8 times higher chance of being sexually active. From the ages of 40 to 49, almost 75 percent of women who lived by themselves had sex in the previous 6 months, while nearly 90 percent of married or cohabitating women did, and at 50 to 59 years, 67.7 percent of women living alone had sex in the previous 6 months, while almost 87 percent of married and cohabitating women did (Thomas, Hess, & Thurston, 2015).

Health is also important, and good health has been repeatedly associated with sexual activity and satisfaction (Thomas et al., 2015; Fisher et al., 2015). Menopause matters as well; 61 percent of married or cohabiting premenopausal women but only 41 percent of postmenopausal women reported having sex once a week or more (Rossi, 2004), and hot flashes are associated with declines in sexual activity (Thomas et al., 2015). Other factors such as surgery, medications, and too much food or alcohol can also impact sexual activity (Rossi, 2004).

Nonphysiological issues also impact sexual activity. For example, body image can influence the desire to have sex. Women who feel confident about their bodies and are high in self-acceptance tend to have higher levels of sexual satisfaction, while those who are self-conscious about their appearance are more likely to report declines (Thomas, Hamm, Borrero, Hess, & Thurston, 2018). A couple's relationship quality is important too. When a couple communicates well, kisses and cuddles frequently, and is physically tender, this is associated with greater sexual satisfaction. Importantly, couples who can communicate about sexual activity and preferences, who care about each other's pleasure, and who desire approximately the same amount of sexual activity also tend to be more satisfied (Thomas et al., 2018; Fisher et al., 2015; Freak-Poli et al., 2017; Gillespie, 2017).

checkpoint
can you . . .

- Contrast men's and women's reproductive changes at midlife?
- Identify factors that can affect women's experience of menopause?
- Tell which reported symptoms have been found to be related to menopause, and which have not?
- Identify changes in male sexual functioning in middle age?
- Discuss changes in sexual activity during middle age?

Physical and Mental Health

Most middle-aged Americans, like those in other industrialized countries, are generally healthy. All but 16.7 percent of 45- to 64-year-olds consider themselves in good to excellent health (National Center for Health Statistics, 2018), and only 2.2 percent of 45- to 54-year-olds and 3.5 percent of 65- to 74-year-olds are currently limited in their activities of daily living, performing everyday chores, such as making dinner or using a bathroom (National Center for Health Statistics, 2018).

Nevertheless, baby boomers may be less healthy than previous generations. Research has shown increases in the use of medical services, hospitalization rates for coronary stent insertion, and hip and knee replacement surgery (Freid & Bernstein, 2010), and there are indications that younger cohorts may be showing sharper increases in issues associated with activities of daily living (Seeman, Merkin, Crimmins, & Karlamangla, 2009).

HEALTH TRENDS AT MIDLIFE

hypertension
Chronically high blood pressure.

Hypertension (chronically high blood pressure) is an increasingly important concern from midlife on as a risk factor for cardiovascular disease and kidney disease. In 2015–2016, 43.4 percent of American men and 38 percent of women ages 45 to 64 were diagnosed with hypertension (National Center for Health Statistics, 2018), although these numbers will need to be adjusted in light of new recommendations released in November 2017 (American College of Cardiology, 2017). Previous guidelines defined high blood pressure at 140/90; however, because of research showing an increased risk of disease at lower levels, the recommended cutoff for high blood pressure is now 130/80 (Ettehad et al., 2016). While numbers are still high, in the United States increasing numbers of people are successfully identifying and controlling their high blood pressure (Yoon et al., 2015). Some adults can lower their blood pressure with lifestyle modifications, such as weight loss, increases in physical activity, eating a low-salt diet with plentiful fruits and vegetables, increasing potassium intake, and consuming light amounts of alcohol. If lifestyle modifications are not effective, medication is generally used as well (Frisoli, Schmieder, Grodzicki, & Messerli, 2011).

A relatively simple question, "How are you?" can help alert physicians to quality of life issues that might affect health and health outcomes. Researchers have suggested that such questions be incorporated in all medical appointments for older adults.

Hahn et al., 2007

Hypertension is the world's leading preventable cause of early death. Currently, approximately 31 percent of people worldwide have high blood pressure. In high-income countries, rates decreased by 2.6 percent from 2000 to 2010, presumably as a result of better diagnosis and treatment. By contrast, low- and middle-income countries showed an increase of 7.7 percent (Mills et al., 2016). These high rates are troubling given hypertension's status as a risk factor for cardiovascular disease and stroke (Forouzanfar et al., 2015). Currently, these two diseases are the leading causes of global death, and estimates are that 1 in 4 deaths can be attributed to them (Abubakar, Tillmann, & Banerjee, 2015).

In the United States, cancer has replaced heart disease as the leading cause of death between ages 45 and 64 (National Center for Health Statistics, 2018). Overall, death rates have declined since the 1970s for people in this age bracket, in large part because of improvements in treatment of heart attack patients (Hoyert, Arias, Smith, Murphy, & Kochanek, 2001). Chest pain is the most common symptom of a heart attack in both men and women, but women may experience other symptoms, such as back and jaw pain, nausea and vomiting, indigestion, difficult breathing, or palpitations (Patel, Rosengren, & Ekman, 2004).

diabetes
Disease in which the body does not produce or properly use *insulin,* a hormone that converts sugar, starches, and other foods into energy needed for daily life.

The prevalence of **diabetes** doubled in the 1990s (Weinstein et al., 2004). Approximately 13.2 percent of adults age 45 to 64 years have been diagnosed with diabetes (National Center for Health Statistics, 2018). The most common type, mature-onset (type 2) diabetes, typically develops after age 30 and becomes more prevalent with age. Unlike juvenile-onset (type 1), or insulin-dependent, diabetes, in which the level of blood sugar rises because the body does not produce enough insulin, in mature-onset diabetes glucose levels rise because the cells lose their ability to use the insulin the body produces. As a result, the body may try to compensate by producing too much insulin. People with mature-onset diabetes often do not realize they have it until they develop such serious complications as heart disease, stroke, blindness, kidney disease, or loss of limbs (American Diabetes Association, 1992).

BEHAVIORAL INFLUENCES ON HEALTH

On average, Americans who smoke, are overweight, and have high blood pressure and high blood sugar have a life expectancy 4 years less than those who do not (Danaei et al., 2010). By the same token, people who do not smoke, who exercise regularly,

drink alcohol in moderation, and eat plenty of fruits and vegetables have 4 times less risk of dying in midlife and old age (Khaw et al., 2008). Perhaps more important from a quality of life perspective, people who guard their health not only live longer but also have shorter periods of disability at the end of life (Vita, Terry, Hubert, & Fries, 1998).

Weight in particular seems to affect health. Excess weight in middle age increases the risk of impaired health and death (Jee et al., 2006), even in healthy people (Yan et al., 2006) and for those who have never smoked (Adams et al., 2006). Being overweight, which is medically defined as having a body mass index (BMI) of between 25 to 29.9, is a risk factor. However, obesity, defined as a BMI of 30 or more, is an even greater risk and associated with ever greater mortality (Flegal, Kit, Orpana, & Graubard, 2013). Weight also interacts with ethnicity, making some ethnic groups more likely to become overweight or obese. For example, when considering overweight, Hispanics have the highest prevalence rate at 84.2 percent, in comparison to non-Hispanic whites at 70.8 percent and non-Hispanic blacks at 76 percent (Flegal, Carroll, Ogden, & Curtin, 2010). When considering obesity, non-Hispanic blacks (48.1 percent) demonstrate the highest prevalence rate, with non-Hispanic whites (34.5 percent) and Hispanics (42.5 percent) at lower risk (Ogden, Carroll, Fryar, & Flegal, 2015).

Physical activity in midlife is an important protective factor, particularly given that declines in cardiovascular fitness are steep after age 45 (Jackson, Sui, Hébert, Church, & Blair, 2009). Unfortunately, research suggests that the average person engages in about a half hour less of physical activity per day over the span of 10 years from early adulthood to midlife, replacing previously active time with sedentary activity (Pettee Gabriel et al., 2018). Physical activity can increase the chances of remaining mobile in old age (Patel et al., 2006), of avoiding weight gain (Lee, Djoussé, & Sesso, 2010), and of staying healthier longer (Jackson et al., 2009). Adults who engage in regular, moderate, or vigorous exercise are about 35 percent less likely to die in the next 8 years than those with a sedentary lifestyle. Those with cardiovascular risk factors and a history of coronary heart disease benefit the most from being physically active (Richardson, Kriska, Lantz, & Hayward, 2004). Last, physical activity is associated with better cognitive functioning at midlife (Hoang et al., 2016) and a decreased risk of dementia in late adulthood (Blondell, Hammersley-Mather, & Veerman, 2014; Tolppanen et al., 2015).

Unfortunately, only about a third of U.S. adults show good compliance with health recommendations, most notably with respect to suggested dietary guidelines (Wright, Hirsch, & Wang 2009). Although adhering to a healthy lifestyle throughout life is ideal, changes later in life can reverse some of the damage (Tolppanen et al., 2015).



Research suggests that regular church attendance is related to decreases in the risk of death and increases in health. Some of these influences appear to be indirect—for example, those who attend church frequently are less likely to abuse alcohol and smoke—but others may be direct—those who attend church regularly show higher subjective well-being. In other words, they just plain feel better.

Koenig & Vaillant, 2009

SOCIOECONOMIC STATUS AND HEALTH

People with low socioeconomic status tend to have poorer health, shorter life expectancy, more activity limitations due to chronic disease, and lower well-being than people with higher SES. In part, this is due to the cost of health care. In 2017, almost 38 percent of poor and near poor people either delayed or did not receive medical care because of its expense (National Center for Health Statistics, 2018b).

The reasons for the connection between SES and health may also be psychosocial. People with low SES tend to live in more stressful environments and thus report higher levels of perceived stress. These higher levels of stress, in turn, are associated with a greater likelihood of engaging in unhealthy behaviors, such as consuming a poor diet, smoking, and not exercising (Algren et al., 2018). People with higher SES, by contrast, experience less stress and have a greater sense of control over what happens to them, attenuating their stress response (Mooney, Elliott, Douthit, Marquiz, & Seplaki, 2016). They also tend to choose healthier lifestyles and to seek medical attention and social support when they need it (Lachman & Firth, 2004; Marmot & Fuhrer, 2004). Moreover, they tend to show higher compliance with lifestyle modifications recommended to improve health indices (Wright, Hirsch, & Wang, 2009).

However, there are wide individual differences in health among low-SES adults. Protective influences include the quality of social relationships and the level of religious engagement from childhood on (Ryff, Singer, & Palmersheim, 2004). Negative influences include loneliness, which has a negative effect on both mental and physical well-being and is a risk factor for poor health and mortality (Cacioppo & Cacioppo, 2014).

RACE/ETHNICITY AND HEALTH

Even though racial and ethnic disparities in health have decreased in the United States since 1990, substantial differences persist (National Center for Health Statistics, 2018b). In trying to determine the cause of these disparities, researchers have looked to the human genome. Research in this area has found distinctive variations in the DNA code among people of different ancestry. These variations are linked to predispositions to various diseases, from cancer to obesity, and such data may ultimately open the way to targeted treatments of preventive measures (Antonarakis & Cooper, 2019).

Although genetics may offer some clues to differences in health as a function of race or ethnicity, by far the most research has focused on correlates of ethnicity and how those might be related to differences in health. Poverty is most likely the largest single underlying factor in this link. People who live in poverty generally have poorer access to health care, more stressful lives, and greater exposure to potential toxins in their everyday environment (Smedley & Smedley, 2005).

There are other differences between people of different ethnicities. From young adulthood throughout middle age, African Americans have higher overall death rates and higher incidence of hypertension, obesity, and diabetes (National Center for Health Statistics, 2018b). Given the strong relationship between race and socioeconomic status in the United States, many of these health disparities are attributable to the effects of poverty. For African Americans, for example, poverty has been related to poor nutrition, substandard housing, and poor access to health care (Smedley & Smedley, 2005). However, even when African Americans have high socioeconomic status, racial disparities in health still exist. One factor that has been identified as a potential causal influence is the additive effects of discrimination, racism, and social inequality. The added burden of these factors over a lifetime can result in an accumulating strain on the body with consequent negative effects on health and wellness (Colen, Ramey, Cooksey, & Williams, 2018; Williams, Priest, & Anderson, 2016).

Hispanic Americans, like African Americans, have a disproportionate incidence of stroke, liver disease, diabetes, HIV infection, homicide, and cancers of the cervix and stomach (Office of Minority Health, CDC, 2005; National Center for Health Statistics, 2016). In 2017, Hispanics had the lowest rates of health care coverage (83.9 percent) compared to African American (89.4 percent), Asian (92.7 percent), and non-Hispanic white (93.7 percent) individuals (Berchick, Hood, & Barnett, 2018). Hispanics are particularly likely to lack health insurance and a regular source of health care if they have limited English proficiency (Martorell & Martorell, 2006). Not surprisingly, they are also less likely to be screened for cholesterol and for breast, cervical, and colorectal cancers or to receive influenza and pneumonia vaccines (Balluz, Okoro, & Strine, 2004).

checkpoint can **you** . . .

- Describe the typical health status in middle age, and identify health concerns that become more prevalent at this time?
- Discuss behavioral, socioeconomic, and racial/ethnic factors in health and mortality at middle age?

GENDER AND HEALTH

Women have a higher life expectancy than men and lower death rates throughout life (Murphy, Xu, Kochanek, & Arias, 2018). Women's greater longevity has been attributed to genetic protection given by the second X chromosome (which men do not have) and, before menopause, to beneficial effects of the female hormone estrogen on both cardiovascular and cognitive health (Rodin & Ickovics, 1990; USDHHS, 1992; Hara, Waters, McEwen, & Morrison, 2015). However, psychosocial and cultural factors, such as men's greater propensity for risk-taking, also may play a part (Mahalik et al., 2013; Cortenay, 2011).

Although women live longer, they are slightly more likely to report being in fair or poor health than men. According to the MIDUS survey, middle-aged women tend to report more specific symptoms and chronic conditions than men, and they devote more effort to maintaining their health (Cleary, Zaborski, & Ayanian, 2004). Men may feel that admitting illness is not masculine and seeking help means a loss of control (Seidler, Dawes, Rice, Oliffe, & Dhillon, 2016), and they are less likely to seek professional help for health problems or stay overnight in a hospital (National Center for Health Statistics, 2018b). They are also more likely to suffer from chronic health problems such as cancer or high blood pressure (Siegel, Miller, & Jemal, 2015; Maranon & Reckelhoff, 2013) and to report drug or alcohol problems (Seidler et al., 2016). Both genders, however, show roughly the same degree of limitations in daily living (12.8 percent for men versus 12.5 percent for women) as a result of chronic health conditions (National Center for Health Statistics, 2018b).



Women's greater longevity has been attributed to genetic protection given by the second X chromosome (which men do not have) and, before menopause, to beneficial effects of the female hormone estrogen, particularly on cardiovascular health.
Dave and Les Jacobs/Blend Images LLC

As women's lifestyles have become more like men's, so have their health patterns. For example, the gender gap in deaths from heart disease has narrowed primarily because heart attack rates in women have risen. Explanations for this increase rely in part on rising rates of obesity and diabetes in women and in part on the tendency of doctors to assume heart disease is less likely in women. Thus, doctors are more likely to recognize and treat heart disease risk in men, leading to a better focus on controlling risk factors in men than in women (Towfighi, Zheng, & Ovbiagele, 2009; Vaccarino et al., 2009). This type of trend may help explain why the difference between women's and men's life expectancy shrank from 7.6 years in 1970 to 5 years in 2017 (Murphy et al., 2018).

With longer life spans, women in many developed countries now can expect to live half their adult lives after menopause, during which time they are at increased risk for osteoporosis, breast cancer, and heart disease. As a result, increasing attention is being paid to women's health issues at this time of life (Barrett-Connor et al., 2002). There has also been more awareness of men's health issues as well. For example, as they age, men face an increasing risk of erectile dysfunction, particularly if their health is already poor (Gupta et al., 2011).

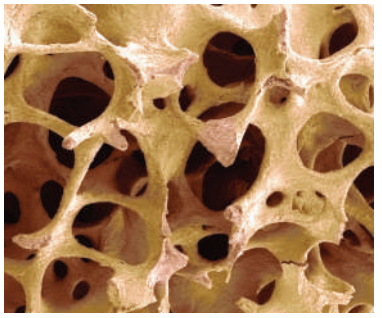
Even just an hour a day spent in moderate exercise such as walking, doing housework, or going on an easy bike ride can help prevent unhealthy weight gain in women.

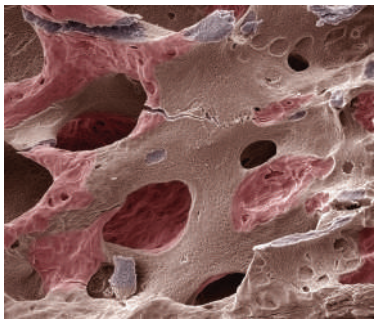
For many years, older men were subject to aggressive screening procedures for prostate cancer. Sometimes small cancers would be discovered, and many men were treated for those cancers. However, given the slow growth of prostate cancer, it is likely that many of these growths would never have become dangerous. Thus, new recommendations were recently developed to reduce the emphasis on aggressive screening procedures with the goal of reducing unnecessary medical treatment. Now, unless men meet one of a number of particular risk factors, prostate screening is not always recommended (Moyer, 2012; Heidenreich et al., 2011).

Bone Loss and Osteoporosis In women, bone loss rapidly accelerates in the first 5 to 10 years after menopause as levels of estrogen, which helps in calcium absorption, fall. Extreme bone loss may lead to **osteoporosis** ("porous bones"), a condition in which the bones become thin and brittle as a result of calcium depletion. Common signs of osteoporosis are marked loss in height and a hunchbacked posture that results from compression and collapse of a weakened spinal column. In a national observational study of more than 200,000 postmenopausal women, almost half had previously undetected low bone mineral density, and 7 percent of these women had osteoporosis (Siris et al., 2001). Osteoporosis is a major cause of broken bones in old age and can greatly affect quality of life and even survival (NIH, 2003).

osteoporosis
Condition in which the bones become thin and brittle as a result of rapid calcium depletion.

Almost 3 out of 4 cases of osteoporosis occur in white women, most often in those with fair skin, small frame, low weight and BMI, and a family history of the condition, and those whose ovaries were surgically removed before menopause (NIH Consensus Development Panel, 2001; Siris et al., 2001). Other risk factors, besides age, include smoking and lack of exercise (Siris et al., 2001). A predisposition to osteoporosis seems





Images of normal (top) and osteoporotic (bottom) bones

(top) Steve Gschmeissner/Science Photo Library/Brand X Pictures/Getty Images

(bottom) Steve Gschmeissner/Science Photo Library/Getty Images

to have a genetic basis, particularly as there are indications that genetic markers may have implications for which drugs may be most effective in an individual (Richards, Zheng, & Spector, 2012).

The treatment approaches for osteoporosis have come under scrutiny in recent years (Gualler & Laine, 2014). Previous treatment philosophies assumed increasing available calcium should increase bone strength. However, research indicated that calcium supplements did not affect the risk of a bone fracture. Moreover, calcium supplements increased the risk of other health issues, including kidney stones, cardiovascular problems, and gastrointestinal issues (Reid, 2014). Additionally, there was also confusion about the role of hormone replacement therapy (HRT) in women. While HRT can ameliorate some of the symptoms of menopause as well as slow bone loss, its use also carries significant risks (De Villiers et al., 2013).

In 2017, the American College of Physicians (ACP) released new, evidence-based guidelines for the treatment and management of osteoporosis in both men and women (Qaseem, Forciea, McLean, & Denberg, 2017). Strong recommendations included the use of biphosphonates (drugs that slow or prevent bone loss) such as alendronate, risedronate, zoledronic acid, or denosumab in women who have been diagnosed with osteoporosis. These medications reduce the risk of hip or vertebral fractures in women, but the evidence for their effectiveness in men is weaker. In contrast to earlier recommendations, the ACP strongly recommends HRT not be used for treating osteoporosis in women, as new evidence does not show it to be effective. The ACP also recommends biphosphonate therapy for 5 years; however, bone density monitoring does not appear to confer any additional benefits to patients and is not necessary. Last, the ACP recommends that treatment decisions be holistic and take into account patient preferences and profile, and the financial and medical costs and benefits of medications.

Good lifestyle habits can reduce risk, especially if started early in life (NIH Consensus Development Panel, 2001). Longitudinal studies suggest that exercise can help slow bone density loss (Kemmler, Bebenek, Kohl, & von Stengel, 2015). While some researchers have argued the data on exercise are inconclusive (Qaseem et al., 2017), others have pointed out that the benefits of exercise are promising and extend even further than bone health. For example, staying active can maintain strength, agility, and balance, and can thus be protective against falls that often lead to broken bones in older adults. Older adults also benefit from proper nutrition and the avoidance of smoking or heavy drinking (Cosman et al., 2014).



Routine mammography to screen for breast cancer is generally recommended for older women. If cancer is detected before it spreads, women have about a 98 percent chance of surviving at least 5 years after diagnosis.

Source: Rhoda Baer/National Cancer Institute (NCI).

Breast Cancer and Mammography One in 8 American women develops breast cancer at some point in her life (American Cancer Society, 2017b). In 2017, 42,510 people in the United States died of breast cancer (Kochanek, Murphy, Xu, & Arias, 2019).

About 5 to 10 percent of breast cancer cases are thought to be hereditary, resulting from inherited mutations. The most common of these are mutations of the *BRCA1* and *BRCA2* genes. Women without these mutations have roughly a 10 percent chance of developing breast cancer. However, those who have a *BRCA1* or *BRCA2* mutation have as much as a 70 percent chance of developing breast cancer. Another gene, *PALB2*, can also predispose women to a higher risk of breast cancer (American Cancer Society, 2017d).

However, the vast majority of breast cancer cases are environmentally influenced. Once found mostly in affluent countries, breast cancer is becoming a worldwide problem as Western lifestyles move into the developing world (Porter, 2008). Worldwide, approximately 627,000 women died

in 2018 from breast cancer. Breast cancer is responsible for the largest number of cancer-related deaths among women (World Health Organization, 2019c).

Overweight women, those who drink alcohol, those who experience early menarche and late menopause, those with a family history of breast cancer, and those who have no children, did not breast-feed, or who bore children later in life have a greater risk of breast cancer, whereas those who are moderately physically active and eat low-fat, high-fiber diets are at less risk (American Cancer Society, 2017b; McTiernan et al., 2003). Weight gain, especially after menopause, increases a woman's risk of breast cancer, and weight loss decreases the risk (Eliassen, Colditz, Rosner, Willett, & Hankinson, 2006).

Advances in treatment and early diagnosis have dramatically improved prospects for breast cancer patients. Fully 89 percent of U.S. women with breast cancer now survive at least 5 years past diagnosis. If the cancer is still localized and has not yet spread, the 5-year survival rate is 99 percent (Miller et al., 2016). Cancer can be treated with removal of part or all of the breast, along with radiation or chemotherapy.

The benefits of **mammography,** diagnostic X-ray examination of the breasts, appear to be greatest for women over 50. In 2009, the U.S. Preventive Services Task Force issued a new set of guidelines recommending that women begin routine screening for breast cancer at 50, rather than at 40 years of age as had been previously suggested. However, adherence to this diagnostic schedule varies, and medical professionals and organizations often disagree with recommended diagnostic guidelines (Corbelli et al., 2014).

mammography
Diagnostic X-ray examination of the breasts.

Hormone Therapy The most troublesome physical effects of menopause are linked to reduced levels of estrogen, and **hormone therapy (HT)** has been used to address these effects. HT is treatment with artificial estrogen, sometimes in combination with progesterone, to help relieve symptoms of menopause. HT has a complicated pattern of risks and benefits.

hormone therapy (HT)
Treatment with artificial estrogen, sometimes in combination with the hormone progesterone, to relieve or prevent symptoms caused by decline in estrogen levels after menopause.

On the positive side, HT is the most effective means of addressing symptoms such as night sweats and hot flashes, especially for women below the age of 60 or who went through menopause less than 10 years ago (De Villiers et al., 2013). However, it is not as effective at managing osteoporosis. HT, when started at menopause and continued for at least 5 years, does slow bone loss after menopause (Barrett-Connor et al., 2002; Lindsay, Gallagher, Keerekoper, & Pickar, 2002). However, bone loss resumes within 3 years if and when HT stops (Heiss et al., 2008). Moreover, HT fails to reduce the risk of fracture (Reid, 2014).

While earlier research was equivocal, the most recent research suggests that HT does not impact the risk of either cardiovascular disease or mortality (Manson et al., 2017; Benkhadra et al., 2015). Because of the complicated risk profile of these drugs, HT should not be used for disease prevention but is appropriate for menopausal symptom management in affected women (Manson et al., 2013). Lifestyle changes such as losing weight and stopping smoking, together with any necessary drugs to lower cholesterol and blood pressure, appear to be wiser courses for heart disease prevention in most women (Manson & Martin, 2001). HT, especially when taken orally, has also been associated with a greater, although still overall small, risk of stroke or blood clot (De Villiers et al., 2013).

As with the cardiac data, the links between HR and breast cancer risk are complex. Heightened risk of breast cancer seems to occur mainly among current or recent estrogen users, if estrogen and progestin are used together, and the risk increases with length of use (Chen, Weiss, Newcomb, Barlow, & White, 2002; De Villiers et al., 2013). However, the overall risk is still quite low, with an incidence of less than 1 woman per 1,000 over a year. This risk is comparable to increased risk due to lifestyle factors such as being sedentary or consuming alcohol (De Villiers et al., 2013).

Results on the effects of HT on cognitive function and dementia risk are also difficult to interpret. Some studies have found that HT reduces the risk of cognitive impairment (Zandi et al., 2002), while others have found it increases the risk (Espeland et al., 2004; Shumaker et al., 2004). Timing may matter here. HT that begins in early

checkpoint can you . . .

- Discuss changes in women's health risks after menopause, and weigh the risks and benefits of hormone replacement therapy?

menopause does not seem to have a negative effect on cognition; however, later initiation of HT is associated with increased risk of dementia (De Villiers et al., 2013). Additional research in this area indicates that when women use HT in midlife *only*, they show a lower risk of dementia than women who use HT in early menopause and continue to do so into late adulthood and than women who begin using HT in late adulthood. It may be there is a critical window of time where HT is protective, but taken outside of that window, it is damaging (Whitmer, Quesenberry, Zhou, & Yaffe, 2011; Shao et al., 2012).

STRESS IN MIDDLE AGE

stress
Response to physical or psychological demands.

stressors
Perceived environmental demands that may produce stress.

Stress is the damage that occurs when perceived environmental demands, or **stressors,** exceed a person's capacity to cope with them. The body's capacity to adapt to stress involves the brain, which perceives danger (either real or imagined); the adrenal glands, which mobilize the body to fight it; and the immune system, which provides the defenses. Stress in middle age may come from role changes, career transitions, grown children leaving home, and the renegotiation of family relationships. Midlife can be a pivotal period in the life span, and how challenges are addressed at this juncture can have implications for whether or not an individual's trajectory takes a positive or negative turn into the later stages of life (Lachman, Teshale, & Agrigoroaei, 2015).

Common sources of reported stress include health, work and money, personal debt, housing instability, and hunger. Fifty-eight percent of adults age 40 to 72 also list mass shootings as a source of stress. Discrimination is also problematic, and concerns in this area differ by race and ethnicity. African American adults report discrimination to be a source of stress 46 percent of the time and Hispanics report a rate of 36 percent, while white adults report discrimination as a source of stress 14 percent of the time (American Psychological Association, 2018).

Women tend to report more extreme stress than men (35 percent compared to 28 percent) and to be more concerned about stress (American Psychological Association, 2017a). The classic stress response—*fight or flight*—may be more characteristic of men, activated in part by testosterone. Women's response pattern is typically *tend and befriend*—nurturant activities that promote safety and reliance on social networks to exchange resources and responsibilities. These patterns may have evolved through natural selection and may draw on women's involvement in attachment and caregiving (Taylor, 2006).

People who chew gum on a regular basis report being less stressed.

Smith, 2009



Women are likely to tend and befriend as a way of dealing with stress.
BananaStock/Alamy Stock Photo

Stress and Health The stress response system and the immune system are closely linked and work together to keep the body healthy. However, at times, especially during highly stressful events, the body may not be able to cope (Figure 2). Chronic stress can lead to persistent inflammation and, over time, to disease (Cohen et al., 2012; Miller & Blackwell, 2006). Moreover, a propensity to respond in a negative fashion to stress may interact with genetic predispositions. So, even if similar stressors are experienced, some people respond more negatively than others.

Research has shown a number of life events to be highly stressful, including divorce, the death of a spouse or other family member, or the loss of a job. The more stressful the changes that take place in a person's life, the greater likelihood of serious illness within the next year or 2 (Holmes & Rahe, 1976; Cooper, 2005).

Generally, acute, or short-term, stress, such as the challenge of taking a test or running a competitive race, generally strengthens the immune

system (Segerstrom & Miller, 2004). We are adapted to dealing with such events, and our bodies quickly and efficiently respond to and then recover from the event (Sapolsky, 1992). However, intense or prolonged stress, such as might result from poverty or disability, can weaken or break down the body, increasing the susceptibility to disease (Sapolsky, 1992; Segerstrom & Miller, 2004). In support of this assertion, research has found suppressed immune function in breast cancer patients (Compas & Luecken, 2002), abused women, hurricane survivors, and men with a history of post-traumatic stress disorders (PTSD) (Harvard Medical School, 2002). Daily stressors such as irritations, frustrations, and overloads may be less severe in their impact than life changes, but their buildup can also affect health and emotional adjustment (Almeida, Serido, & McDonald, 2006). For minority group members, discrimination and racism can also lead to increased chronic stress and are associated with an increased risk for disease (Thoits, 2010). These processes are of concern because stress has been increasingly recognized as a factor in such age-related diseases as hypertension, heart disease, stroke, diabetes, osteoporosis, peptic ulcers, depression, HIV/AIDS, and cancer (Baum, Cacioppo, Melamed, Gallant, & Travis, 1995; Cohen, Janicki-Deverts, & Miller, 2007; Levenstein, Ackerman, Kiecolt-Glaser, & Dubois, 1999; Light et al., 1999; Sapolsky, 1992; Wittstein et al., 2005).

What are the main sources of stress in your life? How do you handle stress? What methods have you found most successful?

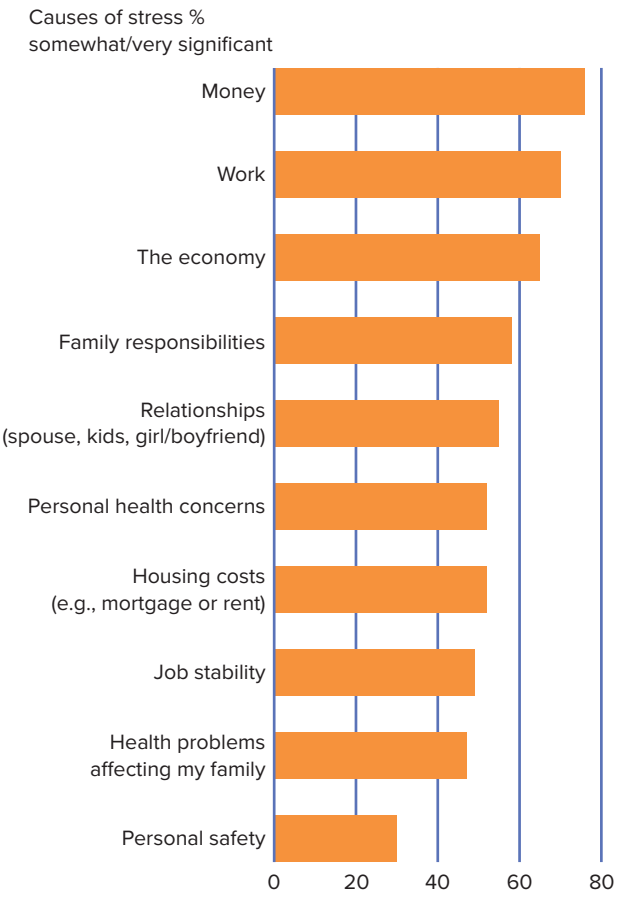


FIGURE 2
Significant Sources of Stress, United States, 2010

Work and money are greater stressors than relationships or health, a national survey found.

Source: American Psychological Association, 2011.

EMOTIONS AND HEALTH

An ancient proverb of Solomon, "A merry heart doeth good like medicine" (Proverbs 17:22), is being borne out by contemporary research. Because the brain interacts with all of the body's biological systems, feelings and beliefs affect bodily functions, including the functioning of the immune system (Ray, 2004; Richman et al., 2005). Negative emotions, such as anxiety and despair, are often associated with poor physical and mental health, and positive emotions, such as hope, with good health and longer life (Ray, 2004; Salovey, Rothman, Detweiler, & Steward, 2000; Spiro, 2001).

Negative emotions serve important adaptive functions and, under the right circumstances, are a healthy response to events. When negative emotions are elicited in negative contexts, they can have beneficial consequences, such as when fear motivates an individual to schedule a screening for a disease (Coifman, Flynn, & Pinto, 2016). However, when negative moods are excessive, long-lasting, or occur too frequently, they can have damaging effects on the body, suppress immune functioning, and increase susceptibility to disease. Negative emotions, such as anxiety and despair, are often associated with poor physical and mental health (Ray, 2004; Salovey et al., 2000; Spiro, 2001). People high in neuroticism and hostility, who are prone to

People who smile widely and more in photos tend to live longer than those who do not.

Abel & Kruger, 2010



A positive outlook may guard against disease and buffer the impact of stress. People with a positive outlook tend to take care of their health.
Rolf Bruderer/Blend Images LLC

such feelings on a regular basis, are more likely to suffer from serious illness and reduced longevity. Hostility has also been associated with an increased risk of coronary heart disease and mortality for postmenopausal women (Lahey, 2009; T. W. Smith, 2006; Tindle et al., 2009) and with an increased risk of death from heart attack in men (Assari, 2017).

The opposite pattern has been found for positive emotions. Positive emotions and well-being are associated with both short-term and long-term positive health outcomes (Diener & Chan, 2011; Howell, Kern, & Lyubomirsky, 2007) and reduced mortality (Chida & Steptoe, 2008). Hope and curiosity have been found to predict a decreased likelihood of hypertension, diabetes, and respiratory tract infections (Richman et al., 2005). Personality traits also affect health: Optimism and conscientiousness are consistently associated with better health and longer life (Kern & Friedman, 2008; T. W. Smith, 2006).

There are also indirect effects of positive emotions on health. A positive emotional outlook motivates people to engage in more healthful practices, such as regular sleep and exercise, and to pay more attention to health-related information. Positive emotions may also affect health indirectly by softening the impact of stressful life events and helping people feel more connected to others (Armenta, Fritz, & Lyubomirsky, 2016; Cohen & Pressman, 2006; Richman et al., 2005).

checkpoint can you . . .

- Explain how emotions and personality may affect health?
- Identify risk factors for psychological distress and depressive symptoms?

MENTAL HEALTH

In 2017, approximately 22.3 million U.S. adults age 26 to 49 had some form of mental, behavioral, or emotional disorder that met DSM-IV criteria in the past year (excluding developmental disorders and substance use disorders). Of those, 7.6 million had a major depressive episode, and slightly over 67 percent of them received treatment for it (Substance Abuse and Mental Health Services Administration, 2018). Depression negatively affects health, making prevention and treatment an important issue (Bromberger, Harlow, Avis, Kravitz, & Cordal, 2004). Adults with serious psychological distress are more likely than their peers to be diagnosed with heart disease, arthritis, or stroke and to report needing help with activities of daily living such as bathing and dressing (Pratt, Dey, & Cohen, 2007).

Even those adults not diagnosed with a mental disorder may experience negative effects at a subclinical level. For example, when asked about the presence of mental-health related symptoms in the past month, 42 percent of adults reported feeling nervous or anxious, 37 percent reported feeling depressed or sad, 33 percent reported constant worrying, and 37 percent reported irritability or anger. Moreover, nearly half of adults reported lying awake at night in the past month due to stress (American Psychological Association, 2016).

checkpoint can you . . .

- Discuss causes and effects of stress and sources of stress in middle age?
- Explain how stress affects health?

COGNITIVE DEVELOPMENT

What happens to cognitive abilities in middle age? Do they improve or decline, or both? Do people develop distinctive ways of thinking at this time of life? How does age affect the ability to solve problems, to learn, to create, and to perform on the job?



Good spellers seem to remain good at spelling as they age. Poor spellers, however, get worse.

Margolin & Abrams, 2007

Measuring Cognitive Abilities in Middle Age

The status of cognitive abilities in middle age has been a subject of much debate. Here, we look at two important lines of research, K. Warner Schaie's Seattle Longitudinal Study and Horn and Cattell's studies of fluid and crystallized intelligence.

TABLE 3 Tests of Primary Mental Abilities Given in Seattle Longitudinal Study of Adult Intelligence

Test	Ability Measured	Task	Type of Intelligence*
Verbal meaning	Recognition and understanding of words	Find synonym by matching stimulus word with another word from multiple-choice list	Crystallized
Word fluency	Retrieving words from long-term memory	Think of as many words as possible beginning with a given letter	Part crystallized, part fluid
Number	Performing computations	Do simple addition problems	Crystallized
Spatial orientation	Manipulating objects mentally in two-dimensional space	Select rotated examples of figure to match stimulus figure	Fluid
Inductive reasoning	Identifying patterns and inferring principles and rules for solving logical problems	Complete a letter series	Fluid
Perceptual speed	Making quick, accurate discriminations between visual stimuli	Identify matching and nonmatching images flashed on a screen	Fluid

*Fluid and crystallized intelligence are defined in the next section.

Sources: Schaie, 1989; Willis and Schaie, 1999.

SCHAIE: THE SEATTLE LONGITUDINAL STUDY

Cognitively speaking, in many respects middle-aged people are in their prime. The Seattle Longitudinal Study of Adult Intelligence, conducted by K. Warner Schaie and his colleagues (Schaie, 1990, 1994, 1996a, 1996b, 2005; Willis & Schaie, 1999, 2006), demonstrates this fact.

The study began in 1956 with 500 randomly chosen men and women across a variety of different age brackets ranging from 22 to 67 years of age. The participants were then followed longitudinally, and assessed every 7 years on timed tests of six primary mental abilities (Table 3). By using multiple cohorts—people of different ages, all followed over time—Schaie and his colleagues were able to tease apart the different influences and conduct more sophisticated analyses.

Most participants showed remarkable stability over time, and no significant reductions in most abilities until after age 60, and then not in most areas. Virtually no one declined on all fronts, and most people improved in some areas. However, there were wide individual differences.

Similarly, there were no uniform patterns of age-related change across cognitive abilities. For example, several abilities peaked during middle age, and verbal meaning even showed improvements into old age. By contrast, about 13 to 17 percent of adults declined in number, memory recall, or verbal fluency between ages 39 and 53 (Schaie, 1994, 2005; Willis & Schaie, 2006).

Schaie and his colleagues also found that successive cohorts scored progressively higher at the same ages on most abilities, possibly because of improvements in education, healthy lifestyles, and other positive environmental influences. However, numerical ability showed overall declines after the 1924 cohort, and verbal meaning declined after the 1952 cohort (Willis & Schaie, 2006; Figure 3).

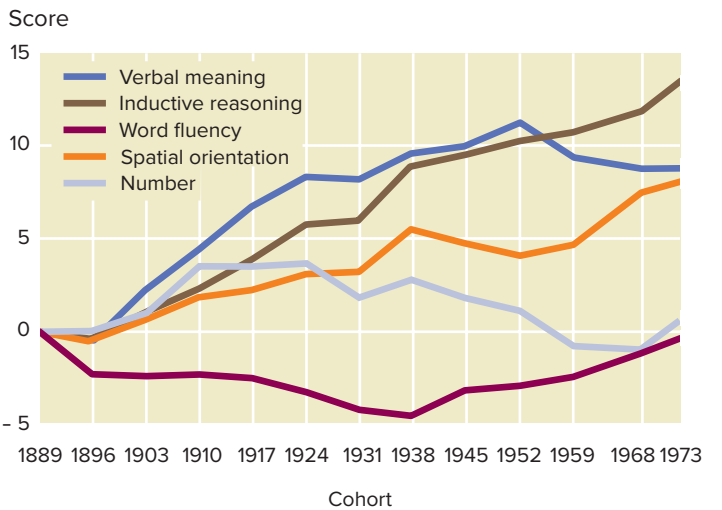


FIGURE 3
Cohort Differences in Scores on Tests of Primary Mental Abilities

More recent cohorts scored higher on inductive reasoning, word fluency, and spatial orientation.

Source: From Schaie, K. W. *Developmental Influences on Adult Intelligence: The Seattle Longitudinal Study*, Fig. 6.1, 137, 2005.

Individuals who scored highest tended to have high educational levels, to have flexible personalities, to be in intact families, to pursue cognitively complex occupations and other activities, to be married to someone more cognitively advanced, to be satisfied with their accomplishments (Schaie, 1994, 2005; Willis & Schaie, 2006), and to be high in the personality dimension of openness to experience (Sharp, Reynolds, Pedersen, & Gatz, 2010). Given the strong cognitive performance of most middle-agers, evidence of substantial cognitive decline in persons younger than 60 may indicate a neurological problem (Schaie, 2005; Willis & Shaie, 1999). In particular, midlife decline in memory recall and verbal fluency, a measure of executive functioning, can predict cognitive impairment in old age (Willis & Schaie, 2006).

HORN AND CATTELL: FLUID AND CRYSTALLIZED INTELLIGENCE

Imagine a glass of water. If you tilt it, the water sloshes around in random swirls and waves. By contrast, a block of ice has a rigid crystalline structure, with every molecule in its place. This is the metaphor used by another set of cognitive researchers (Cattell, 1965; Horn, 1967, 1968, 1970, 1982a, 1982b; Horn & Hofer, 1992) to describe the different types of intelligence. They distinguish between two aspects of intelligence: *fluid* and *crystallized*. **Fluid intelligence** is the ability to solve novel problems on the fly. Such problems require little or no previous knowledge, such as realizing that a hanger can be used to fix a leaky toilet or discovering the pattern in a sequence of figures. It involves perceiving relations, forming concepts, and drawing inferences. **Crystallized intelligence,** by contrast, is the ability to remember and use information acquired over a lifetime, such as finding a synonym for a word or solving a math problem. It is fixed, as is the structure of ice. Crystallized intelligence is measured by tests of vocabulary, general information, and responses to social situations and dilemmas—abilities that depend largely on education and cultural experience.

fluid intelligence
Type of intelligence, proposed by Horn and Cattell, that is applied to novel problems and is relatively independent of educational and cultural influences.

crystallized intelligence
Type of intelligence, proposed by Horn and Cattell, involving the ability to remember and use learned information; it is largely dependent on education and culture.

Typically, fluid intelligence has been found to peak in young adulthood. This is particularly true for perceptual speed, which peaks quite early, beginning in the twenties. From the age of 20 to 60 years, the average person will have lost more than one standard deviation in fluid intelligence (Salthouse, 2010). Working memory capacity also declines with age. However, many older adults perform in the real world at high levels despite the apparent declines in fluid intelligence (Salthouse, 2012). How do we make sense of this discrepancy between cognitive declines and real-world performance?

One explanation is offered by improvements in crystallized intelligence, which increase through middle age and often until near the end of life (Horn, 1982a, 1982b; Horn & Donaldson, 1980). Older adults can use their accumulated lifetime of knowledge to compensate for tasks in which decision making can benefit from prior experiences (Li, Baldassi, Johnson, & Weber, 2013). Thus, you might expect that older adults would do as well or better on tasks such as filling out a tax return, where crystallized intelligence would be helpful, but not on tasks such as learning how to use a new smartphone, where fluid intelligence would be more important (Zaval, Li, Johnson, & Weber, 2015).

People's cognitive performance offers insight into their overall health. While crystallized intelligence is not associated with mortality risk once sociodemographic factors are considered, fluid intelligence is strongly predictive of mortality risk (Batterham, Chistensen, & Mackinnon, 2009; Aichele, Rabbitt, & Ghisletta, 2015). Additionally, a large discrepancy between fluid and crystallized intelligence, particularly for highly educated people, may be an indicator of cognitive decline (O'Shea et al., 2018).

checkpoint can you . . .

- Summarize results of the Seattle Longitudinal Study?
- Distinguish between fluid and crystallized intelligence, and tell how they are affected by age?
- Compare the findings of the Seattle study with those of Horn and Cattell?

The Distinctiveness of Adult Cognition

Instead of measuring the same cognitive abilities at different ages, some developmental scientists look for distinctive qualities in the thinking of mature adults.

THE ROLE OF EXPERTISE

Two young resident physicians in a hospital radiology laboratory examine a chest X-ray. They study an unusual white blotch on the left side. "Looks like a large tumor," one of them says finally. The other nods. Just then, a longtime staff radiologist walks by and looks over their shoulders at the X-ray. "That patient has a collapsed lung and needs immediate surgery," he declares (Lesgold et al., 1988).

Why do mature adults show increasing competence in solving problems in their chosen fields? One answer seems to lie in *specialized knowledge,* or *expertise*—a form of crystallized intelligence that is related to the process of encapsulation.



Expertise in interpreting X-rays, as in many other fields, depends on accumulated, specialized knowledge, which continues to increase with age. Experts often appear to be guided by intuition and cannot explain how they arrive at conclusions.
Terry Vine/Blend Images LLC

The type of knowledge children accumulate—such as how to read, complete math problems, or understand metaphor—is fairly uniform. Most children learn similar things at roughly the same time. In adulthood, however, paths of learning diverge and adults become more or less learned in whatever domain of knowledge they pursue. These advances in expertise continue at least through middle adulthood and, for the most part, are not related to general intelligence. Moreover, they usually do not depend on the brain's information-processing machinery because some adults' fluid intelligence abilities become *encapsulated*—that is, dedicated to handling specific kinds of knowledge. This process of **encapsulation** makes that knowledge easier to access, to add to, and to use. It may take middle-aged people longer than younger people to process *new* information. But when it comes to solving problems *within* their field of expertise, their encapsulated knowledge compensates and allows them to rapidly and effectively solve a problem (Hoyer & Rybash, 1994; Rybash, Hoyer, & Roodin, 1986).

encapsulation
In Hoyer's terminology, the process that allows expertise to compensate for declines in information-processing ability by bundling relevant knowledge together.

Experts notice different aspects of a situation than novices do, and they process information and solve problems differently. Their thinking is often more flexible and adaptable. They assimilate and interpret new knowledge more efficiently by referring to a rich, highly organized storehouse of mental representations of what they already know. For example, imaging studies show that when completing a task within their domain of expertise, experts show brain activation in areas associated with long-term memory. This allows them to integrate information in long-term memory with working memory in "chunks" and thus perform the task at a higher level than novices (Guida, Gobet, Tardieu, & Nicolas, 2012). They sort information on the basis of underlying principles, rather than surface similarities and differences. And they are more aware of what they do *not* know (Charness & Schultetus, 1999; Goldman, Petrosino, & Cognition and Technology Group at Vanderbilt, 1999).

Cognitive performance is not the only ingredient of expertise. Problem solving occurs in a social context. Ability to make expert judgments depends on familiarity with the way things are done—with the expectations and demands of the job and the culture of the community or enterprise. Even concert pianists, who spend hours practicing in isolation, must adapt to various concert halls with different acoustics, to the musical conventions of the time and place, and to the musical tastes of their audiences (Billet, 2001).

Expert thinking often seems automatic and intuitive. Experts generally are not fully aware of the thought processes that lie behind their decisions (Charness & Schultetus, 1999; Salas, Rosen, & Diaz Granados, 2010). They cannot readily explain how they arrive at a conclusion or where a nonexpert has gone wrong. Such intuitive, experience-based thinking is also characteristic of what has been called postformal thought.



If you needed surgery, would you rather go to a middle-aged doctor or one who is considerably older or younger? Why?

INTEGRATIVE THOUGHT

Although not limited to any particular period of adulthood, postformal thought seems well suited to the complex tasks, multiple roles, and perplexing choices and challenges of midlife, such as the need to synthesize and balance work and family demands

(Sinnott, 2003). An important feature of postformal thought is its *integrative* nature (Kallio, 2011). Mature adults interpret what they read, see, or hear in terms of its meaning for them. Instead of accepting something at face value, they filter it through their life experience and previous learning.

In one study (C. Adams, 1991), early and late adolescents and middle-aged and older adults were asked to summarize a Sufi teaching tale. In the story, a stream was unable to cross a desert until a voice told it to let the wind carry it; the stream was dubious but finally agreed and was blown across. Adolescents recalled more details of the story than adults did, but their summaries were largely limited to repeating the story line. Adults, especially women, gave summaries that were rich in interpretation, integrating what was in the text with its psychological and metaphorical meaning for them, as in this response of a 39-year-old:

> I believe what this story was trying to say was that there are times when everyone needs help and must sometimes make changes to reach their goals. Some people may resist change for a long time until they realize that certain things are beyond their control and they need assistance. When this is finally achieved and they can accept help and trust from someone, they can master things even as large as a desert. (p. 333)

Society benefits from this integrative feature of adult thought. Generally, it is mature adults who translate their knowledge about the human condition into inspirational stories to which younger generations can turn for guidance.

checkpoint can you . . .

- Discuss the relationship between expertise, knowledge, and intelligence?
- Give an example of integrative thinking?

Creativity

At about age 40, Frank Lloyd Wright designed Robie House in Chicago. Charles Darwin was 50 when he presented his theory of evolution. Toni Morrison won the Pulitzer Prize for *Beloved,* a novel she wrote at about 55. Many creative people have reached their greatest achievements in middle age.

CHARACTERISTICS OF CREATIVE ACHIEVERS

Intelligence and creativity are not the same thing. Although a certain baseline general intelligence, or IQ, is needed (Guilford, 1956), creative performance is not strongly related to general intelligence once that threshold is reached (Simonton, 2000). This is true even though the baseline IQ needed for creative performance does rise for more complex creative achievements (Jauk, Benedek, Dunst, & Neubauer, 2013).

Intelligence seems to be more strongly influenced by genetic processes than creativity does. Intelligence shows high heritability, and its heritability rises with age as individuals get older and seek out more experiences in line with their proclivities (Plomin & Deary, 2015). By contrast, strong genetic contributions have not been found for creative performance (Runco et al., 2011; Reuter, Roth, Holve, & Hennig, 2006). Whereas many children often show strong creative potential, in adults what matters is creative performance—what and how much a creative mind produces (Sternberg & Lubart, 1995).

Creativity seems to be the product of particular social contexts as well as individual proclivities. With respect to environment, creativity seems to develop from diverse experiences that weaken conventional constraints and challenging experiences that strengthen the ability to persevere and overcome obstacles (Sternberg & Lubart, 1995).

Individual differences also can make creativity more likely. For example, highly creative people are self-starters and risk-takers. They tend to be independent, nonconformist, unconventional, high in emotional intelligence, high in positive affect, and open to new ideas and experiences. Their thinking processes are often unconscious, leading to sudden moments of illumination (Simonton, 2000; Torrance, 1988; Da Costa, Páez, Sánchez, Garaigordobil, & Gondim, 2015). They look at problems more deeply and come up with solutions that do not occur to others (Sternberg & Horvath, 1998). They think in flexible ways and explore many possible solutions to problems (Baas, Nijstad, & De Dreu, 2015).



Helen Mirren, long a highly respected, classically trained actress, reached the apex of her career at the age of 61, when she won the Academy Award for Best Actress for her portrayal of a proud, aging Queen Elizabeth II in the film The Queen.
Jamie Rector/EPA/Shutterstock

However, this is not enough. Extraordinary creative achievement requires deep, highly organized knowledge of a subject and a strong emotional attachment to the work, which spurs the creator to persevere in the face of obstacles. A person must first be thoroughly grounded in a field before she or he can see its limitations, envision radical departures, and develop a new and unique point of view (Keegan, 1996; Baer, 2015).

Not surprisingly, researchers have looked for creative problem-solving correlates in the brain. This research is challenging—creative ideas, by their very nature, are divergent and wide-ranging. One meta-analysis including 34 imaging studies showed that when people were engaged in creative tasks, they showed more activation in the prefrontal cortex regardless of what type of creative task they were performing. However, different areas became more active depending on task demands. For example, tasks that required inhibitory processes, fluency, and control were likely to generate activity in the lateral prefrontal cortex, whereas tasks that required the activation of semantic (meaning-based) associations tended to elicit more activity in the superior and inferior central gyri (Gonen-Yaacovi et al., 2013).

CREATIVITY AND AGE

Is there a relationship between creative performance and age? On psychometric tests of divergent thinking, age differences consistently appear. Whether data are cross-sectional or longitudinal, scores peak, on average, around the late thirties (Simonton, 1990). After this, they remain relatively flat for some time, and then decline in the seventies (Massimiliano, 2015). A similar age curve emerges when creativity is measured by variations in output (number of publications, paintings, or compositions). A person in the last decade of a creative career typically produces only about half as much as during the late thirties or early forties, though somewhat more than in the twenties (Simonton, 1990).



Think of an adult you know who is a creative achiever. To what combination of personal qualities and environmental forces would you attribute her or his creative performance?

However, the age curve varies depending on the field. Poets, mathematicians, and theoretical physicists tend to be most prolific in their late twenties or early thirties. Research psychologists reach a peak around age 40, followed by a moderate decline. Novelists, historians, and philosophers become increasingly productive through their late forties or fifties and then level off. These patterns hold true across cultures and historical periods (Dixon & Hultsch, 1999; Simonton, 1990).

However, there are some indications that this data, or the interpretations of it, may be flawed. For instance, it is not clear that productivity should be the metric by which creativity is measured, especially as some research suggests that older adults' work remains innovative over time. For example, meta-analyses of age and creativity at work suggest there is no direct relationship between the two and that much depends on how creativity is defined (Rietzschel, Zacher, & Stroebe, 2016; Ng & Feldman, 2013). Additionally, patterns of creative output may have changed for more recent cohorts. For example, while previous research seemed to suggest researchers' productivity peached in the forties, more recent data suggest that those researchers who are productive when young continue to publish scholarly articles at high rates until retirement (Stroebe, 2010).

checkpoint can **you** . . .

- Discuss prerequisites for creative achievement?
- Summarize the relationship between creative performance and age?

Work and Education

In industrialized societies, occupational roles typically are based on age. Young people are students; young and middle-aged adults are workers; older adults organize their lives around retirement and leisure. In postindustrial societies, people make multiple transitions throughout their adult lives (Czaja, 2006).

WORK AND RETIREMENT AGE

Before 1985, the average age of retirement moved steadily downward. Since then, the trend has reversed. Before bringing their working lives to a complete stop, people may reduce work hours or days, gradually moving into retirement over a number of years. This practice is called *phased retirement*. Or they may switch to another company or a new



We become more ambidextrous—using either hand rather than a dominant hand to perform functions—as we get older. Researchers suggest this may be tied to retirement. Generally, we intensify this dominance in everyday activities. Once retirement occurs and those activities change, so may our dominance.

Kalisch, Wilimzig, Kleibel, Tegenthoff, & Dinse, 2006

line of work, a practice called *bridge employment* (Czaja, 2006). A majority of older Americans now remain active in the labor force after retirement from their career job (Cahill, Giandrea, & Quinn, 2013). Not surprisingly, those people who have retired or entered partial retirement are generally more interested in volunteering (Tang, 2016).

What has brought about this change? People may continue working to maintain their physical and emotional health and their personal and social roles or simply because they enjoy the stimulation of work (Czaja, 2006; Sterns & Huyck, 2001). Others work primarily for financial reasons. For example, data show that the implementation of the Affordable Care Act (ACA), which increased the affordability of comprehensive health care for many, led to increased early retirement and increases in part-time work (which does not generally include health benefits) among women and low-income men (Heim & Lim, 2017).

The rise in the Social Security retirement age to 67 for full benefits offers an inducement to keep working. The Age Discrimination in Employment Act, which eliminated mandatory retirement ages for most occupations, and the Americans with Disabilities Act, which requires employers to make reasonable accommodations for workers with disabilities, have helped mature workers to keep their jobs.

WORK AND COGNITIVE DEVELOPMENT

"Use it or lose it" applies to the mind as well as the body. Work can influence cognitive functioning.

Adults can affect their cognitive development by the occupational choices they make. For example, flexible thinkers tend to seek out and obtain substantively complex work—work that requires thought and independent judgment. In turn, complex work stimulates more flexible thinking, and flexible thinking then increases the ability to do such work (Kohn, 1980). Work need not necessarily be construed in the traditional way, and the same is true of men and women engaged in complex household work, such as planning a budget or making complicated repairs such as putting in new plumbing (Caplan & Schooler, 2006). Regardless of the specifics, people who are deeply engaged in complex work or cognitively stimulating lifestyles tend to show stronger cognitive performance and fewer declines than their peers as they age (Avolio & Sosik, 1999; Schaie, 1984; Schooler, 1990; La Rue, 2010).

Openness to experience—a personality variable—also affects cognitive performance over time (Sharp et al., 2010). People who are high on openness to experience are more likely to retain their faculties and show high work performance. Similarly, those people who consistently seek more stimulating opportunities are likely to remain mentally sharp (Avolio & Sosik, 1999). Interestingly, this association may work both ways. Older adults enrolled in a cognitive training program for 30 weeks showed increases in openness to experience at the conclusion of the training (Jackson, Hill, Payne, Roberts, & Stine-Morrow, 2012).

This suggests that if work, both on the job and at home, could be made meaningful and challenging, more adults might retain or improve their cognitive abilities. This seems to be happening to some extent. The gains in cognitive abilities seen in older cohorts may reflect workplace changes that put a premium on adaptability, initiative, and decentralized decision making.

checkpoint can you . . .

- Discuss trends in work and retirement in middle age?
- Explain how work can affect cognitive functioning?

THE MATURE LEARNER

In 2016, 23.6 percent of U.S adults 45 to 54 years of age and 20.2 percent of adults 55 to 65 years of age completed a work experience or credential program (National Center for Education Statistics, 2018b).

Adult Education and Work Skills Changes in the workplace often entail a need for more training or education. Expanding technology and shifting job markets require a life-span approach to learning. The largest area of non-degree-granting work credential programs involvea training in health care (National Center for Education Statistics,

2018b). Technological skills are increasingly necessary for success in the modern world and are a major component of work-related adult education. With experience, middle-aged people can perform computer-based tasks as well as young adults (Czaja, 2006), especially when they are high in positive affect and sense of control, and have retained psychomotor speed (Zhang, Grenhart, McLaughlin, & Allaire, 2017).

Employers see benefits of workplace education in improved morale, increased quality of work, better teamwork and problem solving, and greater ability to cope with new technology and other changes in the workplace (Conference Board, 1999).

Literacy Training **Literacy** is a fundamental requisite for participation not only in the workplace but in all facets of a modern, information-driven society. At the turn of the century, a person with a fourth-grade education was considered literate; today, a high school diploma is barely adequate.

In 2014, 17 percent of U.S. adults could not locate clearly identifiable information in brief English prose, 27 percent could not perform simple numerical operations such as addition, and 23 percent could not use simple technological tools such as e-mail or the Internet. Compared to other countries, the United States ranks about average on literacy tests. However, U.S. adults are clustered at both the high and low ends of the scale (Rampey et al., 2016).

Middle-aged and older adults tend to have lower literacy levels than young adults, but the average literacy level of adults ages 50 to 59 has increased since 1992. Adults below basic literacy are less likely to be employed than adults at higher literacy levels (Kutner et al., 2007; Rampey et al., 2016). In the United States, the National Literacy Act requires the states to establish literacy training centers with federal funding assistance.

Globally, 750 million adults—about 12 percent of the world population—are illiterate, mostly in sub-Saharan Africa and Southern Asia. Women make up two-thirds of illiterate adults worldwide (UNESCO, 2017). Illiteracy is especially common among women in developing nations, where education typically is considered unimportant for them. In 1990, the United Nations launched literacy programs in such developing countries as Bangladesh, Nepal, and Somalia (Linder, 1990). The United Nations Educational, Scientific and Cultural Organization is currently involved in the Capacity Development for Education, a program providing targeted evidence-based assistance with educational reform to vulnerable countries.



From what you have seen, do students of nontraditional age seem to do better or worse in college than younger students? How would you explain your observation?

literacy
In an adult, ability to use printed and written information to function in society, achieve goals, and develop knowledge and potential.

checkpoint can you . . .

- Give reasons why mature adults return to the classroom?
- Discuss the importance of literacy and literacy training in the United States and internationally?

summary and key terms

Middle Age: A Social Construct

- The concept of middle age is a social construct. It came into use in industrial societies as an increasing life span led to new roles at midlife.
- The span of middle adulthood is often subjective.
- Middle adulthood is a time of both gains and losses.
- Most middle-aged people are in good physical, cognitive, and emotional condition. They have heavy responsibilities and multiple roles and feel competent to handle them.
- Middle age is a time for taking stock and making decisions about the remaining years.

PHYSICAL DEVELOPMENT

Physical Changes

- Although some physiological changes result from aging and genetic makeup, behavior and lifestyle can affect their timing and extent.
- Most middle-aged adults compensate well for gradual, minor declines in sensory and psychomotor abilities. Losses in bone density and vital capacity are common.
- Symptoms of menopause and attitudes toward it may depend on cultural factors and natural changes of aging.

- Although men can continue to father children until late in life, many middle-aged men experience a decline in fertility and in frequency of orgasm.
- A large proportion of middle-aged men experience erectile dysfunction. Erectile dysfunction can have physical causes but also may be related to health, lifestyle, and emotional well-being.
- Sexual activity generally diminishes gradually in middle age.

presbyopia (*440*)
myopia (*440*)
presbycusis (*440*)
basal metabolism (*441*)
vital capacity (*443*)
menopause (*443*)
perimenopause (*443*)
erectile dysfunction (*446*)

Physical and Mental Health

- Most middle-aged people are healthy and have no functional limitations; however, baby boomers may be less healthy than previous generations at middle age.
- Hypertension is a major health problem beginning in midlife. Cancer has passed heart disease as the number one cause of death in midlife. The prevalence of diabetes has doubled.
- Diet, exercise, alcohol use, and smoking affect present and future health. Preventive care is important.
- Low income is associated with poorer health.
- Racial and ethnic disparities in health and health care have decreased but still persist.
- Postmenopausal women become more susceptible to heart disease as well as to bone loss leading to osteoporosis. Chances of developing breast cancer also increase with age.
- Hormone therapy is highly effective for treating some of the symptoms of menopause but has a complex pattern of risks and benefits.
- Stress occurs when the body's ability to cope is not equal to the demands on it. Stress is related to a variety of practical problems. Severe stress can affect immune functioning.
- Role and career changes and other experiences typical of middle age can be stressful, but resilience is common.
- Personality and negative emotionality can affect health. Positive emotions tend to be associated with good health.
- Psychological distress is prevalent in middle age.

hypertension (*448*)
diabetes (*448*)
osteoporosis (*451*)
mammography (*453*)
hormone therapy (HT) (*453*)
stress (*454*)
stressors (*454*)

COGNITIVE DEVELOPMENT

Measuring Cognitive Abilities in Middle Age

- The Seattle Longitudinal Study found that several of the primary mental abilities remain strong during middle age, but there is great individual variability.
- Fluid intelligence declines earlier than crystallized intelligence.

fluid intelligence (*458*)

crystallized intelligence (*458*)

The Distinctiveness of Adult Cognition

- Some theorists propose that cognition takes distinctive forms at midlife. Advances in expertise, or specialized knowledge, have been attributed to encapsulation of fluid abilities within a person's chosen field.
- Postformal thought seems especially useful in situations calling for integrative thinking.

encapsulation (*459*)

Creativity

- Creative performance depends on personal attributes and environmental forces.
- Creativity is not strongly related to intelligence.
- Previous research suggested there was an age-related decline in creative output by occupation, but more recent data suggest findings may be more complex than originally thought.

Work and Education

- A shift away from early retirement and toward more flexible options is occurring.
- Complex work may improve cognitive flexibility.
- Many adults participate in educational activities, often to improve work-related skills and knowledge.
- Literacy training is an urgent need in the United States and globally.

literacy (*463*)

Design elements: (Butterfly Icon): Stockbyte/Getty Images; (World Icon): janrysavy/Getty Images

chapter 16

Psychosocial Development in Middle Adulthood

outline

Looking at the Life Course in Middle Age

Change at Midlife: Theoretical Approaches

The Self at Midlife: Issues and Themes

Relationships at Midlife

Consensual Relationships

Relationships with Maturing Children

Other Kinship Ties

learning objectives

Discuss stability and change in development in middle adulthood.

Summarize personality development and psychological adjustment in middle age.

Identify some important aspects of close relationships in middle adulthood.



Streetangel/Getty Images

did you know?

- The idea of a midlife crisis has been largely discredited, and it is fairly unusual to have one.
- Marital satisfaction generally bottoms in early middle age and peaks when children are grown.
- With adequate support, caring for an infirm parent can be an opportunity for personal growth.

In this chapter, we look at theoretical perspectives and research on psychosocial issues and themes at midlife. We then focus on intimate relationships: marriage, cohabitation, and divorce; gay and lesbian relationships; friendships; and relationships with maturing children, aging parents, siblings, and grandchildren. All these may be woven into the rich texture of the middle years.

One of the many things nobody ever tells you about middle age is that it's such a nice change from being young.

—William Feather

Looking at the Life Course in Middle Age

Developmental scientists view the course of midlife psychosocial development in several ways. *Objectively,* they look at trajectories or pathways, such as a once-traditional wife and mother's pursuit of a midlife career. *Subjectively,* they look at how people construct their identity and the structure of their lives (Moen & Wethington, 1999).

Lives do not progress in isolation. Individual pathways intersect with those of family members, friends, acquaintances, and strangers. Work and personal roles are interdependent, and those roles are affected by trends in the larger society. Cohort, gender, ethnicity, culture, and socioeconomic status also affect the life course. All these factors and more enter into the study of psychosocial development in middle adulthood.

checkpoint can you . . .

- Distinguish between objective and subjective views of the life course?
- Identify factors that affect the life course in middle age?

Change at Midlife: Theoretical Approaches

In psychosocial terms, middle adulthood once was considered a relatively stable period of development in which little change occurred. Middle-aged adults were rarely the object of direct study. When they were involved in research, such research was more likely to focus on their role as parents and the ways in which they affected their children's development or on their role as caregivers for elderly parents (Lachman, 2004).

When research on midlife was conducted, it utilized primarily cross-sectional designs in which adults of different ages were compared to each other. This work obscured individual trajectories and patterns of change and stability (Willis, Martin, & Röcke, 2010). It focused primarily on average changes in middle-aged adults under the assumption that after the rapid changes of childhood and adolescence and before the declines of late adulthood, development was relatively stable (Schaie, 2005).

However, there is a renewed interest in midlife research. The changing demographics of countries such as the United States, where large proportions of middle-aged adults are moving into late adulthood, has made studying the dynamics of this age more vital. Moreover, the field and the tools available to researchers have changed. Newer work, utilizing previously unavailable longitudinal data and more sophisticated statistical techniques, has allowed researchers to more carefully track individual trajectories of change and stability (Willis et al., 2010). In the following section, we focus on some classic models of middle adulthood that have had the greatest impact on the field as a way to frame our understanding of development in midlife.

TRAIT MODELS

Recall that the best known trait model of personality described the individual differences between people as consisting of five factors: openness to experience, conscienciousness,



The Big Five traits are related to actual, physical differences in brain structures of adults. For example, extraversion is correlated to the size of the medial orbitofrontal cortex—an area of the brain involved in processing rewards—and neuroticism is related to the volume of brain areas associated with threat and punishment. This supports a biologically based model of the Big Five.

DeYoung et al., 2010

extraversion, agreeableness, and neuroticism (Costa & McCrae, 1980). The research in this area originally claimed that these traits, known as the Big Five, were relatively continuous and were not believed to change in any appreciable way after the age of 30. More recent data suggest changes during those years are possible (Roberts & Mroczek, 2008).

What specific changes have been noted? Conscientiousness—being deliberate, organized, and disciplined—tends to be highest in middle age (Donellan & Lucas, 2008), perhaps as a result of work experiences (Roberts & Mroczek, 2008). Individual life trajectories can affect this process. For example, compared to people who continue to work, retirees tend to increase in agreeableness—being straightforward, altruistic, and modest—and decrease in activity (Lockenhoff, Terracciano, & Costa, 2009). However, those who become unemployed against their will show decreases in agreeableness and conscientiousness. This relationship is stronger, especially in men, the longer the unemployment persists (Boyce, Wood, Daly, & Sedikides, 2015). Social relationships matter too. Middle-aged men who remarry tend to become less neurotic (Roberts & Mroczek, 2008); those who divorce decrease in extraversion (Allemand, Hill, & Lehmann, 2015); and increases in extraversion and agreeableness, along with decreases in neuroticism, are associated with high perceived social support (Allemand, Schaffhuser, & Martin, 2015; Hill, Weston, & Jackson, 2017).

Are the Big Five a human universal? It does appear that, at least in literate, urban samples across a large number of cultures, the Big Five traits are a good representation of personality (McCrae & Costa, 1997; McCrae & Terracciano, 2005). However, either the traits themselves or the processes that underlie them are likely not universal. For example, in one study, researchers found the same traits represented in Japanese and American samples over a 9-year period; however, there were much greater fluctuations in trait levels in the Japanese than in the American sample (Chopik & Kitayama, 2018). This process interacts with gender. Research across 55 nations has shown that gender differences in personality traits are larger in more prosperous nations where women have more equality. In such nations, women tend to report higher levels of neuroticism, extraversion, agreeableness, and conscientiousness than men (Schmitt, Realo, Voracek, & Allik, 2008).

Moreover, the same five factors may not exist in all cultures. A study involving individuals of the Tsimané, a preliterate, hunter-gatherer indigenous society, did not find the same five-factor personality structure. The structure that emerged from their data could more accurately be characterized as two primary factors organized around "prosociality" and "industriousness," perhaps more important in a society dependent on subsistence labor to survive (Gurven, von Rueden, Massenkoff, Kaplan, & Lero Vie, 2013). Thus, culture may affect which features of the personality emerge as important or the processes that involve personality change over time.

NORMATIVE-STAGE MODELS

Erik Erikson was the most influential of the normative-stage theorists. As with all stages of the life span, Erikson believed there was a challenge to be faced in middle age, with both risks and positive outcomes possible.

generativity versus stagnation
Erikson's seventh stage of psychosocial development, in which the middle-aged adult develops a concern with establishing, guiding, and influencing the next generation or else experiences stagnation (a sense of inactivity or lifelessness).

generativity
Erikson's term for concern of mature adults for finding meaning through contributing to society and leaving a legacy for future generations.

Erikson believed that the years around age 40 were a time when people entered their seventh stage: **generativity versus stagnation. Generativity,** as Erikson defined it, involved finding meaning through contributing to society and leaving a legacy for future generations. The virtue of this period is *care:* "a widening commitment to *take care* of the persons, the products, and the ideas one has learned *to care for*" (Erikson, 1985, p. 67). People who do not find an outlet for generativity run the risk of becoming self-absorbed, self-indulgent, and stagnant. Adults who slide into stagnation may find themselves disconnected from their communities because of their failure to find a way to contribute.

Erikson believed that generativity was especially salient during midlife because of the demands placed on adults through work and family. Research (see Table 1) supports that middle-aged people do indeed score higher on generativity than younger and older

ones. The age at which individuals achieve generativity varies, as does its strength at any particular time, and some people are more generative than others (Keyes & Ryff, 1998; McAdams, 2006; Steward & Vandewater, 1998).

Overall, women report higher levels of generativity than men do, and this is particularly true in early adulthood (Keyes & Ryff, 1998). Moreover, for women, being a parent does not seem to be pivotal in the development of generativity. However, for men, having a child early in adulthood is associated with greater generativity. In one study, young fathers had higher scores on generative behavior than older fathers (Karacan, 2014). By late adulthood, levels of generativity in men and women are more similar (Keyes & Ryff, 1998; Cox, Wilt, Olson, & McAdams, 2010). Apparently, even those adults who enter midlife with low levels of generativity can catch up to their peers later (Whitbourne, Sneed, & Sayer, 2009). It may be that relief from primary family and work responsibilities frees middle-aged and older adults to express generativity on a broader scale (Keyes & Ryff, 1998).

For many adults, generativity is expressed through parenting, as well as through the generally more leisurely pursuit of grandparenting (Hebblethwaite & Norris, 2011). However, this is not the only path; generativity can derive from involvement in multiple roles (McAdams, 2013; Chen, Krahn, Galambos, & Johnson, 2019). It can be expressed through teaching or mentorship, productivity or creativity, and self-generation or self-development. It can extend to the world of work, to politics, to religion, to hobbies, to art, to music, and to other spheres, or as Erikson called it, "maintenance of the world." Regardless of its form, generativity tends to be associated with prosocial behavior (McAdams, 2006). So, for example, volunteering for community service or for a political cause is an expression of generativity (Hart, Southerland, & Atkins, 2003; Matsuba et al., 2012).



Generativity, a concern for guiding the younger generation, can be expressed through coaching or mentoring. Generativity may be a key to well-being in midlife.
SW Productions/Photodisc/Getty Images

High levels of generativity are linked to positive outcomes. For example, highly generative people tend to report greater well-being and satisfaction in midlife (McAdams, 2001; Adams-Price, Nadorff, Morse, Davis, & Sterns, 2018) and in later adulthood (Sheldon & Kasser, 2001; Adams-Price et al., 2018), perhaps through the sense of having contributed meaningfully to society (Roman, 2018). Moreover, the positive effects are also physical in nature; generativity is also associated with good health and a decreased risk of disability, cognitive decline, and mortality (Gruenewald, Liao, & Seeman, 2012; Malone, Liu, Vaillant, Rentz, & Waldinger, 2016).

TIMING OF EVENTS: THE SOCIAL CLOCK

Every culture has a social clock describing the ages at which people are expected to reach certain milestones. Timing of events models suggest that, rather than being based on years lived, development is more affected by *when* events occur in a person's life. In other words, what matters is not that a person turns 65 but that the person retires.

In previous generations, the timing of major events in the social clock were fairly predictable. When occupational patterns were more stable and retirement at age 65 was almost universal, the meaning of work was more similar for all adults nearing retirement age. However, in a time of frequent job changes, downsizing, and either early or delayed retirement, the meaning of work is more variable. Similarly, when most women's lives revolved around bearing and rearing children, the end of the reproductive years meant something different. When people died at younger ages, those who survived into middle age were more likely to feel that they were reaching the end of their life. Today,

TABLE 1 A Self-Report Test for Generativity

• I try to pass along the knowledge I have gained through my experiences.
• I do not feel that other people need me.
• I think I would like the work of a teacher.
• I feel as though I have made a difference to many people.
• I do not volunteer to work for a charity.
• I have made and created things that have had an impact on other people.
• I try to be creative in most things that I do.
• I think that I will be remembered for a long time after I die.
• I believe that society cannot be responsible for providing food and shelter for all homeless people.
• Others would say that I have made unique contributions to society.
• If I were unable to have children of my own, I would like to adopt children.
• I have important skills that I try to teach others.
• I feel that I have done nothing that will survive after I die.
• In general, my actions do not have a positive effect on others.
• I feel as though I have done nothing of worth to contribute to others.
• I have made many commitments to many different kinds of people, groups, and activities in my life.
• Other people say that I am a very productive person.
• I have a responsibility to improve the neighborhood in which I live.
• People come to me for advice.
• I feel as though my contributions will exist after I die.

Source: McAdams, Dan P., and Ed de St. Aubin. "A Theory of Generativity and its Assessment through Self-Report, Behavioral Acts, and Narrative Themes in Autobiography." *Journal of Personality and Social Psychology* 62, no. 6 (1992): 1003--015. https://psycnet.apa.org/buy/1992-33565-001.

middle-aged people may be raising children, being parents to adolescents and young adults, or serving as caregivers to aging parents. Because the pathways people take are more varied, so are the boundaries of middle age.

Research has shown a number of factors affect people's subjective sense of aging and their entry into middle age. For instance, ethnic minority group members, people who have lower levels of education or socioeconomic status, young parents, divorced people, or people whose parents have died tend to report an earlier age of entry into middle age (Toothman & Barrett, 2011; Barrett & Toothman, 2017). Gender also alters the subjective timeline. Women report that middle age starts and ends later than men do, perhaps in an attempt to avoid the social devaluation conferred upon "old" women (Toothman & Barrett, 2011). Getting older matters as well. As people age, they tend to report feeling younger than what they actually are, and what they consider to be "middle-aged" versus "old" shifts upward (Shinan-Altman & Werner, 2019).

While many middle-aged adults seem well able to handle this life stage (Lachman, 2004), research suggests that adults who get "off track" may have more difficulties than those who follow the expected trajectory for individuals in their culture. For example, one study of almost 700 Turkish adults found that those who perceived themselves as married "on time" showed higher levels of well-being, autonomy, competence, and relatedness than those who perceived themselves as early or late (Pekel-Uludağlı & Akbaş, 2016). Similarly, longitudinal research with 405 Canadian adults found early marriage

was associated with a lower risk of depression in middle age. This provides support for the influence of social norms on age (Johnson, Krahn, & Galambos, 2017).

While there are many norms regarding the "correct" timing for life events, one particularly strong influence, especially for women, involves norms surrounding parenting (Billari et al., 2010). Early parenting, for instance, has been associated with declines in well-being and an increased risk of depression when compared to on-time parenting (Koropeckyj-Cox, Pienta, & Brown, 2007; Pekel-Uludağlı & Akbaş, 2018).

Because women's fertility declines with age, norms regarding late parenting are generally felt more strongly by women than men. In survey data collected from 25 European countries involving over 43,000 people, 57.2 percent of respondents said that women over the age of 40 were generally too old to consider having a child (Billari et al., 2010), despite estimates that only about 17 percent of 40-year-old women are definitely infertile (Leridon, 2008). Still, because of the intense time-graded social norms regarding motherhood, women are likely to feel increasing pressure to have children with age, and this affects adjustment to midlife. While women who have children report declines in reproductive anxiety over time, women who do not have children are more likely to express anxiety about reproductive aging (Barrett & Toothman, 2017). This process can interact with culture. For instance, research in 12 European countries found that those women who had children more than 2 years later than their country's average age for their cohort were, in old age, lonelier than those who had children "on time." Moreover, this effect was stronger in more traditionalist countries.

Fortunately, despite the multiple challenges and variable events of midlife, many middle-aged adults show remarkable resilience (Ryff et al., 2012). In the following section, we focus on the psychosocial challenges of midlife, on how people resolve their changing identity, and on the maintenance of psychological well-being and positive mental health during aging.



Research suggests that people who are required to wear a uniform at work have lower morbidity than those who can wear what they choose. The researchers suggest that clothing is often an environmental cue to aging, and uniforms, because everyone must wear the same thing, removes that cue and thereby primes improved health.

Hsu, Chung, & Langer, 2010

checkpoint can you . . .

- Summarize important changes that occur at midlife, according to trait and normative-stage theory and research?
- Tell how historical and cultural changes have affected the social clock for middle age?

The Self at Midlife: Issues and Themes

Whether we look at middle-aged people objectively, in terms of their outward behavior, or subjectively, in terms of how they describe themselves, certain issues and themes emerge. Is there such a thing as a midlife crisis? How does identity develop in middle age? What contributes to psychological well-being?

IS THERE A MIDLIFE CRISIS?

The middle-aged man who impulsively buys an expensive sports car or the woman who suddenly leaves her job and home to travel to find herself are familiar stereotypes. Often, changes in personality and lifestyle such as these during the early to middle forties are attributed to what has been called a **midlife crisis.** At about this age, many people realize that they will not be able to fulfill the dreams of their youth, or that fulfillment of their dreams has not brought the satisfaction they expected, and they become more aware of their own mortality. The midlife crisis is a supposedly stressful period triggered by this review and reevaluation of one's life.

midlife crisis
In some normative-crisis models, stressful life period precipitated by the review and reevaluation of one's past, typically occurring in the early to middle forties.

There is both longitudinal and cross-sectional evidence from multiple countries that, on average, both men and women's well-being gradually drops until they reach midlife.

As far as you know, did one or both of your parents go through what appeared to be a midlife crisis? If you are middle-aged or older, did you go through such a crisis? If so, what issues made it a crisis? Did it seem more serious than transitions at other times of life?

At that point, it gradually and smoothly increases until at least the age of 70, although this shift occurs sooner for those people who are temperamentally higher in well-being or who come from countries with higher levels of well-being as a whole (Cheng, Powdthavee, & Oswald, 2015); Graham & Pozuelo, 2017).

Despite the midlife dip in well-being, the term *midlife crisis* is now considered an inaccurate representation of what most people experience (Wethington, 2000). Crises are not experienced only during midlife, although they are somewhat more common during that time, and not all people experience them. For example, from their twenties to their forties, 39 to 46 percent of men and 49 to 59 percent of women report a crisis (Robinson & Wright, 2013). People who do have crises at midlife generally also have crises at other times in their lives as well, so a midlife crisis may be a manifestation of a neurotic personality rather than a developmental phase (Lachman, Teshale, & Agrigoroaei, 2015).

Crises are sometimes triggered by events or circumstances. So, for example, in one study, older Korean adults with higher education and economic status were less likely to experience a midlife crisis, while poor health, low social support, and high stress were associated with a greater likelihood of experiencing a midlife crisis (Chang, 2018).

Recent research with chimpanzees and orangutans shows an inverted U-shaped curve for well-being. Researchers have interpreted this as suggesting that, just like us, some great apes experience a midlife crisis of sorts.

Weiss, King, Inoue-Murayama, Matsuzawa, & Oswald, 2012

Men and women also differ with respect to the types of issues that precipitate a crisis. Men report more crises centered upon work, while women report more concerns regarding relationships and family issues (Robinson & Wright, 2013).

It may be better to consider midlife a **turning point**—a psychological transition that involves significant change or transformation in the perceived meaning, purpose, or direction of a person's life. Turning points may be triggered by major life events, normative changes, or a new understanding of past experience, either positive or negative, and they may be stressful. However, in the MIDUS survey and in studies of resilience, many respondents reported positive growth from successful resolution of life challenges (Ryff et al., 2012).

turning point
Psychological transitions that involve significant change or transformation in the perceived meaning, purpose, or direction of a person's life.

Turning points often involve an introspective review and reappraisal of values and priorities (Bauer & McAdams, 2004). The **midlife review** involves recognizing the finiteness of life and can be a time of taking stock, discovering new insights about the self, and spurring midcourse corrections in the design and trajectory of one's life. However, it can also involve regret over failure to achieve a dream or a keener awareness of *developmental deadlines*—time constraints on, say, the ability to have a child or to make up with an estranged friend or family member (Heckhausen, 2001).

midlife review
Introspective examination that often occurs in middle age, leading to reappraisal and revision of values and priorities.

Whether a turning point becomes a crisis may depend less on age than on individual circumstances and personal resources. People with **ego resiliency**—the ability to adapt flexibly and resourcefully to potential sources of stress—and those who have a sense of mastery and control are more likely to navigate the midlife crossing successfully (Heckhausen, 2001; Lachman, 2004; Kremen, Lachman, Pruessner, Sliwinski, & Wilson, 2012). They recover from stress more rapidly (Tugade, Frederickson, & Feldman Barrett, 2004), are less likely to become depressed after experiencing a trauma (Frederickson, Tugade, Waugh, & Larkin, 2003), and are less likely to experience a midlife crisis (Chang, 2018). For people with resilient personalities, even negative events, such as an unwanted divorce, can become springboards for positive growth (Klohnen, 1996; Moen & Wethington, 1999) (see Table 2).

ego-resiliency
The ability to adapt flexibly and resourcefully to potential sources of stress.



A midlife review might inspire a woman who senses her biological clock ticking to move forward on her wish to have a child.
thechatat/Shutterstock

IDENTITY DEVELOPMENT

Although Erikson defined identity formation as the main concern of adolescence, he noted that identity continues to develop throughout adulthood as well.

MIDLIFE CAREER CHANGE

As originally described by Erik Erikson, midlife is characterized as including a period of "life review" that involves evaluating past and present priorities, shifting responsibilities, and seeking out rewarding activities. One area in which people may experience life review relates to their career.

In prior generations, people often stayed employed with the same company from young adulthood to old age. However, this pattern is increasingly rare in today's world. Corporate restructuring, organizational downsizing, layoffs, and rapid technological change may eliminate certain classes of jobs (Myers & Harper, 2014) and, in doing so, prompt a life review focused on occupational identity. For some middle-aged adults, appraisal of career satisfaction prompts change and leads them to voluntarily seek new careers as well-seasoned professionals in midlife.

Motivations for voluntary midlife career change include personal fulfillment, career satisfaction, contributing to greater societal good, increased prestige, or intentionally pursuing career paths put on hold during early adulthood (Etaugh, 2013). Phanse & Kaur (2015) conducted interviews with managers near the peak of their careers who opted for career change. Multiple reasons were cited, but the majority centered around themes of "self-renewal" and desire to perform new, more creative work. Other common reasons include lack of challenge, stress and anxiety due to job insecurity, workplace bullying, and conflicts with management (Barclay, Stoltz, & Chung, 2011).

Career transition can work out in favor or to the detriment of the career seeker. A failed career transition may result in psychological distress or damage to professional reputation (Barclay et al., 2011). While some pursue a new, clearly defined career interest, for others, options take years to crystallize into a solid career path (Etaugh, 2013). A strong sense of career identity can also cloud vision on work skills that are valuable and applicable across industries, leading people to overlook jobs they might be well suited for (Howes & Goodman-Delahunty, 2014).

Many describe midlife career change as "soul searching" and "stressful," but it can also be rewarding. Self-efficacy and confidence work as catalysts for successful midlife career change (Etaugh, 2013). "Survival needs," or being able to financially provide for family, are linked to psychological well-being and are a chief area of consideration in midlife career change (Kim, Fouad, Maeda, Xie, & Nazan, 2017).



What would you recommend to those seeking a midlife career transition? What approaches could workplaces take in better supporting needs of middle-aged professionals?

Susan Krauss Whitbourne: Identity Processes According to the **identity process theory (IPT)** of Susan Krauss Whitbourne (1987, 1996; Jones, Whitbourne, & Skultety, 2006), physical characteristics, cognitive abilities, and personality traits are incorporated into **identity schemas.** These self-perceptions are continually confirmed or revised in response to incoming information.

Piaget described two processes that have been applied toward understanding identity development. *Assimilation* is the interpretation of new information via existing cognitive structures. *Accommodation* involves changing cognitive structures to more closely align with what is encountered. **Identity assimilation** involves holding onto a consistent sense of self in the face of new experiences that do not fit the current understanding of the self. Contradictory or confusing information is absorbed without changing one's identity schema. **Identity accommodation,** in contrast, involves adjusting the identity schema to fit new experiences. Here discontinuity of the self is the result because identity accommodation involves changing the understanding of the self.

Ideally, people are able to achieve **identity balance** and maintain a stable sense of self while adjusting their self-schemas to incorporate new information, such as the effects of aging. People who achieve identity balance recognize changes and respond flexibly; they seek to control what can be controlled and accept what cannot.

Overuse of either assimilation or accommodation is unhealthy. People who constantly assimilate may seek to maintain a youthful self-image and ignore what is going

identity process theory (IPT)
Whitbourne's theory of identity development based on processes of assimilation and accommodation.

identity schemas
Accumulated perceptions of the self shaped by incoming information from intimate relationships, work-related situations, and community and other experiences.

identity assimilation
Whitbourne's term for effort to fit new experience into an existing self-concept.

identity accommodation
Whitbourne's term for adjusting the self-concept to fit new experience.

identity balance
Whitbourne's term for a tendency to balance assimilation and accommodation.

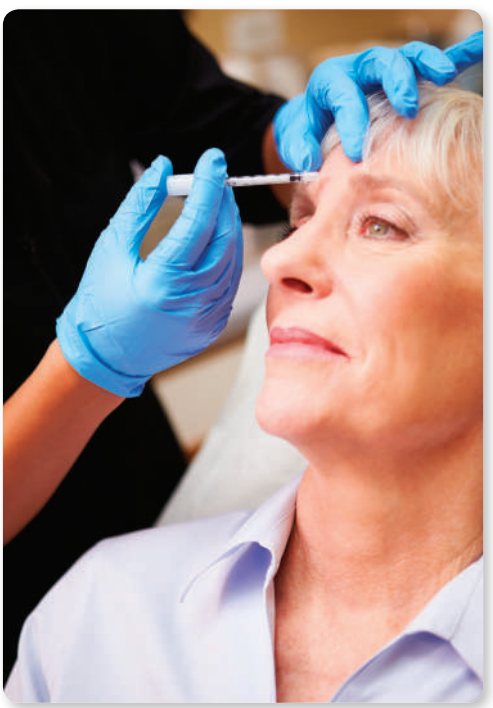
TABLE 2 Characteristics of Ego-Resilient Adults

Most Characteristic	Most Uncharacteristic
Has insight into own motives and behavior	Has brittle ego-defense; maladaptive under stress
Has warmth; capacity for close relationships	Is self-defeating
Has social poise and presence	Is uncomfortable with uncertainty and complexities
Is productive; gets things done	Overreacts to minor frustrations; is irritable
Is calm, relaxed in manner	Denies unpleasant thoughts and experiences
Is skilled in social techniques of imaginary play	Does not vary roles; relates to all in same way
Is socially perceptive of interpersonal cues	Is basically anxious
Can see to the heart of important problems	Gives up and withdraws from frustration or adversity
Is genuinely dependable and responsible	Is emotionally bland
Responds to humor	Is vulnerable to real or fancied threat; fearful
Values own independence and autonomy	Tends to ruminate and have preoccupying thoughts
Tends to arouse liking and acceptance	Feels cheated and victimized by life
Initiates humor	Feels a lack of personal meaning in life

Note: These items are used as criteria for rating ego-resiliency, using the California Adult Q-Set.

Source: Adapted from Block, 1991, as reprinted in Klohnen, 1996.

on in their body. This process of denial may make it harder for them to confront the reality of aging when it can no longer be ignored. By contrast, people who constantly accommodate are weak and highly vulnerable to criticism. Their identity is easily undermined. They may overreact to early signs of aging, such as the first gray hair, and their pessimism may hasten physical and cognitive declines.



The popularity of regular Botox injections to temporarily smooth lines and wrinkles may express what Whitbourne calls an assimilative identity style.
Monkey Business Images/Shutterstock

Generativity and Identity Erikson saw generativity as an aspect of identity formation. Research supports this connection. Successful achievement of identity is associated with generativity, and both together are then associated with positive outcomes.

A particularly fruitful place to examine this is with respect to balancing the demands of home and family, something that is generally more difficult for women than men (Allen, Herts, Bruck, & Sutton, 2000). The process of fulfilling multiple roles, which for women may involve challenging traditional norms and stereotypes, is one that is likely to affect identity processes. Moreover, work and children are areas in which people often seek generative action. Thus, most work in this area has focused on women.

Research has found that for women, inhabiting multiple roles early in life—whether or not they were married, had children, or worked outside the home—impacted identity development. Those women who filled more social roles were more likely to develop a firm sense of identity, and, once developed, their identity balance was associated with generativity and, consequently, well-being, psychological health, and successful resolution of work-family conflict (Vandewater, Ostrove, & Stewart, 1997; DeHaan & MacDermid, 1994; Peterson & Stewart, 1996).

Once established, generativity paves the way for positive life outcomes. For instance, generativity has been associated with positive feelings about marriage, motherhood, and the care of aging parents, and an increased certainty about identity and sense of confidence late in life (Peterson & Duncan, 2007; Peterson, 2002; Zucker, Ostrove, & Stewart, 2002). The relationship between identity and generativity may also affect behavior. In a study comparing environmental

activists and nonactivists, identity maturity was associated with more activism. Presumably, this was because having a mature identity motivated individuals to act in more a generative fashion (Matsuba et al., 2012). These behaviors can have long-term health consequences. In one study, highly generative people from the ages of 60 to 75 years were found to have more frequent social contact with and provide more support to others, volunteer more, have lower levels of negative affect, be more likely to be married, have higher levels of education, and be less likely to smoke, all variables that affect health. Over the course of 10 years, they were also found to have a lower risk of impairment in activities of daily living or mortality (Gruenewald, Liao, & Seeman, 2012).

Narrative Psychology: Identity as a Life Story We all carry with us the story of who we are. The field of *narrative psychology* views the development of the self as a continuous process of constructing one's life story—a dramatic narrative to help make sense of one's life and connect the past and present with the future (McAdams, 2006). This evolving story provides a person with a "narrative identity" (Singer, 2004). Indeed, some narrative psychologists view identity itself as this internalized *script* or story. People follow the script they have created as they act out their identity (McAdams, Diamond, de St. Aubin, & Mansfield, 1997). Midlife often is a time for revision of the life story (McAdams, 1993; Rosenberg, Rosenberg, & Farrell, 1999).

Studies in narrative psychology are based on a standardized 2-hour life-story interview. The participant is asked to think of his or her life as a book, to divide the book into chapters, and to recall eight key scenes, each of which includes a turning point. Research using this technique has found that people's scripts tend to reflect their personalities (McAdams, 2006).

Highly generative adults tend to construct *generativity scripts.* These scripts often feature a theme of *redemption,* or deliverance from suffering, and are associated with psychological well-being. In one such story, a nurse devotes herself to the care of a good friend during a fatal illness. Although devastated by her friend's death, she comes out of the experience with a renewed sense of confidence and determination to help others (McAdams, 2006). The tendency to develop narratives in which events are generally interpreted as being positive and negative events are closely examined and processed for their meaning is associated with well-being and adjustment (Lilgendahl & McAdams, 2011; Weststrate & Glück, 2017).

checkpoint can you . . .

- Compare the concepts of the midlife crisis and of turning points and discuss their relative prevalence?
- State typical concerns of the midlife transition and factors that affect how successfully people come through it?
- Summarize Whitbourne's identity process theory and tell how identity assimilation, identity accommodation, and identity balance differ, especially in response to signs of aging?

checkpoint can you . . .

- Explain the connection between generativity and identity and discuss research on generativity and age?
- Explain the concept of identity as a life story, and how it relates to generativity?

PSYCHOLOGICAL WELL-BEING AND POSITIVE MENTAL HEALTH

Mental health is not just the absence of mental illness. *Positive* mental health involves a sense of psychological well-being, which goes hand in hand with a healthy sense of self (Keyes & Shapiro, 2004). How do developmental scientists measure well-being, and what factors affect well-being at midlife?

Emotionality, Personality, and Age Many studies, including the MIDUS survey, have found a gradual decline in negative emotions and an increase in positive emotions through early adulthood to old age (Mroczek, 2004; Carstensen et al., 2011; Diehl, Hay, & Berg, 2011). According to the MIDUS findings, women reported slightly more negative emotionality (such as anger, fear, and anxiety) at all ages than men. Positive emotionality (such as cheerfulness) increases, on average, among men but falls among women in middle age and then rises sharply for both sexes, but especially men, in late adulthood (Mroczek, 2004). Generally, increasing age is associated with more effective emotional regulation, greater emotional well-being, and more co-occurrence of positive and negative emotions (Carstensen et al., 2011).

The ability to regulate emotions has implications for the stressors of daily life. Younger adults show greater individual variation in emotionality than older adults. In other words, while average levels of emotionality are similar in both younger and older adults, older adults show less of a positive rise in response to positive events, but also



We get more nostalgic as we age. One of the consequences of this is it makes us more susceptible to advertisements that appeal to nostalgia and more likely to purchase an item.

Kusumi, Matsuda, & Sugimori, 2010



Just like emotionality, self-esteem becomes more stable with increasing age.

Meier, Orth, Denissen & Kuhnel, 2011



The Red Hat Society, whose members go to tea in red hats and purple dresses, began with a few women friends' decision to greet middle age with verve, humor, and élan.
nano/Getty Images

less of a negative rise to negative events (Röcke, Li, & Smight, 2009). However, younger adults may experience more stressful events than older adults. When adults of different ages are matched for the number of daily stressors they experience, some of the variability in emotional responses is reduced (Brose, Scheibe, & Schmiedek, 2013).

Relationships can also affect emotional experiences and hence stress. Married people at midlife tended to report more positive emotions and fewer negative emotions than unmarried people (Mroczek, 2004), but the quality of the relationship affects this process. Continuously married people, and especially those who reported an increase in marital satisfaction over time, showed markers associated with good cardiovascular health when compared to remarried adults. This suggests that the marital discord and strain experienced by the remarried adults had lasting effects on their health (Donoho, Seeman, Sloan, & Crimmins, 2015).

Subjective well-being (how happy a person feels) is also related to personality traits, especially neuroticism. People who are high in neuroticism are more likely to experience a low sense of subjective well-being. High extraversion and conscientiousness, by contrast, are associated with high subjective well-being (Weiss, Bates, & Luciano, 2008; Anglim & Grant, 2016; Grant, Langan-Fox, & Anglim, 2009).

There are some normative developmental trends in personality. Specifically, in adulthood, people generally show increases in agreeableness, conscientiousness, and emotional stability and decreases in extraversion, neuroticism, and openness to experience (Roberts, Walton, & Viechtbauer, 2006; Milojev & Sibley, 2017). However, people also show individual change, which can be a response to their unique life trajectory, and these factors interact with each other. For instance, people high in extraversion, agreeableness, emotional stability, and openness to experience are likely to also be high in well-being. And increases in well-being over time predict increases in extraversion, agreeableness, emotional stability, and openness to experience. Thus, some people may be more well-suited to positively and adaptively addressing the challenges of midlife (Hill, Turiano, Mroczek, & Roberts, 2012).

Life Satisfaction and Age While many international surveys originally reported that most adults of all ages, both sexes, and all races report being satisfied with their lives (Myers, 2000; Walker, Skowronski, & Thompson, 2003), more recent data suggest that when very poor or troubled nations are included in analyses, we cannot characterize all people as being satisfied with their lives. However, it is still the case that the majority of societies meet enough basic human needs so that happiness is the default condition for people in many cultures (Diener, Diener, Choi, & Oishi, 2018). One reason for this general finding of life satisfaction under many circumstances is that the positive emotions associated with pleasant memories tend to persist, whereas the negative feelings associated with unpleasant memories fade. Most people also have good coping skills (Walker et al., 2003). After either especially happy or distressing events, such as marriage or divorce, they generally adapt, and subjective well-being returns to, or close to, its previous level (Lucas et al., 2003; Diener, 2000).

Social support—friends and spouses—and religiosity are important contributors to life satisfaction (Diener, 2000; Myers, 2000). So are certain personality dimensions—extraversion and conscientiousness (Mroczek & Spiro, 2005; Siegler & Brummett, 2000) and the quality of work and leisure (Diener, 2000; Myers, 2000). Moreover, the relationship between many of these factors is interactive. For instance, having good social relationships makes people happier, which then results in better social relationships (Lyubomirsky, King, & Diener, 2005). Being happy at work is associated with higher life satisfaction, which then predicts work productivity and occupational commitment (Erdogan, Bauer, Truxillo, & Mansfield, 2012).

Not surprisingly, income affects life satisfaction as well. Adults who make more money report higher life satisfaction, and this relationship is strongest in middle

adulthood (Cheung & Lucas, 2015). Moreover, people in wealthier nations report greater subjective well-being than those in poorer nations (Ng & Diener, 2018). However, purchasing material goods does not increase life satisfaction, although spending money for experiences does (Gilovich, Kumar, & Jampol, 2014).

Exercise matters too. In a daily diary study, middle-aged and older adults who engaged in more physical activity on a regular basis reported higher life satisfaction than more sedentary adults, and all study participants reported higher life satisfaction on days in which they were more active than usual (Maher, Pincus, Ram, & Conroy, 2015). It may be that the association between life satisfaction and exercise is driven by overall physical health, as healthier people are more likely to engage in physical activity.

Does life satisfaction change with age? Although a majority of older adults report rising levels of life satisfaction as they age, this is certainly not the case for every adult. Adults who report poor social relationships and a lack of a sense of control tend to report declines in life satisfaction (Rocke & Lachman, 2008). There are also developmental changes that can best be described as fitting a U-shaped curve. Generally, life satisfaction is lower in early adulthood, rises in mid-adulthood, and then declines again in late adulthood (Maher et al., 2015; Mroczek & Spiro, 2005; Helson & Wink, 1992). This may in part be driven by how adults feel about themselves as self-esteem shows a path similar to that of life satisfaction, suggesting a link between the two. Self-esteem seems to increase until middle adulthood, peak at 60 years of age, and then decline (Orth, Trzesniewski, & Robins, 2010).

Multiple Dimensions of Well-Being Within the discipline of psychology, a subjective sense of happiness is characterized as well-being. Although people generally have an overall sense of how happy they are, happiness is multidimensional, and people can be more or less pleased with various aspects of their life. Carol Ryff and colleagues developed a model that includes six dimensions of well-being referred to as the Ryff Well-Being Inventory (Keyes & Ryff, 1999; Ryff, 1995; Ryff & Keyes, 1995; Ryff & Singer, 1998). The model includes six dimensions: self-acceptance, positive relations with others, autonomy, environmental mastery, purpose in life, and personal growth. As described in Table 3, those who score higher on these dimensions may have a stronger sense of well-being than those who score lower.

Studies using Ryff's scale have shown midlife to be a period of generally positive mental health. In cross-sectional research, middle-age people were more autonomous than younger adults but less purposeful and less focused on personal growth—future-oriented dimensions that declined in late adulthood. Environmental mastery, on the other hand, increased for all groups over time. Self-acceptance was relatively stable for all age groups. Overall, men's and women's well-being were quite similar, but women had more positive social relationships (Ryff, 1998; Ryff, 2014; Springer, Pudrovska, & Hauser, 2011).

When Ryff's scale was used to measure the psychological well-being of minority group members, the collective portrait replicated these age-related patterns. However, black and Hispanic women scored lower than black and Hispanic men in several areas. But when employment and marital status were controlled, minority status predicted positive well-being in several areas, even when education and perceived discrimination were accounted for. It may be that such factors as self-regard, mastery, and personal growth are strengthened by meeting the challenges of minority life (Ryff et al., 2004).

Research suggests that more recent immigrants to the United States may be more physically and mentally healthy than those who have been here for two or more generations. Resistance to assimilation may promote well-being in first-generation immigrants, especially in the domains of autonomy, quality of relationships, and purpose in life. Researchers have proposed the term *ethnic conservatism* for this tendency to resist assimilation and cling to familiar values and practices that give meaning to life. Ethnic conservatism is less effective in promoting well-being among the second generation, who may find it harder to resist the pull of assimilation (Horton & Schweder, 2004). By contrast, bicultural identity—being able to identify with both minority and majority cultures—is associated with well-being (Yamaguchi, Kim, Oshio, & Akutsu, 2016; Ferrari, Rosnati, Manzi, & Benet-Martínez, 2015).

checkpoint can you . . .

- Explain the concept of positive mental health?
- Discuss age trends in emotionality, personality, life satisfaction, and psychological well-being?
- Explain the importance of a multifaceted measure of well-being, and name and describe the six dimensions in Ryff's model?

TABLE 3 Definitions of Theory-Guided Dimensions of Well-Being

SELF-ACCEPTANCE	
High scorer: maintains positive feelings about the self, integrating both positive and negative aspects of the multidimensional self; is satisfied with past life choices. *Low scorer:* is dissatisfied with the self and dislikes personal characteristics; would prefer to be different and is troubled and disappointed with past life choices.	
POSITIVE RELATIONS WITH OTHERS	
High scorer: has high quality, loving and trusting relationships with others; expresses empathy for others and concern with their welfare; appreciates the dynamic and interactive give and take that relationships require. *Low scorer:* is distant and mistrustful; shows little empathy or warmth toward others; tends to remain isolated and unhappy in relationships; unwilling to make compromises.	
AUTONOMY	
High scorer: is self-sufficient and independent; acts in accordance with personal standards and is not easily swayed by societal pressures; has internal regulation of behavior. *Low scorer:* worries about the opinions of others; looks to others for standards of behavior and guidance on important decisions; tends to conform.	
ENVIRONMENTAL MASTERY	
High scorer: feels confident in abilities and is capable of managing the environment; is able to effectively utilize emerging opportunities; uses personal needs as a guide in the creation or selection of contexts suitable for those needs. *Low scorer:* is ineffective at managing everyday responsibilities; feels helpless in the face of difficulty; fails to recognize available opportunities or potential changes that might improve situations; lacks a sense of personal control over events.	
PURPOSE IN LIFE	
High scorer: has articulated personal goals and has a sense of purpose in life; has beliefs, aims, and objectives that guide life choices; feels a sense of meaning that incorporates both past and present life. *Low scorer:* drifts through life without a clear sense of direction; lacks personal goals and sees little purpose to past life; feels as if life has little meaning.	
PERSONAL GROWTH	
High scorer: feels that the self is continually developing and expanding over time and has a sense of realizing his or her potential; is open to new experiences; believes that personal improvement of the self and behavior is ongoing; works to improve and expand self-knowledge. *Low scorer:* feels stuck in the present self and feels a sense of stagnation in the present life; fails to develop new attitudes or patterns of behavior; is apathetic and bored with life.	

Source: Adapted from Keyes and Ryff, 1999, p. 163, Table 1.

Relationships at Midlife

It is hard to generalize about the meaning of relationships in middle age today. Not only does that period cover a quarter-century of development; it also embraces a greater multiplicity of life paths than ever before (S. L. Brown, Bulanda, & Lee, 2005).

THEORIES OF SOCIAL CONTACT

social convoy theory
Theory, proposed by Kahn and Antonucci, that people move through life surrounded by concentric circles of intimate relationships on which they rely for assistance, well-being, and social support.

According to **social convoy theory,** people move through life surrounded by *social convoys:* circles of close friends and family members of varying degrees of closeness, on whom they can rely for assistance, well-being, and social support, and to whom they in turn also offer care, concern, and support (Antonucci & Akiyama, 1997; Kahn & Antonucci, 1980). Characteristics of the person (gender, race, religion, age, education, and marital status) together with characteristics of that person's situation (role expectations, life events, financial stress, daily hassles, demands, and resources) influence the size and composition of the convoy, or support network; the amount and kinds of social support a person receives;

and the satisfaction derived from this support. All of these factors contribute to health and well-being (Antonucci, Akiyama, & Merline, 2001).

Generally, the size of the social network peaks in young adulthood and declines thereafter. The declines in size are primarily seen in friendship networks; the size of the family network remains relatively stable over time. Researchers have variously described this decline in friendship networks as due to changing circumstances (e.g., the increase in time demands of work and family life) or motivational goals (e.g., staying most close to people who help us regulate emotions). Other relationships, such as those with coworkers or neighbors, tend to be important during particular times. For example, when changing jobs or moving, people in the social network may drop out or new people may be included (Wrzus, Hänel, Wagner, & Neyer, 2013). Late in adulthood, if family demands decline, women are more likely than men to add new social network members (Schwartz & Litwin, 2018).

Laura Carstensen's (1991, 1995, 1996; Carstensen, Isaacowitz, & Charles, 1999) **socioemotional selectivity theory** assumes we select our friends based on their ability to meet our goals. According to Carstensen, social interaction has three main goals: (1) it is a source of information; (2) it helps people develop and maintain a sense of self; and (3) it is a source of emotional well-being. In infancy, the third goal, the need for emotional support, is paramount. From childhood through young adulthood, information-seeking comes to the fore. By middle age, although information-seeking remains important (Fung, Carstensen, & Lang, 2001), the original, emotion-regulating function of social contacts begins to reassert itself. In other words, middle-aged people increasingly seek out others who make them feel good (Figure 1). For instance, although their social networks are smaller than those of younger adults, older adults describe their social network members more positively and less negatively. In other words, older adults chose to limit their interactions to those people whom they find to be emotionally fulfilling and supportive (English & Carstensen, 2014; Carmichael, Reis, & Duberstein, 2015).

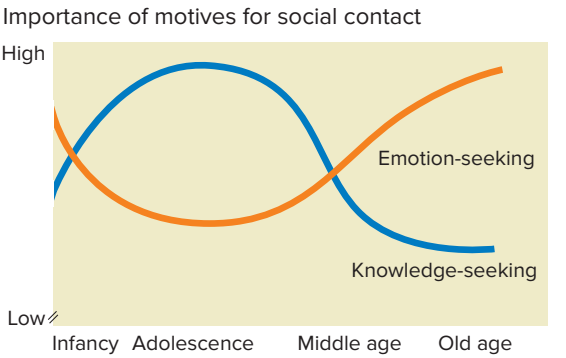


FIGURE 1
How Motives for Social Contact Change across the Life Span

According to socioemotional selectivity theory, infants seek social contact primarily for emotional comfort. In adolescence and young adulthood, people tend to be most interested in seeking information from others. From middle age on, emotional needs increasingly predominate.

Source: Annual Review of Gerontology and Geriatrics.

socioemotional selectivity theory
Theory, proposed by Carstensen, that people select social contacts on the basis of the changing relative importance of social interaction as a source of information, as an aid in developing and maintaining a self-concept, and as a source of emotional well-being.

RELATIONSHIPS, GENDER, AND QUALITY OF LIFE

For most middle-aged adults, relationships are key to well-being (Markus et al., 2004; Thomas, Liu, & Umberson, 2017). For example, social support from spouses, and to a lesser extent from children and friends, is related to well-being in older adults (Chen & Feeley, 2014; Lee & Szinovacz, 2016), and social support is related to life satisfaction at all ages (Siedlecki, Salthouse, Oishi, & Jeswani, 2014). According to two national surveys, having a partner and being in good health were the biggest factors in well-being for women in their fifties. Being single, divorced, or widowed, however, was associated with depression, loneliness, and decreases in happiness (Koropeckyj-Cox, Pienta, & Brown, 2007). Having a tense relationship with a spouse, mother, or sibling, in other research, was also associated with a risk of depression, especially for women (Gilligan et al., 2017).

However, relationships can also present stressful demands (Lachman, 2004; Lee & Szinovacz, 2016), which tend to fall most heavily on women. A sense of responsibility and concern for others may impair a woman's well-being when problems or misfortunes beset others; men are less likely to be affected in this way (Revenson et al., 2016). Thus, men tend to benefit more from relationships than women do (Liu & Waite, 2014; Lui, Waite, & Shen, 2016). Their greater concern for the welfare of others may help explain why middle-aged women tend to be unhappier with their marriages than are men (Antonucci & Akiyama, 1997; S. P. Thomas, 1997).

In studying midlife social relationships, we need to keep in mind that their effects can be both positive and negative (Arnett, 2018; Lee & Szinovacz, 2016). In the remaining sections of this chapter, we examine intimate relationships in the middle years. We look first at relationships with spouses, cohabiting partners, homosexual partners, and friends; next at bonds with maturing children; and then at ties with aging parents, siblings, and grandchildren.

checkpoint
can **you** . . .

- **Summarize two theoretical models of the selection of social contacts?**
- **Discuss how relationships can affect quality of life in middle adulthood?**

Consensual Relationships

Marriages, cohabitations, homosexual unions, and friendships typically involve two people of the same generation who mutually choose each other. How do these relationships fare in middle age?

MARRIAGE



How many longtime happily married couples do you know? Can you tell whether their marriages followed patterns similar to those mentioned in this section?

Midlife marriage is very different from what it used to be. When life expectancies were shorter, couples who remained together for 25, 30, or 40 years were rare. The most common pattern was for marriages to be broken by death and for survivors to remarry. Additionally, people had many children and expected them to live at home until they married. It was unusual for a middle-aged husband and wife to be alone together. Today, more marriages end in divorce, but couples who stay together can often look forward to 20 or more years of married life after the last child leaves home.

Researchers used to believe that marriages followed a U-shaped curve, where marriages were marked by declining levels of satisfaction until roughly 2 decades in, upon which time marriages would begin to once again turn more positive. By the third and fourth decade, it was believed, marital satisfaction was as high as in the first few years of marriage (Rollins & Feldman, 1970; Orbuch, House, Mero, & Webster, 1996). However, it now appears this was incorrect. Marriages generally follow a developmental sequence, with initial sharp declines in marriage satisfaction followed by a plateau, then further, slower declines over the longer term. Not surprisingly, people who divorce report even lower marital satisfaction (Bradbury, Fincham, & Beach, 2000; Kurdek, 1999).

Why do we see these changes in marital satisfaction? One factor that has been consistently found to negatively impact marital satisfaction is the birth of a child (Twenge, Campbell, & Foster, 2003). Both mothers and fathers report a decline in satisfaction following this event, although many couples rebound as children get older, somewhat more self-sufficient, and particularly when they enter primary school (Keizer & Schenk, 2012). Marital satisfaction can also suffer in middle age, when many couples have teenage children and are heavily involved in careers (Orbuch et al., 1996). Despite the stereotypes surrounding the empty nest, on average, the departure of children from the family home is usually met with an average rise in marital satisfaction for parents, although it also increases the risk of marital dissolution slightly (Bouchard, 2014). Satisfaction usually reaches a height when children are grown, many people are retired or entering retirement, and a lifetime accumulation of assets helps ease financial worries (Orbuch et al., 1996).



A diamond isn't forever. The more money spent on an engagement ring and wedding, the less time a marriage is likely to last.

Francis-Tan & Mialon, 2015

Sexual satisfaction affects marital satisfaction and stability. Those couples who are satisfied with their sex lives tend to be satisfied with their marriages (Fallis, Rehman, Woody, & Purdon, 2016), and better marital quality leads to longer marriages for both men and women (Yeh, Lorenz, Wickrama, Conger, & Elder, 2006). Similar results have been found in Brazil, Germany, Spain, Japan, and the United States (Heiman et al., 2011).

COHABITATION

Cohabitation has increased greatly in the United States. Overall, estimates are that in 2016, there were approximately 18 million cohabiting opposite-sex adults, an increase of almost a third since 2007. While cohabitation has generally been less common in midlife than in young adulthood, with the aging of the baby boom generation, it is becoming more common (Stepler, 2017a). About 8 percent of adults age 35 to 49 and 4 percent of adults 50 and older were cohabitating in 2016 (Stepler, 2017a). Baby boomers have shown the largest percent increase in cohabitation rates of any age group (Manning, 2013). When older adults do cohabitate, their relationships are generally more stable than those of younger cohabiting adults, and cohabitation is more often viewed as an alternative to marriage rather than a prelude to it (Brown, Bulanda, & Lee, 2012).

What explains the rise in cohabitation for older adults? One of the reasons is a desire for an intimate companion without the commitment of formal marriage—a commitment that, in middle age, may come to mean the possibility of having to care for an infirm partner. Whereas the majority of younger cohabitators have not been previously married, the majority of older cohabitators have (Stepler, 2017a). Moreover, cohabiting adults with disabled or ill partners, as a whole, provide less care than do married partners in the same situation (Noël-Miller, 2011). This process appears to be most relevant for widowed women (Davidson, 2001). Aging men, alternatively, may be motivated to cohabitate because they anticipate needing the kind of care that wives traditionally provide and may worry about not getting it otherwise (S.L. Brown, Bulanda, & Lee, 2005).

Do cohabitants reap the same rewards as married people? Although there is little research on cohabitation among middle-aged and older people, one study suggests the answer, at least for men in the United States, is no. Among 18,598 Americans over age 50, cohabiting men (but not cohabiting women) were more likely to be depressed than their married counterparts, even when such variables as physical health, social support, and economic resources were controlled. Indeed, cohabiting men were about as likely to be depressed as men without partners (S.L. Brown et al., 2005). However, the outcomes of cohabitation differ by country. While cohabitation does not provide the same level of health benefits as marriage in the United States, Britain, and Australia, cohabiting adults and married adults are equally healthy in Norway and Germany. In Australia, cohabiting women, but not men, are as healthy as married people (Perelli-Harris et al., 2017).

DIVORCE

While divorce rates for younger adults have fallen in recent years, divorce rates for middle-aged adults are rising. From 1990 to 2015, the divorce rate for adults age 40 to 49 years rose by 14 percent, and the divorce rate for adults older than 50 years rose by a stunning 109 percent (Stepler, 2017b). Although divorce in midlife is more common than in the past, the breakup can still be traumatic. In an American Association of Retired Persons (AARP) survey of adults who had been divorced at least once in their forties, fifties, or sixties, most respondents described the experience as more emotionally devastating than losing a job and about as devastating as a major illness, though less devastating than a spouse's death. Midlife divorce seems especially hard for women, who are more negatively affected psychologically by divorce at any age than men are (Marks & Lambert, 1998; Montenegro, 2004).

With respect to physical health, marital dissolution is associated with apparently contradictory health outcomes (Sbarra, Hasselmo, & Bourassa, 2015). First, divorce is associated with an elevated chance of chronic health conditions and mortality in both sexes, but especially in men (Sbarra & Coan, 2017; Hughes & Waite, 2009; Amato, 2010). Second, most people adjust well to divorce and ultimately do well (Amato, 2010; Mancini, Bonanno, & Clark, 2011; Luhmann, Hofmann, Eid, & Lucas, 2012). How do we explain these diverse threads of research?

It may be that individual differences in the response to divorce explain the discrepancy in findings. For instance, a relatively small proportion of adults may show an extreme response to divorce and exhibit health-related consequences such as blood pressure increases or cardiovascular disease. This may bias some findings toward risk. Other adults may be more resilient and adjust well, explaining other findings. Thus, to understand the effects of divorce, we must examine individual risk and resilience factors (Sbarra et al., 2015).

Long-standing marriages may be less likely to break up than more recent ones. One possible explanation lies with the concept of **marital capital.** The longer a couple is married, the more likely they are to have built up joint financial assets, to share the same friends, to go through important experiences together, and to get used to the emotional benefits that marriage can provide. This accumulated "capital" can be difficult to give up (Becker, 1991; Jones, Tepperman, & Wilson, 1995).

marital capital
Financial and emotional benefits built up during a long-standing marriage, which tend to hold a couple together.

All else being equal, couples with daughters are more likely to divorce than those with sons.

Dahl & Moretti, 2004

Another important factor that keeps many couples from divorcing is finances. Higher socioeconomic status is associated with lower risk of divorce in the United States, Israel, and Finland (Kaplan & Herbst, 2015; Jalovaara, 2003, 2001). Additionally, research has shown that marriage stability and consumer debt are associated, and stable marriages are also more likely to have low debt and be high in financial satisfaction (Dew, 2011; Archuleta, Britt, Tonn, & Grable, 2011). Financial disagreements also predict divorce (Dew, Britt, & Huston, 2012). One interpretation of these findings is that healthy marriages are more likely to have healthy finances and thus presumably more to lose on both fronts in the event of divorce.

However, gender interacts with income. When women outearn their husbands, the risk of divorce increases (Kaplan & Herbst, 2015; Jalovaara, 2003, 2001). Most of the time, however, when marriages end, middle-aged divorcees, especially women who do not remarry, tend to be less financially secure than those who remain married (Wilmoth & Koso, 2002; Lin, Brown, & Hammersmith, 2017).

When they do divorce, why do middle-aged people do so? The number one reason given is partner abuse—verbal, physical, or emotional. Other frequent reasons are differing values or lifestyles, infidelity, alcohol or drug abuse, relationship problems, and simply falling out of love (Marks & Lambert, 1998; Cohen & Finzi-Dottan, 2012).

The sense of violated expectations may be diminishing as midlife divorce becomes more common (Marks & Lambert, 1998; Norton & Moorman, 1987). Even in long marriages, the increasing number of years that people can expect to live in good health after child rearing ends may make the dissolution of a marginal marriage an attractive option, and, at least for women, growing economic independence makes it more practical to consider as well (Hiedemann, Suhomilinova, & O'Rand, 1998). Moreover, while it may be stressful, divorce can also lead to personal growth (Aldwin & Levenson, 2001; Luhmann et al., 2012). Older adults' better emotional regulatory strategies and greater life knowledge may make them better able to weather the storms of marriage dissolution.

MARITAL STATUS, WELL-BEING, AND HEALTH

As in young adulthood, marriage offers major benefits. In cross-sectional studies, married people appear to be healthier, both physically and mentally, in middle age and they tend to live longer than single, separated, or divorced people (S. L. Brown et al., 2005, Kaplan & Kronick, 2006; Zhang, 2006). Overall, married people enjoy better health, lower mortality, and better cardiovascular health than their single counterparts (Robles, Slatcher, Trombello, & McGinn, 2014).

But why would marriage (a social relationship) affect health (a biological state)? Two classes of theories have been advanced to explain these findings. The first posits that marriage is associated with the encouragement of health-promoting behaviors. So, for example, a husband might persuade or encourage his wife to stop smoking. The second theory focuses on the stress response system. In this view, the social support provided by marriage buffers individuals against life stressors. As chronic stress negatively affects health, married people are thus protected against some of its effects (Robles et al., 2014). This may be mediated by immune function. Long-term stress depresses immune system functioning (Dhabhar, 2014). Being in a good marriage, with its protective social support, can thus bolster the immune system (Graham, Christian, & Kiecolt-Glaser, 2006).

Marital quality appears to be a key factor. In one recent meta-analysis of 126 studies, including more than 72,000 individuals from the United States, Brazil, Canada, China, Finland, Germany, Hong Kong, Israel, Netherlands, Sweden, and the United Kingdom, marital quality was associated with better health and lower cardiovascular reactivity during marital conflict (Robles et al., 2014). Protective effects of marriage quality on health have also been found in China, Japan, Taiwan, and South Korea (Chung & Kim, 2014). A number of studies have found that these effects are more pronounced in men than in women and extend to mortality (Robards, Evandrou, Falkingham, & Vlanchantoni, 2012; Rendall, Weden, Favreault, & Waldron, 2011).

While a good marital relationship can buffer people against life stressors, a poor marital relationship can make people more vulnerable to them. For example, depression in one marriage partner puts the spouse at risk for cognitive declines and depression (Monin et al., 2018). These effects can also be physical. Marital strains increase both men's and women's aging-related declines in health, and this effect grows stronger with age (Umberson, Williams, Powers, Liu, & Needham, 2006). Similarly, women who are in unsatisfying married or cohabiting relationships are at higher risk for cardiovascular disease and other health problems, especially if marital conflict is involved (Gallo, Troxel, Matthews, & Kuller, 2003; Kiecolt-Glaser & Newton, 2001). Moreover, just as spouses can encourage healthy behaviors in each other, they can also encourage unhealthy behaviors in each other. For example, when one member of a couple becomes obese, the risk of the other spouse becoming obese as well nearly doubles (Cobb et al., 2015). When attempting to quit smoking, married people are more successful if their spouse attempts to quit at the same time or is a nonsmoker (Franks, Pienta, & Wray, 2002; Foulstone, Kelly, & Kifle, 2017).

What about single adults? In comparison to their married peers, single adults show a disadvantage. In the MIDUS sample, single people, especially men, were more likely to be anxious, sad, or restless and to be less generative than their younger counterparts. Formerly married, noncohabiting women and men reported more negative emotionality than those still in a first marriage (Marks, Bumpass, & Jun, 2004). Those who never marry may be at the highest risk for cardiovascular and other disease (Kaplan & Kronick, 2006). However, being single may be better than being in a bad marriage. For example, the blood pressure of adults in low-quality marriages was higher than that of single adults (Holt-Lunstad, Birmingham, & Jones, 2008).

checkpoint can you . . .

- Describe the typical age-related pattern of marital satisfaction, and cite factors that may help explain it?
- Compare the benefits of marriage and cohabitation in middle age?
- Discuss the effects of marriage, cohabitation, and divorce on well-being and physical and mental health?

GAY AND LESBIAN RELATIONSHIPS

The cohort of gays and lesbians now in middle age grew up at a time when homosexuality was not as accepted as it is now and was sometimes considered a mental illness. At that time, homosexuals tended to be isolated not only from the larger community but also from each other. It was not until the 1990s that acceptance of homosexual relationships began to increase sharply, and the general public's negative perception of gays and lesbians became more positive (Keleher & Smith, 2012; Hicks & Lee, 2006).

One factor that seems to affect relationship quality in gays and lesbians is whether or not they have internalized society's negative views on homosexuality. Overall, homosexual people who have internalized a negative view of their sexuality report lower relationship quality (Cao et al., 2017; Frost & Meyer, 2009). This may be because when faced with an episode of discrimination—which is common for sexual minorities—gays and lesbians who have internalized negative beliefs about themselves are more likely to respond with anxiety or depression (Feinstein, Goldfried, & Davila, 2012). Even in the absence of precipitating events, gays and lesbians who have internalized the homophobic attitudes held by others are more likely to show symptoms of depression, presumably because these attitudes affect their overall self-concept. When depressive symptoms increase, so do relationship issues (Frost & Meyer, 2009).

Coming out can be a challenging process. Some middle-aged gays and lesbians may be still working out conflicts with parents and other family members (sometimes including spouses) or hiding their homosexuality from them. Some move to cities with large homosexual populations where they can more easily seek out and form relationships. While times have changed and society is more accepting of homosexual relationships, many older gays and lesbians are still reluctant to fully come out of the closet. For example, one recent study showed that about a third of older adults still feared being completely open about their sexuality (Gardner, DeVries, & Mockus, 2014).

On June 26, 2015, same-sex marriage became the law of the land in the United States. While the American Medical Association had released a statement in 2009 arguing that exclusion from marriage might be contributing to health disparities between



Some gay men and women do not come out until well into adulthood and so may develop intimate relationships later in life than their heterosexual counterparts.
Lars A. Niki

homosexual and heterosexual couples (American Medical Association, 2009), there was a paucity of research on the possible benefits of marriage for gays and lesbians. Given the already established findings for heterosexual couples, did the same dynamics exist in gay and lesbian couples?

While more work needs to be done, initial data on marriage equality show that gay and lesbian couples also benefit from marriage. In one study, 1,166 married gay, lesbian, and bisexual couples reported less distress than their single counterparts, as did married heterosexuals when compared to single adults (Wight, LeBlanc, & Badgett, 2013). As with heterosexual couples, marriage seems to have a greater effect on well-being than cohabitation (Chen & van Ours, 2018). Presumably, the same factors that influence health and well-being in heterosexual marriages are affecting homosexual and bisexual marriages as well.

However, there is also a more direct pathway from marriage to health: health insurance. Prior to marriage equality laws, same-sex couples were often excluded from their partners' health insurance coverage, even in relatively accommodating states specifying guidelines for civil unions (Ponce, Cochran, Pizer, & Mays, 2010). Once marriage was possible, many more people became eligible for health insurance through their same-sex spouses. Thus, following the passage of marriage equality laws, gay and lesbian couples showed increases in health insurance coverage rates and access to health care, and research showed evidence for greater utilization of preventive health care outcomes for men (Carpenter, Eppink, Gonzales, & McKay, 2018).

Earlier research suggested gay and lesbian couples were more likely to break up than heterosexual couples, but as marriage was unavailable to many, data were scarce and the studies had methodological problems. More recent nationally representative U.S. data suggest that both heterosexual and homosexual couples have similar rates of relationship duration and stability (Rosenfeld, 2014).

checkpoint can you . . .

- Discuss issues regarding gay and lesbian relationships at midlife?

FRIENDSHIPS



Loneliness is contagious. Recent research conducted on social networks suggests lonely people act in less affirming ways to others. Their behavior is often interpreted as implying rejection or indifference, which then makes those people feel more lonely too.

Hawkley & Cacioppo, 2010

Social relationships are vitally important; both their quantity and quality are predictive of mental health, physical health, and mortality (Holt-Lunstad, Smith, & Layton, 2010). However, as Carstensen's theory predicts, social networks tend to become smaller and more intimate at midlife. Still, friendships persist and are a strong source of emotional support and well-being, especially for women (Carmichael, Reis, & Duberstein, 2015; Antonucci et al., 2001).

The quality of midlife friendships often makes up for what they lack in quantity of time spent. Especially during a crisis, such as a divorce or a problem with an aging parent, adults turn to friends for emotional support, practical guidance, comfort, companionship, and talk (Antonucci & Akiyama, 1997; Hartup & Stevens, 1999; Suitor & Pillemer, 1993). The quality of such friendships can affect health, as can lack of friendships. Loneliness, for example, is predictive of increases in blood pressure, even when such variables as age, gender, race, and cardiovascular risk factors are taken into account (Hawkley, Thisted, Masi, & Cacioppo, 2010).

Friendship quality impacts psychological variables as well. While in early adulthood, loneliness, depression, well-being, and social integration are affected by the number of friends a person has, in late adulthood, the quality of friends is what matters. While more older adults lack a confidant and often feel lonely as a result, when they do have good friends, they report more satisfaction as a result of contact with their friends than do younger adults (Nicolaisen & Thorsen, 2017). Those older adults with higher-quality friendships have better psychosocial well-being (Carmichael et al., 2015). This is especially true in times of crisis: Depressed adults with high-quality friendships have a lower suicide risk than those who do not have good friends (Marver et al., 2017).

checkpoint can you . . .

- Summarize the quantity, quality, and importance of friends in middle age?

Relationships with Maturing Children

Parenthood is a process of letting go, and this process usually approaches or reaches its climax during the parents' middle age (Marks et al., 2004). It is true that, with contemporary trends toward delayed marriage and parenthood, some middle-aged people now face such issues as finding a good day care or preschool program and screening the content of video games. However, most parents in the early part of middle age must cope with a different set of issues, which arise from living with children who will soon be leaving home. Once children become adults and have their own children, the intergenerational family multiplies in number and in connections. Increasingly, middle-aged parents have to deal with an adult child's continuing to live in the family home or leaving it only to return.

ADOLESCENT CHILDREN

Ironically, the people at the two times of life popularly linked with emotional crises—adolescence and midlife—often live in the same household. It is usually middle-aged adults who are the parents of adolescent children. While dealing with their own special concerns, parents have to cope daily with young people who are undergoing great physical, emotional, and social changes.

Generally, most parents at midlife express they are happy with their parenting role. For example, mutual warmth and acceptance has been associated with parenting satisfaction in both Chinese and European American middle-aged mothers (Chang & Greenberger, 2012). However, contextual and relational variables affect happiness. For example, parents are more likely to report happiness when they are financially secure, healthy, close to their child, retired, or younger parents (Mitchell, 2010). Parenting satisfaction is also positively related to parental education level and marital status, and negatively related to conflict between the parents (Downing-Matibag, 2009).

Negative emotions are also possible. Although research contradicts the stereotype of adolescence as a time of inevitable turmoil and rebellion, some rejection of parental authority is normative, and this can be difficult for parents. A healthy attachment between parent and teen can, somewhat paradoxically, make the separation process of adolescence and early adulthood proceed more smoothly (Ponappa, Bartle-Haring & Day, 2014; Inguglia, Ingolglia, Liga, Coco & Cricchio, 2015).

An important task for parents is to accept maturing children as they are, not as what the parents had hoped they would be. When parents perceive of their children as mature and approve of their life choices, this process is easier. By contrast, when parents do not approve of their child's choices, they are more likely to perceive their child's striving for autonomy as hostile or immature (Kloep & Hendry, 2010). Parental satisfaction declines when parents perceive their adolescent children as being involved in negative behaviors or failing to meet the challenges of life (Downing-Matibag, 2009). Fortunately, the parent-child relationship often improves with age (Blieszner & Roberto, 2006).

WHEN CHILDREN LEAVE: THE EMPTY NEST

Research is challenging popular ideas about the **empty nest**—a supposedly difficult transition, especially for women, that occurs when the youngest child leaves home. Although some parents do have problems in adjusting to the empty nest, they are far outnumbered by those who find the departure liberating (Mitchell & Lovegreen, 2009; Antonucci et al., 2001). Generally, parents whose children have left the nest report higher levels of well-being, especially when their children stay in frequent contact with them (Gorchoff, John, & Helson, 2008; White & Edwards, 1990). They are particularly likely to adjust well when their children leave "on time," are perceived to be successful, moral people, and

empty nest
Transitional phase of parenting following the last child's leaving the parents' home.

Feeling lonely? Try heating your house. Research suggests that how warm the temperature of a room is affects how socially connected we feel. Warmer rooms are associated with feelings of closeness to others.

Ijzerman & Semin, 2009

have good family bonds (Mitchell, 2010). Whether or not families are blended also matters. Stepmothers and fathers whose children with previous partners move out report greater increases in life satisfaction at the launching of children from the family home than other groups (Ivanova, 2019).

When children are not accomplished, however, this process may be more difficult. Typically, when adult children have greater needs, parents provide more material and financial support to them (Fingerman, Miller, Birditt & Zarit, 2009), a process which can provide parents relief from negative moods (Huo, Graham, Kim, Birditt, & Fingerman, 2017). Given this tendency, it is not surprising to also find that such parents are likely to feel torn between wanting their adult children to assert their independence and a desire to step in and help. Men, in particular, seem to be more affected by their children's successes and failures (Birdtitt, Fingerman & Zaritt, 2010). Some ambivalence during these situations is standard, but far more stress results when there is already tension in the relationship (Birdtitt, Miller, Fingerman & Lefkowitz, 2009) or when grown children return home (Thomas, 1997). This stress has been shown to raise parents' stress hormone levels (Birditt, Kim, Zarit, Fingerman & Loving, 2016), a finding which has negative implications for their health.

The effects of the empty nest on a marriage depend on its quality and length. In a good marriage, the departure of grown children may usher in a second honeymoon. The departure of children from the family home generally increases marital satisfaction, perhaps because of the additional time partners now have to spend with each other (Bouchard, 2014; Gorchoff, John & Helson, 2008). The empty nest may be harder on couples whose identity is dependent on the parental role or who now must face marital problems they had previously pushed aside under the press of parental responsibilities (Antonucci et al., 2001).

The empty nest does not signal the end of parenthood. It is a transition to a new stage: the relationship between parents and adult children.

PARENTING GROWN CHILDREN

Parents are more likely to show favoritism for adult children than young children, in particular when those children are daughters, live nearby, share their values, have avoided deviant behaviors, and have previously helped them out.

Suitor, Seechrist, Plikuhn, & Pillemer, 2008

Even after children have left home for good, parents are still parents. The midlife role of parent to young adults raises new issues on the part of both generations (Marks et al., 2004).

Middle-aged parents generally give their children more help and support than they get from them (Antonucci et al., 2001). This assistance improves their chances of attending college, establishing careers, or buying homes (Johnson & Benson, 2012). Estimates of the proportion of parents who provide financial assistance to their adult children range from 32 to 75 percent (Shoeni & Ross, 2005; Siennick, 2011). Parents give the most help to children who need it most, typically those who are single or are single parents, or who are criminal offenders (Blieszner & Roberto, 2006; Siennick, 2011).

Some parents have difficulty treating their offspring as adults, and many young adults have difficulty accepting their parents' continuing concern about them. In a warm, supportive family environment, such conflicts can be managed by an open airing of feelings (Putney & Bengtson, 2001). However, at the same time, adult children's problems do have the potential to reduce their parents' well-being (Greenfield & Marks, 2006).

revolving door syndrome
Tendency for young adults who have left home to return to their parents' household in times of financial, marital, or other trouble.

Since the 1980s in most Western nations, more and more adult children have delayed leaving home until the late twenties or beyond (Mouw, 2005). Furthermore, the **revolving door syndrome,** sometimes called the *boomerang phenomenon*, has become more common. Increasing numbers of young adults, especially men, return to their parents' home, sometimes more than once and sometimes with their own families (Aquilino, 1996; Blieszner & Roberto, 2006; Putney & Bengtson, 2001). Often a return to the family home is precipitated by emotional or financial concerns, or alcohol problems (Sandberg-Thoma, Snyder & Jang, 2015; Smits, Van Gaalen, & Mulder, 2010). Sometimes adult children move back home to care for ailing parents (South & Lei, 2015).

Do you think it is a good idea for adult children to live with their parents?

Prolonged parenting may lead to intergenerational tension when it contradicts parents' normative expectations. As children move from adolescence to young adulthood, parents typically expect them to become independent, and children expect to do so. As

the timing-of-events model would predict, a grown child's delayed departure from the nest or return to it may produce family stress (Antonucci et al., 2001; Aquilino, 1996). From the adult child's point of view, the provision of financial support from a parent can threaten self-efficacy (Mortimer, Kim, Staff, & Vuolo, 2016), and while living with parents can provide much needed financial and emotional support, it can also threaten a sense of independence (Burn & Szoeke, 2016).

However, the nonnormative experience of parent-child coresidence is becoming less. This has become particularly true in times of economic crisis. For example, in 2008, American researchers found the presence of adult children living at home was associated with a decline in marital quality. However, from 2008 to 2012, the percentage of U.S. adult children who returned to live at home as a result of the great recession rose to 36 percent. When the researchers again collected data on the same variables in 2013, they found the presence of adult children in the home was no longer associated with low marital quality unless the child also had problems. The researchers argued that child coresidence was only damaging to marital quality when it was nonnormative. When the economy made coresidence increasingly common, this altered the interpretation and consequences of coresidence (Davis, Kim, & Fingerman, 2016).

checkpoint can you . . .

- Discuss the changes parents of adolescent children go through?
- Compare how women and men respond to the empty nest?
- Describe typical features of relationships between parents and grown children?
- Give reasons for the prolonged parenting phenomenon, and discuss its effects?

Other Kinship Ties

At midlife, responsibility for care and support of aging parents may begin to shift to their middle-aged children. In addition, a new relationship often begins at this time of life: grandparenthood.

RELATIONSHIPS WITH AGING PARENTS

The middle years may bring dramatic, though gradual, changes in parent-child relationships. Something else may happen during these years: one day a middle-aged adult may look at a mother or father and see an old person, who may need a daughter's or son's care.



Most middle-aged adults and their aging parents have warm, affectionate relationships.
Hero/Fancy/Corbis/Glow Images

Becoming a Caregiver for Aging Parents Even when they do not live close to each other, most middle-age adults and their parents have warm, affectionate relationships based on frequent contact, mutual help, feelings of attachment, and shared values. Positive relationships with parents contribute to a strong sense of self and to emotional well-being at midlife (Blieszner & Roberto, 2006).

Most commonly, help and assistance continue to flow from adults to their own children rather than to their parents. However, with the changing demographics of the United States, particularly the lengthening of the life span, many middle-aged adults gradually take on more responsibilities for their parents. For example, a son might realize that his mother is no longer able to drive and might decide to stop by the grocery store once a week for her, or a daughter might realize her father is no longer able to remember to pay bills unassisted and set up payments for him. This normative development is seen as the healthy outcome of a **filial crisis,** in which adults learn to balance love and duty to their parents with autonomy in a two-way relationship.

The majority of help consists of assistance with everyday needs and, less commonly, emergencies and crises. This pattern is true of most families; however, the dynamics change in situations in which parents are disabled or experience some sort of crisis themselves. Not surprisingly, in these cases, adult children often provide resources to their middle-aged parents (Fingerman et al., 2010).

Members of this generation—sometimes called the **sandwich generation**—may be caught in a squeeze between the competing needs of their own children and the emerging needs of their parents (see Windows on the World).

filial crisis
In Marcoen's terminology, normative development of middle age, in which adults learn to balance love and duty to their parents with autonomy within a two-way relationship.

sandwich generation
Middle-aged adults squeezed by competing needs to raise or launch children and to care for elderly parents.

The world over, caregiving is typically a female function (Kinsella & Velkoff, 2001). When an ailing mother is widowed or a divorced woman can no longer manage alone, it is most likely that a daughter will take on the caregiving role (Pinquart & Sörenson, 2006; Schulz & Martire, 2004). Daughters and older mothers tend to be especially close (Fingerman & Dolbin-MacNab, 2006). Daughters tend to provide more care to aging parents, but the proportion of sons and daughters in a family affect this process. If a woman has brothers, she tends to provide more care. If a man has sisters, he tends to provide less care (Grigoryeva, 2017).

Family relations in middle and late adulthood can be complex. With increasing longevity, middle-aged couples with limited emotional and financial resources may need to allocate them among two sets of aging parents as well as provide for their own (and possibly their own adult children's) needs. Not surprisingly, many adult children express a sense of ambivalence toward the care of their aging parents or in-laws (Willson, Shuey, & Elder, 2003). Ambivalence may emerge out of the struggles found in trying to juggle competing needs. Most couples are willing to contribute time or money, but not both, and few have the necessary resources or inclination to support both sets of parents. Couples tended to respond more readily to the needs of the wife's parents, presumably because of her greater closeness to them. African American and Hispanic couples are more likely than white couples to provide consistent assistance of all types to parents on each side of the family (Shuey & Hardy, 2003).

Strains of Caregiving Caregiving can be stressful. Many caregivers find the task a physical, emotional, and financial burden, especially if they work full-time, have limited financial resources, or lack support and assistance (Lund, 1993a; Schulz & Martire, 2004). It is hard for women who work outside the home to assume an added caregiving role, and reducing work hours or quitting a job to meet caregiving obligations can increase financial stress.

Emotional strain may come not only from caregiving itself but also from the need to balance it with the many other responsibilities of midlife (Antonucci et al., 2001; Climo & Stewart, 2003). Elderly parents may become dependent at a time when middle-aged adults need to launch their children or, if parenthood was delayed, to raise them.

Caregiving can also lead to marriage problems. Adult caregivers report less marital happiness, greater marital inequality, more hostility, and, for women, a greater degree of depressive symptomatology and depression over time (Bookwala, 2009). Some research has shown that caregiving is associated with a greater risk of relationship dissolution for women in cohabitating relationships, but not necessarily for men or for married women (Penning & Wu, 2019).

Estimates are that approximately 59 percent of family caregivers are caring for a parent with physical impairments (National Alliance for Caregiving, 2015). Caring for a person with physical impairments is hard. Increasing disability on the part of aging parents is associated with declines in relationship quality between parents and children (Kim et al., 2016). It can be even more difficult to care for someone with dementia, a situation faced by 26 percent of caregivers. Moreover, 37 percent of care recipients have more than one condition or illness (National Alliance for Caregiving, 2015).

Dementia and related conditions are among the hardest to cope with. In addition to being unable to carry on basic functions of daily living, people with dementia may be incontinent, suspicious, agitated or depressed, subject to hallucinations, likely to wander about at night, dangerous to self and others, and in need of constant supervision (Schulz & Martire, 2004). Sometimes the caregiver becomes physically or mentally ill under the strain (Richardson, Lee, Berg-Weger, & Grossberg, 2013). Because women are more likely than men to give personal care, their mental health and well-being may be more likely to suffer (Friedemann & Buckwalter, 2014; Amirkhanyan & Wolf, 2006; Pinquart & Sörenson, 2006). Sometimes the stress created by the incessant, heavy demands of caregiving is so great as to lead to abuse, neglect, or even abandonment of the dependent elderly person (Lachs & Pillemer, 2015).

window on the world

THE GLOBAL "SANDWICH GENERATION"

Parents are living longer, and young adult children need support for longer periods, bringing new challenges for middle-aged adults. In recent years, researchers have called those in their forties and fifties who are squeezed between caring for both their own children and their aging parents the "sandwich generation." As the worldwide aging population increases, balancing the roles of how to care for aging parents as well as children will become an increasingly important global issue.

According to the Pew Research Center, 47 percent of middle-aged adults are part of the sandwich generation in the United States. About 15 percent of U.S. middle-aged adults are providing financial support and 61 percent are providing emotional support and day-to-day assistance to both their aging parents and their own children (Parker & Patten, 2013). About 29 percent of adult children up to age 30 still live with their parents or have returned home after college, being at least partially supported by their parents (Parker, 2012).

Similar trends have been found in other parts of the world as well. It is estimated that by 2050, worldwide there will be three times more people in the sandwich generation caring for approximately 2 billion aging parents (United Nations, 2007). In Australia, 2.6 million people are considered "sandwich carers"; in the United Kingdom, an additional 2.4 million fall into this group (Carers UK Staff, 2012; Carers Australia Staff, 2012).

In many parts of the world, particularly in developing countries, it is common for multiple generations of families to live together. For example, in Japan, nearly 50 percent of elders live with their children (National Institutes of Health, 2007), and in China, 35 to 45 percent of the elderly live with their children (Ren & Treiman, 2014). Even if elders do not live with their children, family support is very important in Japan and China, and adult children are often available for daily care and assistance.

Caring for aging parents can be a daunting, stressful, and sometimes overwhelming task. A study by the American Psychological Association found that 40 percent of adults in the 35 to 55 age range who are caregivers for both parents and children reported extreme levels of stress, stating that family was the top source of their stress. This stress takes a toll on family relationships and the well-being of the caretakers themselves (American Psychological Association, 2007). It is important for caretakers to recharge and take care of themselves physically and mentally. Though it may feel like a challenge at times, those being cared for are usually the people that are most important to the caretakers, and their care is an act of dedicated love for their family members.

what's your view

How would you handle the responsibilities of caring for aging parents? What can you do to support a loved one who finds himself or herself in this situation?

A result of these and other strains may be **caregiver burnout,** a physical, mental, and emotional exhaustion that can affect adults who care for aged relatives (Hategan, Bourgeois, Cheng, & Young, 2018). Even the most patient, loving caregiver may become frustrated, anxious, or resentful under the constant strain of meeting an older person's seemingly endless needs. Often families and friends fail to recognize that caregivers have a right to feel discouraged, frustrated, and put upon. Caregivers need a life of their own, beyond the loved one's disability or disease. Sometimes other arrangements, such as institutionalization, assisted living, or a division of responsibilities among siblings, must be made (Shuey & Hardy, 2003).

caregiver burnout
Condition of physical, mental, and emotional exhaustion affecting adults who provide continuous care for sick or aged persons.

Community support programs can reduce the strains and burdens of caregiving. Support services may include meals and housekeeping; transportation and escort services; and adult day care centers, which provide supervised activities and care while caregivers work or attend to personal needs. *Respite care* (substitute supervised care by visiting nurses or home health aides) gives regular caregivers some time off. Through counseling, support, and self-help groups, caregivers can share problems, gain information about community resources, and improve skills.

What would you do if one or both of your parents required long-term care? To what extent should children or other relatives be responsible for such care? To what extent, and in what ways, should society help?

Some family caregivers, looking back, regard the experience as uniquely rewarding. If a caregiver deeply loves an infirm parent; cares about family continuity; looks at caregiving as a challenge; and has adequate personal, family, and community resources to meet that challenge, caregiving can be an opportunity for personal growth in competence, compassion, self-knowledge, and self-transcendence. Moreover, family caregivers report a sense of spiritual and religious growth and fulfilling a sense of duty (Lloyd, Patterson, & Muers, 2016; Bengstron, 2001; Climo & Stewart, 2003). When family caregivers can identify and articulate the positive aspects of caring for a person with dementia, they are less likely to experience depression and more likely to report higher well-being, life satisfaction, and self-efficacy (Quinn & Toms, 2018).

RELATIONSHIPS WITH SIBLINGS

Sibling ties are the longest-lasting relationships in most people's lives. In some cross-sectional research, sibling relationships over the life span look like an hourglass, with the most contact at the two ends—childhood and middle to late adulthood—and the least contact during the child-raising years. After establishing careers and families, siblings may renew their ties (White, 2001; Putney & Bengston, 2001; Conger & Little, 2010). Other studies indicate a decline in contact throughout adulthood. Sibling conflict tends to diminish with age—perhaps because siblings who do not get along see each other less (Putney & Bengston, 2001).

Relationships with siblings who remain in contact can be central to psychological well-being in midlife (Thomas, 2009; Spitze & Trent, 2006). As in young adulthood, sisters tend to be closer than brothers (Blieszner & Roberto, 2006; Spitze & Trent, 2006). Sibling relationships may be particularly beneficial for those adults who did not have children. For instance, siblings sometimes serve as caregivers for each other, and when they do, they are less negatively affected by doing so than are caregivers for parents or spouses (Namkung, Greenberg, & Mailick, 2016).

Dealing with the care of aging parents can bring siblings closer together but also can cause resentment and conflict. Disagreements may arise over the division of care or over an inheritance, especially if the sibling relationship has not been good (Ngangana, Davis, Burns, McGee, & Montgomery, 2016; Blieszner & Roberto, 2006). Problems may also emerge if there are perceptions of favoritism, either as perceived currently or as remembered from childhood, particularly for the maternal relationship (Peng, Suitor, & Gilligan, 2016; Suitor, Gilligan, Peng, Jung, & Pillemer, 2015).

checkpoint can **you** . . .

- Describe the change in the balance of filial relationships that often occurs between middle-aged children and elderly parents?
- Cite sources of potential strain in caregiving for elderly parents?
- Discuss the nature of sibling relationships in middle age?

GRANDPARENTHOOD



In many Asian countries, grandparents live in the same home as their grandchildren, playing an important role in their lives.
Kohei Hara/Digital Vision/Getty Images

Often grandparenthood begins before the end of active parenting. In 2014, the United States had a population of 69.5 million grandparents (Monte, 2017). By the age of 65, 83 percent of people have grandchildren, and about a third of them list having more time to spend with family as the most valued aspect of getting older (Krogstad, 2015).

The Grandparent's Role In many developing societies, extended-family households are common, and grandparents play an integral role in child raising and family decisions. Their assistance is often precipitated by factors such as poverty, disease, migration, and other family challenges and crises. In Asian countries such as Thailand and Taiwan, about 40 percent of the population age 50 and older lives in the same household with a minor grandchild, and half of those with grandchildren age 10 or younger—usually grandmothers—provide care for the child (Kinsella & Velkoff, 2001). In China and Romania, mothers' migration in search of work resulted

in large numbers of young children being "left behind" with family members, usually grandmothers (Ban et al., 2017; Piperno, 2012). In some countries in sub-Saharan Africa, high mortality rates in young adults as a consequence of AIDS make grandparents a critical resource for the children left orphaned by disease (Uhlenberg & Cheuk, 2010). Grandparent care is common in Europe, with slightly over 40 percent of grandparents providing regular or occasional care for their grandchildren. The provision of regular day care is somewhat more common in Southern than Northern Europe (Glaser et al., 2013; Iacovou & Skew, 2011). In short, grandparents—globally—are an important part of their grandchildren's lives.

In the United States, the extended family household is common in some minority communities, but the dominant household pattern is the nuclear family. In 2014, estimates are that approximately 4 percent of U.S. grandparents lived in households with their grandchildren (Glaser et al., 2018). Although 68 percent of the grandparents in an AARP survey see at least one grandchild every 1 or 2 weeks, 45 percent live too far away to see their grandchildren regularly (Davies & Williams, 2002).

In general, grandmothers have closer, warmer, more affectionate relationships with their grandchildren (especially granddaughters) than grandfathers do and see them more (Putney & Bengtson, 2001). Grandparents who have frequent contact with their grandchildren, feel good about grandparenthood, attribute importance to the role, and have high self-esteem tend to be more satisfied with being grandparents (Reitzes & Mutran, 2004). Grandparents sometimes have difficulty balancing their connection with their grandchildren and allowing their children to parent their family in accordance with their own beliefs and values (Breheny, Stephens, & Spilsbury, 2013).

About 22 percent of U.S. grandparents provide regular child care for working parents (Krogstad, 2015). Indeed, grandparents are almost as likely to be child care providers as organized child care centers or preschools; 23.7 percent of children under age 5 and 31.7 percent of children overall with employed mothers are under a grandparent's care while the mothers are at work (Laughlin, 2013). In countries where the government spends more funds on child care assistance, grandparent care is less common. For example, in Denmark and Sweden, approximately 2 percent of families use grandparent care, contrasted with 15 percent in Germany and around 30 percent in Italy and Spain (Del Boca, 2015). Geographical proximity of grandparents who are willing to assist with child care, including both regular care and unanticipated "emergency" care, has a positive effect on the probability of women working outside the home (Compton & Pollak, 2014).



Have you had a close relationship with a grandmother or grandfather? If so, in what specific ways did that relationship influence your development?

Grandparenting after Divorce and Remarriage One result of the rise in divorce and remarriage is a growing number of grandparents and grandchildren whose relationships are endangered or severed. After a divorce, because the mother usually has custody, her parents tend to have more contact and stronger relationships with their grandchildren, and the paternal grandparents tend to have less (Doyle, O'Dywer, & Timonen, 2010). When fathers have primary custody or share custody, paternal grandparents continue to have contact with their grandchildren, and the degree of contact may even increase if the divorced father needs assistance (Jappens & Van Bavel, 2016). If the mother is close to the paternal grandmother, children may remain close to their paternal grandmother in the event of a divorce as well (Attar-Schwartz & Fuller-Thomson, 2017).

A divorced mother's remarriage typically reduces her need for support from her parents but not their contact with their grandchildren. For paternal grandparents, however, the new marriage increases the likelihood that they will be displaced or that the family will move away, making contact more difficult (Cherlin & Furstenberg, 1986). This is unfortunate; continued contact and a good relationship with grandparents is associated with greater life satisfaction, higher self-esteem and mastery, and lower anxiety in children whose parents have divorced (Jappens, 2018).

Before 1965, grandparents had no legal rights to see their grandchildren in the event of a divorce or death of their adult child. Because ties with grandparents are important to children's development, every state has given grandparents (and in some states, great-grandparents, siblings, and others) the right to visitation after a divorce or the

death of a parent if a judge finds it in the best interest of the child (Mason, 2011). However, a few state courts have struck down such laws for being too broad and potentially infringing on parental rights (Greenhouse, 2000). Some legislatures have restricted grandparents' visitation rights. Currently, the laws vary state by state, and the burden of proof is generally on the grandparents.

Raising Grandchildren In the United States, about 1 in 10 grandparents is raising a grandchild, and this number is rising (U.S. Census Bureau, 2014). Many are serving as parents by default for children whose parents are unable to care for them—often as a result of teenage pregnancy, substance abuse, illness, divorce, or death (Glaser et al., 2018). Increasingly, the opioid epidemic is taking a toll as well, and increasing numbers of children are entering the foster care system or being cared for by grandparents as a result of parental death, incarceration, or addiction (United, 2016).

Surrogate parenting by grandparents is a well-established pattern in African American and Latino families. It is more common among grandmothers, especially those living in poverty. They are also likely to be younger and have lower educational levels (Blieszner & Roberto, 2006; Dolbin-McNab & Hayslip, 2014; Dunifon, Ziol-Guest, & Kopko, 2014).

Unexpected surrogate parenthood can be a physical, emotional, and financial drain on middle-age or older adults (Blieszner & Roberto, 2006). They may have to quit their jobs, shelve their retirement plans, drastically reduce their leisure pursuits and social life, and endanger their health.

Most grandparents who take on the responsibility to raise their grandchildren do it because they do not want their grandchildren placed in a stranger's foster home. Grandparents often have to deal with a sense of guilt because the adult children they raised have failed their own children and with the rancor they may feel toward these adult children. For some caregiver couples, the strains produce tension in their relationship. If one or both parents resume their normal roles, it may be emotionally wrenching to return the child (Crowley, 1993; Larsen, 1990, 1991).

Taking over the full care of grandchildren can be psychologically and physically taxing (Hadfield, 2014). With respect to physical health, studies have indicated custodial grandparents are at higher risk of poor physical health (Neely-Barnes, Graff, & Washington, 2010; Musil et al., 2010). Custodial grandparents also report higher levels of anxiety, stress, and particularly depression, and those who are caring for children with social, behavioral, or emotional problems are particularly at risk (Doley, Bell, Watt, & Simpson, 2015; Minkler & Fuller-Thomson, 2001; Neely-Barnes et al., 2010). They may also feel judged as having done a poor job at raising their own children or ashamed at being in the position of raising grandchildren (Hayslip, Fruhauf, & Doblin-MacNab, 2017). High levels of social support can help grandparents deal with the difficulties of parenting their grandchildren and are associated with better psychological health (Hayslip. Blumenthal, & Garner, 2014).

Grandparents providing **kinship care** who do not become foster parents or gain custody have no legal status and few rights. They may face many practical problems, from enrolling the child in school and gaining access to academic records to obtaining medical insurance for the child. Grandchildren are usually not eligible for coverage under employer-provided health insurance even if the grandparent has custody. Moreover, kinship families are not legally entitled to as many benefits as foster families (Lin, 2014), despite research showing that kinship care allows children to remain connected to their family networks and cultural traditions (Kiraly & Humphreys, 2013). Like working parents, working grandparents need good, affordable child care and family-friendly workplace policies, such as time off to care for a sick child. The federal Family and Medical Leave Act of 1993 does cover grandparents who are raising grandchildren, but many do not realize it.

Grandparents can be sources of guidance, companions in play, links to the past, and symbols of family continuity. They express generativity, a longing to transcend mortality by investing themselves in the lives of future generations. Men and women who do not become grandparents may fulfill generative needs by becoming foster grandparents or volunteering in schools or hospitals. By finding ways to develop what Erikson called the virtue of *care*, adults prepare themselves to enter the culminating period of adult development.

kinship care
Care of children living without parents in the home of grandparents or other relatives, with or without a change of legal custody.

checkpoint can you . . .

- Tell how parents' divorce and remarriage can affect grandparents' relationships with grandchildren?
- Discuss the challenges involved in raising grandchildren?
- Tell how grandparenthood has changed in recent generations?
- Describe the roles grandparents play in family life?

summary and key terms

Looking at the Life Course in Middle Age

- Developmental scientists view midlife psychosocial development both objectively, in terms of trajectories or pathways, and subjectively, in terms of people's sense of self and the way they actively construct their lives.
- Change and continuity must be seen in context and in terms of the whole life span.

Change at Midlife: Theoretical Approaches

- Research looking at midlife used to be relatively rare, but changing demographics in the United States have sparked renewed interest in midlife.
- Trait models suggest developmental change as well as changes in response to life events. Some processes may be culturally specific.
- Erikson's seventh psychosocial stage is generativity versus stagnation. Generativity can be expressed through parenting and grandparenting, teaching or mentorship, productivity or creativity, self-development, and "maintenance of the world." The virtue of this period is *care*. Current research on generativity finds it most prevalent at middle age but not universally so.
- The greater fluidity of the life cycle today has partly undermined the assumption of a social clock.

generativity versus stagnation (*468*)
generativity (*468*)

The Self at Midlife: Issues and Themes

- Key psychosocial issues and themes during middle adulthood concern the existence of a midlife crisis, identity development (including gender identity), and psychological well-being.
- Research does not support a normative midlife crisis. It is more accurate to refer to a transition that may be a psychological turning point.
- According to Whitbourne's identity process theory, people continually confirm or revise their perceptions about themselves on the basis of experience and feedback from others. Identity processes typical of an individual can predict adaptation to aging.
- Generativity is an aspect of identity development.
- Narrative psychology describes identity development as a continuous process of constructing a life story. Highly generative people tend to focus on a theme of redemption.
- Emotionality and personality are related to psychological well-being.
- Research based on Ryff's six-dimensional scale has found that midlife is generally a period of positive mental health and well-being, though socioeconomic status is a factor.

midlife crisis (*471*)
turning points (*472*)
midlife review (*472*)
ego-resiliency (*472*)
identity process theory (IPT) (*473*)
identity schemas (*473*)
identity assimilation (*473*)
identity accommodation (*473*)
identity balance (*473*)

Relationships at Midlife

- Two theories of the changing importance of relationships are Kahn and Antonucci's social convoy theory and Carstensen's socioemotional selectivity theory. According to both theories, socioemotional support is an important element in social interaction at midlife and beyond.
- Relationships at midlife are important to physical and mental health but also can present stressful demands.

social convoy theory (*478*)

socioemotional selectivity theory (*479*)

Consensual Relationships

- Research on marriage satisfaction indicates there is generally an initial rapid decline, followed by a plateau, and then further, slower declines over the long term. The birth of a child is associated with steep declines, while sexual satisfaction is associated with marital satisfaction.
- Cohabitation is increasing in midlife but may negatively affect men's well-being.
- Divorce at midlife can be stressful and life-changing. Marital capital tends to dissuade midlife divorce.
- Divorce today may be less threatening to well-being in middle age than in young adulthood.
- Married people tend to be healthier at middle age than people with any other marital status.
- Because some gays and lesbians delayed coming out, at midlife they may be just establishing intimate relationships.
- Middle-aged people tend to invest less time in friendships than younger adults do but depend on friends for emotional support and practical guidance.

marital capital (*481*)

Relationships with Maturing Children

- Parents of adolescents have to come to terms with a loss of control over their children's lives.
- The emptying of the nest is liberating for many women but may be stressful for couples whose identity is dependent on the parental role or those who now must face previously submerged marital problems.
- Middle-aged parents tend to remain involved with their adult children, and most are generally happy with the way their children turned out. Conflict may arise over grown children's need to be treated as adults and parents' continuing concern about them.
- Today, more young adults are delaying departure from their childhood home or are returning to it. Adjustment tends to be smoother if the parents see the adult child as moving toward autonomy.

empty nest (*485*)

revolving door syndrome (*486*)

Other Kinship Ties

- Relationships between middle-aged adults and their parents are usually characterized by a strong bond of affection. The two generations generally maintain frequent contact and offer and receive assistance. Aid flows mostly from parents to children.
- As life lengthens, more and more aging parents become dependent for care on their middle-aged children. Acceptance of these dependency needs may be the outcome of a filial crisis.
- The chances of becoming a caregiver to an aging parent increase in middle age, especially for women.
- Caregiving can be a source of considerable stress but also of satisfaction. Community support programs can help prevent caregiver burnout.
- Although siblings tend to have less contact at midlife than before and after, most middle-aged siblings remain in touch, and their relationships are important to well-being.
- Most U.S. adults become grandparents in middle age and have fewer grandchildren than in previous generations.
- Geographic separation does not necessarily affect the quality of grandparenting relationships.
- Divorce and remarriage of an adult child can affect grandparent-grandchild relationships.
- A growing number of grandparents are raising grandchildren whose parents are unable to care for them. Raising grandchildren can create physical, emotional, and financial strains.

filial crisis (*487*)

sandwich generation (*487*)

caregiver burnout (*489*)

kinship care (*492*)

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part 8
LATE ADULTHOOD

chapter 17

Physical and Cognitive Development in Late Adulthood

outline

Old Age Today

PHYSICAL DEVELOPMENT

Longevity and Aging

Physical Changes

Physical and Mental Health

COGNITIVE DEVELOPMENT

Aspects of Cognitive Development

learning objectives

Discuss the causes and impact of the aging population.

Characterize longevity and discuss biological theories of aging.

Describe physical changes in late adulthood.

Identify factors that influence health and well-being in late adulthood.

Describe the cognitive functioning of older adults.



Dave and Les Jacobs/Blend Images LLC

did you know?

- By 2050, the population of people 65 and over is projected to be 1.6 billion worldwide.
- In many parts of the world, the fastest-growing age group consists of people in their eighties and older.
- Older brains can grow new nerve cells—something once thought impossible.

In this chapter, we begin by sketching demographic trends among today's older population. We look at the increasing length and quality of life in late adulthood and at causes of biological aging. We examine physical changes and health. We then turn to cognitive development: changes in intelligence and memory, the emergence of wisdom, and the influence of continuing education in late life.

Wrinkles should merely indicate where smiles have been.

—Mark Twain (1835–1910)

Old Age Today

In Japan, old age is a status symbol; travelers checking into hotels there are often asked their age to ensure that they will receive proper deference. In the United States, by contrast, aging is generally seen as undesirable. In research, the most consistent stereotypes that have emerged regarding the elderly are that while older people are generally seen as warm and loving, they are incompetent and of low status (Cuddy, Norton, & Fiske, 2005; Cary & Chasteen, 2015). These stereotypes about aging, internalized in youth and reinforced for decades by societal attitudes, may become self-stereotypes, unconsciously affecting older people's expectations about their behavior and often acting as self-fulfilling prophecies (Levy, 2003).



What stereotypes about aging have you heard in the media and in everyday life?

Today, efforts to combat **ageism**—prejudice or discrimination based on age—are making headway, thanks to the growing visibility of active, healthy older adults. Reports about aging achievers appear frequently in the media. On television, older people are less often portrayed as dotards and more often as level-headed, respected, wise, or cunning, a shift that may be important in the reduction of negative stereotypes about the elderly (Bodner, 2009).

ageism
Prejudice or discrimination against a person (most commonly an older person) based on age.

We need to look beyond distorted images of age to its true, multifaceted reality. What does today's older population look like?



The growing visibility of such active, healthy older adults as actress Diana Rigg is changing the perception of old age. At age 75, she played the role of brilliant, sharp-tongued Lady Oleanna Tyrell on the popular fantasy drama Game of Thrones.
HBO/Kobal/Shutterstock

THE GRAYING OF THE POPULATION

The global population is aging. In 2015, 617 million people worldwide were age 65 or older, and by 2050, the total population in that age group is projected to reach 1.6 billion (He, Goodkind, & Kowal, 2016). By 2020, there will be more people aged 60 years and older on the planet than there will be children under the age of 5 years, and in 2050, most of them will be living in low- and middle-income countries rather than in the high-income countries where this demographic shift first began (World Health Organization, 2018i). Aging populations result from declines in fertility accompanied by economic growth, better nutrition, healthier lifestyles, improved control of infectious disease, safer water and sanitation facilities, and advances in science, technology, and medicine (He et al., 2016).

Countries vary with respect to how aged their populations are (see Figure 1). For instance, in Japan, 26.6 percent of the population was 65 years and older in 2015, a number that is projected to grow to 40.1 percent by 2050. Qatar's age 65 and over percentage of the population, by contrast, was only 0.9 percent in 2015, with a projected growth to 22.1 percent by 2050. Many of the oldest populations are found in Europe and North America (Federal Interagency Forum on Aging-Related Statistics, 2019). In many parts of the world, the fastest-growing age group consists of people in their eighties and older. The population of people 80 and older is projected to almost triple between 2015 and 2050, from 126.5 million to 446.6 million. By contrast, the percentage rate increase predicted for adults age 65 and older is about 1.5 times the current numbers, and there is an almost flat

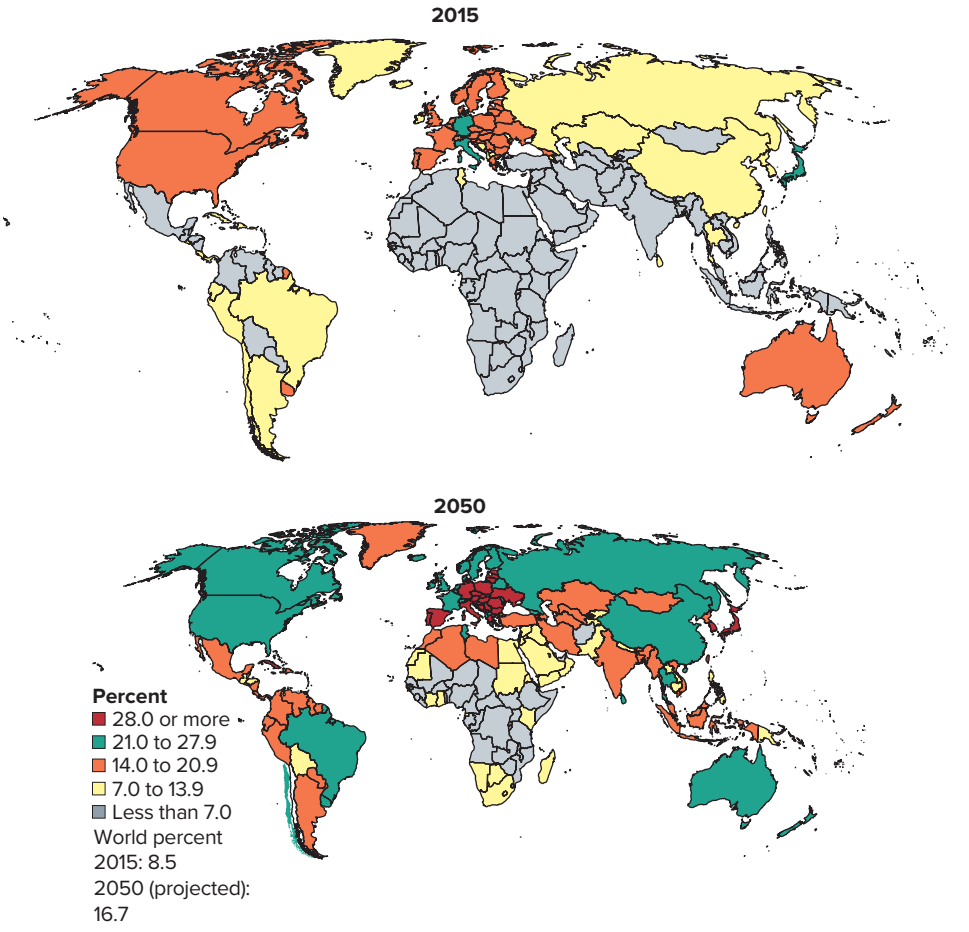


FIGURE 1

Percentage of Population Age 65 and Older: 2015 and 2050

The growth of the population age 65 and up is projected to increase rapidly in the coming decades. Growth will be greatest in much of the developing world.

Source: He, W., D. Goodkind, and P. Kowal. *International Population Reports*. P95/16-1, An Aging World: 2015. US Census Bureau, ed. Washington, DC: US Government Publishing Office, 2016.

percentage change predicted in people under the age of 20 (He et al., 2016). Different countries have met the increased needs of their aging populations with varying levels of success (see Window on the World).

In the United States, the graying of the population is due to high birthrates and high immigration rates during the early to mid-twentieth century and a current trend toward smaller families, which has reduced the relative size of younger age groups. The aging of baby boomers—the surge of people born following World War II—is a large factor (Administration on Aging, 2010). Since 1900, the proportion of Americans age 65 and older has more than tripled, from 4.1 percent of the population to 15.2 percent in 2016. The first of the baby boomers turned 65 in 2011, and around 21.7 percent of Americans are likely to be 65 and older in 2040. By 2060, population projections suggest there will be 98.2 million adults age 65 and over in the United States. The 85 and older population is also expected to increase to approximately 14.6 million people in 2040—an increase of 129 percent over 2016 (Administration for Community Living, 2018).

While racial and ethnic minority populations in the United States are, as a whole, younger than the white population, ethnic diversity among older adults is nonetheless increasing. In 2016, 23 percent of Americans age 65 and older were members of

window on the world

ELDER CARE WORLDWIDE

As the world ages, countries must adjust to their demographic shifts and the changing needs of their populations. One pressing need is that for elder care. Both the number of people eligible for programs supporting the elderly and the duration that people require their assistance are growing.

The Global Age Watch Index ranks countries based on how well older people are doing. It measures four aspects of elder welfare: income security, health status, capability, and the enabling environment (aspects that help elders to independently care for themselves). In 2015, data were available for and used to rank 96 out of the 195 countries of the world. Switzerland (1), Norway (2), and Sweden (3) top the list with Afghanistan (96), Malawi (95), and Mozambique (94) at the bottom. In North America, the United States ranked 9th, Canada 5th, and Mexico 33rd. Most of the European countries were in the top half, and the bottom 20 consisted mostly of African, Middle Eastern, and Southeast Asian countries (HelpAge International Staff, 2015).

The top ranking went to Switzerland—where one-fourth of the population is older than 60—because of its many programs promoting health, capability, and activity for the aging population, as well as universal health care and pension plans for all citizens. Nearly one-third of Japan's population is over 60; at number eight in the ranking, Japan is considered one of the oldest and healthiest countries in the world. It has comprehensive policies in place for the elderly, including universal health care and pension plans (HelpAge International Staff, 2015).

Both India (71) and China (52) have many elderly adults and major disparities in quality of health care. In India, 80 percent of the elderly live in rural areas and 40 percent live below the poverty line; there is no official social security or pension plan for the elderly. Chinese elders fare somewhat better with both physical and mental health. The discrepancies are worse in both countries for those older than 75 (HelpAge International Staff, 2015).

Malawi and Mozambique have very few programs for elders. They rank lowest in income security, and as a result, 95 percent of the elderly still work. There are no universal pension programs, and access to health care is very limited. In both countries, chronic diseases are rampant. Elder abuse—financial, physical, and sexual—is common. Many elderly people report feeling unsafe and devalued (HelpAge International Staff, 2015).

Inequality in health care, income, education, and opportunities is apparent between the top- and bottom-ranked countries. In the highest-income countries, nearly all people older than 65 receive some sort of pension and health care. In the low- and middle-income countries, about 25 percent receive a pension or quality health care. Much still needs to be done to equalize elder care worldwide.

what's your view

In countries with limited budgets, what priority should the elderly hold when considering funding for social services? Are they equally, more, or less important than other age groups? Why?

minority groups; by 2060, 45 percent will be. The largest group is African American (9 percent), followed by Asian or Pacific Islander (4 percent), Native American (0.5 percent), Native Hawaiian/Pacific Islander (0.1 percent), and multiracial adults (0.7 percent). Hispanics, who can be any race, are approximately 8 percent of the population. The older Hispanic population is projected to grow most rapidly, to almost 22 percent in 2060 (Administration for Community Living, 2018; Federal Interagency Forum on Aging-Related Statistics, 2016).

YOUNG OLD TO OLDEST OLD

The economic impact of a graying population depends on the proportion of the population that is healthy and able-bodied. In this regard, the trend is encouraging. Many

problems that we used to think were the result of age have been determined to be due to lifestyle factors or disease.

primary aging
Gradual, inevitable process of bodily deterioration throughout the life span.

secondary aging
Aging processes that result from disease and bodily abuse and disuse and are often preventable.

activities of daily living (ADLs)
Essential activities that support survival, such as eating, dressing, bathing, and getting around the house.

functional age
Measure of a person's ability to function effectively in his or her physical and social environment in comparison with others of the same chronological age.

gerontology
Study of the aged and the process of aging.

geriatrics
Branch of medicine concerned with processes of aging and medical conditions associated with old age.

Primary aging is a gradual, inevitable process of bodily deterioration that begins early in life and continues through the years irrespective of what people do to stave it off. In this view, aging is an unavoidable consequence of getting older. **Secondary aging** results from disease, abuse, and disuse—factors that are often within a person's control (J. C. Horn & Meer, 1987). These two philosophies of aging can be likened to the familiar nature-nurture debate. Primary aging is a nature process governed by biology. Secondary aging is the result of nurture, the environmental insults that accrue over the course of a lifetime. As always, the truth lies somewhere in between and both factors matter.

Today, social scientists who specialize in the study of aging refer to three groups of older adults: the "young old," "old old," and "oldest old." These terms represent social constructions similar to the concept of adolescence. Chronologically, *young old* generally refers to people ages 65 to 74, who are usually active, vital, and vigorous. The *old old,* ages 75 to 84, and the *oldest old,* age 85 and above, are more likely to be frail and infirm and to have difficulty managing **activities of daily living (ADLs).** As a result, the oldest old consume a disproportionate number of resources such as pensions or health care costs given their population size (Kinsella & He, 2009).

A more meaningful classification is **functional age:** how well a person functions in a physical and social environment in comparison with others of the same chronological age. For example, a person of 90 who is still in good health and can live independently may be functionally younger than a 75-year-old suffering the effects of dementia.

The use of these terms and age distinctions has arisen out of research and service needs. **Gerontology** is the study of the aged and aging processes. Gerontologists are interested in differences between elderly people because these differences can influence outcomes. Likewise, researchers and service providers in **geriatrics,** the branch of medicine concerned with aging, are concerned with differences among the elderly. Understanding differences among the elderly has underlined the need for support services that people in age groups such as the *oldest old* may need. For example, some in this age group have outlived their savings and cannot pay for their own care.

checkpoint can you . . .

- Discuss the causes and impact of the aging population?
- State two criteria for differentiating among the young old, old old, and oldest old?
- Differentiate between primary and secondary aging?

PHYSICAL DEVELOPMENT

Longevity and Aging

life expectancy
Age to which a person in a particular cohort is statistically likely to live (given his or her current age and health status), on the basis of average longevity of a population.

longevity
Length of an individual's life.

life span
The longest period that members of a species can live.

Life expectancy is the age to which a person born at a certain time and place is statistically likely to live, given his or her current age and health status. Life expectancy is based on the average **longevity,** or actual length of life, of members of a population. Gains in life expectancy reflect declines in *mortality rates,* or death rates (the proportions of a total population or of certain age groups who die in a given year). The human **life span** is the longest period that members of our species can live. The longest documented life span thus far is that of Jeanne Clement, a French woman who died at 122 years of age.



Keep in mind that life expectancy doesn't reflect the average age at which someone dies. It includes deaths across the life span. Therefore, a short life expectancy can often signify a high infant mortality rate, which pulls down the number.

TRENDS AND FACTORS IN LIFE EXPECTANCY

A baby born in the United States in 2016 can expect to live to 78.6 years, more than 30 years longer than a baby born in 1900 and more than 4 times longer than a baby born at the dawn of human history (National Center for Health Statistics, 2018; Wilmoth, 2000; Figure 2). Much of this increase can be attributed to the influence of antibiotics, vaccination programs, and improved sanitary practices. Life expectancy rates then began to be affected more by deaths from chronic diseases such as heart disease and cancer, and while it continued to rise in the middle of the twentieth century, the change was less dramatic. Most recently, life expectancy in the United States has shown a slight decline, in part because of increased death rates for unintentional drug overdoses (National Center for Health Statistics, 2018). Globally, life expectancy is projected to continue to rise in industrialized countries, although gains are predicted to be relatively low in the United States (Kontis et al., 2017).

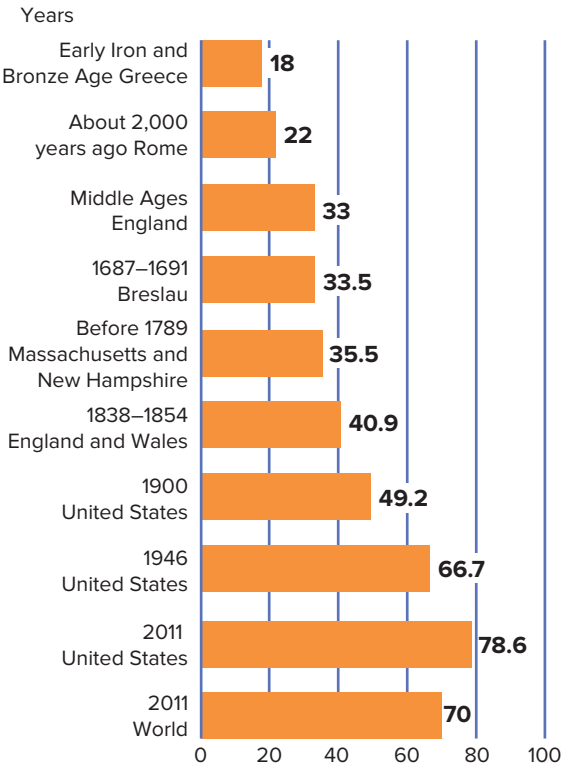


FIGURE 2
Changes in Life Expectancy from Ancient to Modern Times

Source: Adapted from Katchadourian, 1987; 2011 U.S. and world data from World Bank, n.d., and WHO, n.d., respectively.

Gender Differences Nearly all over the world, women live longer and have lower mortality rates at all ages than men. By the age of 65, there are approximately 80.3 men for every 100 women; by age 85, there are only 50 men for every 100 women; and by age 100, women outnumber men by 4 to 1 (He et al., 2016). The gender gap is widest in high-income industrialized nations, where female mortality dropped sharply with improvements in prenatal and obstetric care (Kinsella & He, 2009). In fact, forecasting models predict there is more than a 50 percent probability that women's life expectancy will surpass 90 years of age by 2030 (Kontis et al., 2017). Women's longer lives also have been attributed to their greater tendency to take care of themselves and to seek medical care, the higher level of social support they enjoy, and the rise in women's socioeconomic status in recent decades. Further, men are more likely to smoke, drink, and be exposed to dangerous toxins (Kinsella & He, 2009).

In the United States, women's life expectancy in 1900 was only 2 years longer than men's. The gender gap widened to 7.8 years in the late 1970s, mainly because more men were dying from smoking-related illnesses (heart disease and lung cancer) and fewer women were dying in childbirth. Since then, the gap has narrowed to 5 years (National Center for Health Statistics, 2018). The gender disparity in the United States mirrors the global rates. At the age of 65, there are approximately 79.6 men for every 100 women. This disparity increases with advancing age; by the age of 85, there are 52 men for every 100 women (Federal Interagency Forum on Aging-Related Statistics, 2016).

Regional and Racial/Ethnic Differences Global life expectancy was 72 years in 2016. However, the gap in life expectancies between developed and developing countries is vast. In the African nation of Sierra Leone, a man born in 2016 could expect to live 52.5 years, as compared to 87.1 years for a woman born in Japan (World Health Organization, 2018i). The most dramatic improvements in life expectancy between 2000 and 2015 occurred in Africa, where improvements in child survival and the treatment of malaria and HIV increased life expectancy by 9.4 years (World Health Organization, 2016b).

There are wide racial and ethnic disparities in life expectancy in the United States (see Table 1). On average, white Americans live 3.7 years longer (78.5 years) than African Americans (74.8 years). African Americans, especially men, are more

TABLE 1 Life Expectancy in Years for . . .

	At Birth
Hispanic men	79.3
Hispanic women	84.3
White men	76.3
White women	81.0
African American men	71.9
African American women	78.1

Source: Arias, E., and J. Xu. "United States life tables, 2015." *National Vital Statistics Reports* 67, no. 7 (2018): 1–64

vulnerable than white Americans to illness and death from infancy through middle adulthood. Somewhat surprisingly, Hispanic Americans have the highest life expectancy (80.3 years). The reasons for this are somewhat unclear but may include cultural lifestyle issues or migration effects (e.g., those who migrate to the United States tend to be healthier) (Arias, 2010).

Income and geography also affect life expectancy. Higher socioeconomic status is associated with an increase in life expectancy, and the degree of disparity in life expectancy across income groups has increased in the last decade. Additionally, life expectancy is lowest in the southern United States. It is likely these regional differences are related to health behaviors including smoking, obesity, and exercise rather than differential access to health care (Chetty et al., 2016).

A new way to look at life expectancy is in terms of the number of years a person can expect to live in good health, free of disabilities. Globally, healthy life expectancy (HLE) is 62 years for men and 64.8 years for women. In the United States, HLE is estimated to be 68.5 years of age (World Health Organization, 2018j).

checkpoint can you . . .

- Distinguish life expectancy, longevity, and life span?
- Summarize trends in life expectancy, including gender, regional, and ethnic differences?

WHY PEOPLE AGE

As we get older, we may feel the effects of various chronic conditions or diseases. This process is known as **senescence,** the decline in body functioning associated with aging. Why does senescence occur? Why do we grow old? Most theories about biological aging fall into one of two categories (summarized in Table 2): *genetic-programming theories* and *variable-rate theories.*

senescence
Period of the life span marked by declines in physical functioning usually associated with aging; begins at different ages for different people.

genetic-programming theories
Theories that explain biological aging as resulting from a genetically determined developmental timetable.

Genetic-Programming Theories Is aging an inevitable biological process? **Genetic-programming theories** propose that people's bodies age according to instructions built into the genes and that aging is a normal part of development.

Twin studies have shown that genetic differences account for about one-fourth of the variance in the adult human life span. The genetic influences on aging appear to become stronger over time, especially after age 60 (Willcox et al., 2008; Finkel, Gerritsen, Reynolds, Dahl, & Pedersen, 2014). With the exception of some rare genetic disorders, there is not "a" gene for aging. Rather, aging in typical people involves many gene variants, each with small effects.

Aging also may be influenced by specific genes "switching off," after which age-related losses (such as declines in vision, hearing, and motor control) occur. This process, broadly described as *epigenesis*, involves genes being turned on and off by

TABLE 2 Theories of Biological Aging

Genetic-Programming Theories	Variable-Rate Theories
Programmed senescence theory. Aging is the result of the sequential switching on and off of certain genes. Senescence is the time when the resulting age-associated deficits become evident.	*Wear-and-tear theory.* Cells and tissues have vital parts that wear out.
Endocrine theory. Biological clocks act through hormones to control the pace of aging.	*Free-radical theory.* Accumulated damage from oxygen radicals causes cells and eventually organs to stop functioning.
Immunological theory. A programmed decline in immune system functions leads to increased vulnerability to infectious disease and thus to aging and death.	*Rate-of-living theory.* The greater an organism's rate of metabolism, the shorter its life span.
Evolutionary theory. Aging is an evolved trait thus genes that promote reproduction are selected at higher rates than genes that extend life.	*Autoimmune theory.* Immune system becomes confused and attacks its own body cells.

Source: Adapted from NIH/NIA (1993, 2).

molecular "tags," or instructions. Epigenetic changes do not involve changes in the underlying genetic code; rather, they involve changes in how genes are expressed. The accumulation of epigenetic changes is partly responsible for aging (Kim et al., 2018; D'Aquila, Rose, Bellizzi, & Passarino, 2013; Sierra, Fernández, & Fraga, 2015). Because epigenetic changes are dynamic and modifiable by environmental influences, positive interventions may be able to combat the effects of aging (Field et al., 2018). For example, diet and lifestyle changes can change our epigenetic expression and slow the rate of decline (Pal & Tyler, 2016).

Another cellular process involves *telomeres*, the repetitive fragments of DNA on the tips of chromosomes. Every time a cell divides, replicating its genetic code, the telomeres become shorter. Some theorists argue that cells can divide only a fixed number of times—eventually, they run out of telomeres. Leonard Hayflick (1974) found that human cells will divide in the laboratory no more than 50 times, a number now known as the **Hayflick limit.** Hayflick (1981) argued cells go through the same process in the body as in a laboratory culture. Once cells can no longer replicate, the body loses its ability to repair damaged tissue and thus begins to age.

Hayflick limit
Genetically controlled limit, proposed by Hayflick, on the number of times cells can divide in members of a species.

In support of this theory, research shows that telomeres shorten with age and that the rate of telomere shortening is related to the rate of aging (Honig et al., 2015; Shammas, 2011). Shorter telomeres result in accelerated aging and risk of early death, and they are associated with increased risk of cancer, stroke, diabetes, dementia, chronic obstructive pulmonary disease, and skin disorders (Chilton, O'Brien, & Charchar, 2017). The rate of telomere change is genetically influenced and interacts with environmental influences in a complex fashion over the course of the life span (Honig et al., 2015; Dugdale & Richardson, 2018). Environmental factors that are known to be associated with disease and mortality, such as stress, smoking, alcohol use, and physical inactivity, can all affect the rate of telomere shortening (Puterman, Lin, Krauss, Blackburn, & Epel, 2015; Shalev et al., 2013; Latifovic, Peacock, Massey, & King, 2016; Astuti, Wardhana, Watkins, & Wulaningsih, 2017; Li et al., 2018; Arsenis, You, Ogawa, Tinsley, & Zuo, 2017).

According to *endocrine theory,* the biological clock acts through genes that control hormonal changes. Loss of muscle strength, accumulation of fat, and atrophy of organs may be related to declines in hormonal activity (Lamberts, van den Beld, & van der Lely, 1997). For example, mutations in the genes that code for hormones involved in the regulation of blood sugar have been linked in other species to either increased or decreased life span, and it is likely they function similarly in humans (Van Heemst, 2010). *Immunological theory* proposes a similar process; certain genes may cause problems in the immune system (Holliday, 2004) that then lead to an increased susceptibility to diseases, infections, and cancer (Fulop, Witkowski, Pawelec, Alan, & Larbi, 2014).

According to the *evolutionary theory of aging,* reproductive fitness is the primary aim of natural selection. Therefore, natural selection acts most strongly on the young, who have many years of potential reproduction ahead of them. If a trait favoring reproductive output in the young is present, it will spread throughout the population, even if the effects are later damaging to the individual (Hamilton, 1966; Baltes, 1997). Moreover, natural selection results in energy resources being allocated to protect and maintain the body until reproduction but not necessarily after. After reproduction has ceased, the molecular integrity of the body cells and systems eventually deteriorates beyond the body's ability to repair them (Hayflick, 2004). This deterioration occurs because there is no selective pressure to prevent it once genes have been passed on to the next generation.



This Japanese woman's active lifestyle has contributed to her long healthy life and to her country's lengthy healthy life expectancy.
Digital Vision/PunchStock

Variable-Rate Theories Why might one older adult suffer from arthritis, poor health, and declining perceptual abilities and another remain active and engaged? Why do some people age more quickly or slowly than others? According to **variable-rate theories,** aging is the result of random processes that vary from person to person. They are also called *error theories* because these processes often involve damage due to chance errors in, or environmental assaults on, biological systems.

variable-rate theories
Theories that explain biological aging as a result of processes that involve damage to biological systems and that vary from person to person.

One such theory, *wear-and-tear theory,* holds that the body ages as a result of accumulated damage to the system at the molecular level. Like an old car, the parts of the body eventually wear out (Jin, 2010). Some theorists have argued that while this sounds commonsensical, there is no fundamental reason bodies could not be made to continually regenerate, as they do in youth (Mitteldorf, 2010).

Another theory of aging, known as the *free-radical theory,* proposes that aging results from the formation of **free radicals,** a by-product of metabolic processes (Harman, 1956; 1972). Free radicals are molecules with unpaired electrons. This makes them very reactive because they seek to pair their electrons and will "steal" electrons from neighboring atoms. This process can ultimately damage cell membranes, structures and proteins, fats, carbohydrates, and even DNA. Moreover, free-radical damage accumulates with age and has been associated with cardiovascular disease, cancer, inflammatory diseases such as arthritis, heart disease, neurological disorders such as Parkinson's disease and Alzheimer's disease, gastric ulcers, and many others (Lobo, Patil, Phatak, & Chandra, 2010).

free radicals
Unstable, highly reactive atoms or molecules, formed during metabolism, that can cause internal bodily damage.

The free-radical theory was expanded to the *mitochondrial theory of aging.* Mitochondria—tiny organisms that generate chemical energy for cells and tissues—play an important role in helping cells survive under stress and powering the body. However, when mitochondria generate energy, they also create free radicals as by-products. These free radicals can negatively affect surrounding tissues, including their own mitochondrial DNA. This leads to even more free radical release, more damage, and the aging process (Harman, 2006; 1992; Ziegler, Wiley, & Velarde, 2015).

Free radicals, while potentially damaging, may also play a signaling role by helping regulate genes necessary for cell growth and differentiation (Wojcik, Burzynska-Pedziwiatr, & Wozniak, 2010; Schieber & Chandel, 2014). Some researchers argue their role in the aging process has been overstated (Gladyshev, 2014).

The *rate-of-living theory* postulates that there is a balance between metabolism, or energy use, and life span. The faster a body's metabolism, the shorter its life span, and vice versa (Pearl, 1928). So, for example, a hummingbird would be predicted to have a shorter life than a sloth. While this theory is useful in describing some phenomena, for example, when broadly comparing small and large animals to each other, it does not explain many aspects of aging. For example, exercise, which increases metabolic activity, would be predicted to shorten life span. In reality, it has the opposite effect (Hulbert, Pamplona, Buffenstein, & Buttemer, 2007).

Genetic-programming and variable-rate theories have practical implications. If human beings are programmed to age at a certain rate, they can do little to retard the process. If, on the other hand, aging is variable, then lifestyle practices may influence it.

Some researchers have suggested that rather than focusing on how to extend the human life span, it makes more sense to consider how we can improve human health *while* aging (Partridge, 2010). Still, interest in increasing the life span remains. Controllable environmental and lifestyle factors may interact with genetic factors to determine how long a person lives and in what condition.



Jeanne Calment was a French woman with the longest confirmed life span. She lived a total of 122 years and 164 days.
Pascal Parrot/Sygma/Getty Images

HOW FAR CAN THE LIFE SPAN BE EXTENDED?

Most people understand that more people survive to the age of 40 than to 60 and that more people survive to the age of 60 than to 80. When translated into statistical terms, this concept is known as a **survival curve.** A survival curve represents the percentage of people or animals alive at various ages. With respect to humans, the curve currently ends roughly at age 100, meaning few people survive past this age.

survival curve
A curve on a graph showing the percentage of people or animals alive at various ages.

Can the human life span be extended? Scientists have extended the healthy life spans of worms, fruit flies, and mice through slight genetic mutations (Ishii et al., 1998; Kolata, 1999; Lin, Seroude, & Benzer, 1998; Parkes et al., 1998; Pennisi, 1998). In human beings, of course, genetic control of a biological process may be far more complex. Because no single gene or process seems responsible for senescence and the end of life, we are less likely to find genetic quick fixes for human aging (Holliday, 2004). Moreover, techniques that show promise in shorter-lived species may not apply to humans.

THE OLDEST OLD

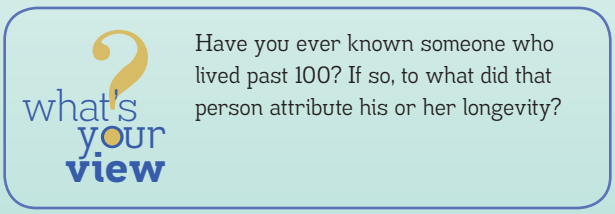
Some people will far outlive the average life expectancy of 78.6 years for Americans (Xu, Murphy, Kochanek, Bastian, & Arias, 2018). Research has increasingly been able to pinpoint factors that keep the "oldest old" alive, often decades longer than their peers.

Nearly no one reaches advanced age without health issues, but a characteristic shared by the oldest old is resilience against disease. Their bodies are subject to extended aging processes, and much greater risk for disease than younger people, and they are more likely to be frail or dependent (Sole-Auro & Crimmins, 2013).

Genetics appears to be important and can explain about 25 percent of the variation in human longevity (Passarino, De Rango, & Montesanto, 2016). Centenarians and supercentenarians appear to possess longevity-assuring genes. These genes seem to counteract age-related molecular damage, loss in function, and cognitive decline (Arai et al., 2014; Arai, 2017). While discovering the genetic variants that lead to longevity might provide us with clues to help us, the research is challenging to conduct given the small number of individuals with whom to conduct research (Santos-Lozano et al., 2016).

Lifestyle factors are also key influencers of longevity and successful aging. The most important lifestyle factor is likely to be exercise. Exercise is clearly beneficial from a physical point of view by, for example, reducing the risk of obesity and cardiovascular disease. However, it is perhaps even more important with respect to the maintenance of cognitive abilities. Blondell and colleagues' (2014) meta-analysis examined the longitudinal impact of physical activity on cognitive decline and found that physical activity was associated with a long-term 18 percent reduction in risk of dementia. Exercise is linked to increased oxygen consumption and cerebral brain flow, which may explain why it helps preserve brain health and cognitive performance (Blondell et al., 2014).

Successful aging also has much to do with psychosocial factors. Cho, Martin, and Poon (2015) highlighted the role of positive affect, which was linked to social interactions. While all people benefitted from social interaction, those who had greatest levels of education and better cognitive functioning were able to engage in more frequent and intense social interactions, which, in turn, contributed to higher levels of positive affect. Family contact, specifically when such interaction is positive, may help stave off depressive symptoms and promote well-being (Fuller-Iglesias, Webster, & Antonucci, 2015).



Have you ever known someone who lived past 100? If so, to what did that person attribute his or her longevity?

Optimists, however, point to data showing continued increases in longevity. In the United States, the number of centenarians increased from roughly 50,000 people in 2000 to approximately 82,000 in 2016 (Xu, 2016; Administration for Community Living, 2018). Data show that while different dynamics are playing out in different countries, the increase in longevity is not uncommon (World Health Organization, 2019g). Interestingly, death rates actually *decrease* after 100 (Coles, 2004). People at 110 are no more likely to die in a given year than people in their eighties (Vaupel et al., 1998). In other words, people hardy enough to reach a certain age are likely to go on living a while longer (Administration on Aging, 2016).

When people who live to be very old are examined, it appears that morbidity—or being in a state of disease—is being compressed. In other words, these people are reaching old age in relatively good health. However, once they begin to deteriorate, they do so very quickly. So, while the overall rate of aging is unchanged, the process of aging itself seems to have been postponed, presumably because of good health (Andersen, Sebastiani, Dworkis, Feldman, & Perls, 2012). Given this finding, the question then becomes: Can we postpone aging even more, delay aging until even later, and thus increase the life span? This has been termed the longevity riddle (Vaupel, 2010).

If you could live as long as you wanted, how long would you choose to live? What factors would affect your answer?

People who, when they were young, held negative stereotypes of the elderly were more likely to experience heart problems later in life.

Levy, Zonderman, Slade, & Ferrucci, 2009

checkpoint can you . . .

- Compare two types of theories of biological aging and discuss their implications and supporting evidence?
- Discuss findings of life-extension research and its limitations in human beings?

While the answer to this question remains to be seen, it raises important issues. It suggests that increasing the healthy life span—a goal worthy in itself—may itself increase life expectancy. It also suggests the most fruitful area for longevity interventions should be focused on risk reduction and living a healthy lifestyle (Fries, Bruce, & Chakravarty, 2011). There are possible economic benefits to this approach. Morbidity compression could lead to people living longer lives, while simultaneously decreasing medical costs because of the compression of poor health at the tail end of the life span (Cutler, Ghosh, & Landrum, 2013).

One line of research—inspired by rate-of-living theories that view energy use as the crucial determinant of aging—is on dietary restriction. Drastic caloric reduction has been found to greatly extend life in worms, fish, and monkeys—in fact, in nearly all animal species on which it has been tried (Colman et al., 2014; Heilbronn & Ravussin, 2003). A review of 15 years of research suggests that calorie restriction can have beneficial effects on human aging and life expectancy (Fontana & Klein, 2007). Calorie-restricted monkeys also show less of the brain atrophy that sometimes accompanies aging (Colman et al., 2009), a finding that may have implications for brain health.

The Calorie Restriction Society practices voluntary caloric restriction, avoiding processed foods rich in refined carbohydrates and partially hydrogenated oils. In comparison with control groups eating a typical Western diet, society members show a low percentage of body fat and a decreased incidence of diabetes, cancer, and age-related disease. Additionally, one study demonstrated that at least over the short term, a 25 percent calorie restriction intervention promoted positive changes in markers related to disease risk and aging in humans. It is not known how effective this would be over the long term. Moreover, it is notable that the study was composed of highly motivated participants and nonetheless had an 18 percent dropout rate in the intervention group, as well as additional participants who dropped out for medical reasons (Ravussin et al., 2015).

Given that a very-low-calorie diet takes great discipline to maintain and is unrealistic for most people, there is increasing interest in developing drugs that mimic the effects of caloric restriction (Fontana, Klein, & Holloszy, 2010). Intermittent fasting, where food is eaten only during some hours of the day, holds some promise. Research suggests it may exert a similar effect on metabolic processes as calorie restriction (Martin, Mattson, & Maudsley, 2006) while being easier to maintain. Last, a more general and holistic approach to aging, with medications used *before* the advent of aging-related disease, might show more promise for extending life in humans (Partridge, 2010).

Physical Changes

Some physical changes typically associated with aging are obvious to a casual observer. Older skin tends to become paler and less elastic, and, as fat and muscle shrink, the skin may wrinkle. Varicose veins may appear on the legs. The hair on the head thins and turns gray and then white, and body hair becomes sparser.

Older adults become shorter as the disks between their spinal vertebrae atrophy. In addition, the chemical composition of the bones changes, creating a greater risk of fractures. Less visible but equally important changes affect internal organs and body systems; the brain; and sensory, motor, and sexual functioning.

ORGANIC AND SYSTEMIC CHANGES

Changes in organic and systemic functioning are highly variable. Some body systems decline rapidly, others hardly at all (Figure 3). There are, however, typical age-related declines in most people. The lungs, for example, become less effective because of reductions in lung volume, atrophy in the muscles involved with breathing, and reductions in the ability of cilia (hairlike structures that clear mucus and dirt out of the lungs) to function effectively (Lowery, Brubaker, Kuhlmann, & Kovacs, 2013). While there are normative age-related declines in immune system functioning, stress can exacerbate this

process, making older people more susceptible to respiratory infections (Kiecolt-Glaser & Glaser, 2001). Heart health suffers as well. Elderly adults are more likely to suffer from arrhythmia (irregular heartbeat), the muscle walls of the heart may thicken, and the valves that control the flow of blood in and out of the heart may no longer open completely. These heart changes result in impaired capacity for pumping blood and thus decreases in cardiovascular fitness (Lee, Huang, & Shen, 2011) Chronic stress in older adults is also related to chronic low-grade inflammation, making older adults more vulnerable to disease (Bauer, Jeckel, & Luz, 2009; Heffner, 2011). Problems with swallowing food, gastric reflux, indigestion, irritable bowel syndrome, constipation, and reduced absorption of nutrients become more common with age (Grassi et al., 2011). This puts elderly people at higher risk of malnutrition (Harris, Davies, Ward, & Haboudi, 2008), especially if they have chronic diseases or are dependent on others for assistance in daily activities (Ülger et al., 2010; Saka, Kaya, Ozturk, Erten, & Karan, 2010).

Reserve capacity is the backup capacity that helps body systems function to their utmost limits in times of stress. With age, reserve levels tend to drop, and many older people cannot respond to extra physical demands as they once did. For example, a person who used to be able to shovel snow from the entire driveway easily may become exhausted from shoveling just the front entry.

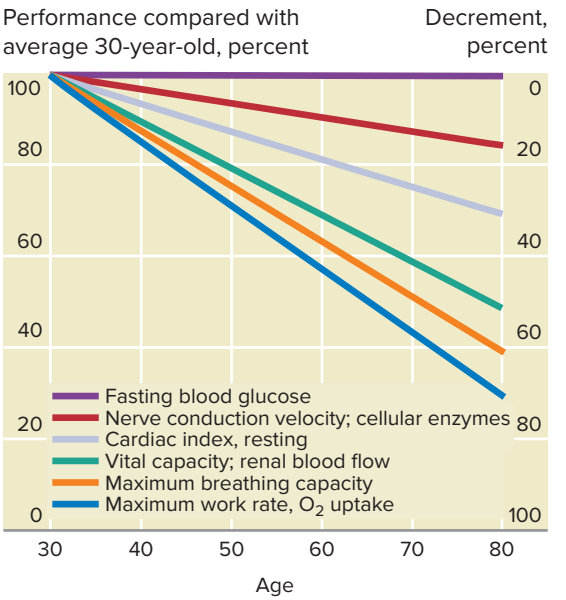


FIGURE 3
Declines in Organ Functioning

Differences in functional efficiency of various internal body systems are typically slight in young adulthood but widen by old age.

Source: Katchadourian, 1987.

THE AGING BRAIN

As people become older, there are declines in the brain's ability to process information rapidly, in executive functioning, and in episodic memory (Fjell & Walhovd, 2010; Hughes, Agrigoroaei, Jeon, Bruzzese, & Lachman, 2018). However, in normal, healthy people, changes in the aging brain are generally subtle and make little difference in functioning. This is because the brain retains a significant degree of plasticity and can compensate for the challenges of aging by reorganizing neural circuitry and working around the problem (Cabeza et al., 2018; Park & Gutchess, 2006). Thus, the declines seen in the aging brain are not as severe. For example, there are age-related changes in functional connectivity, the ways in which different areas of the brain coordinate with each other during a task. In general, imaging studies have found reduced functional connectivity during tasks. However, there is more diffuse activation (more brain areas are used for completing tasks) to compensate. This is particularly true when tasks are challenging (Sala-Llonch, Bartrés-Faz, & Junqué, 2015; Geerligs, Renken, Saliasi, Maurits, & Lorist, 2014).

Some areas of the brain compensate by becoming more active with age. For example, there are increases in prefrontal activity (associated with effortful, controlled tasks) with age (Eyler, Sherzai, Kaup, & Jeste, 2011; Park & Reuter-Lorenz, 2009). This results in a shift toward "semanticized cognition" in older adults. In other words, older adults utilize their vast store of knowledge to strategically bolster their diminishing processing capacities, allowing them to compensate with slower, although often better, decision-making (Spreng & Turner, in press).

In late adulthood, the brain gradually diminishes in volume and weight, particularly in the frontal and temporal regions (Fjell & Walhovd, 2010; Lockhart & DeCarli, 2014). The hippocampus—the seat of memory—also shrinks (Raz, Ghisletta, Rodrigue, Kennedy, & Lindenberger, 2010). There is also a reduction in cortical thickness (Lemaitre et al., 2012). This gradual shrinkage was formerly attributed to a loss of neurons (nerve cells). However, most researchers now agree that—except in certain specific brain areas, such as the cerebellum, which coordinates sensory and motor activity—neuronal loss is not substantial and does not affect cognition (Burke & Barnes, 2006; Finch & Zelinski, 2005). When the pace of these brain changes increases, however, cognitive declines are increasingly likely (Carlson et al., 2008).

reserve capacity
Ability of body organs and systems to put forth 4 to 10 times as much effort as usual under acute stress; also called *organ reserve.*

checkpoint
can **you** . . .

- **Summarize common changes and variations in systemic functioning during late life?**

Another typical change is a decrease in the number, or density, of dopamine neurotransmitters due to losses of synapses (neuronal connections). Dopamine receptors are important as they help in regulating attention (Park & Reuter-Lorenz, 2009). This decline generally results in slowed response time.

Beginning in the midfifties, the myelin sheathing that enables neuronal impulses to travel rapidly between brain regions begins to thin (Natrajan et al., 2015; Hinman & Abraham, 2007). This deterioration of the brain's myelin, or white matter, is associated with cognitive and motor declines (Andrews-Hanna et al., 2007; Finch & Zelinski, 2005).

Postmortem examinations of brain tissue have found significant DNA damage in certain genes that affect learning and memory in most very old people and some middle-aged people (Lu et al., 2004). Such changes are associated with neurodegenerative disorders and dementia (Madabhushi, Pan, & Tsai, 2014). Although adults over the age of 90 years are more than 25 times more likely to develop dementia than adults age 65 to 69 years (Brayne, 2007), such deterioration is not inevitable.

Not all changes in the brain are destructive. Researchers have discovered that older brains can grow new nerve cells from stem cells—something once thought impossible. Evidence of cell division has been found in the hippocampus, a portion of the brain involved in learning and memory (Seib & Martin-Villalba, 2015; Chaker et al., 2016). It appears likely that in humans, physical activity paired with cognitive challenges may be most effective in promoting the growth of new cells (Kempermann, 2015; Di Benedetto, Mueller, Wenger, Duezel, & Pawelec, 2017). Moreover, those older adults who maintain a sense of purpose later in life retain a larger volume of gray matter in their insular cortex when compared to adults without this orientation (Ryff, Heller, Schaefer, Van Reekum, & Davidson, 2016). Findings such as these highlight the plasticity and possibility for positive change in the aging brain even late in life.

checkpoint can **you** . . .

- Identify several age-related changes in the brain and their effects on cognitive and social functioning?

SENSORY AND PSYCHOMOTOR FUNCTIONING

Individual differences in sensory and motor functioning increase with age. Some older people experience sharp declines; others find their abilities virtually unchanged. Visual and hearing problems may deprive them of social relationships and independence, and motor impairments may limit everyday activities.

Vision and Hearing Older eyes need more light to see, are more sensitive to glare, and may have trouble locating and reading signs. Thus driving may become hazardous, especially at night. Older adults may have difficulty with depth or color perception or with such daily activities as reading, sewing, shopping, and cooking (Desai et al., 2001).



In age-related macular degeneration, the leading cause of visual impairment in older adults, the center of the retina gradually loses the ability to distinguish details. In these photos, the left is an image as seen by a person with normal vision, and the right is the same image as seen by a person with macular degeneration.

Source: National Eye Institute, National Institutes of Health.

Losses in visual contrast sensitivity can cause difficulty reading very small or very light print (Owsley, 2011). Vision problems also can cause accidents and falls (Lord, Smith, & Menant, 2010). Many community-dwelling older adults report difficulty with bathing, dressing, and walking around the house, in part because they are visually impaired (Desai, Pratt, Lentzner, & Robinson, 2001; Kempen, Ballemans, Ranchor, van Rens, & Zijlstra, 2012).

People with moderate visual losses often can be helped by corrective lenses or changes in the environment. While only 2.3 percent of U.S adults from 40 to 49 years of age have a visual impairment, by 80 years old, 50 percent of adults—currently about 1.61 million people—need glasses to see well. Women are about a third more likely to have a visual impairment than men are (Varma et al., 2016). Globally, estimates are that 1.3 billion people have some form of visual impairment (World Health Organization, 2018k).

Cataracts, cloudy or opaque areas in the lens of the eye, are common in older adults and eventually cause blurred vision (Iroku-Malize & Kirsch, 2016). Approximately 26 million Americans are currently affected by cataracts (Wittenborn & Rein, 2014), and worldwide, 94 million people are visually impaired and 20 million are blind because of cataracts (Lee & Afshari, 2017; Pascolini & Mariotti, 2012). Surgery to remove cataracts is one of the most frequent operations among older Americans and is generally quite successful. Cataract surgery is associated with a reduction in mortality risk of up to 60 percent (Tseng et al., 2017; Tseng, Yu, Lum, & Coleman, 2016). Presumably the reduction in mortality risk results from a number of factors tied to vision, such as greater ease and accuracy in taking medications, greater likelihood of staying physically active, and lower accident risk.

cataracts
Cloudy or opaque areas in the lens of the eye, which cause blurred vision.

The leading cause of visual impairment in older adults is **age-related macular degeneration.** The macula is a small spot in the center of the retina that helps us keep objects directly in our line of sight in sharp focus. In the most common form of macular degeneration, the retinal cells in this area degenerate over time, and the center of the retina gradually loses the ability to sharply distinguish fine details. Activities such as reading and driving become extremely problematic, as the exact area in which a person focuses becomes blurry. In some cases, treatments using antioxidant and zinc supplements and drugs that block the growth of abnormal blood vessels under the retina can prevent further vision loss but cannot reverse loss that has already occurred. For people with severe degeneration, implantation of a tiny "telescope" that magnifies and focuses central retinal content to other areas of the retina that are still healthy can be used (Foundation Fighting Blindness, 2017).

age-related macular degeneration
Condition in which the center of the retina gradually loses its ability to discern fine details; leading cause of irreversible visual impairment in older adults.

Glaucoma is irreversible damage to the optic nerve caused by increased pressure in the eye. Glaucoma can be treated with eye drops, pills, or surgery. Early treatment can lower elevated pressure in the eye and delay the onset of the condition. However, even with treatment, 10 percent of people who get glaucoma will eventually go blind. In the United States, approximately 120,000 people are blind from glaucoma (Glaucoma Research Foundation, 2017). Worldwide, glaucoma is the leading cause of blindness, and in 2013, approximately 64.3 million people were affected by glaucoma (Tham et al., 2014).

glaucoma
Irreversible damage to the optic nerve caused by increased pressure in the eye.

Globally, about 466 million adults have disabling hearing loss—a permanent hearing loss in the better ear of more than 40 decibels (World Health Organization, 2019d). In the United States, approximately 37.5 million adults have some form of hearing loss (Blackwell, Lucas, & Clarke, 2014).

Hearing impairments increase with age. About 17 percent of adults age 45 to 64 have trouble hearing. By 65 to 74 years, the proportion of affected adults rises to 30 percent, then 45.7 percent for people 75 and older (Centers for Disease Control, 2017l). Men are approximately twice as likely to experience a hearing impairment, and white people are more likely to be affected than other ethnicities (National Institute on Deafness and Other Communication Disorders, 2016). Hearing aids can help but are expensive and may magnify background noises as well as the sounds a person wants to hear. Only 1 in 3 adults age 70 or older who would benefit from the use of hearing aids uses them (National Institute on Deafness and Other Communication Disorders, 2016).

Changes in environmental design, such as brighter reading lights, a closed captioning option on television sets, and built-in telephone amplifiers can help many older adults with sensory limitations.

Strength, Endurance, Balance, and Reaction Time Generally, aging results in a variety of changes related to physical abilities, including increases in body fat and declines in muscle strength, aerobic capacity, flexibility, and agility. Generally, the loss of strength is greater for lower than for upper limbs. The average loss in strength for older adults is approximately 1 to 2 percent annually, a rate that likely increases after age 75 in the absence of physical activity. Flexibility also declines, although less so for women than for men. The declines are related to aging as well as to decreases in physical activity (Milanović et al., 2013).

These physical changes contribute to falls (Trombetti et al., 2016). Falls, the most common cause of fractures, become increasingly common with age (National Center for Injury Prevention and Control, 2013). At age 65 to 74, the rate of fractures is approximately 9 per 1,000 adults. By 85 years of age and older, the rate of fractures reaches 51 per 1,000 adults (Levant, Chari, & DeFrances, 2015). Many falls are preventable by eliminating hazards commonly found in the home (Table 3). Additionally, some physical changes of age contributing to falls can be reversed or slowed. A recent review showed that exercise interventions using multiple-component exercises, resistance training, balance training, and endurance training reduced the risk of falls and improved balance, endurance, and elderly people's ease of walking (Cadore, Rodríguez-Mañas, Sinclair, & Izquiredo, 2013).

The World Health Organization (2019e) has made the promotion of functional ability a priority, and global fitness trends show increased interest in functional fitness training (Thompson, 2016). **Functional fitness** training refers to exercises or activities that improve daily activity. While it has implications for all ages, it is perhaps most relevant to elderly adults, who may have increasing difficulty in performing the activities of daily living necessary for independence. Levels of functional fitness decline with age in concert with physical activity in a bidirectional fashion (Milanovic et al., 2013). In other words, becoming less physically active over time results in declines in functional fitness. Those functional fitness declines then lead to reductions in physical activity as movements become harder to execute.

functional fitness
The ability to perform the physical activities of daily living.

While intervention programs using resistance training in the elderly have shown that it is possible to increase muscle strength, there is limited data on how simple increases in strength transfer to everyday movements. Research does show that strength training

TABLE 3 Safety Checklist for Preventing Falls in the Home

Stairways, hallways, and pathways	Free of clutter Good lighting, especially at top of stairs Light switches at top and bottom of stairs Tightly fastened handrails on both sides and full length of stairs Carpets firmly attached and not frayed; rough-textured or abrasive strips to secure footing
Bathrooms	Grab bars conveniently located inside and outside of tubs and showers and near toilets Nonskid mats, abrasive strips, or carpet on all surfaces that may get wet Night-lights
Bedrooms	Telephones and night-lights or light switches within easy reach of beds
All living areas	Electrical cords and telephone wires out of walking paths Rugs and carpets well secured to floor No exposed nails or loose threshold trim Furniture and other objects in familiar places and not in the way; rounded or padded table edges Couches and chairs proper height to get into and out of easily

Source: Adapted from NIA, 1993.

interventions can help active older adults improve balance and mobility (Copeland, Good, & Dogra, 2018). However, functional fitness interventions that specifically mimic desired actions show more practical success. For example, rather than using a seated leg press, an elderly person might be coached by being asked to sit down and rise from a chair while wearing a weighted vest. A meta-analysis of 13 studies on functional fitness intervention programs showed that such programs were effective in increasing performance in everyday life and that they were more effective than merely focusing on muscle strength (Liu, Shiroy, Jones, & Clark, 2014).

Part of the reason for these gains is that the primary factor in older adults is likely to be a training-induced adaptation in the brain's ability to coordinate motor and brain activity (Voss et al., 2010; Barry & Carson, 2004). For example, vacuuming requires muscle strength in the arms and legs, dynamic balance, control of range of motion, gross and fine motor movements, and the coordination of all movements together (Liu et al., 2014). Thus, functional fitness is as much cognitive as it is physical.

Currently, a large literature exists documenting the positive effects of exercise on cognition. Exercise improves cognitive health in chronically ill adults, helps prevent cognitive declines in healthy adults, and appears to do so regardless of when started and what particular type of exercise is done (Northey, Cherbuin, Pumpa, Smee, & Rattray, 2018; Cai, Li, Hua, Liu, & Chen, 2017; Gomes-Osman et al., 2018; Bherer, Erickson, & Liu-Ambrose, 2013).

SLEEP

Older people tend to sleep and dream less than before. Their hours of deep sleep are more restricted, and they may awaken more easily and earlier in the morning (Pace-Schott & Spencer, 2014). To some extent, this is driven by normative changes in circadian (daily) rhythms. However, the assumption that sleep problems are normal in old age can be dangerous (Mattis & Sehgal, 2016). Poor sleep quality or chronic insomnia can contribute to depression, neurodegenerative disorders such as dementia, and cognitive declines (Baglioni et al., 2011; Lee et al., 2013; Miyata et al., 2013). Either too much sleep or too little sleep is associated with an increased risk of mortality (Gangwisch et al., 2008; Chen, Su, & Chou, 2013).

The American College of Physicians (ACP) recommends that the first line of defense against insomnia and sleep disorders is the use of cognitive behavioral therapy (Qaseem, Kansagara, Forciea, Cooke, & Denberg, 2016). Such therapy may include instructions on, for example, staying in bed only when asleep, getting up at the same time each morning, and learning about false beliefs pertaining to sleep needs. This type of therapy has produced improvements, with or without drug treatment (Lovato, Lack, Wright, & Kennaway, 2014; Reynolds, Buysse, & Kupfer, 1999). However, if it is not effective, the ACP recommends short-term use medications be considered. The most commonly prescribed drugs include benzodiazepines (e.g., Halcion, Ativan), non-benzodiazepine hypnotics (e.g., Ambien), and suvorexant (e.g., Belsomra), a drug that works via altering the signaling of neurotransmitters that regulate sleep.

SEXUAL FUNCTIONING

Contrary to stereotypes, a sizable number of adults remain sexually active late into adulthood. In a national survey, 38.9 percent of U.S. men age 75 to 85 and 16.8 percent of women reported being sexually active (Lindau & Gavrilova, 2010). Men retain more sexual desire; however, both men and women report a decline in sexual desire with age (Aggarwal, 2013), and women report a greater decline in sexual activity (Lee, Nazroo, O'Connor, Blake, & Pendleton, 2016). Ageism and stereotypes about the elderly may negatively influence sexual desire (Heywood et al., 2017), although more recent cohorts report a more positive attitude about sexuality in old age, higher satisfaction in their sex lives, less sexual dysfunction, and higher rates of sexual activity than previous cohorts (DeLamater, 2012).

Sex is different in late adulthood from what it was earlier. Men typically take longer to develop an erection and to ejaculate, may need more manual stimulation, may experience longer intervals between erections, or may have difficult achieving an erection. Women report more difficulties with becoming aroused and experiencing orgasm, breast engorgement and other signs of sexual arousal are less intense than before, and they may experience issues with lubrication (Lee et al., 2016; Lindau et al., 2007). Health problems are more likely to affect the sex life of women than men, but poor mental health and relationship dissatisfaction are associated with sexual dysfunction in both men and women (Laumann, Das, & Waite, 2008).

Housing arrangements and care providers should consider the sexual needs of elderly people. Satisfaction with life, cognitive functioning, and psychological well-being are all strongly related to interest in and having sex (Trudel, Villeneuve, Anderson, & Pilon, 2008). However, the most consistent predictors are health status and the presence of a relationship partner (Schick et al., 2010; DeLamater, 2012). Physicians should avoid prescribing drugs that interfere with sexual functioning if alternatives are available and, when such a drug must be taken, should alert the patient to its effects. Because they rarely use condoms (Schick et al., 2010), sexual health and the transmission of sexually transmitted infections should be discussed with sexually active older adults.

checkpoint can you . . .

- Describe typical changes in sensory and motor functioning and in sleep needs, and tell how they can affect everyday living?
- Summarize changes in sexual functioning and possibilities for sexual activity in late life?

Physical and Mental Health

Increasing life expectancy is raising pressing questions about the relationship between longevity and health, both physical and mental. How healthy are older adults today, and how can they stave off declines in health?

HEALTH STATUS



Exposure to words that evoke stereotypes of the elderly lead to slower walking in young people. How might these stereotypes affect someone who is old?

Bargh, Chen, & Burrows, 1996

Poor health is not an inevitable consequence of aging. About 78 percent of U.S. adults age 65 and older consider themselves in good to excellent health (Federal Interagency Forum on Aging-Related Statistics, 2016). As earlier in life, poverty is strongly related to poor health and to limited access to and use of health care (National Center for Health Statistics, 2018b). For instance, poverty is related to a higher incidence of arthritis, diabetes, high blood pressure, heart disease, depression, and stroke in the elderly (Menec, Shooshtari, Nowicki, & Fournier, 2010). Adults who live in poverty are less likely to engage in such healthy behaviors as leisure-time physical activity, avoidance of smoking, and maintenance of appropriate body weight (Schoenborn & Heyman, 2009).

CHRONIC CONDITIONS AND DISABILITIES

More than 2 out of 3 Americans have multiple chronic conditions. People with chronic health conditions are likely to have a lower quality of life and are at risk of disability and death (Gill & Moore, 2013).

Common Chronic Conditions In 2016, the six top leading causes of death in the United States—heart disease, cancer, chronic lower respiratory disease, stroke, Alzheimer's disease, and diabetes—were chronic conditions (Federal Interagency Forum on Aging-Related Statistics, 2016). More than two-thirds of health care costs involve the management of chronic disease (Gill & Moore, 2013). Worldwide, the leading causes of death at age 50 to 69 and older are heart disease, cancers, diabetes, blood and endocrine disorders, chronic pulmonary disease, and liver disease. By 70 years and older, dementia becomes the fourth leading cause of death (Ritchie & Roser, 2018).

Many of these deaths could be prevented through healthier lifestyles. If Americans were to quit smoking, eat a healthier diet, and engage in higher levels of physical activity, estimates are that approximately 35 percent of preventable deaths could be avoided

TABLE 4 Warning Signs of Stroke

The first letters of four warning signs of stroke spell the word **FAST.**
Face Drooping—Does one side of the face droop or is it numb? Ask the person to smile to see if the person's smile is uneven.
Arm Weakness—Is one arm weak or numb? Ask the person to raise both arms. Does one arm drift downward?
Speech Difficulty—Is speech slurred? Ask the person to repeat a simple sentence.
Time to call 911—If someone shows any of these symptoms, call 911 and get the person to the hospital immediately.

Source: American Heart Association, 2013.

in the elderly (Centers for Disease Control & Merck Co. Foundation, 2007). The overall need for health care services for this population is expected to increase markedly over the next two decades (Centers for Disease Control, 2013d).

Rates of death as a result of diabetes declined recently, although it is still the sixth leading cause of death. Approximately 23 percent of men and 19 percent of women report being diagnosed with diabetes in the United States. Hypertension affects about 55 percent of men and 58 percent of women (Federal Interagency Forum on Aging-Related Statistics, 2016). Hypertension, which can affect blood flow to the brain, is related to declines in attention, learning, memory, executive functions, psychomotor abilities, and visual, perceptual, and spatial skills and is a risk factor for stroke. Table 4 lists warning signs for stroke. Aside from hypertension and diabetes, the most common chronic conditions are arthritis (43 percent of men and 54 percent of women), heart disease (35 percent of men and 25 percent of women), and cancer (26 percent of men and 21 percent of women) (Federal Interagency Forum on Aging-Related Statistics, 2016).

Chronic conditions vary by race/ethnicity. For example, in 2013–2014, 71 percent of older Blacks had hypertension, compared with 54 percent of older whites and Hispanics. Older Blacks and Hispanics were significantly more likely than older whites to have diabetes–both 32 percent, as compared with 18 percent for older whites (Federal Interagency Forum on Aging-Related Statistics, 2016).

Disabilities and Activity Limitations The proportion of older adults in the United States with chronic physical disabilities or activity limitations has declined since the late 1990s (Federal Interagency Forum on Aging-Related Statistics, 2016). However, the proportion of people who have difficulty with functional activities rises sharply with age. Approximately 34 percent of people age 65 to 74 have functional impairments, compared with 48 percent of those age 75 to 84 and 74 percent of those 85 and older (Federal Interagency Forum on Aging-Related Statistics, 2016).

In the presence of chronic conditions and loss of reserve capacity, even a minor illness or injury can have serious repercussions. In one study looking at older adults hospitalized after a fall, those adults were more likely to die or be placed in a nursing home than adults admitted to the hospital for reasons unrelated to a fall (Aitken, Burmeister, Lang, Chaboyer, & Richmond, 2010).



Can you sit cross-legged on the ground and, without using your hands to support yourself, get up off the ground? This is known as the sitting-rising test, and in older adults, the ability to do so is associated with decreased mortality risk.

de Brito et al., 2014

checkpoint can **you** . . .

- Summarize the health status of older adults, and identify chronic conditions common in late life?

LIFESTYLE INFLUENCES ON HEALTH AND LONGEVITY

The chances of remaining healthy and fit in late life often depend on lifestyle choices, especially related to smoking, heavy drinking, and exercise.

Physical Activity A lifelong program of exercise may prevent many physical changes once associated with normal aging. Regular exercise can strengthen the heart and



Exercise helps these women live longer, healthier lives, and the social aspect of their shared activities keeps them mentally healthy.
Ariel Skelley/Digital Vision/Getty Images

Do you engage regularly in physical exercise? How many of the older people you know do so? What types of physical activity do you expect to maintain as you get older?

lungs and decrease stress. It can protect against hypertension, hardening of the arteries, heart disease, osteoporosis, and diabetes. It helps maintain speed, stamina, strength, and endurance. It reduces the chance of injuries by making joints and muscles stronger and more flexible, and it helps prevent or relieve lower-back pain and symptoms of arthritis. It can enable people with such conditions as lung disease and arthritis to remain independent and can help prevent the development of limitations on mobility. In addition, it may improve mental alertness and cognitive performance, help relieve anxiety and mild depression, and enhance feelings of mastery and well-being (Bauman, Merom, Bull, Buchner, & Fiatarone Singh, 2016; Wilson, Ellison, & Cable, 2016; Stubbs et al., 2017; Colberg et al., 2016; Cartee, Hepple, Bamman, & Zierath, 2016).

*In*activity contributes to heart disease, diabetes, colon cancer, and high blood pressure. It may lead to obesity, which affects the circulatory system, the kidneys, and sugar metabolism; contributes to degenerative disorders; and tends to shorten life. An analysis of many studies found that aerobic activity of moderate intensity was most beneficial to well-being (Netz, Wu, Becker, & Tenenbaum, 2005). Unfortunately, many older adults do not do even this much. Current recommendations call for a minimum of 150 minutes of moderate aerobic activity over the course of a week, or slightly more than 20 minutes a day. Additional exercise is ideal, but anything is better than nothing (Centers for Disease Control, 2014b). Twenty-eight percent of adults 50 years and older without a chronic disease are physically inactive. Moreover, adults who have chronic diseases are 30 percent less likely to be physically active (Centers for Disease Control, 2016f).

Nutrition Almost 80 percent of Americans age 71 and older fail to meet the criteria for a healthy diet, most notably by eating too many empty calories (Krebs-Smith, Guenther, Subar, Kirkpatrick, & Dodd, 2010). Generally, older women (when compared to older men) and people of higher economic status consume a healthier diet. (Ervin, 2008; Wang et al., 2014).

Nutrition plays a large part in susceptibility to such chronic illnesses as atherosclerosis, heart disease, and diabetes as well as functional and activity limitations. Excessive body fat, particularly from a diet heavy in red and processed meats and alcohol, has been linked to several types of cancer (World Cancer Research Fund, 2007). However, while weight gain is not healthy for older adults, neither is excessive weight loss. Excessive weight loss can lead to muscle weakness and general frailty, and it can be as debilitating to older adults as weight gain (Schlenker, 2010).

A healthy diet can reduce risks of obesity as well as of high blood pressure and cholesterol (Federal Interagency Forum on Aging-Related Statistics, 2016). A diet high in olive oil, whole grains, vegetables, and nuts has been found to reduce cardiovascular risk (Esposito et al., 2004) and—in combination with physical activity, moderate alcohol use, and refraining from smoking—cut 10-year mortality from all causes in healthy 70- to 90-year-old Europeans by nearly two-thirds (Rosamond et al., 2008). Eating fruits and vegetables—especially those rich in vitamin C, citrus fruits and juices, green leafy vegetables, broccoli, cabbage, cauliflower, and brussels sprouts—lowers the risk of cancer and heart disease (Takachi et al., 2007). Overall, a healthy diet is associated with a higher quality of life in older adults (Govindaraju, Sahle, McCaffrey, McNeil, & Owen, 2018).

Periodontal disease is a chronic inflammation of the gums caused by the bacteria in plaque. It can result in tender or bleeding gums and eventual tooth loss. Although more aging Americans are keeping their natural teeth than ever before, 16 percent of adults age 65 to 74 and 31 percent of adults age 75 and above have no teeth (Federal Interagency Forum on Aging-Related Statistics, 2016). Those older adults with fewer than 20 teeth may suffer from malnutrition as a result of the increased difficulty in adequately chewing food (Hassan et al., 2017). Periodontal disease has also been related to cognitive declines and cardiovascular disease (Kaye et al., 2010; Blaizot, Vergnes, Nuwwareh, Amar, & Sixou, 2009). Some suggest it may impair the regulation of blood sugar as well (Zadik, Bechor, Galor, & Levin, 2010).

checkpoint can **you** . . .

- Give evidence of the influences of exercise and nutrition on health and longevity?

MENTAL AND BEHAVIORAL PROBLEMS



Pet therapy results in decreased depressive symptoms and improvements in cognitive functioning for the elderly.

Moretti et al., 2010

Only 6.3 percent of Americans 75 years and older report frequent mental distress (Centers for Disease Control and Prevention, 2013d). However, estimates are that 20 percent of nursing home residents have some form of mental or behavioral problem, and only 3 percent of them seek professional help (American Psychological Association, 2019). Why is there such a disparity in numbers?

The primary reason older people do not seek help is difficulty accessing needed support services (Mackenzie, Scott, Mather, & Sareen, 2008). There is a shortage of trained mental health professionals for the elderly, and this shortage is likely to increase in line with projected increases in the elderly population. In 1970, about 4 million older adults had mental and behavioral problems. In 2030, this number is projected to reach 15 million (American Psychological Association, 2019).

Depression Rates of reported depressive symptomatology have stayed relatively stable since the late 1990s. In 2016, 11 percent of older men and 16 percent of older women in the United States reported symptoms of clinical depression (Federal Interagency Forum on Aging-Related Statistics, 2016). Heredity has been estimated to account for 37 percent of the risk for major depression; however, genetic influences seem to be more important in women than in men (Mullins & Lewis, 2017; Kendler, Gatz, Gardner, & Pedersen, 2006).

Vulnerability seems to result from the influence of multiple genes interacting with environmental factors. For instance, one consistently identified risk factor for depression in adulthood, more than doubling the risk, is childhood abuse or neglect (Mandelli, Petrelli, & Serretti, 2015). Special risk factors in late adulthood include chronic illness or disability, cognitive decline, and divorce, separation, or widowhood (Harvard Medical School, 2003; Mueller et al., 2004). Depression plays a more pervasive role in mental functional status, disability, and quality of life than do physical ailments such as diabetes or arthritis (Noël et al., 2004).

Depression can be treated by antidepressant drugs, psychotherapy, or both, and antidepressant drugs appear to work equally as well as they do at younger ages (Blazer, 2009). Regular exercise can reduce symptoms of mild to moderate depression (Stanton & Reaburn, 2014; Dunn, Trivedi, Kampert, Clark, & Chambliss, 2005), although this may not be true for very frail older adults (Underwood et al., 2013).

Dementia Sixty-nine-year-old Rose has become increasingly forgetful. Although her memory for long-ago events is sharp and detailed, she often repeats herself or finds herself standing in her kitchen, unsure of why she walked in. Always responsible in the past, she now has multiple unpaid bills and got lost driving home from the store in the past week. It is likely that Rose is experiencing the effects of dementia.

Dementia is the general term for physiologically caused cognitive and behavioral decline sufficient to interfere with daily activities. Cognitive decline becomes increasingly common with advanced age, affecting 11 percent of American men and 13 percent of women age 75 to 84, and 24 percent of men and 30 percent of women 85 and older (Federal Interagency Forum on Aging-Related Statistics, 2016). Worldwide, there are approximately 50 million people with dementia and approximately 10 million new cases every year (World Health Organization, 2017).

dementia
Deterioration in cognitive and behavioral functioning due to physiological causes.

Although there are about 50 causes of dementia of known origin, the vast majority of cases (about two-thirds) are caused by **Alzheimer's disease,** a progressive, degenerative brain disorder (Hamza et al., 2011). **Parkinson's disease,** the second most common disorder involving progressive neurological degeneration, is characterized by tremor, stiffness, slowed movement, and unstable posture. Although estimates vary widely, at 60 years of age, slightly less than half of 1 percent of people are affected. By 80, the proportion of affected people rises to slightly under 2 percent, with the proportion of affected men rising with increasing age (Pringsheim, Jette, Frolkis, & Steeves, 2014). These two diseases together with *multi-infarct dementia (MD),* which is caused by a series of small strokes, account for at least 8 out of 10 cases of dementia, all irreversible.

Alzheimer's disease
Progressive, irreversible, degenerative brain disorder characterized by cognitive deterioration and loss of control of bodily functions, leading to death.

Parkinson's disease
Progressive, irreversible degenerative neurological disorder, characterized by tremor, stiffness, slowed movement, and unstable posture.



Because our pet population is living longer too, dementia also occurs in dogs and is known as canine cognitive dysfunction syndrome. Common signs include accidents in the house, wandering in circles or staring, and changes in appetite and circadian rhythms.

checkpoint can you . . .

- Tell why late-life depression may be more common than is generally realized?
- Name the three main causes of dementia in older adults?

Dementia is not inevitable. A variety of factors protect people from developing dementia. Certain personality traits, in particular, conscientiousness and neuroticism, seem to confer protection (Low, Harrison, & Lackersteen, 2013). Cognitive characteristics and education are also protective (Xu et al., 2016; Sharp & Gatz, 2011), as is a challenging job (Smart, Gow, & Deary, 2014; Seidler et al., 2004), and bilingualism, even in those who are illiterate (Bialystok, Craik, & Freeman, 2007; Alladi et al., 2013). Essentially, an active mind stays healthy longer.

Staying engaged with others may be beneficial, but results are unclear. Some studies, particularly those that look at adults of different ages, show reductions in dementia risk with social interaction and engagement. Other studies, particularly longitudinal work, show little effect of social networks on dementia (Baumgart et al., 2015; Marioni et al., 2015).

Cognitive impairment is more likely in people with poor health, especially those who experience strokes or diabetes (Tilvis et al., 2004). A lack of regular physical activity puts people at risk for later dementia (Baumgart et al., 2015), and instituting an exercise program even late in life may help reverse some of the early signs of cognitive impairment in otherwise healthy adults (Lautenschlager et al., 2008). Indeed, many of the risk factors for dementia are modifiable. Estimates are that 35 percent of dementia cases could be prevented by modifying a series of risk factors including education, hearing loss, obesity and hypertension, depression, smoking, physical inactivity, diabetes, and social isolation (Yaffe, 2018).

Alzheimer's Disease Alzheimer's disease (AD) is one of the most common and most feared terminal illnesses among aging persons. It gradually robs patients of intelligence, awareness, and even the ability to control their bodily functions—and finally kills them. The disease affected more than 50 million people in 2018, and that number is expected to more than triple to 152 million by 2050 (Patterson, 2018).

Alzheimer's is the sixth leading cause of the death in the United States, and an estimated 5.8 million people are living with AD, approximately 200,000 of whom are under 65 and may have an early-onset form of the disease. Almost two-thirds of affected individuals are women. Older African Americans have about double the risk and Hispanics have about 1½ times the risk for AD or other cognitive impairments as do non-Hispanic white adults (Alzheimer's Association, 2019).

Symptoms The classic symptoms of Alzheimer's disease are memory impairment, deterioration of language, and deficits in visual and spatial processing. The most prominent early symptom is inability to recall recent events or take in new information. A person may repeat questions that were just answered or leave an everyday task unfinished. These early signs may be overlooked because they look like forgetfulness or are interpreted as signs of normal aging.

Personality changes—for instance, rigidity, apathy, egocentricity, and impaired emotional control—tend to occur early in the disease's development (Balsis, Carpenter, & Storandt, 2005). There are indications that these personality changes may be useful in predicting which adults might be at risk of developing dementia (Pocnet, Rossier, Antonietti, & von Gunten, 2013). More symptoms follow: irritability, anxiety, depression, and, later, delusions, delirium, and wandering. Long-term memory, judgment, concentration, orientation, and speech all become impaired, and patients have trouble handling basic activities of daily life. By the end, the patient cannot use language, does not recognize family members, cannot eat without help, cannot control the bowels, and loses the ability to walk. Death usually comes within 8 to 10 years after symptoms appear (Cummings, 2004). Table 5 compares early warning signs of Alzheimer's disease with normal mental lapses.

Causes and Risk Factors Accumulation of an abnormal protein called *beta amyloid peptide* appears to be the main culprit contributing to the development of Alzheimer's disease (Sadigh-Eteghad et al., 2015; Selkoe & Hardy, 2016). The brain of a person with AD contains excessive amounts of **neurofibrillary tangles** (twisted masses of dead neurons) and large waxy clumps of **amyloid plaque** (nonfunctioning tissue formed by beta

neurofibrillary tangles
Twisted masses of protein fibers found in brains of persons with Alzheimer's disease.

amyloid plaque
Waxy chunks of insoluble tissue found in brains of persons with Alzheimer's disease.

TABLE 5 Alzheimer's Disease versus Normal Behavior

Symptoms of Disease	Normal Behavior
Permanently forgetting recent events; asking the same questions repeatedly	Temporarily forgetting things
Inability to do routine tasks with many steps such as making and serving a meal	Inability to do some challenging tasks
Forgetting simple words	Forgetting unusual or complex words
Getting lost on one's own block	Getting lost in a strange city
Forgetting what the numbers in a checkbook mean and what to do with them	Making mistakes in balancing a checkbook
Putting things in inappropriate places (e.g., a wristwatch in a fishbowl)	Misplacing everyday items
Rapid, dramatic mood swings and personality changes	Occasional mood changes

amyloid in the spaces between neurons). Because these plaques are insoluble, the brain cannot clear them away. They may become dense, spread, and destroy surrounding neurons, block cell-to-cell signaling, or trigger inflammatory responses.

There is evidence that another mechanism driving the progression of neurodegenerative disease is the breakdown of myelin, the fatty substance that coats axons and allows neural impulses to travel more rapidly. Myelin affords our brains some of their great complexity, but it also makes us vulnerable to neurodegenerative disease in old age, particularly in late developing areas of the brain (Bartzokis, Lu, & Mintz, 2007; Wang et al., 2018). In this theory, neurodegenerative disease results from the brain's efforts to repair broken-down myelin, which result in the release of neurofibrillary tangles and amyloid plaques. These substances can damage neurons directly as described above, but the brain is also affected by the compromised myelin (Papuć & Rejdak, 2018; Amlien & Fjell, 2014). When attempts to restore myelin are successful, disease progression is slow. However, when this process fails, neurodegenerative disease progresses (Bartzokis, 2011).

Alzheimer's disease is influenced by genetics. Some rare variants caused by dominant mutations and occurring less than 1 percent of the time are associated with early onset dementia (Hsu et al., 2018). However, the majority of dementia cases involve multifactorial effects, where any one of a number of genetic variants may put people at elevated risk. The more variants a person has and the more environmental risk factors they accumulate over the course of a lifetime, the higher the chance of developing AD. Epigenetic modifications that determine whether a particular gene is turned on are important (Lord & Cruchaga, 2014).

For example, a variant of the *APOE* gene has been found to contribute to susceptibility to both early- and late-onset AD (Van Cauwenberghe, Van Broeckhoven, & Sleegers, 2015; Gatz, 2007). Sex modifies this association; the gene puts women at greater risk than men (Altmann, Tian, Henderson, & Greicius, 2014). A variant of another gene called *SORL1* has been found to stimulate the formation of amyloid plaques (Reitz et al, 2011; Meng et al., 2007). Another gene variant involved in the manufacture of amyloid precursors, cathepsin D, moderately increases the risk as well (Schuur et al., 2011). However, identified genes are thought to explain no more than half of all AD cases. Moreover, new genes are continually being identified (Lambert et al., 2013). A recent meta-analysis of over 450,000 people identified 29 new risk genetic loci that were more common in people with AD (Jansen et al., 2019).

Although a number of lifestyle factors have been studied regarding their potential impact on AD, results are mixed and conclusions difficult to reach. However, some



Esther Lipman Rosenthal's battle with Alzheimer's disease is evident in her artwork. She created the picture on the left, showing her husband golfing, at age 55 and the picture on the right, showing him on cross-country skis, at age 75, during the early and middle stages of her disease.

Photos courtesy of Linda Goldman.

general lifestyle factors, such as diet and physical activity, have been implicated. Foods rich in vitamin E, vitamin D, vitamin B-12, omega-3 fatty acids, antioxidants, and unhydrogenated unsaturated fats—such as nuts, seeds, fish, and eggs—may be protective against AD, whereas foods high in saturated and trans-unsaturated fats, such as red meat, butter, and ice cream, may be harmful. Vegetables, legumes, fruits, and whole grains should be the base of a diet, and exercise should be incorporated into a routine (Cao et al., 2016; Barnard et al., 2014; Morris, 2004). Smokers have increased risk of AD (Saito, Diaz, Chung, & McMurtray, 2017; Durazzo, Mattsson, Weiner, & Alzheimer's Disease Neuroimaging Initiative, 2014). Additionally, depression, high blood pressure, obesity, and physical inactivity also increase risk (Deckers et al., 2015; Bellou et al., 2017). Nonsteroidal anti-inflammatory drugs such as aspirin and ibuprofen were originally thought to cut the risk of AD (Vlad, Miller, Kowall, & Felson, 2008); however, randomized controlled studies have not found an association (Wang et al., 2015).

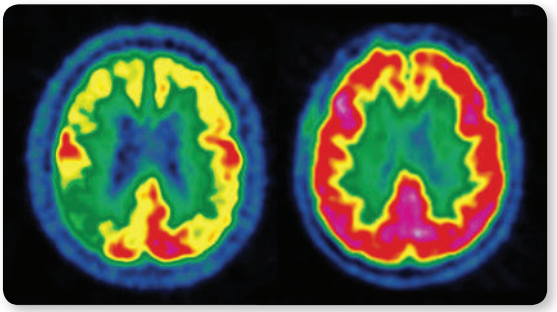
Education and cognitively stimulating activities have been associated with reduced risk of the disorder (Sattler, Toro, Schönknecht, & Schröder, 2012; Wilson, Scherr, Schneider, Tang, & Bennet, 2007). The protective effect may be due not to education itself, but rather to the fact that educated people tend to be cognitively active (Wilson & Bennet, 2003). Cognitive activity may build **cognitive reserve** and thus delay the onset of dementia (Stern, 2012). Cognitive reserve, like organ reserve, may enable a deteriorating brain to continue to function under stress, up to a point, without showing signs of impairment.

cognitive reserve
Hypothesized fund of energy that may enable a deteriorating brain to continue to function normally.

Although, a NIH Consensus Development statement (Daviglus et al., 2010) stated that no firm conclusions could be drawn about lifestyle modifications, a recent report by the Alzheimer's Association (Baumgart et al., 2015) argued there is enough evidence to provide some general guidelines. Regular physical activity and the management of cardiovascular risk factors (diabetes, obesity, hypertension, and smoking), a healthy diet, and remaining cognitively active throughout the life span all offer a protective advantage.

Diagnosis and Prediction AD is generally diagnosed via medical assessment. A medical history of the patient is taken, including a mental status exam, a physical and neurological exam, and possibly blood and imaging tests, in order to rule out alternative explanations (Alzheimer's Association, 2019). Until relatively recently, the only definitive way to diagnose AD, however, was a post-mortem examination of the affected brain. Current efforts are focused on diagnosing the disease early in the process, when signs of cognitive deficits are mild.

Neuroimaging is becoming an increasingly useful tool and shows great promise for future diagnostic purposes. The identification of AD prior to symptom onset has a variety of important applications, from assessing those individuals at risk of developing dementia to monitoring interventions and drug treatments to allowing people time to plan for their future. A number of organizations, including the U.S. Preventive Services Task Force Recommendation Services, the Society of Nuclear Medicine and Molecular Imaging, the Alzheimer's Association Imaging Taskforce, and the European Federation of the Neurological Societies, have published guidelines about the use of and applications for imaging techniques in diagnosis and study. While all agree that currently, brain imaging is not sufficient for diagnosis, it holds great promise (Moyer, 2014; Johnson et al., 2013; Filippi et al., 2012). A particularly promising avenue involves the use of machine learning methods. Currently, computer-assisted algorithms have become proficient at distinguishing healthy brains from those suffering the effects of dementia but are not yet able to differentiate between different types of dementia (Ahmed et al., 2019; Pellegrini et al., 2018).



These PET (positron emission tomography) scans show significant decrease of glucose cerebral metabolism and reduced activity (left) in a patient with Alzheimer's disease, compared to the greater activity levels seen in a normal brain (right).
ISM/Centre Jean Perrin/Medical Images

Another diagnostic approach has focused on finding biomarkers—a measurable indicator of a biological process—in order to diagnose early manifestations of the disease. Currently, three biomarkers have been strongly associated with dementia risk: tau proteins, amyloid plaques, and neurofilament light chains (NFLs). Tau proteins help deliver materials to neurons; however, in AD, they become twisted into neurofibrillary tangles. Amyloid is a protein found throughout the body that in AD results in plaques of

sticky buildup. NFL is a protein released when myelin is tangled. Researchers have used technology to detect all three substances in the cerebral and spinal fluid of people with AD (Olsson et al., 2016; Georganopoulou et al., 2005). Importantly, biomarker tests also show promise for ruling out AD in people showing impairment (Molinuevo et al., 2014).

Despite the identification of several genes associated with AD (Kim et al., 2014), genetic testing so far has a limited role in prediction and diagnosis. Still, it may be useful in combination with cognitive tests, brain scans, and clinical evidence of symptoms. There is evidence that people alter their health behaviors if told they have genes making them vulnerable to dementia (Chao et al., 2008), so such information may someday become part of the way in which the medical profession addresses risk in individuals. Genetic profiles may also offer a means by which to predict which drugs might be most effective in different individuals (Roses et al., 2014).

Treatment Although no cure has yet been found, early diagnosis and treatment can slow the progress of Alzheimer's disease and improve quality of life. Currently, the U.S. Food and Drug Administration has approved four drugs that have been shown to slow, though not stop, the progression of Alzheimer's disease for a limited time (Alzheimer's Association, 2019). One medication is memantine (commercially known as Namenda). The use of memantine is well tolerated and has been shown to improve cognition and behavior and allow people to more effectively carry out activities of daily living, although the overall effect is small (Kishi et al., 2017; Matsunaga, Kishi, & Iwata, 2015).

Another experimental approach involved immunotherapy (Solomon & Frenkel, 2010). In this approach, a "vaccine" was developed that trained the immune system to attack amyloid plaques. While there was some success in early trials, they were halted because some patients developed meningoencephalitis, or swelling of their brain tissue, and others showed little change (Panza, Logroscino, Imbimbo, & Solfrizzi, 2014).

In the absence of a cure, management of the disease is critical. Previous research indicated that cognitive training interventions resulted in gains in both cognitive and behavioral areas (Sitzer, Twamley, & Jeste, 2006). More current research suggests the gains may be more modest. Recent meta-analyses have shown that while cognitive interventions do sometimes result in small cognitive gains, the benefits are not usually clinically significant and there are few improvements in everyday functioning (Kallio, Öhman, Kautiainen, Hietanen, & Pitkälä, 2017; Huntley, Gould, Liu, Smith, & Howard, 2015). Moreover, while cognitive training improves performance in healthy older adults, there is little evidence that it delays cognitive declines or dementia (Butler et al., 2018).

However, behavioral symptoms can be managed. Behavioral therapies can slow deterioration, improve communication, and reduce disruptive behavior. Drugs can relieve agitation, lighten depression, and help patients sleep. Proper nourishment and fluid intake together with exercise, physical therapy, and control of other medical conditions are important, and cooperation between the physician and the caregiver is essential (Alzheimer's Association, 2019).

checkpoint can you . . .

- Summarize what is known about the prevalence, symptoms, causes, risk factors, diagnosis, and treatment of Alzheimer's disease?

COGNITIVE DEVELOPMENT

Aspects of Cognitive Development

Old age "adds as it takes away," wrote the poet William Carlos Williams in one of three books of verse he produced between his first stroke at the age of 68 and his death at 79. As Baltes's life-span developmental approach suggests, age brings gains as well as losses. Let's look first at intelligence and general processing abilities, then at memory, and then at wisdom, which is popularly associated with the later years.

The effects of aging aren't all bad. As we get older, we are more likely to attend to and process positive, happy faces than negative ones, a tendency that may have implications for how we handle real-life problems.

Mather & Carstenson, 2003

INTELLIGENCE AND PROCESSING ABILITIES

Does intelligence diminish in late adulthood? The answer depends on what abilities are being measured, and how. Some abilities, such as speed of mental processes and abstract reasoning, may decline in later years, but other abilities tend to improve throughout most of adult life. Although changes in processing abilities may reflect neurological deterioration, there is much individual variation, suggesting that declines in functioning are not inevitable and may be preventable.

Wechsler Adult Intelligence Scale (WAIS)
Intelligence test for adults that yields verbal and performance scores as well as a combined score.

Measuring Older Adults' Intelligence To measure the intelligence of older adults, researchers often use the **Wechsler Adult Intelligence Scale (WAIS).** The WAIS is a standardized measure that allows assessment of a person's intellectual functioning at different ages. Scores on the WAIS subtests yield a verbal IQ, a performance IQ, and a total IQ. Older adults tend not to perform as well as younger adults on the WAIS, but the difference is primarily in processing speed and nonverbal performance. On the five subtests in the performance scale (such as identifying the missing part of a picture or mastering a maze), scores drop with age, but on the six tests making up the verbal scale—particularly tests of vocabulary, information, and comprehension—scores fall only slightly (Figure 4). This is called the *classic aging pattern* (Botwinick, 1984). This age disparity in performance, particularly for processing speed, is smaller in more recent cohorts (Miller, Myers, Prinzi, & Mittenberg, 2009). Variability in scores—meaning some people score higher than others—increases with age and particularly in those areas in which average declines are more apparent (Wisdom, Mignogna, & Collins, 2012).

This pattern is likely a consequence of muscular and neurological slowing. For tasks that do not require speed, declines are less likely. For example, verbal items that hold up with age are based on knowledge and do not require the test-taker to figure out or do anything new. The performance tasks involve the processing of new information and require perceptual speed and motor skills.

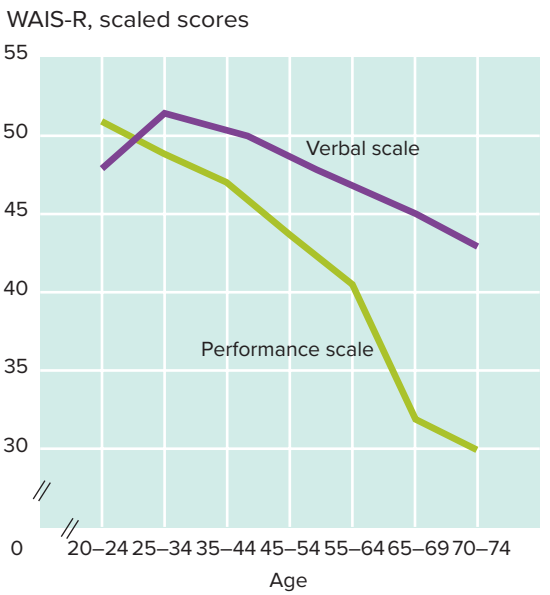


FIGURE 4
Classic Aging Pattern on the Revised Version of the Wechsler Adult Intelligence Scale (WAIS-R)

Scores on the performance subtests decline far more rapidly with age than scores on the verbal subtests.

Source: Botwinick, 1984.

The Seattle Longitudinal Study: Use It or Lose It In some ways, the mind can be thought of as a muscle. It too responds to use, and it too declines if not engaged in the world around us. This "use it or lose it" dynamic is illustrated with research from the Seattle Longitudinal Study of Adult Intelligence. Researchers measured six primary mental abilities: verbal meaning, word fluency, number (computational ability), spatial orientation, inductive reasoning, and perceptual speed. Consistent with other studies, perceptual speed tended to decline earliest and most rapidly. Cognitive decline in other respects was slower and more variable. Very few people weakened in all abilities, and many improved in some areas. Most fairly healthy older adults showed only small losses until the late sixties or seventies. Not until the eighties did they fall below the average performance of younger adults, and even then declines in verbal abilities and reasoning were modest (Schaie & Willis, 2010; Schaie, 2005).

The most striking feature of the Seattle findings was the tremendous variation among individuals. Some participants showed declines during their forties, but a few maintained full functioning very late in life. Those most likely to show declines were men who had low educational levels, were dissatisfied with their success in life, and exhibited a significant decrease in flexibility of personality. Some health-related variables also were important, most notably, hypertension and diabetes. Participants who engaged in cognitively complex work and who were in good health tended to retain their abilities longer. Engaging in activities that challenge cognitive skills promotes the retention or growth of those skills and, as we mentioned earlier, appears to protect against dementia (Schaie & Willis, 2010; WIllis & Schaie, 2005; Lindwall et al., 2012).

Longitudinal findings suggest that cognitive training may enable older adults not only to recover lost competence but even to surpass their previous attainments (Schaie & Willis, 1996). In the Seattle study, participants who underwent an intervention focused on training them in reasoning skills showed decreased likelihood of dementia 7 years after the training occurred (Blaskewicz, Boron, Willis, & Schaie, 2007).

Cognitive deterioration, then, often may be related to disuse. Much as many aging athletes can call on physical reserves, older people who get training, practice, and social support seem to be able to draw on mental reserves.

Everyday Problem Solving The purpose of intelligence, of course, is not to take tests but to deal with the challenges of daily life. In many studies, the quality of practical decisions (such as what car to buy or how to compare insurance policies) bore only a modest relationship, if any, to performance on tasks like those on intelligence tests (Blanchard-Fields, 2007) and, often, no relationship to age (Meyer et al., 1995). Similarly, much research on everyday problem solving (such as what to do about a flooded basement) has not found as early a decline as is often seen in measures of fluid intelligence, and some research has found marked improvement (Blancher-Fields, Stein, & Watson, 2004; Mienaltwoski, 2011), particularly when the contexts being assessed are those that older people are familiar with (Aristico, Orom, Cervone, Krauss, & Houston, 2010).

Age differences are reduced in studies that focus on *interpersonal* problems—such as how to deal with a new mother who insists on showing her older mother-in-law how to hold the baby—rather than on *instrumental* problems—such as how to return defective merchandise (Thornton & Dumke, 2005). Older adults have more extensive repertoires of strategies to apply to interpersonal situations than younger adults do, and they are more likely to chose a highly effective strategy than are younger adults (Fingerman & Charles, 2010).

Changes in Processing Abilities In many older adults, a general slowdown in central nervous system functioning is a major contributor to losses of efficiency of information processing and changes in cognitive abilities. Speed of processing, one of the first abilities to decline, is related to health status, balance, and gait and to performance of activities of daily living, such as looking up phone numbers and counting out change (Ball, Edwards, & Ross, 2007; Bezdicek, Stepankova, Novakova, & Kopecek, 2016).

Additionally, older adults also tend to have more difficulty with switching attention from one task to another (Bucur & Madden, 2010). These findings may help explain why many older adults have difficulty driving, which requires rapid attentional shifts and processing (Duley & Adams, 2013; Bialystok, Craik, Klein, & Viswanathan, 2004). Training can improve older adults' performance. Participation in such programs has been shown to extend the period of time before older adults are forced to stop driving, to allow them to more effectively and independently complete activities of daily living to a later age, and to reduce symptoms of depression (Edwards, Delahunt, & Mahncke, 2009; Wolinsky et al., 2015).

Although age-related declines in processing abilities occur, it is not inevitable that older adults will show declines in everyday life. Many older adults naturally compensate. For example, they use their vast reservoirs of knowledge to compensate for declines that do occur (Peters, Hess, Västfjäall, & Auman, 2007). Generally, older adults tend to do better on tasks that depend on ingrained habits and knowledge (Bialystok et al., 2004). It is likely that older adults are using alternative, although complementary, neural circuits for more difficult tasks, and it may be that cognitive interventions are exerting their influence here by restructuring the pathways used to complete such tasks (Park & Reuter-Lorenz, 2009).

Cognitive Abilities and Mortality Psychometric intelligence may be a predictor of how long and in what condition adults will live. In one longitudinal study, people who scored high in intelligence as children were less likely to suffer from poor health or have chronic health conditions at age 50 (Wraw, Dearly, Gale, & Der, 2015). Other longitudinal work



What are some ways to sustain a high level of intellectual activity in late life? Do you think you need to develop new or broader interests that you will want to pursue as you age?

checkpoint can you . . .

- Compare the classic aging pattern on the WAIS with those of the Seattle Longitudinal Study with regard to cognitive changes in old age?
- Cite evidence of the plasticity of cognitive abilities in late adulthood?
- Discuss the relationship between practical (everyday) problem solving and age?

showed high intelligence in childhood was associated with a lower risk of mortality at age 79 (Čukić , Brett, Calvin, Batty, & Deary, 2017). Cognitive performance is also linked to physical health in adulthood. For example, physically frail older adults are at higher risk for cognitive impairment (Robertson, Savva, & Kenny, 2013), and people who have been critically ill often show cognitive impairments for up to year after they recover (Pandharipande et al., 2013).

Recently, researchers have begun to wonder if the intelligence mortality link is an artifact of methodological confounds in research. For example, studies that include childhood adversity within the models are less likely to find a link between intelligence and mortality (Kilgour, Starr, & Whalley, 2010). Socioeconomic status (SES) may also matter. Some studies have found that childhood SES does not seem to attenuate the link between intelligence and health (Der, Batty, & Deary, 2009). However, when adult SES is included in models, the strength of the relationship between health and intelligence is lessened (Calvin et al., 2010). Yet another interpretation is that, as many diseases such as diabetes and hypertension may lead *both* to cognitive declines earlier in life *and* an earlier death, data showing a link between the two may reflect the action of the disease instead of an association between IQ and mortality (Batty, Deary, & Gottfredson, 2007).

checkpoint
can **you** . . .

- Discuss findings on the slowdown in neural processing and its relationship to cognitive decline?
- Discuss the relationship of intelligence to health and mortality?

MEMORY AND AGING

Failing memory is often considered a sign of aging. Loss of memory is the chief worry reported by older Americans (National Council on the Aging, 2002). Slightly under 19 percent of adults age 65 and older have cognitive impairment without dementia (Langa et al., 2017).

Short-Term Memory Researchers assess short-term memory by asking a person to repeat a sequence of numbers, either in the order in which they were presented (*digit span forward*) or in reverse order (*digit span backward*). Digit span forward ability holds up well with advancing age (Craik & Jennings, 1992; Wingfield & Stine, 1989) but digit span backward performance does not (Craik & Jennings, 1992; Lovelace, 1990). Why? One reason may involve the differentiation of sensory and working memory. **Sensory memory** involves the brief storage of sensory information. For example, when you see the trail left behind by a fourth of July sparkler, you are seeing the trace left by your sensory memory. **Working memory** involves the short-term storage of information being actively processed, such as when you calculate the tip on a restaurant bill in your head. Some theorists argue that forward repetition requires only sensory memory, which retains efficiency throughout life. However, backward repetition requires the manipulation of information in working memory, which gradually shrinks in capacity with age (Hale et al., 2011).

sensory memory
Initial, brief, temporary storage of sensory information.

working memory
Short-term storage of information being actively processed.

A key factor in memory performance is the complexity of the task (Park & Reuter-Lorenz, 2009). Tasks that require only *rehearsal,* or repetition, show very little decline. Tasks that require *reorganization* or *elaboration* show greater falloff (Emery, Heaven, Paxton, & Braver, 2008). If you are asked to verbally rearrange a series of items (such as "Band-Aid, elephant, newspaper") in order of increasing size ("Band-Aid, newspaper, elephant"), you must call to mind your previous knowledge of Band-Aids, newspapers, and elephants (Cherry & Park, 1993). More mental effort is needed to keep this additional information in mind, using more of the limited capacity of working memory.

Long-Term Memory Information-processing researchers divide long-term memory into three major systems: *episodic memory, semantic memory,* and *procedural memory.*

Do you remember what you had for breakfast this morning? Such information is stored in **episodic memory,** the long-term memory system most likely to deteriorate with age (Tromp, Dufour, Lithfous, Pebayle, & Després, 2015). Episodic memory is linked to specific events; you retrieve an item by reconstructing the original experience in your mind. Older adults are less able than younger people to do so, perhaps because they

episodic memory
Long-term memory of specific experiences or events, linked to time and place.

focus less on context (where something happened, who was there), and rely more on gist than details (Dodson & Schacter, 2002). Because of this, they have fewer connections to jog their memory (Lovelace, 1990). Also, older people have had many similar experiences that tend to run together. When older people perceive an event as distinctive, they can remember it nearly as well as younger people (Geraci, McDaniel, Manzano, & Roediger, 2009).

Some types of long-term memories remain vigorous as people age. **Semantic memory** consists of meanings, facts, and concepts accumulated over a lifetime of learning. Semantic memory shows little decline with age, although infrequently used or highly specific information may sometimes be difficult to retrieve (Luo & Craik, 2008). Indeed, some aspects of semantic memory, such as vocabulary and knowledge of rules of language, may even increase with age (Camp, 1989).

Another long-term memory system that remains relatively unaffected is procedural memory. **Procedural memory** includes motor skills (like riding a bike) and habits (like taking a particular street home) that, once learned, take little conscious effort. If you have ever intended to stop by the grocery store on your way home, and ended up pulling into your driveway instead without thinking about it, you have experienced the automaticity that is characteristic of procedural memory. It is relatively unaffected by age (Fleischman, Wilson, Gabriele, Bienias, & Bennett, 2004).



Riding a bicycle requires procedural memory. Once learned, procedural skills can be activated without conscious effort, even after a long period of disuse.
Granger Wootz/Brand X Pictures/Blend Images/Getty Images

semantic memory
Long-term memory of general factual knowledge, social customs, and language.

procedural memory
Long-term memory of motor skills, habits, and ways of doing things, which can be recalled without conscious effort; sometimes called *implicit memory.*

Speech and Memory: Effects of Aging As people become older, they often begin to have minor difficulties with language. However, these experiences are not generally due to issues related to language per se but rather are the result of problems accessing and retrieving information from memory. The core language processes remain relatively unchanged across age (Shafto & Tyler, 2014). Thus, they are considered memory problems rather than language problems. For example, have you ever been unable to come up with a word that you knew perfectly well? This is known as the tip-of-the-tongue (TOT) phenomenon; it occurs in people of all ages but becomes more common in late adulthood (Burke & Shafto, 2004). Presumably, the TOT phenomenon results from a failure in working memory (Schwartz, 2008). Other problems in verbal retrieval include errors in naming pictures of objects aloud, more ambiguous references and slips of the tongue in everyday speech, more use of nonfluencies (such as "um" and "er") in speech, and a tendency to misspell words (such as *indict*) that are spelled differently than they sound (Burke & Shafto, 2004). Older adults also may show declines in the complexity of grammar used in speech (Kemper, Thompson, & Marquix, 2001).

Why Do Some Memory Systems Decline? What explains older adults' memory losses? Investigators have offered several hypotheses. One approach focuses on the biological structures that make memory work. Another approach looks at problems with the three steps required to process information in memory: *encoding, storage,* and *retrieval*.

Neurological Change Different memory systems depend on different brain structures. Thus, a disorder that damages a particular brain structure may impair the type of memory associated with it. For example, Alzheimer's disease disrupts working memory (located in the prefrontal cortex at the front of the frontal lobes) as well as semantic and episodic memory (located in the frontal and temporal lobes); Parkinson's disease affects procedural memory, located in the cerebellum, basal ganglia, and other areas (Budson & Price, 2005).

The main structures involved in normal memory processing and storage include the *frontal lobes* and the *hippocampus.* The *frontal lobes* are active in both encoding and retrieval of episodic memories. Dysfunction in these areas may cause false memories—"remembering" events that never occurred. Specifically, changes in the prefrontal cortex and medial temporal lobes seem to be most responsible (Devitt & Schacter, 2016).

Memory can be improved with a simple technique—saying words out loud, even if you just mouth the words.

McLeod, Gopie, Hourihan, Neary, & Ozubko, 2010

The *hippocampus,* a small, centrally located structure deep in the temporal lobe, seems critical to the ability to store new information in episodic memory and is broadly important for memory processes. Research with adults in their seventies and older has shown that better memory is associated with larger hippocampal volume. In one study, adults who were 75 years of age and older who performed well on memory tests had larger hippocampal volume (Dekhtyar et al., 2017; O'Shea, Cohen, Porges, Nissim, & Woods, 2016).

The brain often compensates for age-related declines in specialized regions by tapping other regions to help. Younger adults are more likely to use localized areas of the brain during challenging tasks, while older adults are more likely to use more diffuse activation and utilize more or different brain areas as compensatory mechanisms for declines (Sala-Llonch, Bartrés-Faz, & Junqué, 2015). The brain's ability to reorganize may help explain why symptoms of Alzheimer's disease often do not appear until the disease is well advanced and previously unaffected regions of the brain, which have taken over for impaired regions, lose their own working capacity. By the time signs of damage show, the disease has likely existed for decades.

As an example of one frequent consequence in the real world, medically fragile adults are more likely to have problems with memory and thus are less likely to take their medications.

Insel, Morrow, Brewer, & Figueredo, 2006

Problems in Encoding, Storage, and Retrieval Episodic memory is particularly vulnerable to the effects of aging; an effect that is aggravated as memory tasks become more complex or demanding (Cansino, 2009). Older adults seem to have greater difficulty *encoding* new episodic memories, presumably because of difficulties in forming and later recalling a coherent and cohesive episode (Naveh-Benjamin, Brav, & Levy, 2007). They tend to be less efficient and precise than younger adults in the use of strategies to make it easier to remember–for example, by arranging material alphabetically or creating mental associations (Craik & Byrd, 1982). Most studies have found that older and younger adults are about equally knowledgeable as to effective encoding strategies (Salthouse, 1991). Some research has found that training older adults in memory strategies results in fewer age-related declines and that the larger the number of strategies taught, the larger the effect on memory (Gross et al., 2012; Naveh-Benjamin, Brav, & Levy, 2007). However, other researchers have argued that the memory gains are limited, do not generalize to tasks other than those participants are trained in, and do not result in improvements in general memory performance (Bellander et al., 2017).

Another hypothesis is that material in *storage* may deteriorate to the point where retrieval becomes difficult or impossible. Some research suggests that a small increase in "storage failure" may occur with age (Lustig & Flegal, 2008). However, traces of decayed memories are likely to remain, and it may be possible to reconstruct them or at least to relearn the material speedily (Camp & McKitrick, 1989; Chafetz, 1992). In particular, it appears as if memories that contain an emotional component are more resistant to the effects of decay (Kensinger, 2009). For example, studies have found that older adults are motivated to preserve memories that have positive emotional meaning to them (Reed, Chan, & Mikels, 2014; Carstensen & Mikels, 2005). Thus, emotional factors need to be considered in studying memory changes in old age.

We should keep in mind that most of the research on encoding, storage, and retrieval has been done in the laboratory and that results may not transfer to the real world (Kempe, Kalicinski, & Memmert, 2015). For example, in daily diary studies, older adults were more likely to report memory failures on days when they experienced stress, suggesting stress is relevant (Neupert, Almeida, Mroczek, & Spiro, 2006). As another example, memory failures of older adults in daily life often include prospective memory failures. Prospective memory involves remembering to do something in the future, such as remembering to call a friend later. Prospective memory declines with age and is a significant issue for many older adults. However, the research in this area is incomplete and does not illuminate the central processes that govern failure (Kliegel et al., 2016).

checkpoint can you . . .

- Identify two aspects of memory that tend to decline with age, and give reasons for this decline?
- Discuss neurological changes related to memory?
- Explain how problems in encoding, storage, and retrieval may affect memory in late adulthood, and discuss how emotional factors may affect memory?

WISDOM

Wisdom has been defined as "exceptional breadth and depth of knowledge about the conditions of life and human affairs and reflective judgment about the application of this knowledge. It may involve insight and awareness of the uncertain, paradoxical nature of reality and may lead to *transcendence,* detachment from preoccupation with the self" (Kramer, 2003, p. 132). Quite simply, wisdom is the ability to navigate the messiness of life. It involves understanding how people work and how to accomplish goals. People who are wise, according to psychologists, are also comfortable with uncertainty and understand that different people have different viewpoints and that sometimes there is no one right answer.

The most extensive research on wisdom as a cognitive ability has been done by the late Paul Baltes and his colleagues. In a series of studies, Baltes and his associates at the Max Planck Institute in Berlin asked adults of various ages and occupations to think aloud about hypothetical dilemmas. Responses were rated according to whether they showed rich factual and procedural knowledge about the human condition and about dealing with life's problems. Other criteria were awareness that contextual circumstances can influence problems, that problems tend to lend themselves to multiple interpretations and solutions, and that choices of solutions depend on individual values, goals, and priorities (Baltes & Staudinger, 2000; Pasupathi, Staudinger, & Baltes, 2001).

Wisdom is not necessarily a property of old age—or of any age. Instead, it appears to be a rather rare and complex phenomenon that shows relative stability or slight growth in certain individuals (Staudinger & Baltes, 1996; Staudinger, Smith, & Baltes, 1992). A variety of factors, including personality, life experience, and self-reflective tendencies (Westrate & Glück, 2017; Wink & Staudinger, 2016; Shedlock & Cornelius, 2003), affect the propensity to be wise.

Research on physical functioning, cognition, and aging is more encouraging than some might expect. Older adults tend to make the most of their abilities, often exploiting gains in one area to offset declines in another. Research highlights the widely varying paths of physical and cognitive development among individuals. It also points to the importance of emotional well-being in late adulthood.



Think of the wisest person you know. Which, if any, of the criteria for wisdom mentioned in this chapter seem to describe this person? If none do, how would you define and measure wisdom?

checkpoint can **you** . . .

- Compare various approaches to the study of wisdom?
- Discuss findings from Baltes's studies of wisdom?

summary and key terms

Old Age Today

- Efforts to combat ageism are making headway, thanks to the visibility of a growing number of active, healthy older adults.
- The proportion of older people in the United States and world populations is greater than ever before and is expected to continue to grow. People over 80 are the fastest-growing age group.
- Although effects of primary aging may be beyond people's control, they often can avoid effects of secondary aging.
- Specialists in the study of aging sometimes refer to people between ages 65 and 74 as the *young old*, those over 75 as the *old old*, and those over 85 as the *oldest old*. However, these terms may be more useful when used to refer to functional age.

ageism (*497*)
primary aging (*500*)
secondary aging (*500*)
activities of daily living (ADLs) (*500*)
functional age (*500*)
gerontology (*500*)
geriatrics (*500*)

PHYSICAL DEVELOPMENT

Longevity and Aging

- Life expectancy has increased dramatically. The longer people live, the longer they are likely to live.
- In general, life expectancy is greater in developed countries than in developing countries, among Hispanics and white Americans than among African Americans, and among women as compared to men.
- Recent gains in life expectancy come largely from progress toward reducing death rates from diseases affecting older people. Further improvements in life expectancy may depend on whether scientists can learn to modify basic processes of aging.
- Theories of biological aging fall into two categories: genetic-programming theories and variable-rate, or error, theories.
- Research on extension of the life span through genetic manipulation or caloric restriction has challenged the idea of a biological limit to the life span.

life expectancy (*500*)
longevity (*500*)
life span (*500*)
senescence (*502*)
genetic-programming theories (*502*)
Hayflick limit (*503*)
variable-rate theories (*503*)
free radicals (*504*)
survival curves (*504*)

Physical Changes

- Changes in body systems and organs are highly variable. Most body systems continue to function fairly well, but reserve capacity declines.
- Although the brain changes with age, the changes are usually modest. They include loss of volume and weight and a slowing of responses. However, the brain can grow new neurons, change the way it processes information, and build new connections late in life.
- Vision and hearing problems may interfere with daily life but often can be corrected. Irreversible damage may result from age-related macular degeneration or glaucoma. Losses in taste and smell may lead to poor nutrition. Training can improve muscular strength, balance, and reaction time. Older adults tend to be susceptible to accidents and falls.
- Older people tend to sleep less and dream less than before, but chronic insomnia can be an indication of depression.
- Many older adults remain sexually active.

reserve capacity (*507*)
cataracts (*509*)
age-related macular degeneration (*509*)
glaucoma (*509*)
functional fitness (*510*)

Physical and Mental Health

- Most older people are reasonably healthy, especially if they follow a healthy lifestyle. Many do have chronic conditions, but these usually do not greatly limit activities or interfere with daily life.
- Exercise and diet are important influences on health. Loss of teeth can seriously affect nutrition.
- Most older people are in good mental health. Depression, alcoholism, and many other conditions can be reversed with treatment; a few, such as Alzheimer's disease, are irreversible.
- Alzheimer's disease becomes more prevalent with age. It is highly heritable, but diet, exercise, and other lifestyle factors may play a part. Cognitive activity may be protective by building up a cognitive reserve that enables the brain to function under stress. Behavioral and drug can slow deterioration. Mild cognitive impairment can be an early sign of the disease, and researchers are developing tools for early diagnosis.

  dementia (*515*)
  Alzheimer's disease (*515*)
  Parkinson's disease (*515*)
  neurofibrillary tangles (*516*)
  amyloid plaque (*516*)
  cognitive reserve (*518*)

COGNITIVE DEVELOPMENT

Aspects of Cognitive Development

- Older adults do better on the verbal portion of the Wechsler Adult Intelligence Scale than on the performance portion.
- The Seattle Longitudinal Study found that cognitive functioning in late adulthood is highly variable. Few people decline in all or most areas, and many people improve in some. The engagement hypothesis seeks to explain these differences.
- Older adults are more effective in solving practical problems that have emotional relevance for them.
- A general slowdown in central nervous system functioning may affect the speed of information processing.
- Intelligence may be a predictor of longevity.
- Sensory memory, semantic memory, and procedural memory appear nearly as efficient in older adults as in younger adults. The capacity of working memory and episodic memory are often less efficient.
- Older adults have more problems with oral word retrieval and spelling than younger adults. Grammatical complexity and content of speech decline.
- Neurological changes and problems in encoding, storage, and retrieval may account for much of the decline in memory functioning in older adults. However, the brain can compensate for some age-related declines.
- According to Baltes's studies, wisdom is not age-related.

  Wechsler Adult Intelligence Scale (WAIS) (*520*)
  sensory memory (*522*)
  working memory (*522*)
  episodic memory (*522*)
  semantic memory (*523*)
  procedural memory (*523*)

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chapter 18

Psychosocial Development in Late Adulthood

outline

Theory and Research on Personality Development

Well-Being in Late Adulthood

Practical and Social Issues Related to Aging

Personal Relationships in Late Life

Marital Relationships

Nonmarital Lifestyles and Relationships

Nonmarital Kinship Ties

learning objectives

Discuss theories and research on personality changes in late adulthood.

Identify strategies and resources that contribute to older adults' well-being and mental health.

Discuss aging and adaptation to work and retirement.

Characterize the social relationships of aging adults.



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did you know?

- Productive activity seems to play an important part in successful aging.
- In most developed countries, older women are more likely to live alone than older men.
- People who can confide their feelings and thoughts to friends tend to deal better with the changes and challenges of aging.

In this chapter, we look at theory and research on psychosocial development in late adulthood and discuss such late-life options as work, retirement, and living arrangements and their impact on society's ability to support and care for an aging population. Finally, we look at relationships with families and friends, which greatly affect the quality of these last years.

I am still every age that I have been.

—Madeleine L'Engle

Theory and Research on Personality Development

Most theorists view late adulthood as a developmental stage with its own special issues and tasks. It is a time when people can reexamine their lives, complete unfinished business, and decide how best to channel their energies and spend their remaining days, months, or years.

Let's see what theory and research can tell us about personality in this final phase of the life span and about the psychosocial challenges and opportunities of aging. In the next section, we discuss how older adults cope with stress and loss and what constitutes successful aging.

When does "old age" begin? That depends on who you ask. People who are under the age of 30 are pretty sure it begins sometime before you turn 60 years old. However, the older you get, the later you think old age begins—at 75 years of age, only 35 percent of people consider themselves old.

Pew Research Center, 2009a

ego integrity versus despair According to Erikson, the eighth and final stage of psychosocial development, in which people in late adulthood either achieve a sense of integrity of the self by accepting the lives they have lived, and thus accept death, or yield to despair that their lives cannot be relived.

ERIK ERIKSON: NORMATIVE ISSUES AND TASKS

For Erikson, the crowning achievement of late adulthood is a sense of *ego integrity,* or integrity of the self. In the eighth and final stage of the life span, **ego integrity versus despair,** older adults need to evaluate and accept their lives so as to accept death. Building on the outcomes of the seven previous stages, they struggle to achieve a sense of coherence and wholeness, rather than give way to despair over their inability to relive the past differently (Erikson, Erikson, & Kivnick, 1986). People who succeed in this final, integrative task gain a sense of the meaning of their lives within the larger social order. The virtue that may develop during this stage is *wisdom,* an "informed and detached concern with life itself in the face of death itself" (Erikson, 1985, p. 61).

Wisdom, said Erikson, means accepting the life one has lived, without major regrets: without dwelling on "might-have-beens." It means accepting imperfection in the self, in parents, in children, and in life.

Although integrity must outweigh despair if this stage is to be resolved successfully, Erikson maintained that some despair is inevitable. People need to mourn—not only for their own misfortunes and lost chances but for the vulnerability and transience of the human condition.



Jimmy Carter, one of the most active ex-presidents in American history, won the Nobel Prize at age 78 for his continuing work in human rights, education, preventive health research, and conflict resolution, much of it in developing countries. He was born in 1924.

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THE FIVE-FACTOR MODEL: PERSONALITY TRAITS IN OLD AGE

Does personality change in late life? The answer may depend in part on the way stability and change are measured.

Measuring Stability and Change in Late Adulthood Questions about the stability of personality have been the focus of an enduring debate. Generally, personality stability follows an inverted U-shaped curve. Stability is lowest in adolescence, peaks in mid-adulthood,



According to Erikson, ego integrity in late adulthood requires continuing stimulation and challenge, which can come from creative work.
kali9/E+/Getty Images

and then declines in late adulthood (Specht, Egloff, & Schmukle, 2011; Terracciano, McCrae, & Costa, 2010). Most of the personality changes seen in adulthood are in the direction of increased stability, adaptability, and adjustment (Soto, John, Gosling, & Potter, 2011; Hopwood et al., 2011).

While Costa and McCrae reported long-term stability in their data, the stability was in terms of average levels of various traits within a population, and people generally maintained their rank order. In other words, particularly outgoing people were likely to remain more outgoing than their peers, even if everyone became slightly more so over time.

Longitudinal and cross-sectional studies have found continued change in late adulthood. Research has found increases in agreeableness, self-confidence, warmth, emotional stability, and conscientiousness (Soto et al., 2011; Roberts & Mroczek, 2008; Leszko, Elleman, Bastarche, Graham, & Mrozek, 2016) and declines in neuroticism, social vitality (gregariousness), and openness to experience (Leszko et al., 2016; Roberts & Mroczek, 2008). Contrary to stereotypes of the elderly as rigid and set in their ways, there appear to be no age-related trends in inflexibility. In fact, more recent cohorts, as a whole, seem to be more flexible (that is, less rigid) than previous cohorts (Schaie, 2005).

Why do people show normative changes in personality characteristics? Some researchers argue that these processes are driven primarily by intrinsic genetic differences between people that unfold over time (Costa & McCrae, 2013). Other researchers argue that life experiences—getting married, joining the workforce, and so on—are the primary drivers of personality change (Roberts, Wood, & Smith, 2005). Still others argue explicitly for a consideration both of genetic and environmental influences (Hopwood et al., 2011).

Newer, finer grained analysis suggests that personality change consists of *both* stability *and* change and different patterns of change in different individuals, perhaps helping explain the diversity of findings in the literature (Leszko et al., 2016). For instance, there are individual differences in personality stability, peaking at midlife (Schwaba & Bleidorn, 2018). While personality is a largely stable trait across the life span, there is also partial support for a U-shaped trend in stability with increasing instability later in life. Moreover, some traits, such as extraversion, are relatively stable. Others, such as agreeableness, are more likely to change in response to temporary events (Wagner, Lüdtke, & Robitzsch, 2019).

The Influence of Personality and Personality Change on Health and Well-Being Personality is a strong predictor of health and well-being—stronger in most respects than social relationships and health (Isaacowitz & Smith, 2003). The realization that personality *change* can also be predictive moved research away from a primary focus on the static examination of personality to the exploration of how dynamic changes might impact health indices (Leszko et al., 2016). Both processes are important.

A recent meta-synthesis (a secondary meta-analysis of 36 meta-analyses) of more than 500,000 participants examined the influence of the Big Five traits on mental health, physical health, and health-related behaviors. As a whole, there was a strong link between personality and mental health, a moderate link between personality and health-related behaviors, and a weak link between personality and physical health. Moreover, when the personality traits were examined independently, agreeableness, conscientiousness, and neuroticism were stronger predictors than were extraversion and openness to experience (Strickhouser, Zell, & Krizan, 2017).

Personality can affect mental health through a variety of mechanisms. For instance, low extraversion, high neuroticism, and low conscientiousness predict depression. One possible explanation for this association is that both a particular personality profile and depression might stem from a common cause. Another model posits that personality is

a risk factor that might contribute to depression. Yet another model states that while personality does not cause depression, once depression sets in, personality can influence the severity or course depression might take (Hakulinen et al., 2015). Other aspects of mental health might work in a similar fashion.

How might personality affect physical health? Personality traits influence behavior, and behavior influences health. Highly neurotic people have low survival rates, possibly because they are likely to smoke or use alcohol or drugs to help calm their negative emotions and because they are ineffective in managing stress (Mroczek & Spiro, 2007). By contrast, conscientiousness might predict health and mortality because conscientious people tend to avoid risky behaviors and to engage in activities that promote their health, such as regular visits to the doctor or the gym (Friedman & Kern, 2014). The riskiest combination appears to be when individuals are both high in neuroticism as well as low in conscientiousness, as both these patterns are associated with a higher risk of inflammatory responses in the body (Sutin et al., 2010).

Personality change and stability are also important markers of health and well-being. For example, people who remain stable on openness to experience and neuroticism enjoy better reasoning abilities and faster reaction time than those individuals whose levels change (Graham & Lachman, 2012). Additionally, instability in these areas, specifically when neuroticism increases and openness to experience declines, is associated with deterioration in cognitive processing and greater difficulty with activities of daily living (Pocnet, Rossier, Antonietti, & von Gunten, 2013).

Neuroticism appears to be a particularly important trait. People with neurotic personalities (moody, touchy, anxious, and restless) tend to report negative and not positive emotions, and they tend to become even less positive as they age (Charles, Reynolds, & Gatz, 2001; Isaacowitz & Smith, 2003). Neuroticism is a far more powerful predictor of moods and mood disorders than variables such as age, health status, education, or gender (Siedlecki, Tucker-Drop, Oishi, & Salthouse, 2008; Magee, Heaven, & Miller, 2013).

Some changes are beneficial. For instance, increases in agreeableness, conscientiousness, and extraversion are associated with improved physical and mental health (Magee et al., 2013; Turiano et al., 2011) and social well-being (Hill, Turiano, Mroczek, & Roberts, 2012). Moreover, effects appear to be interactive. For example, in one 4-year longitudinal study of over 16,000 Australian adults, agreeableness, conscientiousness, and extraversion predicted well-being. Those adults who were high in well-being then became even more agreeable, conscientious, and extraverted over time. Thus, both personality and well-being exerted reciprocal influences on each other (Soto, 2015). This reciprocal effect between personality and aspects of mental health and well-being exists in both a positive and negative direction—a similar dynamic has been found with personality change and depressive symptoms (Hakulinen et al., 2015).



In January 2011, the oldest baby boomers started turning 65, and apparently they "can't get no satisfaction." Researchers report they are more pessimistic than previous generations and upcoming younger generations.

Cohn & Taylor, 2010

checkpoint can you . . .

- Discuss Erikson's stage of ego integrity versus despair, and tell what Erikson meant by *wisdom*?
- Summarize research about personality traits and stability and their effects on physical and mental health and well-being?

Well-Being in Late Adulthood

In general, older adults have fewer mental disorders and are happier and more satisfied with life than younger adults (Yang, 2008). Happiness tends to be high in early adulthood, declines until people reach 50 years of age, and then tends to rise again until 85 years of age—at that point reaching levels even higher than in the teenage years (Stone, Schwartz, Broderick, & Deaton, 2010). Once people reach older adulthood, the prevalence of psychiatric disorders tends to decrease through the later decades of life, and gender differences tend to even out (Reynolds, Pietrzak, El-Gabalawy, Mackenzie, & Sareen, 2015).

The U-shaped pattern of well-being appears to be most true for elderly adults in wealthy areas of the world where English is spoken. It does not appear to be a universal feature of human psychology. In sub-Saharan African, well-being is generally low and remains so over time. In Eastern European countries, well-being is moderate and then falls steeply in old age, a pattern that is reproduced in Latin America and the Caribbean to a lesser degree (Steptoe, Deaton, & Stone, 2015).

The rise in happiness seen in American adults later in life may reflect the value of a mature outlook, but it also may reflect the selective survival of happier people, especially after the age of 70 (Segerstrom, Combs, Winning, Boehm, & Kubzansky, 2016). Still, some cohort variations and social disparities exist. For example, baby boomers report lower levels of happiness than do earlier and later cohorts, perhaps due to the immense size of their generation and the resulting competitive strains for schooling, jobs, and economic security, as well as the turbulent societal events of their formative years (Yang, 2008).

Another explanation for this generally positive picture comes from socioemotional selectivity theory: As people get older, they tend to seek out activities and people that give them emotional gratification (English & Carstensen, 2014). Older adults are also better at regulating their emotions, thus they tend to be happier and more cheerful than younger adults and to experience negative emotions less often and more fleetingly (Urry & Gross, 2010; Jacques, Bessette-Symons, & Cabeza, 2009). Additionally, older adults also show a bias in their information processing known as the positivity effect. Older adults are more likely to pay attention to, and then remember, positive events than negative events (Reed, Chan, & Mikels, 2014).

In some adults, there is a sharp and rapid decline in well-being and life satisfaction approximately 3 to 5 years before death known as a "terminal drop." Events more common in the last years of life—the loss of a spouse, increasing mobility limitations, deteriorating health, or the knowledge that the end of life is drawing near—may lead to the declines (Gerstorf et al., 2010). However, satisfaction with various parts of life needs to be examined separately. For example, satisfaction with health, housing, and recreation has not been found to be associated with mortality risk, while low satisfaction with religion, self-esteem, and finances has (St. John, Mackenzie, & Menec, 2015).



"Elderspeak"—the use of words or phrases such as "How are we feeling?" or "good girl"—is often used in an attempt to be helpful or kindly, but it is more likely to be viewed as demeaning or condescending.

Balsis & Carpenter, 2006

COPING AND MENTAL HEALTH

coping
Adaptive thinking or behavior aimed at reducing or relieving stress that arises from harmful, threatening, or challenging conditions.

Coping is adaptive thinking or behavior aimed at reducing or relieving stress that arises from harmful, threatening, or challenging conditions. It is an important aspect of mental health. First, we'll examine an approach to the study of coping: the cognitive- appraisal model. Then we'll examine a support system to which many older adults turn: religion.

cognitive-appraisal model
Model of coping, proposed by Lazarus and Folkman, that holds that, on the basis of continuous appraisal of their relationship with the environment, people choose appropriate coping strategies to deal with situations that tax their normal resources.

Cognitive-Appraisal Model In the **cognitive-appraisal model** (Lazarus & Folkman, 1984), people respond to stressful or challenging situations on the basis of two types of analyses. In *primary appraisal,* people analyze a situation and decide, at some level, whether or not the situation is a threat to their well-being. In *secondary appraisal,* people evaluate what can be done to prevent harm and choose a coping strategy to handle the situation. Coping includes anything an individual thinks or does in trying to adapt to stress, regardless of how well it works. Choosing the most appropriate strategy, and adapting to the various stressors of life, requires a continuous reappraisal of the relationship between person and environment.

problem-focused coping
In the cognitive-appraisal model, coping strategy directed toward eliminating, managing, or improving a stressful situation.

Coping Strategies: Problem-Focused versus Emotion-Focused Coping strategies may be either problem-focused or emotion-focused. **Problem-focused coping** involves the use of *instrumental,* or action-oriented, strategies to eliminate, manage, or improve a stressful condition. This type of coping is more common when a person sees a realistic chance to change the situation. For example, some students may feel they are capable of learning the relevant material and will do well on an upcoming exam. To achieve this, they may use such problem-focused coping strategies as going to the professor for extra help or spending more time studying. By addressing the source of stress, people using problem-focused coping seek to lessen any harm to the self.

emotion-focused coping
In the cognitive-appraisal model, coping strategy directed toward managing the emotional response to a stressful situation so as to lessen its physical or psychological impact.

Emotion-focused coping, by contrast, involves attempting to manage the emotional response to a stressful situation to relieve its physical or psychological impact. People are more likely to use this coping strategy when they conclude that little or nothing can be done about the situation itself. Thus they direct their energy toward "feeling

better" rather than toward any actions meant to change the situation. For example, when faced with a difficult test, students who feel they are unable to learn the material well enough to earn a good grade may select coping strategies that focus on emotions rather than actions. They might ignore the upcoming test and go out with friends instead of studying, decide the class is not important after all, or become angry with the professor for being unfair. There are two types of emotion-focused coping: *proactive* (confronting or expressing one's emotions or seeking social support) and *passive* (avoidance, denial, suppression of emotions, or acceptance of the situation as it is).

Age Differences in Choice of Coping Styles Older adults tend to use more emotion-focused coping than younger people (Trouillet, Doan-Van-Hay, Launay, & Martin, 2011; Meléndez, Mayordomo, Sancho, & Tomás, 2012); this is particularly true when looking at the oldest old (Martin et al., 2008). Moreover, adults with cognitive impairments and Alzheimer's disease are less likely to use problem-focused coping strategies, in all likelihood because their impairments reduce their capacity for doing so (Meléndez, Satorres, Redondo, Escudero, & Pitarque, 2018).

Generally, emotion-focused coping is less adaptive than problem-focused coping, but this is only true when something can realistically be done about the problem. When a solution is not available, it may be more adaptive to control negative or unpleasant emotions. Ideally, both emotion- and problem-focused coping are available for use, thus allowing a more flexible range of responses to stressful events.

When asked how they would deal with various kinds of problems, most people, regardless of age, usually pick problem-focused strategies. However, in highly emotional or stressful situations (such as that of a divorced man who is allowed to see his child only on weekends but who wants more contact), adults of all ages are more likely to use emotion-focused coping, but older adults choose emotion-focused strategies (such as waiting until the child is older or trying not to worry about it) more often than younger adults do (Blanchard-Fields, Stein, & Watson, 2004).

Coping styles are related to physical well-being. In general, happier people are healthier. Research suggests that adaptive coping is related to health via stress hormone pathways (Carver, 2007). In one study of more than 500 older adults, those adults who used problem-focused coping strategies and sought social support in the face of stressful events showed lower levels of cortisol, a stress hormone, over the course of the day (O'Donnell, Badrick, Kumari, & Steptoe, 2008). Coping need not be problem-focused for elderly adults to be effective, however. For example, in another study, when older adults had chronic age-related and largely uncontrollable stressors, shifting emotion state with self-compassion (kindness and concern, rather than pity or self-criticism) was associated with lower cortisol levels (Herriot, Wrosch, & Gouin, 2018).



Which type of coping do you tend to use more: problem-focused or emotion-focused? Which type do your parents use more? Your grandparents? In what kinds of situations does each type of coping seem most effective?

The management of stress hormone levels is important because higher cortisol can lead to declines in health over time. For instance, in another study, older adults who did not use adaptive coping strategies *and* who had high cortisol showed more functional disabilities (i.e., more problems with activities of daily life) over time. Neither those adults who had high cortisol and coped effectively nor those adults who had low cortisol showed similar declines (Wrosch, Miller, & Schulz, 2009).



Religious activity seems to help many people cope with stress and loss in later life.
ESB Professional/Shutterstock

The Effect of Religion and Spirituality on Health and Well-Being As a whole, older adults today are more religious than younger adults. For example, 43 percent of younger millennials (born

between 1990 and 1996) say religion is very important in their lives. However, 59 percent of baby boomers (born from 1946 to 1964) say the same, and for those over the age of 72, the number rises to 67 percent (Pew Research Center, 2015). This is true not just in the United States but also, as recent research conducted in over 100 countries shows, in at least 46 other countries across the world, including many in Europe and Latin America. Globally, approximately 51 percent of younger adults report that religion is very important to them as compared to 57 percent of older adults (Kramer & Fahmy, 2018).

Religion seems to play a supportive role for many older people and can be part of their coping strategy (Meléndez et al., 2012). For instance, adults who have been diagnosed with Alzheimer's disease show diminished use of problem-focused coping strategies and increasing use of religion, presumably as a way of coping with their declines in functioning (Melendez et al., 2018). Religion may benefit older people by providing social support, encouraging a healthy lifestyle, giving the perception of control over life through prayer, fostering positive emotional states, reducing stress, and using faith in God as a way of interpreting misfortunes (Seybold & Hill, 2001). But does religion actually improve health and well-being?

Many studies suggest a positive link between religion or spirituality and health and mortality (Lawler-Row & Elliot, 2009; Powell, Shahabi, & Thoresen, 2003). Overall, those people who identify with a religion and who attend services at least once a month are more likely to describe themselves as "very happy" than those people who are not actively religious (Marshall, 2019). Other research has found positive associations between religiosity or spirituality and measures of health, well-being, marital satisfaction, and psychological functioning, and negative associations with depression, suicide, delinquency, criminality, and drug and alcohol use (Koenig, 2012; Seybold & Hill, 2001; Bjørkløf, Engedal, Selbæk, Kouwenhoven, & Helvik, 2013; Green & Elliott, 2010).

Relatively little of the research on religion and spirituality has been done with racial/ethnic minorities, although many of the patterns that have been found across groups are similar. For example, older Mexican Americans who attend church once a week have a 32 percent lower mortality risk than those who never attend (Hill, Angel, Ellison, & Angel, 2005). Similar results were found in China, with a 21 percent reduction in mortality risk for elderly adults who participated in religious activities on a regular basis as compared to those who did not (Zeng, Gu, & George, 2011).

An important factor may be the social support provided by church membership and the religious community (Taylor, Chatters, Lincoln, & Woodward, 2017). It appears this support is related to a reduced risk of depression (Chatters, Taylor, Woodward, & Nicklett, 2015). In one national study of over 2,000 Asian Americans, church attendance was associated with a decreased risk of depression. However, this relationship was mediated by social support. In other words, the social support provided by attending church, rather than church attendance per se, was the crucial factor in risk reduction (Ai, Huang, Bjorck, & Appel, 2013).

For racial and ethnic minorities, who must deal with the continuing influence of racism and discrimination, religion may play a more important role in their efforts to cope than it does for white Americans (Tabak & Mickelson, 2009). For example, religion is closely related to life satisfaction and well-being in elderly black people (Park, Holt, Le, Christie, & Williams, 2018; Krause, 2004a). One factor is the belief held by many black people that the church helps sustain them in confronting racial injustice (Ellison, DeAngelis, & Güven, 2017; Ellison, Musick, & Henderson, 2008).

Another reason for the positive links between health and spirituality is because people who belong to a church are more likely to engage in healthy behaviors (Lawler-Row & Elliot, 2009). Research has shown that this is true with black adults and that religious beliefs are associated with greater fruit and vegetable consumption, reductions in alcohol consumption, and increases in physical activity (Holt, Clark, Debnam, & Roth, 2014; Debnam, Holt, Clark, Roth, & Southward, 2012). This is true not just within churchgoers in the United States but globally as well. For example, in one international study, actively religious people were less likely to smoke in 17 of 19 countries surveyed, and in 11 of the 19 countries, they were less likely to drink several times a week (Marshall, 2019).

checkpoint can you . . .

- Describe the cognitive-appraisal model of coping, and explain the relationship between age and choice of coping strategies?
- Discuss how religiosity and spirituality relate to mortality risk, health, and well-being in late life?

MODELS OF "SUCCESSFUL," OR "OPTIMAL," AGING

A considerable body of work has identified three main components of successful aging: (1) avoidance of disease or disease-related disability, (2) maintenance of high physical and cognitive functioning, and (3) sustained, active engagement in social and productive activities (activities, paid or unpaid, that create social value). Successful agers tend to have social support, both emotional and material, which aids mental health; and as long as they remain active and productive, they do not think of themselves as old (Rowe & Kahn, 1997; Moore et al., 2015). Another approach emphasizes subjective well-being and satisfaction with life (Jopp & Smith, 2006; Cho, Martin, Poon, & Georgia Centenarian Study, 2014). Agreement on what constitutes successful aging is surprisingly absent (Martinson & Berridge, 2014). However, a meta-analysis of studies that included quantitative data as well as a definition of "successful aging" found that approximately one-third of adults over the age of 60 engage in successful aging (Depp & Jeste, 2009).

Keeping these concerns in mind, let's look at some classic and current theories and research about aging well.

checkpoint can you . . .

- Tell what is meant by *successful,* or *optimal, aging* and why the concept is controversial.

Disengagement Theory versus Activity Theory Who is making a healthier adjustment to old age: a person who peacefully watches the world go by from a rocking chair or one who keeps busy from morning till night? According to **disengagement theory**, a normal part of aging involves a gradual reduction in social involvement and greater preoccupation with the self. According to **activity theory**, the more active older people remain, the better they age.

disengagement theory
Theory of aging that holds that successful aging is characterized by mutual withdrawal of the older person and society.

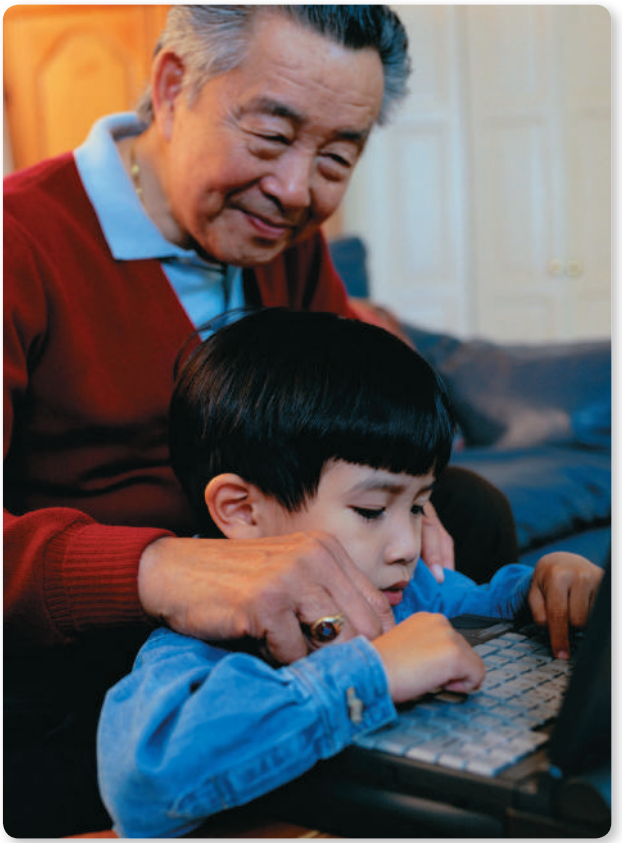
activity theory
Theory of aging that holds that to age successfully a person must remain as active as possible.

Disengagement theory was one of the first theories in gerontology. Its proponents (Cumming & Henry, 1961) regarded disengagement as a normative, or typical, part of aging. They argued that awareness of the approach of death and declines in physical functioning resulted in a gradual, inevitable withdrawal from social roles. Moreover, because society stops providing useful roles for the older adult, the disengagement is mutual—others do not try to stop it.

For a time, this approach was influential, but more than five decades of research have provided little support for disengagement theory, and its influence has largely waned (Achenbaum & Bengtson, 1994). This approach may have reflected beliefs about aging at the time it was developed (Moody, 2009), rather than described a normative and healthy developmental process.

The second approach, *activity theory,* takes the opposing viewpoint. In this theory, we are what we do (Moody, 2009). Rather than retreating from life, adults who age successfully tend to remain engaged with social roles and connections. The more active they remain in those roles, the more satisfied with life they are likely to be. When they lose a role, such as when they retire, they find a substitute role, such as volunteering (Neugarten, Havighurst, & Tobin, 1968). Research generally supports this approach, showing that people who retain their major role identities tend to report greater well-being and better mental health (Greenfield & Marks, 2004). For example, retired adults who continued or began to volunteer during the course of one longitudinal study were less likely to show the declines in well-being that other adults did (Wahrendorf & Siegrist, 2010).

As originally framed, activity theory is now regarded as overly simplistic. Early research did indeed suggest that activity was associated with life satisfaction (Neugarten et al., 1968); however, the interpretation of this finding may have been flawed. Rather than activity driving satisfaction, it may have been relationships that were responsible for the effect. People who remain active are more likely to maintain high-quality social relationships, and the presence of these relationships is likely to positively affect life satisfaction (Litwing & Shiovitz-Ezra, 2006). In addition, a good proportion of disengaged people are nonetheless happy with their lives, and recent research suggests that disengagement and activity theory may both speak to successful aging. Specifically, adults who believed themselves to be aging successfully struck a balance between self-acceptance and being happy with themselves as they were and remaining simultaneously engaged and involved with life (Reichstadt, Sengupta, Depp, Palinkas, & Jeste, 2010). Findings such



Older people who feel useful to others, as this grandparent does to his grandson, are more likely to age successfully.
Steve Mason/Photodisc/Getty Images

as these suggest that activity may work best for most people but disengagement may be appropriate for others, and that it may be unwise to make generalizations about a particular pattern of successful aging (Moen, Dempster-McClain, & Williams, 1992; Musick, Herzog, & House, 1999).

Continuity Theory What you prefer prior to the later stages of life may influence what you prefer when you reach them. In other words, if you are happy being active now, you are likely to be happy being active later. However, if you are happy being less active now, you may prefer a quieter lifestyle later in life too (Pushkar et al., 2009). This is the primary premise of **continuity theory** (Atchley, 1989). In this approach, people's need to maintain a connection between past and present is emphasized, and activity is viewed as important, not for its own sake but because it represents continuation of a previous lifestyle. For example, many retired people are happiest pursuing work or leisure activities similar to those they enjoyed in the past (Pushkar et al., 2010). Women who have been involved in multiple roles (such as wife, mother, employee, or volunteer) tend to continue those involvements as they age—and remain happier for having done so (Moen et al., 1992). And people who, in middle age, enjoyed leisure activities such as reading books, pursuing a hobby, or gardening tended to engage in these activities in old age as well (Agahi, Ahacic, & Parker, 2006). Continuity in activities is not always possible because some older adults must cut back on participation in favorite events due to visual, motor, or cognitive impairments. Older adults are likely to be happier, however, if they can maintain their favorite activities to some extent. So, for instance, if adults who are forced to retire are able to find bridge employment (a job following retirement), then they show fewer declines in well-being (Dingemans & Henkens, 2015).

continuity theory
Theory of aging, described by Atchley, that holds that in order to age successfully people must maintain a balance of continuity and change in both the internal and external structures of their lives.

The Role of Productivity Some researchers focus on productive activity, any action that provides a contribution to society, as a key to aging well. Productive activity, whether paid or unpaid, has been found to have positive effects on older adults. For example, a recent meta-analysis found that across 73 studies, volunteering was associated with a host of positive outcomes, including reduced depression, better health and functional ability, and lower mortality risk. The authors suggest that participating in volunteering keeps older adults physically, cognitively, and socially active, and this increased engagement then positively affects health indices (Anderson et al., 2014). Generally, the more activities adults are involved in and the more time spent on them, the greater the positive effects (Vozikaki, Linardakis, Micheli, & Philalithis, 2017; Baker, Cahalin, Gerst, & Burr, 2005). Similar effects have been found for working, but not for caregiving activities (Choi, Stewart, & Dewey, 2013; Stav, Hallenen, Lane, & Arbesman, 2012; Pinquart & Sörenson, 2003).

Some research suggests that frequent participation in leisure activities can be as beneficial to health and well-being as participation in productive activities, although this effect may be stronger for women (Agahi & Parker, 2008). Social relationships appear to be important here (Stav et al., 2012). Those adults who perceive their social relationships as positive are more likely to engage in leisure activities, and leisure activities are then associated with better health outcomes (Chang, Wray, & Lin, 2014). However, this does not mean that leisure activities that are more solitary in nature do not have any benefits. For example, meditation, gardening, reading, and listening to the radio have been associated with well-being and quality of life (Geiger et al., 2016; Wang & MacMillan, 2013; Menec, 2003; Machón, Larrañaga, Dorronsoro, Vrotsou, & Vergara, 2017).

checkpoint can you . . .

- Compare disengagement theory, activity theory, and continuity theory?
- Discuss the importance of productivity in late adulthood?

Selective Optimization with Compensation According to Paul Baltes and his colleagues (Baltes, 1997), successful aging involves strategies that enable people to adapt to the changing balance of growth and decline throughout life. In childhood, resources are primarily used for growth, and in early adulthood resources are used to maximize reproductive fitness. In old age, resources are increasingly directed toward the maintenance of health and the management of loss (Baltes & Smith, 2004; Jopp & Smith, 2006). Older adults allocate these resources via a process called **selective optimization with compensation (SOC).** SOC involves developing abilities that allow for maximum gain, as well as developing abilities that compensate for decline and could lead to loss. According to SOC, older adults conserve their resources by:

selective optimization with compensation (SOC)
Enhancing overall cognitive functioning by using stronger abilities to compensate for those that have weakened.

- *Selecting* fewer and more meaningful activities or goals.
- *Optimizing,* or making the most of, the resources they have to achieve their goals.
- *Compensating* for losses by using resources in alternative ways to achieve their goals.

For example, the celebrated concert pianist Arthur Rubenstein gave his farewell concert at age 89. He was able to compensate for his age-related memory loss by selecting a smaller repertoire of material to play and by practicing longer each day to optimize his performance. He also compensated for declines in motor abilities by slowing down his playing immediately before fast movements, thus heightening the contrast and making the music sound faster (Baltes & Baltes, 1990).

The same life-management strategies apply to psychosocial development. According to Carstensen's (1991, 1995, 1996) socioemotional selectivity theory, older adults become more selective about social contacts, keeping up with friends and relatives who can best meet their current needs for emotional satisfaction. In this way, even though older adults may have fewer friends, the friends that they do have are closer and provide more rewarding social contact (English & Carstensen, 2014).

Research has found that use of SOC is associated with positive developmental outcomes, including greater well-being (Baltes & Smith, 2004). Eventually, though, older people reach the limit of their available resources, and compensatory efforts may no longer work. Adjusting one's personal standards to changes in what is possible to achieve may be essential to maintaining a positive outlook on life. The argument about what constitutes successful or optimal aging and what contributes to well-being in old age is far from settled, and may never be. One thing is clear: People differ greatly in the ways they can and do live—and want to live—in the later years of life.



Are you satisfied with any of the definitions of successful, or optimal, aging presented in this section? Why or why not?

checkpoint can you . . .

- Explain how selective optimization with compensation helps older adults deal with losses?

Practical and Social Issues Related to Aging

Whether and when to retire are among the most crucial lifestyle decisions people make as they approach late adulthood. These decisions affect their financial situation and emotional state, as well as the ways they spend their waking hours and the ways they relate to family and friends. The need to provide financial support for large numbers of retired older people also has serious implications for society, especially as the baby boom generation starts to retire. Another social issue is the need for appropriate living arrangements and care for older people who can no longer manage on their own. (Window on the World reports on stereotypes of older people worldwide.)

WORK AND RETIREMENT

Retirement took hold in many industrialized countries during the late nineteenth and early twentieth centuries. In the United States, the creation of the Social Security system in the 1930s, together with company-sponsored pension plans, made it possible for many older workers to retire with financial security. Eventually, mandatory



Despite the fact that more women develop Alzheimer's disease, men tend to have earlier and more problems with forgetting, a tendency that may have more immediate practical consequences for those entering the later states of life.

Petersen et al., 2010

window on the world

AGING STEREOTYPES WORLDWIDE

In America, Australia, the United Kingdom, and many other countries around the world, the elderly are often seen as frail, useless, mentally incompetent, lonely, and a burden to society. Late adulthood is thought of as a time of decline, worry, fear, and loss (Quine, Morrell & Kendig, 2007).

These negative age stereotypes can lead to segregation and discrimination in society and can undermine political support for programs benefitting older people, including access to health care and medical treatments (Cheng & Heller, 2009). Ageism can directly affect the elderly as they often internalize societal views, hastening physical and mental decline. It has been found that adopting these negative stereotypes can decrease life span by up to 7½ years (Scheve & Venzon, 2017).

One American study found that 84 percent of elders still in the workforce reported being subjected to ageism at work. Reports include insulting jokes, patronizing behavior, disrespectful attitudes or gestures, and comments about being slow, frail, and sickly (Roscigno, Mong, Byron, & Tester, 2007). A similar study was done in Slovenian countries and found that older employees were stereotyped as being less motivated, less adaptable, not innovative, and slower (Rožman, Treven, & Čančer, 2016). It is notable that despite the stereotypes, both studies concluded that older employees are often better workers, showing less absenteeism, higher commitment, more knowledge, more professionalism, and greater loyalty to their companies.

The belief that elders are treated with reverence and respect in other cultures penetrates our knowledge of Asian countries and many less industrialized nations. However, research shows there are both positive and negative beliefs about the elderly in these countries (Vauclair, Hanke, Huang, & Abrams, 2017). Cultures with high levels of poverty or with harsh living conditions provide less care for the elderly. The treatment of elders depends much on their usefulness and contributions they can provide to others (McGuire, 2017). Elder abuse is common and often seen as the norm. In parts of India, elderly widows are considered "ill omens" and are sent to live in widow villages, isolated from their family and society (Cheng & Heller, 2009).

The way we view the aging process influences how we age. For example, in the Tarahumara society in Mexico, the belief is that people get stronger as they age. Many elders are still able to run great distances and lead very healthy active lives (Scheve & Venzon, 2017). Research has shown that elders with positive attitudes about aging show lower rates of mental illness, quicker recovery times from illness and stress, and less cognitive decline, and they live longer (McGuire, 2017).

Social policies are focused on increasing education, developing positive images of the elderly and supporting the continuation of independence and resources for elders. The goals are to increase hope for the future and reduce fears among the elderly and include assisting with financial and health struggles (Quine et al., 2007).

what's your view

What do you think we can do to combat negative stereotypes about the elderly? How can you challenge your own beliefs about the elderly?

Although you may have more time to enjoy a glass of wine after you retire, unfortunately, you'll pay more for it the next day. Older people metabolize wine more slowly and have less liquid in their bodies. Therefore, blood alcohol level rises more quickly and is likely to result in a more severe hangover.

National Institute on Alcohol Abuse and Alcoholism, 2010

retirement at age 65 became almost universal. However, in 1983, the age for full eligibility for Social Security retirement benefits was raised to 67 years for people born in 1960 or later, and more stringent penalties were instituted for early retirement at age 62. Despite these changes, the number of people receiving benefits has continued to rise in concert with the changing demographics of the United States (Duggan, Singleton, & Song, 2007), reaching a peak in 2003 and remaining relatively stable from that point on. In 2017, the median age at retirement was 62 years. Black and Hispanic retirees are more likely to retire before 62 years than are white adults (Larrimore, Durante, Kreiss, Park, & Sahm, 2018).

Today, compulsory retirement has been virtually outlawed in the United States as a form of age discrimination, and the line between work and retirement is not as clear as it used to be. There are no longer norms concerning the timing of retirement, how to plan for it, and what to do afterward. Often, a desire to pursue activities other than work or to spend time with family are the impetus for retirement. However, with

increasing age, many adults retire because of health reasons (Larrimore et al., 2018). There are multiple interrelated issues, including marital status, current assets and liabilities, the status of dependents, the nature of the work and whether or not age will make that challenging, and the current state of the job market (Gibaldi, 2013). Only 40 percent of those older adults who stop working in their fifties and sixties stop for good; the remainder go back to work either part- or full-time before permanently exiting the workforce (Maestas, 2010).



About 500,000 older Americans volunteer through the Senior Corps program. These volunteers are building a home for a low-income family through Habitat for Humanity.
Hill Street Studios/Blend Images/Getty Images

Trends in Late-Life Work and Retirement In the United States, most adults who *can* retire *do* retire, and, with increasing longevity, they spend more time in retirement than in the past (Dobriansky, Suzman, & Hodes, 2007). However, the proportion of workers older than 65 years of age has increased sharply. This graying of the working population is expected to continue to increase through 2024 and is the fastest growing labor participation group. Projections suggest that by that time, 41 million people age 55 and older, 13 million of whom will be 65 and older, will be in the workforce (Toossi & Torpey, 2017).

Life after Retirement Retirement is not a single event but a dynamic adjustment process that is best conceptualized as a form of decision making. Within one model are five broad categories of resources that help determine how well a person adjusts to retirement: (1) individual attributes such as health and financial status; (2) preretirement job-related variables such as job stress; (3) family-related variables such as marriage quality and dependents; (4) retirement transition-related variables such as retirement planning; and (5) postretirement activities such as bridge employment and volunteer work (Wang, Henkens, & van Solinge, 2011).

The research on adjustment to retirement has supported this model. For example, both physical health and financial situation predict retirement adjustment (Barbosa, Monteiro, & Murta, 2016; Earl, Gerrans, & Halim, 2015). Additionally, people who retire from jobs they find unpleasant or stressful show increases in well-being upon retirement (Wang, 2007). In further support of the model, retirees in happy marriages with fewer dependents show higher levels of well-being than other groups (Wang & Shi, 2014; Pinquart & Schindler, 2007). When a spouse dies, this negatively affects retirement adjustment (van Solinge & Henkens, 2008).

Whether and how well people are able to plan for retirement also impact adjustment. Those people who retire earlier than planned or against their will show declines in well-being (Barbosa et al., 2016; Wang & Shi, 2014), whereas the opportunity to plan retirement is associated with well-being and life satisfaction (Wang, 2007). Bridge employment also appears to be beneficial, and in recent research across 16 European countries, it was found to be particularly important for older adults of lower socioeconomic status living without a partner (Dingemans & Henkens, 2019).

People transitioning from working to retirement are particularly likely to volunteer (Tang, 2016), and those who do volunteer are more likely to experience high levels of well-being during retirement (Hao, 2008). Volunteering during retirement has been positively associated with good health and negatively associated with depression, functional limitations, and mortality (Wahrendorf, Blane, Matthews, & Siegrist, 2016). Volunteering also predicts positive emotionality and protects against declines in well-being associated with major role-identity losses and declines in mental health (Greenfield & Marks, 2004; Hao, 2008).

Thus, adjustment to retirement does not depend on one factor alone, but rather upon a variety of factors. Additionally, it is not something that happens immediately. Rather, it is a process that occurs over time, dynamically, between a person, important interactional partners, and the various environments a person is involved with or seeks out.

HOW DO OLDER ADULTS FARE FINANCIALLY?

Since the 1960s, Social Security has provided the largest share of older Americans' income—33 percent in 2017 (Social Security Administration, 2018). Other sources of income include income from assets (13 percent), private pensions (19 percent), and earnings (30 percent) (Federal Interagency Forum on Aging-Related Statistics, 2010). Dependence on Social Security and asset income rises dramatically with age and decreases with income level (Federal Interagency Forum on Aging-Related Statistics, 2016).

Social Security and other government programs, such as Medicare, which covers basic health insurance for U.S. residents who are 65 or older or are disabled, have enabled today's older Americans, as a group, to live fairly comfortably. In 2017, 86 percent of retirees used Medicare (Larrimore, Durante, Kreiss, Park, & Sahm, 2018). The proportion of older adults living in poverty has fallen from 35 percent in 1959, to 29 percent in 1966, and then to 10 percent in 2014 (Administration on Aging, 2016; Federal Interagency Forum on Aging-Related Statistics, 2016). The poverty rate for older adults, while still lower than that of the total population, showed an increase in 2016—the only demographic group to do so (Semega, Fontenot, & Kollar, 2017). As the U.S. population grays and as proportionately fewer workers contribute to the Social Security system, it seems likely that benefits will decline (Sawicki, 2005).

Women—especially if they are single, widowed, separated, or divorced or if they were previously poor or worked only part-time in middle age—are more likely (12 percent) than men (7 percent) to live in poverty in old age (Federal Interagency Forum on Aging-Related Statistics, 2016). There are also ethnic differences. Older African Americans and Hispanic Americans, at rates of 23 and 17 percent, respectively, are more likely to live in poverty than older white Americans at 7.4 percent (Federal Interagency Forum on Aging-Related Statistics, 2010). The highest poverty rates are among older Hispanic women (20 percent) and older African American women (21 percent) who live alone (Federal Interagency Forum on Aging-Related Statistics, 2016).

checkpoint can **you** . . .

- Describe current trends in late-life work and retirement?
- Discuss how retirement can affect well-being?
- Discuss the economic status of older adults and issues concerning Social Security?

LIVING ARRANGEMENTS

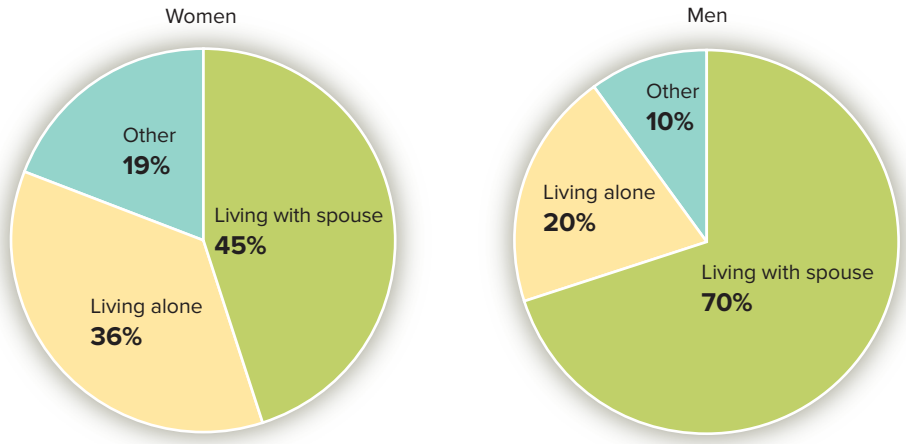
In developing countries, older adults typically live with adult children and grandchildren in multigenerational households, though this custom is declining. In developed countries, most older people live alone or with a partner or spouse (Kinsella & Phillips, 2005).

In the United States in 2014, about 7 percent of adults age 65 and older lived in senior housing of various types. Because of women's greater life expectancy, about 70 percent of noninstitutionalized men but only about 45 percent of noninstitutionalized women lived with a spouse. Twenty percent of the men and 36 percent of the women lived alone, although the proportion living alone increases with advancing age. Approximately 10 percent of the men and 19 percent of the women lived with other relatives or nonrelatives, including partners and children (Figure 1). Minority elders, especially Asian and Hispanic Americans, in keeping with their traditions, were more likely to live in extended family households (Federal Interagency Forum on Aging-Related Statistics, 2016).

Aging in Place Most older adults in industrialized countries prefer to stay in their own homes and communities (Aurand, Miles, & Usher, 2014). This option, called **aging in place,** makes sense for those who can manage on their own or with minimal help. Most informal caregivers, such as family, who provide aging in place care do so willingly, but it can be a significant source of stress and worry for them (Sanders, Stone, Meador, & Parker, 2010). While Medicaid provides funds for nursing homes, home and community services are optional for states to fund.

aging in place
Remaining in one's own home, with or without assistance, in later life.

For older people with impairments that make it hard to get along entirely on their own, minor support—such as meals, transportation, and home health aides—often can help them stay put, as can ramps, grab bars, and other relatively low-cost home modifications. Minorities, older adults with lower educational levels, and adults with low levels of social support, although not necessarily those with lower incomes, are less likely to have such modifications (Meucci, Gozalo, Dosa, & Allen, 2016).



Source: Federal Interagency Forum on Aging-Related Statistics, 2016.

FIGURE 1
Living Arrangements of Noninstitutionalized Men and Women Age 65 and Over, United States, 2015

In part because of women's longer life expectancy, they are more likely to live alone (especially as they get older), whereas men are more likely to live with a spouse. The "Other" category includes those living with adult children, other relatives, or nonrelatives.

Most older people do not need much help, and those who do can often remain in the community if they have at least one person to depend on. In fact, the single most important factor keeping people out of institutions is being married (Nihtila & Martikainen, 2008). Increasingly, technological aids such as activity monitoring, wandering detection, and e-health applications are being used to help keep older adults physically safe and connected to others (Peek et al., 2014). With such help, aging in place can help older adults delay entry into nursing homes (Young, Kalamaras, Kelly, Hornick, & Yucel, 2015).

Let's look more closely at the two most common living arrangements for older adults without spouses—living alone and living with adult children—and then at living in institutions and alternative forms of group housing.

One reason many older adults prefer to age in place is because assisted living facilities often do not allow them to bring their pets.

Toohey, Hewson, Adams, & Rock, 2017

Living Alone The growth of elderly single-person households has been spurred by greater longevity, increased benefits and pensions, increased homeownership, more elder-friendly housing, more availability of community support, and reduced public assistance with nursing home costs. Because women live longer than men and are more likely to be widowed, older women in the most developed countries are more likely than older men to live alone (Kinsella & Phillips, 2005). In the United States, about 28 percent of all noninstitutionalized older adults live alone, a greater proportion of which are women. Forty-four percent of women age 75 and over live alone (Administration on Aging, 2018). Older people living alone are more likely than older people with spouses to be poor and to end up in institutions (Administration on Aging, 2016; Kaspar, Pezzin, & Rice, 2010).

It might seem that older people who live alone, particularly the oldest old, would be lonely. However, such factors as personality, cognitive abilities, physical health, and a depleted social network play a greater role in loneliness (Martin, Kliegel, Rott, Poon, & Johnson, 2007). Social activities, such as volunteer work, can help an older person living alone stay connected to the community (Carr, Kail, Matz-Costa, & Shavit, 2017). Additionally, technology-based interventions using computers and the Internet to address social and emotional needs have also been shown to reduce loneliness (Choi, Kong, & Jung, 2012).

The older you are, the more you are likely to say that a television is a necessity versus a luxury. Younger people show the opposite pattern.

Taylor & Wang, 2010

Living with Adult Children Historically, older people in many African, Asian, and Latin American societies could expect to live and be cared for in their children's or grandchildren's homes, but this pattern is changing. While there are generally a greater number of surviving generations in a family, they are also less likely to live in the same household together (World Health Organization, 2019h). Many older adults are reluctant to burden their families and to give up their freedom. The parent may feel useless, bored, and isolated from friends. If the adult child is married and the spouse and parent do not get along well or caregiving duties become too burdensome, the marriage may be

threatened (Shapiro & Conney, 2007). Often, moving in with adult children is a consequence of economic pressures; parents move in not because they want to, but because they have little choice (Isengard & Szydlik, 2012). Adults, especially women, who move in with relatives are at higher risk of loneliness than those that are able to continue to live with a spouse or partner (Henning-Smith, 2016; Greenfield & Russel, 2011).

Whether or not living with adult children will be successful depends largely on the quality of the relationship that existed in the past and on the ability of both generations to communicate fully and frankly. Often, friction increases as adult children and their aging parents navigate the shifting power dynamics of the relationship. Actions seen by adult children as serving to keep parents safe, such as driving parents to the store rather than allowing them to drive themselves, may be seen by parents as an infringement upon their autonomy and be met with resistance and rejection (Heid, Zarit, & Fingerman, 2015). How this conflict is managed has repercussions for both parties. For instance, when adult children give in to conflict repeatedly, they are more likely to become depressed over time, and relationship quality declines. However, when adult children attempt to reason with their aging parents rather than giving in, this is associated with more positive relationship quality. Being directly confrontational and arguing with parents is associated with negative relationship quality; however, it is also associated with greater provision of support (Heid, Zarit, & Fingerman, 2017). Importantly, the provision of support and benefits is a two-way street. Aging parents also provide benefits to their adult children, including emotional support, advice, and practical support (Huo, Graham, Kim, Zarit, & Fingerman, 2017). Indeed, while most informal caregivers do report time constraints and difficulty handing all aspects of caregiving, they also report positive aspects of caregiving (Federal Interagency Forum for Aging-Related Statistics, 2016).

A recent movement toward "consistent assignment" in nursing homes involves having the same caregivers care for an elderly person on a regular basis, rather than the more common rotation of caregivers. This consistency allows for better monitoring of care and condition, as well as affording the elderly person an opportunity to establish relationships with caregivers.

Span, 2010

Living in Institutions Many older adults opt to age in place if they expect their health to be good but prefer to live with relatives if they anticipate ill health or frailty (Fernández-Carro, 2016). Assisted living or retirement communities are frequently cited as preferred living situations as well, particularly by those who are already living in them (Kasper, Wolff, & Skehan, 2018). Many see institutionalization as a last resort and view the transition to a nursing home with trepidation, and fewer than half report a good quality of life once there (Toot, Swinson, Devine, Challis, & Orrell, 2017). While many would prefer not to live in nursing homes, many residents are left little choice by dementia, increasing frailty, caregiver illness, or their behavioral issues (Prince, Prina, & Guerchet, 2015; Afram et al., 2014). Sometimes these issues can lead to elder abuse (see Research in Action).

The use of nonfamily institutions for care of the frail elderly varies greatly around the world. Institutionalization has been rare in developing regions but is becoming more common even in countries such as Japan with traditions of elder care. Moreover, declines in fertility have resulted in a rapidly aging population and a shortage of family caregivers (World Health Organization, 2019e). Comprehensive geriatric home visitation programs in some countries, such as the United Kingdom, Denmark, and Australia, have been effective in holding down nursing home admissions (Stuck, Egger, Hammer, Minder, & Beck, 2002).



Older adults in a retirement village with supportive living facilities keep their minds active. These older adults are taking a computer class in cooperation with a nearby community college.

Katarzyna Bialasiewicz/iStock/Getty Images

In all countries, the likelihood of living in a nursing home increases with age—in the United States, from about 1 percent at ages 65 to 74 to 9 percent at age 85 and over (Administration on Aging, 2018). Most older nursing home residents worldwide and almost 3 out of 4 in the United States are women (Federal Interagency Forum on Aging-Related Statistics, 2004; Kinsella & Velkoff, 2001). In addition to gender, being poor and living alone significantly increase the risk of entering long-term care (Martikainen et al., 2009).

In 2017, there were approximately 1.2 million adults over the age of 65 living in institutional settings (Administration on Aging, 2018). Such care is expensive. The median cost in 2018 for a private room in a nursing home in the United States was $8,365 per month (Genworth, 2018). High costs, among other factors, have spurred a shift from institutionalization to less expensive alternative living

options (discussed in the next section) and home health care. Nonetheless, as the baby boom generation ages and if current nursing home usage rates continue, the number of residents is projected to rise sharply (Seblega et al., 2010). Such growth would greatly burden Medicaid, the national health insurance program for low-income persons and the major source of payments for nursing home usage (Ness, Ahmed, & Aronow, 2004).

Federal law sets strict requirements for nursing homes and gives residents the right to choose their own doctors, to be fully informed about their care and treatment, and to be free from physical or mental abuse, corporal punishment, involuntary seclusion, and physical or chemical restraints. Some states train volunteer ombudsmen to act as advocates for nursing home residents, to explain their rights, and to resolve their complaints about such matters as privacy, treatment, food, and financial issues.

Alternative Housing Options A relatively new but growing segment of the housing market is in age-qualified active adult communities. In these communities for people age 55 and older, residents can walk out their front door and find a variety of leisure opportunities, such as fitness centers, tennis courts, and golf courses, close by.

For those who cannot or prefer not to live completely independently, a wide array of group housing options, many of them described in Table 1, have emerged. Some of these newer arrangements enable older people with health problems or disabilities to receive needed services or care without sacrificing autonomy, privacy, and dignity.



As you become older and possibly at least partly incapacitated, what type of living arrangement would you prefer?

One popular option is *assisted living,* housing specifically for older adults (Hawes, Phillips, Rose, Holan, & Sherman, 2003). Assisted-living facilities enable tenants to live in their own homelike space while giving them easy 24-hour access to needed personal

TABLE 1 Group Living Arrangements for Older Adults

Facility	Description
Retirement hotel	Hotel or apartment building remodeled to meet the needs of independent older adults. Typical hotel services (switchboard, maid service, message center) are provided.
Retirement community	Large, self-contained development with owned or rental units or both. Support services and recreational facilities are often available as in active adult communities.
Shared housing	Housing can be shared informally by adult parents and children or by friends. Other times social agencies match people who need a place to live with people who have extra rooms. The older person usually has a private room but shares living, eating, and cooking areas.
ECHO (elder cottage housing opportunity) housing	An independent unit created so that an older person can live in a remodeled single-family home or in a portable unit on the grounds of a single-family home—often, but not necessarily, that of an adult child. Units offer privacy, proximity to caregivers, and security.
Congregate housing	Private or government-subsidized rental apartment complexes or mobile home parks provide meals, housekeeping, transportation, social and recreational activities, and sometimes health care. One type is a *group home:* A social agency brings together a small number of elderly residents and hires helpers to shop, cook, do heavy cleaning, drive, and give counseling.
Assisted-living facility	Semi-independent living in one's own room or apartment. Similar to congregate housing, but residents receive personal care (bathing, dressing, and grooming) and protective supervision. *Board-and-care homes* are similar but smaller and offer more personal care and supervision.
Foster-care home	Owners of a single-family residence take in an unrelated older adult and provide meals, housekeeping, and personal care.
Continuing care retirement community	Long-term housing services for affluent elderly people as their needs change. A resident may start out in an independent apartment; then move into congregate housing with cleaning, laundry, and meals; then into an assisted-living facility; and finally into a nursing home. *Life-care communities* are similar but guarantee housing and medical or nursing care for a specified period or for life; they require a substantial entry fee in addition to monthly payments.

Source: Adapted from Laquatra and Chi, 1998; Porcino, 1993.

research in action

ELDER ABUSE

Although they are likely to be underreported, estimates are that 15.7 percent of adults age 60 and older are abused across the world (World Health Organization, 2019f). In the United States, the estimated prevalence rate is 10 percent (Pillemer, Connolly, Breckman, Spreng, & Lachs, 2015), and for every reported case, an estimated 23 cases remain undetected (Centers for Disease Control, 2017m).

Elder abuse can take various forms, including physical abuse, sexual abuse, or abusive sexual contact, emotional or psychological abuse, and neglect. Elder abuse can also include financial abuse or exploitation, which involves the use of an older person's resources, such as savings accounts or Social Security payments, for personal gain (Centers for Disease Control, 2018m).

A number of factors increase the risk of elder abuse, including being female, having difficulty with activities of daily living, poor health, poverty, and having previously been victimized. Dementia and cognitive impairment are also strong predictors of the likelihood of abuse (Burnes et al., 2015; Friedman, Santos, Liebel, Russ, & Conwell, 2015; Acierno et al., 2010). Perpetrators of abuse are most likely to be family members; to be male; to have a history of mental or physical illness, substance abuse, physical abuse, or violence; and to be unemployed or suffering from economic strain (Lachs & Pillemer, 2015).

Abuse can also occur within the context of nursing homes or residential care communities. Low pay, long hours, physical demands, and minimal education and training contribute to job burnout, demoralization, and high stress levels among staff members. Residents may also have problem behaviors and inflict violence on staff members, which increase odds of neglect or retaliation (Castle, Ferguson-Rome, & Teresi, 2013). Residents also harm one another. While verbal mistreatment is most common, physical altercations can occur as well (Lachs et al., 2016). Sexual abuse occurs too, with staff or other residents commonly the perpetrators (Malmedal, Iverson, & Kilvik, 2005).

Financial abuse often goes unreported. Exploitation of power of attorney privileges is a common occurrence. A trusted party is granted legal ability to make financial decisions in the elders' best interests. Instead, the party withdraws funds or makes financial decisions to benefit themselves. Not only are these cases difficult to detect, but these crimes often go unprosecuted as well (Gibson & Greene, 2013).

what's your view

What actions or measures do you support to prevent or reduce elder mistreatment? What can be done to empower senior citizens, family members, or institutions to report abuse or mistreatment to authorities?

checkpoint can you . . .

- Compare various kinds of living arrangements for older adults, their relative prevalence, and their advantages and disadvantages?

and health care services. In most of these facilities a person can move, when and if necessary, from relative independence (with housekeeping and meals provided) to help with bathing, dressing, managing medications, and using a wheelchair to get around. However, assisted-living facilities vary widely in accommodations, operation, philosophy, and rates, and those offering adequate privacy and services are generally not affordable for moderate- and low-income persons (Hawes et al., 2003). Indeed, facilities are disproportionately found in areas with more educated residents and higher incomes (Stevenson & Grabowski, 2010).

Personal Relationships in Late Life

Our stereotypes often lead us to believe that old age is a time of loneliness and isolation. While it is true that older adults have far fewer people in their social networks than younger adults do (English & Carstensen, 2014), with men's social networks being even

smaller than those of women (McLaughlin, Vagenas, Pachana, Begum, & Dobson, 2010), this does not mean older adults are necessarily isolated and lonely. For instance, meta-analyses including people from a variety of countries indicate that loneliness remains essentially unchanged from adolescence to old age (Mund, Freuding, Möbius, Horn, & Neyer, 2019), although there are some indications that it may increase in the very oldest old (Luhmann & Hawkley, 2016). Moreover, despite their smaller social networks, older adults retain a close circle of confidants (Cornwell , Laumann & Schumm, 2008). Furthermore, the relationships older adults *do* maintain are more important to their well-being than ever (Charles & Carstensen, 2007) and help keep their minds and memories sharp (Kuiper et al., 2016).



People tend to gain emotional intelligence with age. They respond more empathically to sad events or stimuli and are better at reframing that information in a positive way.

Seider, Shiota, Whalen, & Levenson, 2010

THEORIES OF SOCIAL CONTACT AND SOCIAL SUPPORT

According to *social convoy theory,* aging adults maintain their level of social support by identifying members of their social network who can help them and avoiding those who are not supportive. As former coworkers and casual friends drop away, most older adults retain a stable inner circle of social convoys: close friends and family members on whom they can rely and who strongly affect their well-being (Antonucci & Akiyama, 1995).

A somewhat different explanation of changes in social contact comes from *socioemotional selectivity theory* (Carstensen, 1991, 1995, 1996). As remaining time becomes short, older adults choose to spend time with people and in activities that meet immediate emotional needs. A college student may put up with a disliked teacher for the sake of gaining needed knowledge; an older adult may be less willing to spend precious time with a friend who gets on her nerves.

Thus, even though older adults may have smaller social networks than younger adults do, they tend to have as many very close relationships (Cornwell et al., 2008), and they report greater satisfaction with their relationships than do younger adults (Luong, Charles, & Fingerman, 2011). Their positive feelings toward old friends are as strong as those of young adults, and their positive feelings toward family members are stronger (Charles & Piazza, 2007).

THE IMPORTANCE OF SOCIAL RELATIONSHIPS

Most of us want and need the support and love of others around us, and we are happier when part of a social community. Because of this need, social isolation—or loneliness—is an important outcome variable that affects both psychological and physical health. Indeed, strong social relationships are as important for health and mortality as smoking, being obese, and abusing alcohol (Holt-Lunstad, Smith, & Layton, 2010).

People who are socially isolated and lonely tend to show more rapid physical and cognitive declines than those who are not, even very late in life (Cherry et al., 2013; Shankar, Hamer, McMunn, & Steptoe, 2013; Hawkley & Cacioppo, 2007; Luo, Hawkley, Waite, & Cacioppo, 2012). Moreover, the feeling of being useless to others is a strong factor for disabilities and mortality (Tilvis, Laitala, Routasalo, Strandberg, & Pitkala, 2012; Gu, Dupre, & Qiu, 2017). Conversely, a recent meta-analysis including 10 studies and over 136,000 respondents indicated having a purpose in life was associated with decreased risk of heart attack and death (Cohen, Bavashi, & Rozanski, 2016).

Strong, positive social ties can literally be a lifesaver. One longitudinal study showed that socially isolated men were 53 percent more likely than the most socially connected men to die of cardiovascular disease and more than twice as likely to die from accidents or suicide (Eng, Rimm, Fitzmaurice, & Kawachi, 2002). Similar data with women showed that older women who received the most social support were 2 times less likely to die during a 10-year period than those who received the least such support (Lyyra & Heikkinen, 2006). To be beneficial, however, relationships must be of good quality. If they are marked by criticism, rejection, neglect, control, or undermining behaviors, they can serve as chronic stressors (Rook, 2015).

THE MULTIGENERATIONAL FAMILY

A new term has emerged to describe these caregivers: the sandwich generation.

Historically, families rarely spanned more than three generations. Today, many families in developed countries can include four or more generations, making it possible for a person to be both a grandparent and a grandchild at the same time (Costanzo & Hoy, 2007). This has led to the rise of multigenerational families, in which grandparents, their adult children, and grandchildren live under the same roof. In 2016, 20 percent of the U.S. population lived in multigenerational families, a number that has increased since the low of 12 percent in 1980 (Cohn & Passel, 2018).

The presence of so many family members can be enriching but also can create special pressures (McIlvane, Ajrouch, & Antonucci, 2007; Dunifon, Ziol-Guest, & Kopko, 2014). While there is great variability, older adults are as a group more likely to suffer from debilitating disease or infirmity, and their care can be physically and emotionally draining (Gonyea, 2013). Given the rapid growth in the population of adults 85 and older (Ortman, Velkoff, & Hogan, 2014), many people in their late sixties or beyond, whose own health and energy may be faltering, may find themselves serving as caregivers. Generally, the burden of this intergenerational care falls to women (Gonyea, 2013; Cook & Cohen, 2018), due in part to gender role norms of women as caregivers.

The ways families deal with these issues often have cultural roots. People from cultures that strongly focus on familial bonds are, not surprisingly, more receptive to the needs of their aging parents and more likely to offer support than are people from more individualistic cultures (Kalmijn & Saraceno, 2008; Tomassini, Glaser, & Stuchbury, 2007). For example, the nuclear family and the desire of older adults to live apart from their children reflect dominant U.S. values of individualism, autonomy, and self-reliance, while Hispanic and Asian American cultures traditionally emphasize *lineal,* or intergenerational, obligations (C. L. Johnson, 1995). Not surprisingly, Asian American, Hispanic, black, and immigrant families in the United States are more likely to live in multigenerational homes, although the increase recently seen is shared across all ethnic groups (Cohn & Passel, 2018; Dunifon et al., 2014). There are suggestions that the accelerating pace of globalization will result in a movement away from the more traditionally oriented family bonds found in many countries and toward the individualistic style more characteristic of more economically stable nations (Costanzo & Hoy, 2007).

checkpoint can you . . .

- Tell how social contact changes in late life, and discuss theoretical explanations of this change?
- Explain the importance of positive social contact and social support, and cite evidence for a relationship between social interaction and health?
- Discuss issues concerning the new multigenerational family?

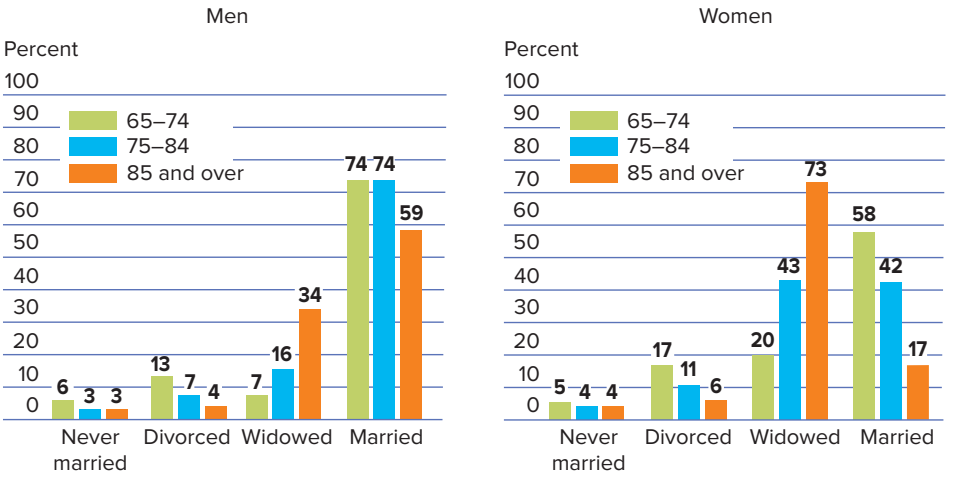
Marital Relationships

Unlike other family relationships, marriage—at least in contemporary Western cultures—is generally formed by mutual consent. Thus its effect on well-being has characteristics of both friendship and kinship ties (Antonucci & Akiyama, 1995). It can provide both the highest emotional highs and the lowest lows a person experiences. What happens to marital quality in late life?

LONG-TERM MARRIAGE

Because women usually marry older men and outlive them and because men are more likely to remarry after divorce or widowhood, a higher proportion of men than women throughout the world are married in late life (Andrew, Ogunwole, Blakesles, & Rabe, 2018; see Figure 2).

Married couples who are still together in late adulthood are more likely than middle-aged couples to report higher satisfaction and fewer adjustment problems in their marriages (Orathinkal & Vansteenwegen, 2007; Tavakol, Nikbakht Nasrabadi, Moghadam, Salehiniya, & Rezaei, 2017). This may be because spouses who remain together are likely to have worked out their differences. Marriage satisfaction is important because it has been related not just to psychological well-being but also to multiple positive health indices (Carr, Freedman, Cornman, & Schwarz, 2014; Robles, Slatcher, Trombello, & McGinn, 2014; Margelisch, Schneewind, Violette, & Perrig-Chiello, 2017).



Note: Married includes married, spouse present; married, spouse absent; and separated. These data refer to the civilian noninstitutionalized population.

Source: Andrew, R. W., S. U. Ogunwole, and Blakeslee. Federal Interagency Forum on Aging-Related Statistics. *Older Americans Update 2016: Key Indicators of Well-Being*. Washington, DC: U.S. Government Publishing Office, 2016.

FIGURE 2
Marital Status of the U.S. Population Age 65 and Over by Age Group and Sex, 2016

Because of women's greater longevity, they are more likely than men to be widowed in late life, whereas men are more likely to be married or remarried in late life.

The way couples resolve conflicts is key to marital satisfaction throughout adulthood. Married people with more discord in their marriages tend to be anxious and depressed, whereas those with less discordant marriages tend to have higher self-esteem and report higher levels of marital satisfaction (Whisman & Uebelacker, 2009; Whisman, Robustelli, & Labrecque, 2018; Schmitt, Kliegel, & Shapiro, 2007). Patterns of conflict resolution tend to remain fairly constant throughout a marriage, and those couples who believe strongly in marriage, share responsibility for decision making, and share household chores are more likely to report low levels of conflict and high levels of happiness in their marriage (Kamp Dush & Taylor, 2012). The way emotions are handled matters as well. Marriage partners, especially wives, who are able to successfully regulate negative emotions and communicate effectively are more likely to report high marriage satisfaction (Bloch, Haase, & Levenson, 2014; Tavakol et al., 2017).



Many couples who are still together late in life say they are happier in marriage than they were in their younger years. Important benefits of marriage include intimacy, sharing, and a sense of belonging to one another.
Stockbyte/Getty Images

Late-life marriage can be severely tested by advancing age and physical ills, though a close marital relationship can moderate the negative psychological effects of functional disabilities by reducing psychological distress (Jean, 2017). Spouses who care for disabled partners may feel isolated, angry, and frustrated, especially if they are in poor health themselves. Such couples may be caught in a vicious cycle: The illness puts strains on the marriage, and these strains may then aggravate the illness (Karney & Bradbury, 1995), putting the caregiver's health and well-being at risk (Graham et al., 2006). For example, when one spouse is hospitalized, the other's risk of death increases (Christakis & Allison, 2006).

Spousal caregiving late in life often ends with the institutionalization or death of one partner. A longitudinal study of more than 2,000 older couples captured the fragile nature of spousal caregiving in late life. At the beginning of the study, all couples were living independently in the community. Eight years later, 20.7 percent of the husbands and 18.1 percent of the wives had been institutionalized. Moreover, 17.1 percent of husbands and 33.1 percent of wives became widowed over the course of the study (Noël-Miller, 2010).

WIDOWHOOD

With increasing age, death of a spouse becomes more common, and more so in women than in men. Women tend to outlive their husbands and are less likely than men to marry again. As Figure 2 shows, U.S. women age 65 and over are far more likely than men of the same age to be widowed. By the age of 65, women are almost 3 times as likely as men to be widowers (Federal Interagency Forum on Aging-Related Statistics, 2016).

Widowhood has been repeatedly associated with increased mortality, with the sharpest declines seen in the first 6 months following the death of a spouse (Shor et al., 2012; Moon, Kondo, Glymour, & Subramanian, 2011) and in rural rather than urban areas (Wright, Rosato, & O'Reilly, 2015). Risk is higher for unexpected deaths (Sullivan & Fenelon, 2013). While becoming widowed is a risk for both men and women, men appear to be affected more strongly by the loss of a spouse. For example, older widowed men are far more likely to be institutionalized than older widowed women following the death of a spouse (Nihtilä & Martikainen, 2008). Additionally, while women's mortality risk following the death of a spouse is 15 percent, men's increased risk is 27 percent (Shor et al., 2012), and risk remains high for men in urban areas, whereas women's risk declines over time (Wright, Rosato, & O'Reilly, 2015).

DIVORCE AND REMARRIAGE

Divorce in middle-aged and older adults, although rare, has risen. The divorce rate has approximately doubled since the 1990s in adults age 50 and older, and it has nearly tripled in those 65 years of age and older (Stepler, 2017). This rise can be attributed to a variety of factors. First, increasing life expectancy increases the risk of divorce as people may be unwilling to spend long periods of time with a spouse they find unsuitable. As a correlate to this, remarriages, which also become more common with increasing age, are more likely to result in divorce than first marriages. Also, as divorce becomes more common, it also becomes more acceptable. Last, women's participation in the workforce has given them more economic security and hence lessened the financial burden of divorce for many women (Brown & Lin, 2012).

In 2013, 67 percent of divorced or widowed adults age 55 to 64 years and 50 percent of those 65 and older remarried, an increase from previous years. Men are somewhat more likely to remarry, a difference that emerges sometime in middle age. This gender gap has decreased since the 1960s and most strikingly for younger cohorts. In 1960, the gender gap was plus-29 for adults 55 to 64 years of age and plus-28 for adults over 65. These numbers are now, respectively, plus-8 and plus-26 (Livingston, 2014).

checkpoint can **you** . . .

- Discuss factors affecting marital satisfaction in late adulthood?
- Explain gender differences in the prevalence of widowhood?
- Tell why divorce in late life is rare, and identify the special character of remarriage in late adulthood?

Nonmarital Lifestyles and Relationships

SINGLE LIFE

In the United States, the number of single older adults has risen in the past few decades. These adults may be single either because of never marrying, divorce, or widowhood. These demographic changes reflect a number of influences, including a decision to delay or forgo marriage, liberalization of divorce, cohabitation, and unmarried parenthood. In the United States, approximately 37 percent of baby boomers, who began to turn 65 in 2011, are unmarried (Brown & Wright, 2017).

In most countries, 5 percent or less of older men and 10 percent or less of older women have never married. In Europe, this gender difference may reflect the toll on marriageable men taken by World War II, when today's older cohort were of marrying age. In some Latin American and Caribbean countries, proportions of never-marrieds are higher, probably due to the prevalence of consensual unions (Kinsella & Phillips, 2005). In the United States, approximately 5 percent of American men and 6 percent of American women 65 years or older have never been married (Federal Interagency Forum on Aging-Related Statistics, 2016).

When compared to divorced or widowed people, older never-married adults in the United States are more likely to prefer single life and less likely to be lonely (Dykstra, 1995), even though they are most likely to live alone and receive the least social support. They are less likely to experience "single strain"—chronic practical and emotional stressors attributed to the lack of an intimate partner (Pudrovska, Schieman, & Carr, 2006).

However, when compared to married adults, never-married people, especially men, are disadvantaged (Lin & Brown, 2012). They do not benefit from the protective effects of marriage on morbidity and mortality discussed earlier, and they are as likely to have poor health (Tamborini, 2007) and be at higher risk of death as divorced or widowed adults (Rendall, Weden, Favreault, & Waldron, 2011). Moreover, they are more likely to live in poverty than married couples, as well as divorced and widowed older adults (Tamborini, 2007).

Approximately 14 percent of single adults age 57 to 85 years are in a dating relationship (Brown & Shinohara, 2013). Previously married older men are more likely to date than previously married older women, probably because of the greater availability of women in this age group. Men prefer to date women who are younger than they are, while women show a preference for older men until age 75, after which they prefer younger men as well (Alterovitz & Mendelsohn, 2009). Women gain a protective psychological benefit from dating and show similar levels of stress, depression, and loneliness whether or not they are dating, cohabitating, or married when compared to single women. However, men do not show the same benefit. Men who are dating report similar and higher levels of loneliness to single men when compared to cohabitating and married men (Wright & Brown, 2017).

Some adults classified as "single" in traditional studies are nonetheless in committed relationships. In recent decades, there has been an increase in "living apart together" (LAT) relationships in both Europe and the United States (Liefbroer, Poortman, & Seltzer, 2015; Strohm, Seltzer, Cochran, & Mays, 2009). LAT unions are monogamous intimate relationships between unmarried people who live in different households. While reasons vary, older adults are more likely to enter into a LAT relationship rather than marriage in order to maintain their autonomy, retain control of their finances, and, particularly for women, avoid being placed in the role of caregiver (Upton-Davis, 2012). Generally, both men and women report high levels of happiness and support and low levels of strain within their LAT relationships (Lewin, 2017), perhaps because those individuals who are unhappy find it relatively easy to leave the relationship. Research suggests that while those people in LAT unions are highly attached to their partners, they do not necessarily expect the relationship to be long lasting and show ambivalence with respect to the possibility of providing assistance in the event the relationship partner becomes ill (van der Wiel, Mulder, & Bailey, 2018; Gierveld, 2015).

COHABITATION

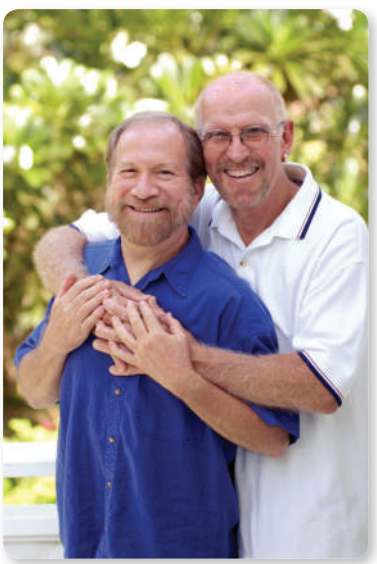
Cohabitation rates have risen sharply for older adults. In 2007, approximately 2.3 million adults 50 years and older were cohabitating. By 2016, this number had risen to 4 million, a 75 percent increase (Stepler, 2017). While younger adults sometimes view cohabitation as a prelude to marriage, older adults are more likely to view it as an alternative to marriage (Brown, Bulanda, & Lee, 2012). Approximately 9 out of 10 cohabitating older adults were previously married (Brown, Lee, & Bulanda, 2006).

Generally, cohabitating relationships tend to be quite stable in older adults and are relatively unlikely to lead to separation, a finding that is especially true for women 65 years and older (Brown et al., 2012; Vespa, 2012). This may be because such relationships generally tend to be at least as satisfying as marriage. Research has shown that cohabitators report equal levels of emotional satisfaction, pleasure, openness, time spent together, criticism, and demands as married couples (Brown & Kawamura, 2010). The benefits of cohabitation are most true for men. While women derive equal benefits from merely dating, for men, living in the same home is key (Wright & Brown, 2017).

In younger adults, cohabitation is often the result of economic concerns. However, this does not seem to be the case in older adults. Factors such as wealth (Vespa, 2012), owning a home, receiving Social Security payments or a pension, or having private health insurance (Brown et al., 2012) do not seem to affect the likelihood that a couple will choose to cohabitate. Perhaps older adults, particularly women, are hesitant to marry and prefer to cohabitate because of the possibility of having to provide care to a disabled or sick partner later in life (Noël-Miller, 2011). In support of this interpretation, cohabitating women are least likely to eventually marry if they are in good health and are financially well-off (Vespa, 2013).

GAY AND LESBIAN RELATIONSHIPS

There is little research on homosexual relationships in old age, largely because the current cohort of older adults grew up at a time when living openly as a homosexual was rare (Fredriksen-Goldsen & Muraco, 2010). For aging gays and lesbians who recognized their homosexuality before the rise of the gay liberation movement in the late 1960s, their self-concept tended to be shaped by the then-prevailing stigma against homosexuality. Those who came of age after the liberation movement was in full swing are more likely to view their homosexuality simply as a *status:* a characteristic of the self like any other (Rosenfeld, 1999).



Intimacy is important to older gay men, as it is to older heterosexual adults. Contrary to stereotype, homosexual relationships in late life are strong and supportive.
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Gay and lesbian relationships in late life tend to be strong, supportive, and diverse. Many homosexuals have children from earlier marriages; others have adopted children. Friendship networks or support groups may in part substitute for the traditional family (Reid, 1995). Those who have maintained close relationships and strong involvement in the homosexual community tend to adapt to aging with relative ease (Friend, 1991; Reid, 1995). However, living with a partner, whether married or cohabitating, has an additional protective effect against loneliness (Kim & Fredriksen-Goldsen, 2014). Moreover, married gay and lesbian adults and unmarried partners report better physical health than do single gay and lesbian adults (Goldsen et al., 2017).

Many problems of older gays and lesbians grow out of societal attitudes. Often, there are strained relationships within the family of origin. A common issue is discrimination in nursing homes and social service agencies and discriminatory policies against same-sex living arrangements. Although marriage equality laws have reduced the extent of discrimination, unmarried individuals may face significant barriers in the event a partner falls ill or dies. They may have difficulty dealing with health care providers, managing bereavement and inheritance issues, and lack access to a partner's Social Security benefits (Orel, 2004; Kim & Fredricksen-Goldsen, 2014; Knochel, Quam, & Croghan, 2011; Rawlings, 2012; Addis, Davies, Green, MacBride-Stewart, & Shepherd, 2009).

FRIENDSHIPS

Maintaining friendships is important for well-being. Most older people have close friends, and, as in early and middle adulthood, those with an active circle of friends tend to be healthier and happier (Golden, Conroy, & Lawlor, 2009; Huxhold, Miche, & Schüz, 2013). Emotional closeness seems to be a key factor. When emotional closeness is lacking, more frequent contact with friends does not impact feelings of loneliness (Drageset, Kirkevold, & Espehaug, 2011). However, regardless of closeness, those people who are not getting as much contact as they desire are more likely to feel lonely (Nicolaisen & Thorsen, 2017).

The element of choice in friendship may be especially important to older people (Golden et al., 2009), who may feel their control over their lives slipping away (R. G. Adams, 1986). Friendship may also help older adults deal with some of the role losses of late life; those with friends tend to be happier (Adams & Taylor, 2015).

Some research has shown that many older people enjoy spending time with their friends more than time spent with their families. As earlier in life, friendships tend to revolve around pleasure and leisure, whereas family relationships tend to involve everyday needs and tasks (Antonucci & Akiyama, 1995). People usually rely on relatives for long-term commitments, such as caregiving, but friends may, on occasion, fulfill this function. Although friends cannot replace a spouse or partner, they can help compensate for the lack of one (Hartup & Stevens, 1999). When family relationships are poor, older adults tend to have closer relationships with friends, and this in turn is associated with well-being (Wrzus, Wagner, & Neyer, 2012). For example, never married, divorced, and widowed older adults who receive high levels of emotional and practical support from friends are less likely to be lonely (Dykstra, 1995).

In line with social convoy and socioemotional selectivity theories, longtime friendships often persist into very old age (Antonucci, Ajrouch, & Birditt, 2013). However, losing friends, either because of conflict, death, or relocation, is a relatively common experience, especially for individuals in lower socioeconomic strata (Rook & Charles, 2017; Cornwell, 2014). This is a particularly pressing issue for women, who are more likely to survive their husbands (d'Epinay, Cavalli, & Guillet, 2010). Although many older people do make new friends, even after age 85 (Johnson & Troll, 1994), older adults are more likely than younger adults to attribute the benefits of friendship (such as affection and loyalty) to specific individuals who cannot be replaced (de Vries, 1996).

checkpoint
can **you** . . .

- Discuss differences between never-married and previously married singles in late life?
- Discuss trends in and effects of cohabitation in late life?
- Discuss strengths and problems of gay and lesbian relationships in late life?
- Identify special characteristics of friendship in old age?

Nonmarital Kinship Ties

Some of the most lasting and important relationships in late life come not from mutual choice (as marriages, cohabitations, homosexual partnerships, and friendships do) but from kinship bonds. Let's look at these.

RELATIONSHIPS WITH ADULT CHILDREN

Most older people have living children but, because of global trends toward smaller families, have fewer of them than in previous generations (Dobriansky et al., 2007; Kinsella & Phillips, 2005). In European countries, almost half of adults in their sixties live within 15 miles of their adult children, and about one-third live with an adult child (Hank, 2007). In the United States, about 57.1 percent of people have their nearest adult child living within a close distance to them, and 19.1 percent have an adult child living with them (Choi, Seltzer, Schoeni, Wiemers, & Hotz, 2018). Co-residence commonly results from economic pressures (Isengard & Szydlik, 2012) and is less common in countries with strong welfare services. It is most common in the more traditional Mediterranean countries (Greece, Italy, and Spain) and least common in the Scandinavian countries (Denmark and Sweden). The mother-daughter relationship tends to be especially close (Lefkowitz & Fingerman, 2003), and about half of older parents below age 80 report contact with a child, most often a daughter, at least once a week (Hank, 2007).

A study of 60- to 90-year-old participants asked to evaluate a man who either bragged about himself or about his son showed that bragging about the achievements of those close to us—a process known as burnishing—can lead to perceptions of a person as less capable.

Tal-Or, 2010

The balance of mutual aid between parents and their adult children tends to shift as parents age, with children providing a greater share of support. Older adults who receive more help from their children than they give them, over time, are more likely to show increases in psychological distress (Reczek & Zhang, 2016). While the provision of support to aging parents can result in declines in well-being for both parents and adult children, a close, high-quality relationship can buffer against this (Merz & Huxhold, 2010; Merz, Consedine, Schulze, & Schuengel, 2009).

Older parents who can do so often continue to provide financial support to children. In less-developed countries, older parents contribute through housekeeping, child care, and socialization of grandchildren (Kinsella & Phillips, 2005). Adults with children doing less well than they would like often have conflicted feelings: They are concerned and want to help but at the same time may feel a desire to be free of responsibility toward adult children or want to encourage independence and autonomy (Birditt, Fingerman, & Zarit, 2010; Smith, 2012). They tend to be distressed if their children have serious problems and may consider such problems a sign of their failure as parents (Pillemer & Suitor, 1991; Suitor, Pillemer, Keeton, & Robison, 1995; Troll & Fingerman, 1996). Many older people whose adult children are mentally ill, retarded, physically disabled, or stricken with serious illnesses serve as primary caregivers for as long as both parent and child live (Greenberg & Becker, 1988; Ryff & Seltzer, 1995). The strain of this caregiving adds up over time. In middle age, parents of children with intellectual or developmental disabilities have a similar profile to parents of neurotypical children. However, as they enter old age, parents of disabled children have worse physical and mental health (Seltzer, Floyd, Song, Greenberg, & Hong, 2011). Additionally, the generally unexpected loss of an adult child can result in deep psychological distress and unresolved grief (Van Humbeeck et al., 2013).

What about the increasing number of older adults without living children? Slightly over 8 percent of U.S. adults age 55 years and older do not have any children (Margolis & Verdery, 2017). In Europe, approximately 10 percent of adults age 50 and over are childless, ranging from 6 percent in the Czech Republic to 15 percent in Switzerland (Deindl & Brandt, 2017). A survey of research conducted across 66 countries found that having children is not associated with greater well-being, and in fact, it is most commonly associated with decreased well-being. However, context matters. For the oldest age groups, and for widowers, the relationship reverses (Stanca, 2016). Macrosystem variables also affect the outcomes of childlessness. In wealthier countries, parents are more likely to report lower well-being, and in countries where parenting and childbearing are highly valued, childless adults are more likely to report lower life satisfaction and happiness (Stanca, 2016; Tanaka & Johnson, 2014). Thus, parenthood does not guarantee well-being in old age, nor does childlessness necessarily harm it.



Elderly siblings are an important part of each other's support network, and sisters are especially vital in maintaining family relationships.

Hans L Bonnevier/Johner/Getty Images

RELATIONSHIPS WITH SIBLINGS

Brother and sisters play an important role in older people's support networks. Relationships with siblings tend to be among the longest lasting of all relationships; 75 percent of adults 70 years of age and older have a living sibling (Settersten, 2007). Siblings, more than other family members and friends, tend to provide companionship and emotional support as older adults (Bedford, 1995). Typically, the sibling relationship between sisters is higher quality and associated with a greater positive influence on well-being (Volkom, 2006).

Sibling commitment, meaning the degree to which siblings keep in contact with and help each other out, is relatively stable across the life span (Rittenour, Myers, & Brann, 2007). Although caring for an ill or disabled sibling can be stressful, both giving support (Gierveld & Dykstra, 2008) and receiving support (Thomas, 2010) are associated with positive outcomes such as reductions in loneliness. Moreover, although caregivers are still worse off than noncaregivers, data from 19 countries show caring for a sibling is associated with

less stress and greater well-being than caring for an ill spouse, child, or parent (Viana et al. 2013).

The nearer older people live to their siblings and the more siblings they have, the more they are likely to confide in them (Connidis & Davies, 1992). Reminiscing about shared early experiences becomes more frequent in old age and may help in reviewing a life and putting the significance of family relationships into perspective (Cicirelli, 1995; Eaves, McQuiston, & Miles, 2005). Sisters are especially vital in maintaining family relationships and well-being (Bedford, 1995; Cicirelli, 1995).

Although the death of a sibling in old age may be understood as normative and becomes increasingly common with advanced age (d'Epinay et al., 2010), survivors may grieve intensely and become lonely or depressed (Cicirelli, 2009). The loss of a sibling represents not only a loss of someone to lean on and a shift in the family constellation, but perhaps even a partial loss of identity. To mourn for a sibling is to mourn for the lost completeness of the original family within which one came to know oneself and can bring home one's own nearness to death (Cicirelli, 1995).

checkpoint can you . . .

- Tell how contact and mutual aid between parents and grown children changes during late adulthood, and how childlessness can affect older people?
- Discuss the importance of sibling relationships in late life?

summary and key terms

Theory and Research on Personality Development

- Erik Erikson's final stage, ego integrity versus despair, culminates in the virtue of *wisdom,* or acceptance of one's life and impending death.
- Erikson believed that people must maintain a vital involvement in society.
- Personality traits show complex patterns of stability and change that are predictive of physical and mental health and well-being.

ego integrity versus despair (*529*)

Well-Being in Late Adulthood

- In research based on the cognitive-appraisal model, adults of all ages generally prefer problem-focused coping, but older adults do more emotion-focused coping than younger adults when the situation calls for it.
- Religion is an important source of emotion-focused coping for many older adults. Links have been found between religion or spirituality and health, longevity, and well-being.
- The concept of successful, or optimal, aging reflects the growing number of healthy, vital older adults, but there is dispute over how to define and measure it and over the validity of the concept.
- Two contrasting early models of *successful,* or *optimal,* aging are disengagement theory and activity theory. Disengagement theory has little support, and findings on activity theory are mixed. Newer refinements of activity theory include continuity theory and an emphasis on productive activity.
- Baltes and his colleagues suggest that successful aging, in the psychosocial as well as the cognitive realm, may depend on selective optimization with compensation.

coping (*532*)
cognitive-appraisal model (*532*)
problem-focused coping (*532*)
emotion-focused coping (*532*)
disengagement theory (*535*)
activity theory (*535*)
continuity theory (*536*)
selective optimization with compensation (SOC) (*537*)

Practical and Social Issues Related to Aging

- Some older adults continue to work for pay, but most are retired. However, many retired people start new careers or do part-time paid or volunteer work. Often retirement is a phased process.
- Older adults tend to be more satisfied with their work and often more productive than younger ones. Age has both positive and negative effects on job performance, and individual differences are more significant than age differences.
- Retirement is an ongoing process. Personal, economic, and social resources may affect morale.
- The financial situation of older Americans has improved, and fewer live in poverty. Women, Hispanic Americans, and African Americans are most likely to be poor in old age.
- In developing countries, the elderly often live with children or grandchildren. In developed countries, most older people live with a spouse or live alone. Minority elders are more likely than white elders to live with extended family members.
- Most older adults in industrialized nations prefer to age in place. Most can remain in the community if they can depend on a spouse or someone else for help.
- Older women are more likely than older men to live alone.
- Older adults in developed countries typically do not expect to live with adult children and do not wish to do so.
- Institutionalization is rare in developing countries. Its extent varies in developed countries. Most likely to be institutionalized are older women, older adults who live alone or do not take part in social activities, those who have poor health or disabilities, and those whose informal caregivers are overburdened.
- Fast-growing alternatives to institutionalization include assisted-living facilities and other types of group housing.

aging in place (*540*)

Personal Relationships in Late Life

- Relationships are important to older people, even though frequency of social contact declines in old age.
- According to social convoy theory, reductions or changes in social contact in late life do not impair well-being because a stable inner circle of social support is maintained. According to socioemotional selectivity theory, older people choose to spend time with people who enhance their emotional well-being.
- Social interaction is associated with good health and life satisfaction, and isolation is a risk factor for mortality.
- The way multigenerational late-life families function often has cultural roots.

Marital Relationships

- As life expectancy increases, so does the potential longevity of marriage. More men than women are married in late life. Marriages that last into late adulthood tend to be relatively satisfying.
- Although a growing proportion of men are widowed, women tend to outlive their husbands and are less likely to marry again.
- Divorce is uncommon among older people, and most older adults who have been divorced are remarried. Remarriages may be more relaxed in late life.

Nonmarital Lifestyles and Relationships

- A small but increasing percentage of adults reach old age without marrying. Never-married adults are less likely to be lonely than divorced or widowed ones.
- Older adults are more likely to cohabit after a prior marriage than before marriage.
- Many gays and lesbians adapt to aging with relative ease, particularly if they maintain relationships as well as involvement in the gay community. However, they may face difficulties as a result of discrimination.
- Most older adults have close friends, and those who do are healthier and happier.
- Older people enjoy time spent with friends more than with family, but the family is the main source of emotional and practical support.

Nonmarital Kinship Ties

- Older parents and their adult children frequently see or contact each other, are concerned about each other, and offer each other assistance. Many older parents are caregivers for adult children.
- In some respects, childlessness does not seem to be an important disadvantage in old age.
- Often siblings offer each other emotional support, and sometimes more tangible support as well. Sisters, in particular, maintain sibling ties.

Design elements: (Butterfly Icon): Stockbyte/Getty Images; (World Icon): janrysavy/Getty Images

part 9
THE END OF LIFE

chapter 19

Dealing with Death and Bereavement

outline

The Many, Changing Meanings of Death and Dying

Facing Death and Loss

Significant Losses

Medical, Legal, and Ethical Issues: The "Right to Die"

Finding Meaning and Purpose in Life and Death

learning objectives

Describe the cultural and historical contexts of death and dying.

Discuss death and bereavement as well as attitudes about death and dying across the life span.

Identify the challenges of coping with the death of another person.

Evaluate issues involved in decisions about death.



Daniel Allan/Getty Images

did you know?

- A marked cognitive decline, in the absence of known physical illness, can predict death nearly 15 years later.
- Research has challenged earlier notions of a single, "normal" pattern of grieving.
- Children as young as 4 may have some understanding of what happens after death but may not fully understand it until well into the school years.

In this chapter, we discuss how people of different cultures and ages think and feel about death and dying. We examine patterns of grief and how people cope with significant loss. We look at questions raised about life support and examine whether people have the right to die. Finally, we consider how confronting death can give life greater purpose.

It is not the years in your life that count but the life in your years.

—Adlai Stevenson

The Many, Changing Meanings of Death and Dying

Death is a biological fact, but it also has social, cultural, historical, religious, legal, psychological, developmental, medical, and ethical aspects, and often these are closely intertwined.

Although death and loss are universal experiences, they have a cultural and historical context. Cultural and religious attitudes toward death and dying affect how people regard their own. Death may mean one thing to an elderly Japanese person, imbued with Buddhist teachings of accepting the inevitable, and another to a third-generation Japanese American youth who has grown up with a belief in directing one's own destiny. Death used to come early and frequently in the life of a family and community and was a constant household companion. Today people in most countries live longer, and death is a less frequent and less visible occurrence.

Let's look more closely at death and mourning in their cultural and historical context.

THE CULTURAL CONTEXT

Customs concerning disposal and remembrance of the dead, transfer of possessions, and even expression of grief vary greatly from culture to culture and often are governed by religious or legal prescriptions that reflect a society's view of what death is and what happens afterward. Cultural aspects of death include care of and behavior toward the dying and the dead, the setting where death usually takes place, and mourning customs and rituals—from the all-night Irish wake, at which friends and family toast the memory of the dead person, to the weeklong Jewish *shiva,* at which mourners vent their feelings and share memories of the deceased. Some cultural conventions, such as flying a flag at half-mast after the death of a public figure, are codified in law.

Although there are wide variations in customs surrounding death, there are nonetheless some commonalities in the experience across cultures. Expressions of grief, anger, and fear are common across cultures, and most cultures have socially sanctioned ways of expressing these emotions within the context of mourning or funeral practices (Parkes, Laungani, & Young, 2015; see Window on the World).

THE MORTALITY REVOLUTION

Until the twentieth century, in all societies throughout history, death was a frequent, expected event, sometimes welcomed as a peaceful end to suffering. Caring for a dying loved one at home was a common experience, as it still is in some rural communities.

Great historical changes regarding death and dying have taken place since the late nineteenth century, especially in developed countries. Advances in medicine and sanitation, new treatments for many once-fatal illnesses, and a better-educated, more health-conscious population have brought about a *mortality revolution.* The top causes of death



Even when brain dead, it is possible for spinal reflexes to cause movement. In one particularly creepy variation, called the Lazarus sign, the dead person raises her or his arms and crosses them over the chest.

Urasaki, Tokimura, Kumai, & Yokota, 1992



Most gladiators died as a result of traumatic brain injury.

Kanz & Grossschmidt, 2006

checkpoint can **you** . . .

- Give examples of cross-cultural differences in customs and attitudes related to death?

window on the world

CULTURAL VARIATIONS IN FUNERAL CUSTOMS

Funerals in America or Europe are generally held at a church or funeral home. People dress in black, a service is held, and the deceased is either buried or cremated. There is often a visitation before the service and a gathering held at the home or church of the family. Though this is the common tradition in much of the Westernized world, it is not the only tradition.

In ancient Greece, bodies of heroes were publicly burned as a sign of honor. Cremation still is widely practiced by Hindus in India and Nepal. In contrast, cremation is prohibited under Orthodox Jewish law in the belief that the dead will rise again for a last judgment and the chance for eternal life (Ausubel, 1964).

The deceased must be buried as soon as possible in traditional Islamic burials, usually within 24 hours, to free the soul from the body. The body is washed, and a burial shroud is placed over it. The deceased is laid facing Mecca, preferably without a casket. Burial sites are unmarked or simply marked. During the 3-day mourning period, the family says daily prayers for the loved one (Rahman, 2011).

For the Toraja in Indonesia, the funeral is a celebration of life. Funerals are elaborate and expensive, and the whole community takes part. The person is embalmed, symbolically fed, and cared for during a series of ceremonies, remaining part of the family until the final burial takes place on the 11th day of the ceremonies. Each year during a ritual called Ma' Nene, the bodies are exhumed, cleaned, and dressed in new clothes and walked around the village (Holloway, 2014).

In Tibet, sky burial rituals are based on the Buddhist belief that the spirit leaves the body the moment a person dies. The body should be returned to the earth and recycled. In the sky burial, the body is dissected and placed on a high cliff where it is offered up to hungry vultures, a final act of kindness to other creatures, contributing to the life cycle (Kerala, 2005).

Cremation has become more common in South Korea due to lack of space to bury the dead. Rather than storing ashes, many people are choosing to turn their loved ones' remains into beads. The beads are colorful and are stored in glass containers to keep the loved ones close (*The Week,* 2012).

In Mexico and Latin America, on November 2nd, the Day of the Dead, families gather to remember and honor those who have passed. It is often celebrated with festivals; families eat, sing, and tell stories about deceased loved ones. Families may visit the gravesite or create an altar for the family member, decorating it with candles, flowers, and the favorite foods of the deceased (Benedetti, 2017).

All these varied customs and practices help people deal with death and bereavement through well-understood cultural meanings that provide a stable anchor amid the turbulence of loss.



What do the funeral traditions in your culture say about conceptions of the death and the afterlife? How do they help people handle death?

in the United States in the 1900s were diseases that most often affected children and young people: pneumonia and influenza, tuberculosis, diarrhea, and enteritis. Today, the majority of deaths occur among people age 65 and older, primarily from diseases such as heart disease and cancer, the top two causes of death (Xu et al. 2018).

Amid all this progress in improving health and lengthening life, something important may have been lost. Looking death in the eye, bit by bit, day by day, people growing up in traditional societies absorbed an important truth: Dying is part of living. As death increasingly became a phenomenon of late adulthood, it became "invisible and abstract" (Fulton & Owen, 1987–1988, p. 380). Such social conventions as placing the dying person in a hospital or nursing home and refusing to openly discuss his or her condition reflected and perpetuated attitudes of avoidance and denial of death. Death—even of the very old—came to be regarded as a failure of medical treatment rather than as a natural end to life (McCue, 1995).

thanatology
Study of death and dying.

Today, this picture again is changing. **Thanatology,** the study of death and dying, is arousing interest, and educational programs have been established to help people deal with

death. Because of the prohibitive cost of extended hospital care that cannot save the terminally ill, many more deaths are now occurring at home, as they once did the world over.

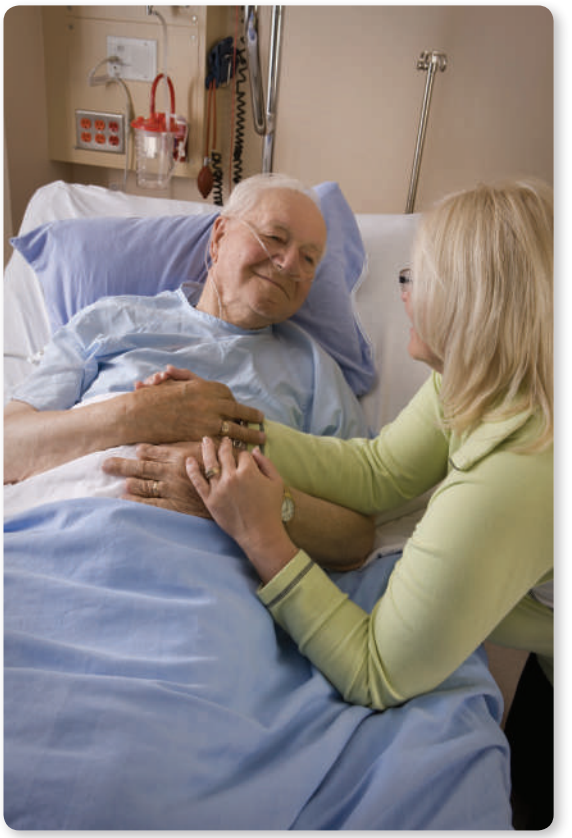
CARE OF THE DYING

Edith, 82 years old, died of organ failure in a hospital following a 5-day stay. She died alone, afraid, hooked up to machines to help sustain her life for as long as possible, and confused about what was going on. Is this how you would choose to die?

Along with a growing tendency to face death more honestly, movements have arisen to make dying more humane. Primary among these movements is the establishment of **hospice care** for dying persons. Hospice care is personal, patient- and family-centered, compassionate care for the terminally ill. Hospice facilities generally provide **palliative care,** which includes relief of pain and suffering, control of symptoms, alleviation of stress, and attempts to maintain a satisfactory quality of life. However, palliative care is not intended to cure or reverse the course of disease.

Hospice facilities offer a specialized type of palliative care for people whose life expectancy is 6 months or less. The goal is to allow the person to die in peace and dignity, while minimizing any pain and suffering, and it often includes self-help support groups for both dying people and their families.

Hospice care may take place at home, but such care can be given in a hospital or another institution, at a hospice center, or through a combination of home and institutional care. The provision of hospice and palliative care is associated with better outcomes. For instance, patients enrolled in hospice report greater satisfaction and pain control; they are less likely to report difficulty breathing; they spend less time in the hospital; and they are less likely to be admitted to the intensive care unit and less likely to die in the hospital. Their families are more likely to report greater satisfaction with care, higher-quality end-of-life care, and compliance with requests about end-of-life preferences (Kleinpell, Vasilevskis, Fogg, & Ely, 2019; Wright et al., 2016; Kumar, Wright, Hatfield, Temel, & Keating, 2017). Hospice care is likely to have its greatest effects if it is provided early enough to improve quality of life (Gaertner et al., 2017), especially for those individuals who are unlikely to benefit from medical intervention.



Hospice care seeks to ease patients' pain and treat their symptoms to keep them as comfortable and alert as possible. It also helps families deal with illness and death.
Ron Nickel/Getty Images

A study of objects placed by the bedside of people in hospice care showed that almost all clients had objects to remind them of home—a source of comfort in their last days.

Kellehear, Pugh, & Atter, 2009

hospice care
Personal, patient- and family-centered care for a person with a terminal illness.

palliative care
Care aimed at relieving pain and suffering and allowing the terminally ill to die in peace, comfort, and dignity.

checkpoint can you . . .

- Discuss the mortality revolution in developed countries?
- Identity the chief goals of hospice care?

Facing Death and Loss

Death is an important chapter in human development. People change in response to death and dying, whether their own or that of a loved one. What changes do people undergo shortly before death? How do people handle grief? How do attitudes toward death change across the life span?

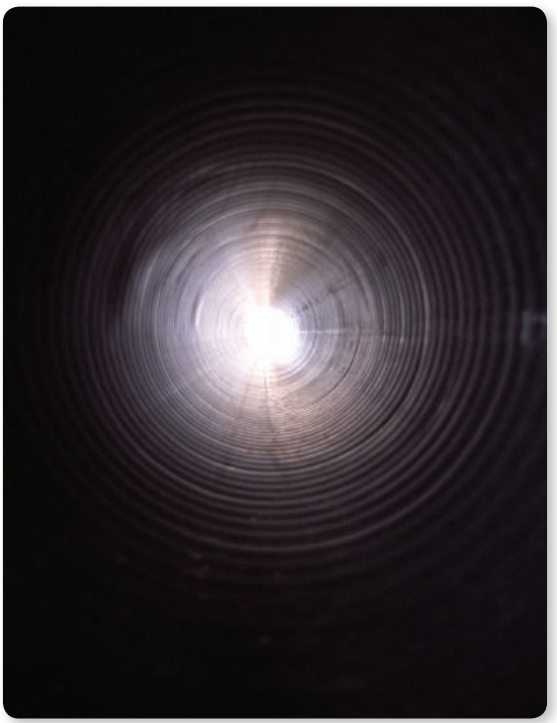
PHYSICAL AND COGNITIVE CHANGES PRECEDING DEATH

Even without any identifiable illness, people around the age of 100 tend to experience functional declines, lose interest in eating and drinking, and die a natural death (Johansson et al., 2004; Small, Fratiglioni, von Strauss, & Bäckman, 2003). There also appear to be changes in life satisfaction that precede death (Windsor, Gerstorf, & Luszcz, 2015; Gerstorf

et al., 2010). Such changes also have been noted in younger people whose death is near. In a 22-year longitudinal study of 1,927 men, life satisfaction showed steep declines within 1 year before death, regardless of self-rated health (Mroczek & Spiro, 2005).

terminal drop
A frequently observed decline in cognitive abilities near the end of life. Also called *terminal decline.*

Terminal drop, or *terminal decline,* refers specifically to a widely observed decline in cognitive abilities shortly before death, even when factors such as demographics and health are controlled for (Gerstorf & Ram, 2013). Losses of perceptual speed have been found to predict death nearly 15 years later (Thorvaldsson et al., 2008), although most declines start about 7.7 years before death occurs (Muniz-Terrera, van den Hout, Piccinin, Matthews, & Hofer, 2013). While more highly educated people generally perform better on cognitive tests, they show similar rates of decline as do less educated people. Dementia, however, accelerates the rate of decline in all people (Bendayan et al., 2017). Areas of decline include memory capacity, perceptual speed, visuospatial abilities, and everyday cognition (Gerstorf & Ram, 2013; Thorvaldsson et al., 2008).



When a brain is deprived of oxygen, certain images arise due to alterations in the visual cortex and can result in the perception of a tunnel, like the images reported by people who have had near-death experiences.
mark gibbons/Alamy Stock Photo

Some people who have come close to dying report *near-death experiences (NDE),* often involving a sense of being out of the body or sucked into a tunnel and visions of bright lights or mystical encounters. These types of experiences have been reported in many different cultures, both in modern times and in written and oral histories of nonindustrialized cultures (Tassell-Matamua, 2013). Skeptics generally interpret these reports as resulting from physiological changes that accompany the process of dying. Some researchers argue that near-death experiences reflect the common bodily structures affected by the process of dying (Mobbs & Watt, 2011), in particular, the oxygen deprivation that occurs in 9 out of 10 dying persons (Woerlee, 2005).

A variety of data from humans, including reports of NDEs in cardiac arrest survivors and individuals undergoing anesthesia; reports of NDE-like experiences in people under the influence of various drugs such as ketamine, LSD, and cannabinoids or under the influence of epilepsy or deliberately induced electrical cortical stimulation; and experiments using mild oxygen deprivation or artificially lowered blood pressure to induce NDE-like sensations, suggest that NDE phenomena are linked to stimulation or damage of various brain areas, most notably in bilateral frontal and occipital areas. The commonly reported altered sense of time, flying sensations, and light reported by some people are theorized to originate in the right hemispheric temporo-parietal junction (TPJ). By contrast, the spiritual dimensions often reported, along with the sounds, music, and voices, are believed to result from the left hemispherical TPJ. Emotions and life review, another commonly experienced aspect of NDEs, are thought to originate from the hippocampus and amygdala (Blanke, Faivre, & Dieguez, 2016).

Regardless of their origin, NDEs are generally experienced as positive, an effect that has been proposed to occur as a result of the release of endorphins that are released during stressful experiences (Agrillo, 2011). Some people who experience NDEs report spiritual growth as one consequence, and the degree of spiritual transformation is related to the depth of the NDE (Greyson & Khanna, 2014). NDEs are predicted to occur more frequently in the coming years as survival rates continue to improve with modern resuscitation techniques (Agrillo, 2011; Van Lommel, 2011).

How do people on death row confront their death? In a survey of their last statements, death row inmates are most likely to talk about forgiveness, claims of innocence, silence, love, activism, and a belief in the afterlife.

Heflick, N. A. (2005).

CONFRONTING ONE'S OWN DEATH

The psychiatrist Elisabeth Kübler-Ross, in her pioneering work with dying people, found that most of them welcomed an opportunity to speak openly about their condition and were aware of being close to death, even when they had not been told. After speaking with some 500 terminally ill patients, Kübler-Ross (1969, 1970) outlined five stages in coming to terms with death: (1) *denial* ("This can't be happening to me!"); (2) *anger* ("Why me?"); (3) *bargaining for extra time* ("If I can only live to see my

daughter married, I won't ask for anything more"); (4) *depression;* and ultimately (5) *acceptance.* She also proposed a similar progression in the feelings of people facing imminent bereavement (Kübler-Ross, 1975).

Kübler-Ross's model has been criticized and modified by other professionals who work with dying patients. Although the emotions she described are common, not everyone goes through all five stages and not necessarily in the same sequence. A person may go back and forth between anger and depression, for example, or may feel both at once.

Dying, like living, is an individual experience. For some people, denial or anger may be a healthier way to face death than calm acceptance. Kübler-Ross's findings, valuable as they are in helping us understand the feelings of those who are facing the end of life, should not be considered the sole model or criterion for a "good death."

Should bereavement be medicated? One study showed that approximately half of doctors believe medicating grief is warranted despite the risk of long-term use or addiction.

Cook, Biyanova, & Marshall, 2007

PATTERNS OF GRIEVING

The death of a loved one is a difficult thing. First, there is **grief,** the emotional response that generally follows closely on the heels of death. This is followed by **bereavement.** Bereavement is a response to the loss of someone to whom a person feels close. But bereavement is not just an event, and it is not just grief—it is also a process of adjustment.

Bereavement often brings about a change in role or status. For example, a person may have to adjust to becoming a widow after previously being a wife, or as an orphan after previously being a son or daughter. There may be social or economic consequences as well—a loss of friends and sometimes of income. In short, bereavement can affect practically all aspects of a person's life.

grief
Emotional response experienced in the early phases of bereavement.

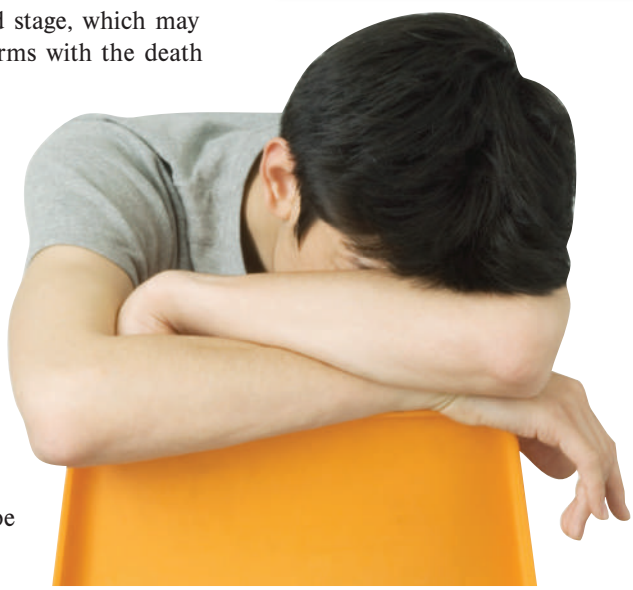
bereavement
Loss, due to death, of someone to whom one feels close and the process of adjustment to the loss.

grief work
Working out of psychological issues connected with grief.

The Classic Grief Work Model How do people grieve? A classic pattern of grief is three stages in which the bereaved person accepts the painful reality of the loss, gradually lets go of the bond with the dead person, and readjusts to life by developing new interests and relationships. This process of **grief work,** the working out of psychological issues connected with grief, often takes the following path—though, as with Kübler-Ross's stages, it may vary (J. T. Brown & Stoudemire, 1983; R. Schulz, 1978).

1. *Shock and disbelief.* Immediately following a death, survivors often feel lost and confused. As awareness of the loss sinks in, the initial numbness gives way to overwhelming feelings of sadness and frequent crying. This first stage may last several weeks, especially after a sudden or unexpected death.
2. *Preoccupation with the memory of the dead person.* In the second stage, which may last 6 months to 2 years or so, the survivor tries to come to terms with the death but cannot yet accept it. These experiences diminish with time, though they may recur—perhaps for years.
3. *Resolution.* The final stage has arrived when the bereaved person renews interest in everyday activities. Memories of the dead person bring fond feelings mingled with sadness rather than sharp pain and longing.

What advice would you give a friend about what to say—and what not to say—to a person in mourning?



Some people recover quickly from the loss of a loved one; others never do.
Spohn Matthieu/PhotoAlto/Getty Images

Grieving: Multiple Variations Although the pattern of grief work just described is common, grieving does not necessarily follow a straight line from shock to resolution. In the *recovery* pattern, the mourner goes from high to low distress. In the *delayed grief* pattern, there may be moderate or elevated initial grief, and symptoms gradually worsen over time. In the *chronic grief* pattern, the mourner remains distressed for a long time. Chronic grief may be especially painful and acceptance most difficult when a loss is ambiguous, as when a loved one is missing and presumed dead. In the final pattern, known as *resilience,* the mourner shows a low and gradually diminishing level of grief in response to the death of a loved one (Bonanno, Westphal, & Mancini, 2011).

TABLE 1 Helping Someone Who Has Lost a Loved One

These suggestions from mental health professionals may enable you to help someone you know through the grieving process:

- ***Share the sorrow.*** Allow—or encourage—the bereaved person to talk about feelings of loss and share memories of the deceased person.
- ***Don't offer false comfort.*** Saying such things as "It's all for the best" or "You'll get over it in time" is not helpful. Instead, simply express sorrow—and take time to listen.
- ***Offer practical help.*** Babysitting, cooking, and running errands are ways to help someone who is grieving.
- ***Be patient.*** It can take a long time to recover from a significant loss. Be available to talk and listen.
- ***Suggest professional help when necessary.*** Don't hesitate to recommend professional help when it appears that someone is experiencing too much pain to cope alone.

Source: National Mental Health Association, n.d.

checkpoint can you . . .

- Summarize changes that may occur in a person close to death?
- Cite possible explanations for near-death experiences?
- Name Kübler-Ross's five stages of confronting death, and tell why her work is controversial?
- Identify the three stages commonly described as ***grief work,*** and discuss newer findings of variations in the grieving process?

Previously, the assumption was sometimes made that something had to be wrong if a bereaved person showed only mild distress and moved on quickly from the death of a loved one. However, research suggests that over half of people can be classified as resilient (Mancini, Bonnano, & Clark, 2011; Spahni, Morselli, Perrig-Chiello, & Bennett, 2015). Moreover, resilience has been associated with positive outcomes, including reduced depression and loneliness and improved life satisfaction (Spahni, Bennett, & Perrig-Chiello, 2016). People who are resilient are generally low in neuroticism and high in extraversion (Mancini, Sinan, & Bonnano, 2015; Mancini et al., 2011). Secure attachment and an internal locus of control have also been associated with resilience (Laird, Krause, Funes, & Lavretsky, 2019). Older adults who are resilient also tend to have had prior experience with adversity (Seery, 2011). In other words, having had bad things happen to you and having overcome them successfully teaches you how to handle life's inevitable challenges more effectively.

The knowledge that grief takes varied forms and patterns has important implications for helping people deal with loss. Table 1 lists suggestions for helping those who have lost a loved one. It may be unnecessary and even harmful to expect mourners to follow a set pattern of emotional reactions. While bereavement therapy may help some people, the evidence suggests that many people will recover on their own if given time (Neimeyer & Currier, 2009).

ATTITUDES ABOUT DEATH AND DYING ACROSS THE LIFE SPAN

There is no single way of viewing death at any age. As the timing-of-events model suggests, death probably does not mean the same thing to an 85-year-old man with excruciatingly painful arthritis, a 56-year-old woman at the height of a brilliant legal career who discovers she has breast cancer, and a 15-year-old who dies of an overdose of drugs. Typical changes in attitudes toward death across the life span depend both on cognitive development and on the normative or nonnormative timing of the event.

Childhood and Adolescence Generally, although many feel uncomfortable doing so, most parents begin to talk about death with their children at around the age of 3 years (Nguyen & Rosengren, 2004; Renaud, Engarhos, Schleifer, & Talwar, 2015). Learning about death involves understanding it is irreversible, universal (happens to everyone), nonfunctional (involves the cessation of all life function), and inevitable (Speece & Brent, 1984).

By the age of 4, children build a partial understanding of the biological nature of death. For example, 3- to 5-year-old German and Shuar children from a rural Amazon

region of Ecuador were told a story and then asked questions about either a human or an animal character that either got tired and went to sleep or was killed. The 3-year-olds rarely answered correctly when asked if the character in the story could move or be afraid, whereas children at the age of 4 had little problem doing so (Barrett & Behne, 2005). However, this understanding is incomplete. In another study, preschoolers and kindergarteners expressed knowledge that a dead mouse would never be alive again or grow up to be an old mouse, but 54 percent said the mouse might still need to eat. By age 7, 91 percent of the children were consistent in their knowledge that such biological processes as eating and drinking cease at death. Generally, children have mastered the biological understanding of death by about 10 years of age (Kenyon, 2001).

While much of the research on children's understanding of death has focused on their understanding of the cessation of biological processes, it is also the case that many adults believe in the afterlife and often explicitly teach their children about it within the context of religious instruction. Within the context of these beliefs, psychological processes are presumed to carry on after death. Thus, affirmative answers to questions about the persistence of thoughts, feelings, and desires after death are not necessarily reflective of immaturity (Harris, 2011). For instance, 5-year-old Vezo children from Madagascar often answered that a dead bird or man could continue to do things such as sit upright or see. By the age of 7, most children responded that a dead entity could perform none of these actions. But as they grew older, children and adolescents, like adults, were increasingly likely to respond that mental processes continued after death, even though biological processes ceased (Astuti & Harris, 2008). Similar findings have emerged in Spanish and British schoolchildren (Giménez & Harris, 2005; Hopkins, 2014).

Death is difficult to understand, even for adults. Children can better understand death if they are introduced to the concept at an early age and are encouraged to talk about it. For example, the death of a pet or knowing another child who dies may provide an opportunity. Yet parents often avoid bringing up the subject. Not surprisingly, children who have had experience with the death of a loved one have a more realistic view of death than children who have not experienced such an event (Bonoti, Leondari, & Mastora, 2013; Hunter & Smith, 2008). However, whether or not children have been raised in a secular or religious fashion does not seem to impact understanding of death (Bering, Blasi, & Bjorklund, 2005).

With respect to bereavement, if children are old enough to love, they are old enough to grieve. However, they may have difficulty expressing or understanding their grief. Like their understanding of death, this depends on cognitive and emotional development (Table 2). Children sometimes express grief through anger, acting out, or refusal to acknowledge a death, as if the pretense that a person is still alive will make it so. They



Children's confusion is related to their cognitive development. In the Piagetian framework discussed in other chapters, we learned that children have difficulty with abstract thought, so euphemisms used to describe death can be confusing to them.

TABLE 2 Manifestations of Grief in Children

Under 3 Years	3 to 5 Years	School-Age Children	Adolescents
Sadness	Increased activity	Deterioration of school performance due to loss of concentration, interest, and motivation	Depression
Fearfulness	Constipation	Crying spells	Somatic complaints
Loss of appetite	Soiling	Lying	Delinquent behavior
Failure to thrive	Bed-wetting	Stealing	Promiscuity
Sleep disturbance	Anger and temper tantrums	Nervousness	Suicide attempts
Social withdrawal	Out-of-control behavior	Abdominal pain	Dropping out of school
Developmental delay	Nightmares	Headaches	
Irritability	Crying spells	Listlessness	
Excessive crying		Fatigue	
Increased dependency			
Loss of speech			

Source: Adapted from AAP Committee on Psychosocial Aspects of Child and Family Health, 1992.

may be confused by adults' euphemisms: that someone "passed on" or that the family "lost" someone or that someone is "asleep" and will never awaken.

Adjusting to loss is more difficult if a child had a troubled relationship with the person who died; if a surviving parent depends too much on the child; if the death was unexpected, especially if it was a murder or suicide; if the child has had previous behavioral or emotional problems; or if family and community support are lacking (AAP Committee on Psychosocial Aspects of Child and Family Health, 1992).

Infants and very young children may respond to the death of a parent initially with crying, despair, and, eventually, pathological detachment. They do not understand death, but they understand loss. They may show feeding or sleeping difficulties, or constipation, and previously toilet-trained toddlers may wet the bed. Depression may manifest as irritation or somatic complaints such as stomachaches (Black, 1998).

Parents and other adult caregivers can help children deal with bereavement by explaining that death is final and inevitable and that they did not cause the death by their misbehavior or thoughts. Children need reassurance that they will continue to receive care from loving adults. It is usually advisable to make as few changes as possible in a child's environment, relationships, and daily activities; to answer questions simply and honestly; and to encourage the child to talk about his or her feelings and about the person who died (Schonfeld, Demaria, & Committee on Psychosocial Aspects of Family Health, 2016). Children may show their grief in short spurts and then return to their daily activities, but this does not mean they have recovered (Gao & Slaven, 2017).

For adolescents, while they are capable of a mature understanding of death, it is not something they normally think much about unless they are directly faced with it. Most teens are at the beginning of their lives, and generally, their contact with death involves the death of a loved one rather than their own mortality. In the event of a close death, teens benefit from talking about it, although support and assistance for them is not always present (Schonfeld et al., 2016). Often teens may turn to peers for such support (Dopp & Cain, 2012). At the same time teens must process their own grief, they are often also asked to take on more adult responsibilities, such as helping take care of younger siblings or providing emotional support to a surviving parent (Schonfeld et al., 2016). The bereavement process can lead to academic problems, especially for juniors and seniors in high school (Schonfeld & Quackenbush, 2010), and mental health issues, particularly depression, conduct disorder, and increased likelihood of substance abuse (Brent, Melhem, Donohoe, & Walker, 2009; Kaplow, Saunders, Angold, & Costello, 2010).

Fortunately, much of the grief response in both children and adolescents declines over time. However, a subset of young people experience persistent or even increasing grief over time (Melhem, Porta, Shamseddeen, Payne, & Brent, 2011). A meta-analysis showed that while the effect size was small to moderate, therapeutic interventions could have positive effects on the bereavement process that persisted over time. The most promising treatment approaches were musical therapy and brief psychotherapy (Rosner, Kruse, & Hagl, 2010).



The unnecessary risks adolescents sometimes take can have tragic results.
John Lund/Tiffany Schoepp/Blend Images LLC

Adulthood Young adults are generally eager to live the lives they have been preparing for. If they are suddenly struck by a potentially fatal illness or injury, they are likely to be frustrated and angry. People who develop terminal illnesses in their twenties or thirties must face issues of death and dying at an age when they normally would be dealing with issues such as establishing an intimate relationship. Rather than having a long lifetime of losses as gradual preparation for the final loss of life, they find their entire world collapsing at once.

In middle age, most adults' bodies send them signals that they are not as young, agile, and hearty as they once were. More and more, they think about how many years they may have left and how to make the most of those years (Neugarten, 1967). Often—especially after the death of both

parents—there is a new awareness of being the older generation or the next in line to die (Scharlach & Fredriksen, 1993). Middle-aged and older adults may prepare for death emotionally as well as in practical ways by making a will, planning their funerals, and discussing their wishes with family and friends.

Older adults may have mixed feelings about the prospect of dying. Some older adults give up on achieving unfulfilled goals. Others push harder to do what they can with life in the time they have left. Many try to extend their remaining time by adopting healthier lifestyles or struggle to live even when they are profoundly ill (Cicirelli, 2002), sometimes using religion to allay anxiety (Krause, Pargament, & Ironson, 2016). When they think or talk of their impending death, some older adults express fear or anxiety and worry about the effect their death will have on their loved ones (Missler et al., 2012). Generally, distress is greater when the discrepancy between how long they want to live and how long they think they have left is large (Cicirelli, 2006).



Try to imagine that you are terminally ill. What do you imagine your feelings would be? Would they be similar to or different from those described with reference to your age group?

Terror Management Theory Regardless of age, the awareness of death is distressing and has the potential to result in declines in well-being and increases in anxiety (Juhl & Routledge, 2016). One approach—terror management theory (TMT)—proposes that humans' unique understanding of death, in concert with self-preservation needs and capacity for fear, results in common emotional and psychological responses when mortality, or thoughts of death, are made salient.

One common response to thoughts of death is to become more committed to a cultural worldview (Burke, Martens, & Faucher, 2010). For example, when death is made salient, people are more likely to endorse their religious beliefs, and they believe more strongly in the afterlife (Vail et al., 2010). This stronger adherence to a religious ideology provides psychological comfort.

Another implication of TMT is that high self-esteem should buffer people against anxiety and fear over death. Feeling significant and valuable to others can help people believe they are more than their physical body. Generally, research has supported a link between high self-esteem and reduced anxiety regarding death (Burke et al., 2010).

Last, mortality salience has been associated with attachment processes. Seeking comfort from loved ones is a common response in humans undergoing threat and is a regulatory strategy to reduce anxiety. Therefore, when death is made salient, those people who are willing and able to would be predicted to engage in behaviors to increase attachment, such as enhanced commitment, attraction, forgiveness, and intimacy, a finding largely verified in research (Plusnin, Pepping, & Kashima, 2018).

checkpoint can you . . .

- Discuss how people of different ages understand and cope with death and bereavement?

Significant Losses

Especially difficult losses that may occur during adulthood are the deaths of a spouse, a parent, or a child. The loss of a potential offspring through miscarriage or stillbirth also can be painful but usually draws less social support.

SURVIVING A SPOUSE

Because women tend to live longer than men and to be younger than their husbands, they are more likely to be widowed. They also tend to be widowed at an earlier age. Slightly over 34 percent of U.S. women, but only 11.9 percent of U.S. men, lose their spouse by age 65 (Federal Interagency Forum on Aging-Related Statistics, 2016).

The stress of widowhood often affects physical and mental health. Bereavement can lead to headaches, memory problems, difficulty with concentration, dizziness, indigestion,

loss of appetite, or chest pain. It also entails higher risks of disability, drug use, anxiety, depression, insomnia, hospitalization, and even death (Stroebe, Schut, & Stroebe, 2007). A meta-analysis of mortality risk including data from over 500 million people showed that becoming a widowed person is associated with a 22 percent increase in risk of death when compared to married people and that this risk is higher for men (27 percent) than women (15 percent) (Moon, Kondo, Glymour, & Subramanian, 2011). The risk is even higher for young adults, if the death was unexpected, and in the early months after a loss (Shah et al., 2013; Stroebe et al., 2007).

The quality of the marital relationship that has been lost may affect the degree to which widowhood affects mental health. Higher relationship quality during the marriage has been associated with greater anger, more anxiety and depression, and feelings of yearning 6 months after the loss of the spouse (Carr & Boerner, 2009; Schaan, 2013).

The loss of companionship may help explain why a widowed person, especially a widower, may soon follow the spouse to the grave (Ray, 2004). However, a more practical explanation also may apply; after the death of a spouse, there may be no one to remind an older widow to take her pills or to make sure a widowed man adheres to a special diet. Those who receive such reminders (say, from children or health workers) tend to improve in health habits and reported health (Williams, 2004).

Widowhood creates other practical problems. For women, the main consequences of widowhood are more likely to be economic strain, whereas for men the chief consequences are more likely to be social isolation and loss of emotional intimacy (Pudrovska, Schieman, & Carr, 2006). Women whose husbands were the chief breadwinners may experience economic hardship or fall into poverty (Hungerford, 2001). Widowed men are more likely to become socially isolated after the death of a spouse than are widows (Isherwood, King, & Luszcz, 2017), whereas older widows are more likely than older widowers to stay in touch with friends from whom they receive social support (Kinsella & Velkoff, 2001).

Ultimately, the distress of loss can be a catalyst for introspection and growth (Lieberman, 1996). In one study, widows continued to talk and think about their deceased husbands decades after the loss, but these thoughts rarely upset them. Instead, these women said they had become stronger and more self-confident as a result of their loss (Carnelley, Wortman, Bolger, & Burke, 2006).



Older widows are more likely than older widowers to stay in touch with friends and benefit from the support of a social network.
Zero Creatives/Getty Images

LOSING A PARENT IN ADULTHOOD

The loss of a parent at any time is difficult, even in adulthood (Marks, Jun, & Song, 2007; Nickerson, Bryant, Aderka, Hinton, & Hofmann, 2013). The majority of bereaved adult children still show an impact on their well-being and experience emotional distress after 1 to 5 years, especially following loss of a mother and most strongly in daughters (Scharlach & Fredricksen, 1993; Leopold & Lechner, 2015).

However, the death of a parent can also be a maturing experience. It can push adults into resolving important developmental issues: achieving a stronger sense of self and a more pressing, realistic awareness of their own mortality, along with a greater sense of purpose, responsibility, commitment, and interconnectedness to others (Pope, 2005; Moss & Moss, 1989; Sharlach & Fredriksen, 1993). It can also push middle-aged adults into reevaluating their relationships with their own grown children, a process that can increase the positive aspects of their relationships (Kim et al., 2018).

Still, the road may not be easy. Although families with a history of conflict are more likely to engage in conflict when a parent is approaching death and important decisions must be made, when adult parents leave instructions for the type of medical treatment they desire at the end of life, this generally results in less stressful decision making and reduced conflict for their children (Tilden, Tolle, Nelson, & Fields, 2001; Kramer & Boelk, 2015). However, regardless of the wishes of the dying parent, if siblings disagree on the treatment provided, this can damage their relationship (Su, McMahan, Williams, Sharma, & Sudore, 2014). Siblings are less likely to engage in conflict over end-of-life care when parents designate someone outside of the family as the person who will make decisions about such care (Khodyakov & Carr, 2009; Kramer, Boelk, & Auer, 2006).

The impact of a parent's death on siblings is equivocal. Some research suggests that following the death of a parent, siblings tend to grow less close. This may be because the link that bound them together in their adult life—a parent—is gone (Walker, Allen, & Connidis, 2005), or it may be because of conflict following parental death about such aspects as funeral arrangements or distribution of assets (Umberson, 2003). Other research suggests that parental death and the intense emotions that elicits may draw siblings closer (Aldwin & Levenson, 2001). A longitudinal approach may help explain these disparate findings. Research shows that sibling contact intensifies after a parent dies and then declines over time. Moreover, when the second parent dies, the effect is intensified once support is no longer needed for a surviving parent (Kalmijn & Leopold, 2019).

LOSING A CHILD

A parent is rarely prepared for the death of a child. Such a death, no matter at what age, comes as a cruel, unnatural shock. The parents may feel they have failed, no matter how much they loved and cared for the child, and they may find it hard to let go.

If a marriage is strong, the couple may draw closer, supporting each other in their shared loss. In other cases, the loss weakens and eventually destroys the marriage (Albuquerque, Pereira, & Narciso, 2016; Lyngstad, 2013). One important factor appears to be whether or not parents grieve a similar amount. Parents who perceive that their spouse is grieving more or less than they are report less satisfaction in the relationship than those who perceive greater similarity in their pain (Buyukcan-Tetik, Finkenauer, Schut, Stroebe, & Stroebe, 2017).

Parents who have lost a child are at heightened risk of being depressed or hospitalized for mental illness and show poorer health-related quality of life (Rogers, Floyd, Seltzer, Greenberg, & Hong, 2008; Li, Laursen, Precht, Olsen, & Mortensen, 2005; Song, Floyd, Seltzer, Greenberg, & Hong, 2010). The stress of a child's loss may even hasten a parent's death (Li, Precht, Mortensen, & Olsen, 2003).

The impact of parental bereavement may vary depending on a variety of factors. Grief rises with the age of a child (up to 17) and the age of a parent (up to 40) (Wijngaards-deMeij et al., 2005; Moor & de Graaf, 2016). Parents whose child dies a traumatic death generally grieve more than those whose child dies of an illness or disorder or those who experience a stillbirth or neonatal death, and mothers tend to grieve more than fathers (Wijngaards-deMeij et al., 2005; Meert et al., 2010). Those parents who are able to make some sense of the loss generally show less intense grief (Keesee, Currier, & Neimeyer, 2008). As time goes by, grief tends to diminish, especially among couples who became pregnant again (Wijngaards-deMeij et al., 2005). However, even decades later, most parents express lasting grief (Rogers et al., 2008).

Many parents hesitate to discuss a terminally ill child's impending death with the child, but those who do so tend to achieve a sense of closure that helps them cope after the loss. In one study, approximately one-third of the parents said they had talked with their children about their impending death, and none of these parents regretted having done so, whereas 27 percent of those who had not brought up the subject regretted it (Kreicbergs, Valdimarsdóttir, Onelöv, Henter, & Steineck, 2004).

When asked what most helped them cope with the end of their child's life, 73 percent of parents whose children died in intensive-care units gave religious or spiritual responses. They mentioned prayer, faith, discussions with clergy, or a belief that the parent-child relationship endures beyond death. Parents also said they were guided by insight and wisdom, inner values, and spiritual virtues such as hope, trust, and love (Robinson, Thiel, Backus, & Meyer, 2006).



Have you lost a parent, a sibling, a spouse, a child, or a friend? If not, which of these losses do you imagine would be hardest to bear, and why? If you have experienced more than one of these types of loss, how did your reactions differ?

MOURNING A MISCARRIAGE

Estimates are that somewhere around 1 in 3 pregnancies ends in miscarriage (Smith, Rissel, Richters, Grulich, & Visser, 2003). Families, friends, and health professionals tend to avoid talking about such losses, which often are considered insignificant compared

checkpoint can you . . .

- Identify specific challenges involved in losing a spouse?
- Discuss ways in which an adult's loss of a spouse or parent can be a maturing experience?
- Explain why parents are rarely prepared emotionally for the death of a child?
- Suggest ways to help expectant parents cope with the loss of a pregnancy?

with the loss of a living child. Moreover, many couples do not tell others about their pregnancy until after the first trimester, during which miscarriage is most common. So, in many cases, friends and family members may not even realize support is needed (Brier, 2008).

How do prospective parents cope with the loss of a child they never knew? Common responses, which are generally reported with greater intensity in women, include grief, depression, guilt, isolation, and sadness (Huffman, Schwartz, & Swanson, 2015; Volgsten, Jansson, Svanberg, Darj, & Stavreus-Evers, 2018). Roughly a third meet the criteria for post-traumatic stress disorder (Farren et al., 2016). Generally, negative outcomes are even stronger when pregnancy losses are recurrent (Kolte, Olsen, Mikkelsen, Christiansen, & Nielsen, 2015).

Whether married or living together, couples who experience a miscarriage prior to 20 weeks of gestation are 22 percent more likely to break up than couples who have a successful pregnancy. When the miscarriage occurs after 20 weeks, that risk is elevated by as much as 40 percent (Gold, Sen, & Hayward, 2010).

Medical, Legal, and Ethical Issues: The "Right to Die"

Do people have a right to die? Should a terminally ill person who wants to commit suicide be allowed or helped to do so? Who decides that a life is not worth prolonging?



Most people believe suicide terrorists are motivated by religious extremism. However, a small and controversial group of researchers argues that their motivation is, more simply, driven by the same desire to commit suicide and the same risk factors that have been found in other clinical populations.

Lankford, 2010

SUICIDE

Although suicide is no longer a crime in modern societies, there is still a stigma against it, based in part on religious prohibitions and in part on society's interest in preserving life. A person who expresses suicidal thoughts may be considered mentally ill, and the desire to die may be temporary and disappear when mental illness abates or circumstances change. On the other hand, a growing number of people consider a mature adult's deliberate choice of a time to end his or her life a rational decision and a right to be defended.

Suicide is a global issue. The global suicide rate was approximately 10.5 per 100,000 people in 2016, representing almost 800,000 people on a yearly basis. While suicide can occur in people of almost any age, rates are highest in the elderly in almost all areas of the world. Men also commit suicide at higher rates than do women. Low- and middle-income countries bear the brunt of the suicide burden, accounting for 79 percent of suicides. They also tend to have higher suicide rates in young adults and older women, while higher-income countries have higher suicide rates in middle-aged men (World Health Organization, 2018l).

Suicide rates in the United States reached their previous high in 1977 at 13.7 deaths per 100,000 people, then slowly declined to a low of 10.4 in 2000. Since then, however, the rate has increased and as of 2016 peaked at 13.9 deaths per 100,000 people (Xu et al., 2018; Curtin, Warner, & Hedegaard, 2016). In the United States, almost 45,000 people committed suicide in 2016 (Xu et al., 2018).

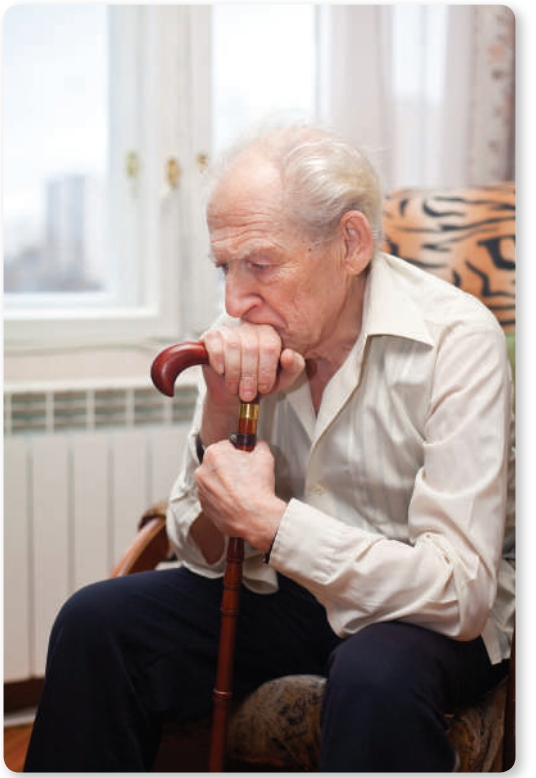
Statistics probably understate the number of suicides; many go unreported and some (such as traffic "accidents" and "accidental" medicinal overdoses) are not recognized as such. Also, the figures on suicides often do not include suicide *attempts;* an estimated 20 to 60 percent of people in the United States who commit suicide have tried before, and about 10 percent of people who attempt suicide will kill themselves within 10 years (Harvard Medical School, 2003).

As in most nations, U.S. suicide rates rise with age (see Table 3) and are higher among men than among women (Curtin et al., 2016: World Health Organization, 2018l), though more women consider or attempt suicide (Figure 1). Young, unmarried women with little education and those who are unusually impulsive, anxious, or depressed are most at risk

TABLE 3 Changes in Suicide Rates by Age, United States, 1999–2016

SUICIDE RATE PER 100,000 PEOPLE		
Age Group	**Rate in 2000**	**Rate in 2016**
15 to 24	10.2	13.2
25 to 34	12.0	16.5
35 to 44	14.5	17.4
45 to 54	14.4	19.7
55 to 64	12.1	18.7
65 to 74	12.5	15.4
75 to 84	17.6	18.2
85 and over	19.6	19.0

Source: Xu, J., S. Murphy, K. Kochanek, B. Bastian, and E. Arias. "Deaths: Final Data for 2016." *National Vital Statistics Reports* 67, no. 5. Hyattsville, MD: National Center for Health Statistics, 2018.



The highest rate of suicide is among white men age 75 and over; the risk rises among men 85 and older. Older people are more likely than younger people to be depressed and socially isolated.
Anna Lurye/Shutterstock

The world's most popular suicide spot is the Golden Gate Bridge in San Francisco, California. Because of this, city officials are considering installing a safety net.

Fleming, 2010; Pogash, 2014

for suicidal thoughts and behavior (Nock et al., 2008). Historically, males were far more likely to succeed in taking their own life, but this gap has diminished in recent years. Men's suicide rates are higher mainly because they are far more likely to use reliable methods, such as firearms, whereas women are more likely to choose other means, such as poisoning or hanging. More than half of completed suicides are by gunshot, and gun deaths via suicide outnumber those by homicide (Xu et al., 2018). The rates of suicide using firearms are much higher in the United States than in other similar industrialized nations (Richardson & Hemenway, 2011), presumably because of easy access to firearms (Anglemyer, Horvath, & Rutherford, 2014). Suicide by suffocation has increased recently; approximately 1 in 4 suicides in 2014 was the result of suffocation (Curtin et al., 2016).

Suicide rates vary among ethnic and racial lines. Native American and Alaskan Natives have the highest rates, at 21.4 per 100,000 people. They are followed by whites (18.1), Asian/Pacific Islanders (7.0), African Americans (6.4), and Hispanics (6.4) (Xu et al., 2018). Although some people intent on suicide carefully conceal their plans, most give warning signs (see Table 4).

While the death of a loved one is always difficult, survivors of people who take their own lives often walk an even more difficult road. Many blame themselves for failing to recognize the signs, and they suffer from feelings of guilt, shame, rejection, and isolation (Hanschmidt, Lehnig, Riedel-Heller, & Kersting, 2016). Because of the stigma attached to suicide, these survivors often struggle with their emotions alone rather than share them with others who might understand (Schomerus et al., 2015).

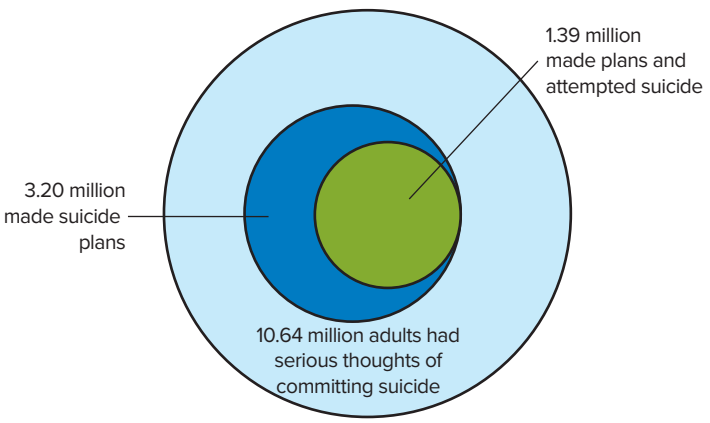


FIGURE 1
About 1.39 million people attempted suicide in 2017.

Source: Substance Abuse and Mental Health Services Administration. *Results from the 2017 National survey on Drug Use and Health. [Data tables].* 2018. Retrieved from https://www.samhsa.gov/data/sites/default/files/cbhsq-reports/NSDUHDetailedTabs2017/NSDUHDetailedTabs2017.pdf.

TABLE 4 Preventing Suicide

WARNING SIGNS OF SUICIDE:
• Feeling depressed, down, or excessively sad
• Feelings of hopelessness, worthlessness, or having no purpose in life, along with a loss of interest or pleasure in doing things
• Preoccupation with death, dying, or violence, or talking about wanting to die
• Seeking access to medications, weapons, or other means of committing suicide
• Wide mood swings—feeling extremely up one day and terribly down the next
• Feelings of great agitation, rage, or uncontrolled anger, or wanting to get revenge
• Changes in eating and sleeping habits, appearance, behavior, or personality
• Risky or self-destructive behavior, such as driving recklessly or taking illegal drugs
• Sudden calmness (a sign that a person has made the decision to attempt suicide)
• Life crises, trauma, or setbacks, including school, work, or relationship problems, job loss, divorce, death of a loved one, financial difficulties, diagnosis of a terminal illness
• Putting one's affairs in order, including giving away belongings, visiting family members and friends, drawing up a will, or writing a suicide note
IF SOMEONE THREATENS SUICIDE:
• Stay calm.
• Take the threat seriously.
• Don't leave the person alone. Prevent access to firearms, knives, medications, or any other item the person may use to commit suicide.
• Don't try to handle the situation alone. Call 911 or the local emergency response number. Phone the person's doctor, the police, a local crisis intervention team, or others who are trained to help.
• While waiting for help, listen closely to the person. Let the person know you're listening by maintaining eye contact, moving closer, or holding his or her hand, if appropriate.
• Ask questions to determine what method of suicide the person is considering and whether he or she has an organized plan.
• Remind the person that help is available.
• If the person does attempt suicide, immediately call for emergency medical assistance and administer first aid, if necessary.

Source: Adapted from American College of Emergency Physicians, 2008.

HASTENING DEATH

In December 2013, 13-year-old Jahi McMath underwent surgery in California to relieve sleep apnea. Despite waking up alert, she suffered a cardiac arrest and massive blood loss shortly thereafter. She was declared irreversibly brain dead. The hospital wanted to remove her from life support, but her family held out hope of some recovery and resisted the process. After a protracted legal battle, her family was allowed to claim her. Because Jahi was legally and medically dead, insurance no longer covered any treatment, so her parents raised money and moved her to an undisclosed location in New Jersey, where families are permitted to reject brain death based on their religious beliefs. There, Jahi

remained on life support for 4 years, never regaining consciousness. In June 2018, Jahi's heart stopped beating, and her body was finally laid to rest. This tragic event illustrates how medical technology has outpaced our legal system and ethics and reminds us that not everyone views life and death in the same way. Is life found within an active brain or a beating heart? How do we decide if someone is truly dead?

Until recent decades, the idea of helping a suffering loved one hasten death was virtually unheard of. Changing attitudes toward hastening death can be attributed largely to revulsion against technologies that keep patients alive against their will despite intense suffering, and sometimes even after the brain has stopped functioning.

Euthanasia *Euthanasia* means "good death" and is intended to end suffering or to allow a terminally ill person to die with dignity. People differ in their beliefs about this process, and some draw distinctions between the types of euthanasia used. **Passive euthanasia** involves withholding or discontinuing treatment that might extend the life of a terminally ill patient, such as medication, life support systems, or feeding tubes. Many people would characterize turning off life support systems as passive euthanasia, although such cases are complicated by the fact that brain dead people are considered legally dead even if their heart continues to beat. Passive euthanasia is generally legal. **Active euthanasia** (sometimes called mercy killing) involves action taken directly or deliberately to shorten a life, and it is generally illegal. An important question regarding either form of euthanasia is whether it is done at the direct request, or to carry out the express wishes, of the person whose death results.

passive euthanasia
Withholding or discontinuation of life-prolonging treatment of a terminally ill person in order to end suffering or allow death with dignity.

active euthanasia
Deliberate action taken to shorten the life of a terminally ill person in order to end suffering or to allow death with dignity; also called *mercy killing*.

Advance Directives Some of the issues surrounding how much medical technology should be used to keep a person alive near the end of life can be addressed if people's wishes are made clear before they are incapacitated. The U.S. Supreme Court held that a person whose wishes are clearly known has a constitutional right to refuse or discontinue life-sustaining treatment (Cruzan v. Director, Missouri Department of Health, 1990). A mentally competent person's wishes can be spelled out in advance in a document called an **advance directive,** which contains instructions for when and how to discontinue futile medical care. All 50 states have since legalized some form of advance directive or adopted other provisions governing the making of end-of-life decisions. However, only about 37 percent of people report having written down their wishes for end-of-life care, and a review of past literature suggests this number has not changed significantly in the past 6 years (Yadav et al., 2017).

advance directive
Document specifying the type of care wanted by the maker in the event of an incapacitating or terminal illness.

An advance directive may take the form of a *living will* or a more formal legal document called a durable power of attorney. A living will may contain specific provisions with regard to circumstances in which treatment should be discontinued, what extraordinary measures—if any—should be taken to prolong life, and what kind of pain management is desired. A person also may specify, through a donor card or a signature on the back of his or her driver's license, that his or her organs be donated to someone in need of an organ transplant.

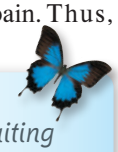
Some living will legislation applies only to terminally ill patients, not to those who are incapacitated by illness or injury but may live many years in severe pain. Thus, advance directives may not help them. Similarly, advance directives may not help patients in comas or in persistent vegetative states. Such situations can be covered by a **durable power of attorney,** which appoints another person to make decisions if the maker of the document becomes incompetent to do so. A number of states have adopted a simple form known as a *medical durable power of attorney* expressly for decisions about health care.



At the time of death, more than a quarter of elderly patients are incapable of making medical care decisions. This illustrates why, difficult as they may be, discussions about the end of life are important.

Silveira, Kim, & Langa, 2010

durable power of attorney
Legal instrument that appoints an individual to make decisions in the event of another person's incapacitation.



As of September 2019, more than 113,000 people were waiting for an organ donation in the United States, and a new person is added to the list every 10 minutes. Would you donate an organ to a friend or family member who needed it? To a stranger? Why or why not?

www.organdonor.gov

Advance care planning is beneficial not just to the dying person, but also to the family. Having a plan of action when death is imminent leads to improved end-of-life care and results in higher levels of family satisfaction and reductions in stress, anxiety, and depression in family members of the terminally ill patient (Detering, Hancock, Reade, & Silvester, 2010). They are also associated with decreased hospitalization rates, an increase in the use of preferred medical treatments, and a decrease in medical costs (Martin, Hayes, Gregorevic, & Lim, 2016). Unfortunately, even with advance planning, directives are not always followed. Often, they are unavailable during a crisis, or the wishes of the ill or dying adult are overruled in the moment (Perkins, 2007). Plans for end-of-life care are more likely to be followed if the decisions are made within the context of coordinated interventions where medical personnel, family members, and trained facilitators work together to determine a course of action (Brinkman-Stoppelenburg, Rietjens, & van der Heide, 2014).

assisted suicide
Suicide in which a physician or someone else helps a person take his or her own life.

Assisted Suicide: Pros and Cons **Assisted suicide**—in which a physician or someone else helps a person bring about a self-inflicted death by, for example, prescribing or obtaining drugs or enabling a patient to inhale a deadly gas—commonly refers to situations in which people with incurable, terminal illnesses request help in ending their lives. Assisted suicide is still illegal in most places but in recent years has come to the forefront of public debate. It may be similar in principle to voluntary active euthanasia, in which, for example, a patient asks for, and receives, a lethal injection, but in assisted suicide the person who wants to die performs the actual deed.

As of September 2019, assisted suicide is legal in nine states (California, Colorado, Hawaii, Montana, Oregon, Vermont, Washington, New Jersey, and Maine) and Washington, D.C. (Death with Dignity, 2019). The American College of Physicians (Sulmasy & Mueller, 2017) and the American Medical Association (American Medical Association, 2018) oppose physician aid in dying as contrary to a practitioner's oath to "do no harm." The American Psychological Association takes no position, neither endorsing nor opposing assisted suicide (American Psychological Association, 2017b). The American public is split with respect to the issue; 47 percent are in favor of laws to legalize assisted suicide, 49 percent are opposed (Duggan, 2014).

The *ethical arguments for* assisted suicide are based on the principles of autonomy and self-determination: that mentally competent persons should have the right to control the quality of their own lives and the timing and nature of their death. Proponents of assisted suicide place a high value on preserving the dignity and personhood of the dying human being. *Medical arguments* hold that a doctor is obligated to take all measures necessary to relieve suffering. Additionally, in assisted suicide, the patient, not the doctor, is the one who takes the actual step to end life. A *legal argument* is that legalizing assisted suicide would permit the regulation of practices that now occur anyway out of compassion for suffering patients. It is argued that adequate safeguards against abuse can be put in place through a combination of legislation and professional regulation (APA Online, 2001).

Some ethical and legal scholars go further: They favor legalizing all forms of *voluntary euthanasia* with safeguards against involuntary euthanasia. The key issue, according to these scholars, is not how death occurs but who makes the decision. They see no difference in principle between pulling the plug on a respirator, pulling out feeding tubes, giving a lethal injection, or prescribing an overdose of pills at the patient's request. They maintain that aid in dying, if openly available, would reduce fear and helplessness by enabling patients to control their own fate (APA Online, 2001; Orentlicher, 1996).

Ethical arguments against assisted suicide center on two principles: (1) the belief that taking a life, even with consent, is wrong; and (2) concern for protection of the disadvantaged. Opponents of aid-in-dying point out that autonomy is often limited by poverty or disability or membership in a stigmatized social group, and they fear that persons in these categories may be subtly pressured into choosing suicide with cost containment as an underlying factor. *Medical arguments* against assisted suicide include the possibility of misdiagnosis, the potential future availability of new treatments, the likelihood of

incorrect prognosis, and the belief that helping someone die is incompatible with a physician's role as healer and that adequate safeguards are not possible. *Legal arguments* against assisted suicide include concerns about enforceability of safeguards and about lawsuits when family members disagree about the propriety of terminating a life (APA Online, 2001).

Because self-administered pills do not always succeed, some opponents contend that physician-assisted suicide would lead to voluntary active euthanasia (Groenewoud et al., 2000). The next step on the slippery slope, some warn, would be involuntary euthanasia—not only for the terminally ill but for others, such as people with disabilities, whose quality of life is perceived as diminished. The opponents claim that people who want to die are often temporarily depressed and might change their minds with treatment or palliative care (APA Working Group on Assisted Suicide and End-of-Life Decisions, 2005; Butler, 1996; Quill et al., 1997).

Legalizing Physician Aid in Dying Since 1997, when a unanimous U.S. Supreme Court left regulation of physician aid-in-dying up to the states, measures to legalize assisted suicide for the terminally ill have been introduced in several states (see Research in Action). Oregon was the first state to pass such a law, the Death with Dignity Act (DWDA). In 1994, Oregonians voted to let mentally competent patients, who have been told by two doctors that they have less than 6 months to live, request a lethal prescription with strong safeguards to make sure the request is serious and voluntary and that all other alternatives have been considered.

In September 1996, a 66-year-old Australian man with advanced prostate cancer was the first person to die legally by assisted suicide.

What has been the experience under the Oregon law? The legalization of assisted suicide has resulted in improvements of palliative care and an increased number of deaths occurring at home (88.6 percent) rather than in the hospital. From 1998 to 2018, 1,459 terminally ill patients took their lives, 168 of them in 2018. The concerns most frequently mentioned by patients who requested and used lethal prescriptions were loss of autonomy (91.7 percent), decreasing ability to participate in activities that made life enjoyable (90.5 percent), and loss of dignity (66.7 percent). The median age at death was 74 years, and most who chose to end their lives were white, well-educated, dying of cancer, on hospice, and had some form of health insurance (Oregon Health Authority, 2019).

Active euthanasia remains illegal in the United States but not in the Netherlands, where in 2002 a law permitting voluntary euthanasia for patients in a state of continuous, unbearable, and incurable suffering went into effect. In such cases, doctors can now inject a lethal dose of medication. Estimates are that somewhere around 1.8 to 2.9 percent of deaths in the Netherlands result from euthanasia or assisted suicide (Steck, Egger, Maessen, Reisch, & Zwahlen, 2013).

Do you think assisted suicide should be legalized? If so, what safeguards should be provided? Would your answers be the same or different for voluntary active euthanasia? Do you see an ethical distinction between euthanasia and oversedation of the terminally ill?

Currently, euthanasia or physician-assisted suicide is also legal in Belgium, Luxembourg, Colombia, and Canada, with public support growing in Western Europe but declining in Central and Eastern Europe. In no areas, including the United States, does data indicate that vulnerable patients such as the disabled have been receiving physician-assisted suicide or euthanasia at higher rates than the general population (Radbruch et al., 2016).

End-of-Life Decisions and Cultural Attitudes It is hard to compare the experience of the Netherlands, which has a homogeneous population and universal national health coverage, with that of such a large, diverse country as the United States. Support for physician-assisted suicide (PAS) varies widely in the United States, ranging from 47 to 69 percent, and has remained essentially unchanged since the 1990s. Less than 20 percent of U.S. physicians report receiving requests for PAS, and fewer than 5 percent have complied. Even in states such as Oregon and Washington, where such requests are legal, fewer than 1 percent of doctors write such prescriptions on a yearly basis (Emanuel et al., 2016). Most Americans—roughly 84 percent—support a terminally ill person's right to decide whether or not to be kept alive with medical treatment, and approximately 70 percent agree that there are some circumstances in which a person should be allowed

Author Aldous Huxley, best known for his dystopic novel Brave New World, *died while high on an intramuscular injection of LSD, administered to him by his wife, at his request.*

research in action

PHYSICIAN-ASSISTED SUICIDE

Physician-assisted suicide (PAS) involves a formal patient request for prescription of a lethal dosage of medication with the intent of ending life (Sulmasy et al., 2017). The patient is the one who administers the fatal dose. Over the years, public attitudes toward PAS have shifted dramatically. About 66 percent of Americans support permitting patients a means of ending one's life in the event of terminal illness (Emanuel, Onwuteaka-Philipsen, Urwin, & Cohen, 2016).

PAS proponents argue for patients' autonomy, self-determination, and a compassionate end to human suffering (Levy, Azar, Huberfeld, Siegel, & Strous, 2013; Pormeister, Finley, & Rohack, 2017). The typical PAS recipient is a white male, over the age of 65, college-educated, with a terminal cancer diagnosis (Emanuel et al., 2016; Sulmasy et al., 2017). Use of PAS remains relatively rare, despite increasing state legalization, accounting for only 0.3 to 4.6 percent of all deaths in legal jurisdictions (Emanuel et al., 2016).

The American Medical Association views PAS in opposition to aims of health restoration for the sick (Yang & Curlin, 2016). Physicians are bound by social justice principles protecting human rights of society's most vulnerable members: the sick, disabled, poor, and minorities. Questions are raised whether these groups may be disproportionately affected by legalized PAS (Sulmasy et al., 2017).

Physicians endorse current standards of care, including patient right to refusal of treatment and further expansion of hospice and palliative care services. Palliative services deliver holistic care to patients, caregivers, and relatives with the goal of easing pain and suffering, increasing psychological and spiritual well-being, family adjustment, and a dignified transition to death (De Lima et al., 2017). Kelley and Morrison (2015) report that over 90 percent of American adults are unaware of the existence of palliative care services, but when educated, many desire these services for end of life.

Awareness of advanced planning options and compassionate physician care are deemed essential in supporting terminally ill patients. Physicians unfortunately experience challenges in providing intensive end-of-life care in time-pressured health care environments (Sulmasy et al., 2017). Many argue for universal accessibility to palliative care services, addressing physical, emotional, and psychological needs of dying patients and their families. Medical technology is essential to prolong life, but preservation of quality at the end of life is equally important to patients.



Do you support expansion of death with dignity laws to legalize physician-assisted suicide? What kinds of safeguards can be put into place to further protect patients?

to die. Only 22 percent of Americans believe everything possible should always be done to save the life of a patient (Parker, 2009a).

In Europe, as in the United States, diversity exists in beliefs regarding PAS. In Western Europe, support appears to be increasing, while in Central and Eastern Europe, support is declining. There are suggestions that these changes are related to simultaneous changes in religiosity, particularly in postcommunist Eastern Europe. The majority of PAS cases involve patients with cancer, typically older and well-educated. While euthanasia and PAS have become increasingly legalized, fears of a "slippery slope" appear to be unfounded as there is no evidence of abuse of PAS on vulnerable populations (Emanuel et al., 2016).

End-of-Life Options and Diversity Concerns One beneficial result of the aid-in-dying controversy has been to call attention to the need for better palliative care and closer attention to patients' motivation and state of mind. When doctors talk openly and realistically with patients about their needs, ways may be found to diminish these concerns without the taking of life (Bascom & Tolle, 2002).

In the United States, issues of social and cultural diversity need to be addressed in end-of-life decision making. Planning for death is inconsistent with traditional Navajo values, which avoid negative thinking and talk. Chinese families may try to protect a dying person from knowledge of his or her impending death. Recent Mexican or Korean immigrants may believe less in individual autonomy than does the dominant U.S. culture (APA Working Group on Assisted Suicide, 2005). Among some ethnic minorities, the value of longevity may take priority over health. Both African Americans and Hispanics are more likely than whites to report they would prefer life-sustaining treatment even if they had an incurable disease and were in a great deal of pain (Lipka, 2014).

Religion is also an important factor. For example, British medical students' attitudes are colored by their religious beliefs. While most students did not condone physician-assisted suicide (PAS), this was particularly true for those students who believed in a god, and particularly so if they were Muslim (Pomfret, Mufti, & Seale, 2018). In the United States, religiosity has also been associated with less support for PAS (Bulmer, Böhnke, & Lewis, 2017). More broadly, this same relationship can also be found on a country-wide level, with more religious countries generally being more accepting of PAS than less religious countries (Stack & Kposowa, 2011; Verbakel & Jaspers, 2010).

Issues of hastening death will become more pressing as the population ages. In years to come, both the courts and the public will be forced to come to terms with these issues as increasing numbers of people claim a right to die with dignity and with help.

checkpoint can you . . .

- Explain why intent to commit suicide is sometimes not recognized, and list warning signs?
- Discuss the ethical, practical, and legal issues involved in advance directives, euthanasia, and assisted suicide?

Finding Meaning and Purpose in Life and Death

The struggle to find meaning in life and in death—often dramatized in books and movies—has been borne out by research. Studies examining religion and death have found that such beliefs are generally beneficial for the dying (Edmondson, Park, Chaudoir, & Wortmann, 2008). In one study of 39 women whose average age was 76, those who saw the most purpose in life had the least fear of death (Durlak, 1973). Conversely, according to Kübler-Ross (1975), facing the reality of death is a key to living a meaningful life:

> It is the denial of death that is partially responsible for [people] living empty, purposeless lives; for when you live as if you'll live forever, it becomes too easy to postpone the things you know that you must do. In contrast, when you fully understand that each day you awaken could be the last you have, you take the time that day to grow, to become more of who you really are, to reach out to other human beings. (p. 164)

life review
Reminiscence about one's life in order to see its significance.

REVIEWING A LIFE

Life review is a process of reminiscence that enables a person to see the significance of his or her life. Life review can occur at any time. However, it may have special meaning in old age, when it can foster ego integrity—according to Erikson, the final critical task of the life span. As the end of their journey approaches, people may look back over their accomplishments and failures and ask themselves what their lives have meant. Awareness of mortality may be an impetus for



Sharing memories evoked by a photo album is one way to review a life. Life review can help people recall important events and can motivate them to rebuild damaged relationships or complete unfinished tasks.
Corbis/VCG/Getty Images

reexamining values and seeing one's experiences and actions in a new light. Some people find the will to complete unfinished tasks, such as reconciling with estranged family members or friends, and thus to achieve a satisfying sense of closure.

Life review therapy and reminiscence interventions can help focus the natural process of life review and make it more conscious, purposeful, and efficient (Westerhof & Bohlmeijer, 2014; Lewis & Butler, 1974). Such interventions have been shown to reduce symptoms of depression and result in greater ego integrity (Pinquart & Forstmeier, 2012). Methods often used for uncovering memories in life review therapy include recording an autobiography; constructing a family tree; spending time with scrapbooks, photo albums, old letters, and other memorabilia; making a trip back to scenes of childhood and young adulthood; reuniting with former classmates or colleagues or distant family members; describing ethnic traditions; and summing up one's life's work.

checkpoint can you . . .

- Explain why life review can be especially helpful in old age and how it can help overcome fear of death?
- List several activities used in life review therapy?
- Explain how dying can be a developmental experience?

DEVELOPMENT: A LIFELONG PROCESS

In his late seventies, the artist Pierre-Auguste Renoir had crippling arthritis and chronic bronchitis and had lost his wife. He spent his days in a wheelchair, and his pain was so great that he could not sleep through the night. He was unable to hold a palette or grip a brush: His brush had to be tied to his right hand. Yet he continued to produce brilliant paintings, full of color and vibrant life. Finally, stricken by pneumonia, he lay in bed, gazing at some anemones his attendant had picked. He gathered enough strength to sketch the form of these beautiful flowers, and then—just before he died—lay back and whispered, "I think I am beginning to understand something about it" (L. Hanson, 1968).

Within a limited life span, no person can realize all capabilities, gratify all desires, explore all interests, or experience all the richness that life has to offer. The tension between possibilities for growth and a finite time in which to do the growing defines human life. By choosing which possibilities to pursue and by continuing to follow them as far as possible, even up to the very end, each person contributes to the unfinished story of human development.

summary and key terms

The Many, Changing Meanings of Death and Dying

- Death has biological, social, cultural, historical, religious, legal, psychological, developmental, medical, and ethical aspects.
- Customs surrounding death and mourning vary greatly from one culture to another, depending on the society's view of the nature and consequences of death. Some modern customs have evolved from ancient beliefs and practices.
- Death rates dropped drastically during the twentieth century, especially in developed countries.
- Nearly three-quarters of deaths in the United States occur among the elderly, and the top causes of death are diseases that primarily affect older adults.
- As death became primarily a phenomenon of late adulthood, it became largely "invisible," and care of the dying took place in isolation, by professionals.
- There is now an upsurge of interest in understanding and dealing realistically and compassionately with death. Examples of this tendency are a growing interest in thanatology and increasing emphasis on hospice care and palliative, or comfort, care.

thanatology (*558*)

hospice care (*559*)

palliative care (*559*)

Facing Death and Loss

- People often undergo cognitive and functional declines shortly before death.
- Some people who come close to dying have "near-death" experiences that may result from physiological changes.
- Elisabeth Kübler-Ross proposed five stages in coming to terms with dying: denial, anger, bargaining, depression, and acceptance. These stages, and their sequence, are not universal.
- There is no universal pattern of grief. The most widely studied pattern moves from shock and disbelief to preoccupation with the memory of the dead person and finally to resolution. However, research has found wide variations and a prevalence of resilience.
- Children's understanding of death develops gradually. Young children can better understand death if it is part of their own experience. Children show grief in age-related ways based on cognitive and emotional development.
- Although adolescents generally do not think much about death, violence and the threat of death are part of some adolescents' daily life. Adolescents tend to take needless risks.
- Realization and acceptance of the inevitability of death increases throughout adulthood.

terminal drop (*560*)

grief (*561*)

bereavement (*561*)

grief work (*561*)

Significant Losses

- Women are more likely to be widowed, and widowed younger, than men, and may experience widowhood somewhat differently. Physical and mental health tend to decline after widowhood, but for some people widowhood can ultimately become a positive developmental experience.
- Death of a parent can precipitate changes in the self and in relationships with others.
- The loss of a child can be especially difficult because it is no longer normative.
- Because miscarriage and stillbirth are not generally considered significant losses in U.S. society, those who experience such losses are often left to deal with them with little social support.

Medical, Legal, and Ethical Issues: The "Right to Die"

- Although suicide is no longer illegal in modern societies, there is still a stigma attached to it. Some people maintain a "right to die," especially for people with long-term degenerative illness.
- The number of suicides is probably underestimated. It is often related to depression, isolation, family conflict, financial troubles, and debilitating ailments. There are many more suicide attempts than actual deaths.
- Euthanasia and assisted suicide involve controversial ethical, medical, and legal issues.
- To avoid unnecessary suffering through artificial prolongation of life, passive euthanasia is generally permitted with the patient's consent or with advance directives. However, such directives are not consistently followed. Most hospitals now have ethics committees to deal with decisions about end-of-life care.
- Active euthanasia and assisted suicide are generally illegal, but public support for physician aid-in-dying has increased.
- The aid-in-dying controversy has focused more attention on the need for better palliative care and understanding of patients' state of mind. Issues of social and cultural diversity need to be considered.

passive euthanasia (*571*)
active euthanasia (*571*)
advance directive (*571*)
durable power of attorney (*571*)
assisted suicide (*572*)

Finding Meaning and Purpose in Life and Death

- The more meaning and purpose people find in their lives, the less they tend to fear death.
- Life review can help people prepare for death and give them a last chance to complete unfinished tasks.
- Even dying can be a developmental experience.

life review (*575*)

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glossary

acceleration programs Programs for educating the gifted that move them through the curriculum at an unusually rapid pace.

accommodation Piaget's term for changes in a cognitive structure to include new information.

acquired immune deficiency syndrome (AIDS) Viral disease that undermines effective functioning of the immune system.

active euthanasia Deliberate action taken to shorten the life of a terminally ill person in order to end suffering or to allow death with dignity; also called *mercy killing.*

activities of daily living (ADLs) Essential activities that support survival, such as eating, dressing, bathing, and getting around the house.

activity theory Theory of aging that holds that to age successfully a person must remain as active as possible.

acute medical conditions Illnesses that last a short time.

adaptation Piaget's term for adjustment to new information about the environment, achieved through processes of assimilation and accommodation.

adolescence Developmental transition between childhood and adulthood entailing major physical, cognitive, and psychosocial changes.

adolescent growth spurt Sharp increase in height and weight that precedes sexual maturity.

adolescent rebellion Pattern of emotional turmoil, characteristic of a minority of adolescents, that may involve conflict with family, alienation from adult society, reckless behavior, and rejection of adult values.

advance directive Document specifying the type of care wanted by the maker in the event of an incapacitating or terminal illness.

ageism Prejudice or discrimination against a person (most commonly an older person) based on age.

age-related macular degeneration Condition in which the center of the retina gradually loses its ability to discern fine details; leading cause of irreversible visual impairment in older adults.

aging in place Remaining in one's own home, with or without assistance, in later life.

alcoholism Chronic disease involving dependence on use of alcohol, causing interference with normal functioning and fulfillment of obligations.

alleles Two or more alternative forms of a gene that occupy the same position on paired chromosomes and affect the same trait.

altruism Behavior intended to help others out of inner concern and without expectation of external reward; may involve self-denial or self-sacrifice.

altruistic behavior Activity intended to help another person with no expectation of reward.

Alzheimer's disease Progressive, irreversible, degenerative brain disorder characterized by cognitive deterioration and loss of control of bodily functions, leading to death.

ambivalent (resistant) attachment Pattern in which an infant becomes anxious before the primary caregiver leaves, is extremely upset during his or her absence, and both seeks and resists contact on his or her return.

amyloid plaque Waxy chunks of insoluble tissue found in brains of persons with Alzheimer's disease.

animism Tendency to attribute life to objects that are not alive.

anorexia nervosa Eating disorder characterized by self-starvation.

anoxia Lack of oxygen, which may cause brain damage.

anticipatory smiling Infant smiles at an object and then gazes at an adult while still smiling.

Apgar scale Standard measurement of a newborn's condition; it assesses appearance, pulse, grimace, activity, and respiration.

art therapy Therapeutic approach that allows a person to express troubled feelings without words, using a variety of art materials and media.

assimilation Piaget's term for incorporation of new information into an existing cognitive structure.

assisted suicide Suicide in which a physician or someone else helps a person take his or her own life.

asthma A chronic respiratory disease characterized by sudden attacks of coughing, wheezing, and difficulty in breathing.

attachment Reciprocal, enduring tie between two people—especially between infant and caregiver—each of whom contributes to the quality of the relationship.

attention-deficit/hyperactivity disorder (ADHD) Syndrome characterized by persistent inattention and distractibility, impulsivity, low tolerance for frustration, and inappropriate overactivity.

authoritarian parenting In Baumrind's terminology, parenting style emphasizing control and obedience.

authoritative parenting In Baumrind's terminology, parenting style blending respect for a child's individuality with an effort to instill social values.

autobiographical memory Memory of specific events in one's life.

autonomy versus shame and doubt Erikson's second stage in psychosocial development, in which children achieve a balance between self-determination and control by others.

autosomes In humans, the 22 pairs of chromosomes not related to sexual expression.

avoidant attachment Pattern in which an infant rarely cries when separated from the primary caregiver and avoids contact on his or her return.

basal metabolism Use of energy to maintain vital functions.

basic sense of trust versus mistrust Erikson's first stage in psychosocial development, in which infants develop a sense of the reliability of people and objects.

Bayley Scales of Infant and Toddler Development Standardized test of infants' and toddlers' mental and motor development.

behavioral genetics Quantitative study of relative hereditary and environmental influences on behavior.

behaviorism Learning theory that emphasizes the predictable role of environment in causing observable behavior.

behaviorist approach Approach to the study of cognitive development that is concerned with basic mechanics of learning.

behavior therapy Therapeutic approach using principles of learning theory to encourage desired behaviors or eliminate undesired ones; also called *behavior modification.*

bereavement Loss, due to death, of someone to whom one feels close and the process of adjustment to the loss.

bilingual Fluent in two languages.

bilingual education System of teaching non-English-speaking children in their native language while they learn English, and later switching to all-English instruction.

binge drinking Consuming 5 or more drinks (for men) or 4 or more drinks (for women) on one occasion.

binge eating disorder Eating disorder in which a person loses control over eating and binges huge quantities of food.

bioecological theory Bronfenbrenner's approach to understanding processes and contexts of human development that identifies five levels of environmental influence.

body image Descriptive and evaluative beliefs about one's appearance.

Brazelton Neonatal Behavioral Assessment Scale (NBAS) Neurological and behavioral test to measure neonate's responses to the environment.

bulimia nervosa Eating disorder in which a person regularly eats huge quantities of food and then purges the body by laxatives, induced vomiting, fasting, or excessive exercise.

bullying Aggression deliberately and persistently directed against a particular target, or victim, typically one who is weak, vulnerable, and defenseless.

canalization Limitation on variance of expression of certain inherited characteristics.

caregiver burnout Condition of physical, mental, and emotional exhaustion affecting adults who provide continuous care for sick or aged persons.

case study Study of a single subject, such as an individual or family.

cataracts Cloudy or opaque areas in the lens of the eye, which cause blurred vision.

cell death In brain development, normal elimination of excess brain cells to achieve more efficient functioning.

central executive In Baddeley's model, element of working memory that controls the processing of information.

central nervous system Brain and spinal cord.

centration In Piaget's theory, the tendency of preoperational children to focus on one aspect of a situation and neglect others.

cephalocaudal principle Principle that development proceeds in a head-to-tail direction, that is, that upper parts of the body develop before lower parts of the trunk.

cesarean delivery Delivery of a baby by surgical removal from the uterus.

child-directed speech (CDS) Form of speech often used in talking to babies or toddlers; includes slow, simplified speech, a high-pitched tone, exaggerated vowel sounds, short words and sentences, and much repetition; also called *parentese* or *motherese*.

childhood depression Mood disorder characterized by such symptoms as a prolonged sense of friendlessness, inability to have fun or concentrate, fatigue, extreme activity or apathy, feelings of worthlessness, weight change, physical complaints, and thoughts of death or suicide.

chromosomes Coils of DNA that consist of genes.

chronic medical conditions Illnesses or impairments that persist for at least 3 months.

circular reactions Piaget's term for processes by which an infant learns to reproduce desired occurrences originally discovered by chance.

classical conditioning Learning based on associating a stimulus that does not ordinarily elicit a response with another stimulus that does elicit the response.

class inclusion Understanding of the relationship between a whole and its parts.

code mixing Use of elements of two languages, sometimes in the same utterance, by young children in households where both languages are spoken.

code switching Changing one's speech to match the situation, as in people who are bilingual.

cognitive-appraisal model Model of coping, proposed by Lazarus and Folkman, that holds that, on the basis of continuous appraisal of their relationship with the environment, people choose appropriate coping strategies to deal with situations that tax their normal resources.

cognitive development Pattern of change in mental abilities, such as learning, attention, memory, language, thinking, reasoning, and creativity.

cognitive neuroscience Study of links between neural processes and cognitive abilities.

cognitive neuroscience approach Approach to the study of cognitive development that links brain processes with cognitive ones.

cognitive perspective View that thought processes are central to development.

cognitive reserve Hypothesized fund of energy that may enable a deteriorating brain to continue to function normally.

cognitive-stage theory Piaget's theory that children's cognitive development advances in a series of four stages involving qualitatively distinct types of mental operations.

cohort A group of people born at about the same time.

commitment Marcia's term for personal investment in an occupation or system of beliefs.

committed compliance Kochanska's term for wholehearted obedience of a parent's orders without reminders or lapses.

componential element Sternberg's term for the analytic aspect of intelligence.

concordant Term describing tendency of twins to share the same trait or disorder.

concrete operations Third stage of Piagetian cognitive development (approximately ages 7 to 12), during which children develop logical but not abstract thinking.

conduct disorder (CD) Repetitive, persistent pattern of aggressive, antisocial behavior violating societal norms or the rights of others.

conscience Internal standards of behavior, which usually control one's conduct and produce emotional discomfort when violated.

conservation Piaget's term for awareness that two objects that are equal according to a certain measure remain equal in the face of perceptual alteration so long as nothing has been added to or taken away from either object.

constructive play Play involving use of objects or materials to make something.

contextual element Sternberg's term for the practical aspect of intelligence.

contextual perspective View of human development that sees the individual as inseparable from the social context.

continuity theory Theory of aging, described by Atchley, that holds that in order to age successfully people must maintain a balance of continuity and change in both the internal and external structures of their lives.

control group In an experiment, a group of people, similar to those in the experimental group, who do not receive the treatment under study.

conventional morality (or morality of conventional role conformity) Second level in Kohlberg's theory of moral reasoning in which standards of authority figures are internalized.

convergent thinking Thinking aimed at finding the one right answer to a problem.

coping Adaptive thinking or behavior aimed at reducing or relieving stress that arises from harmful, threatening, or challenging conditions.

coregulation Transitional stage in the control of behavior in which parents exercise general supervision and children exercise moment-to-moment self-regulation.

corporal punishment Use of physical force with the intention of causing pain but not injury so as to correct or control behavior.

correlational study Research design intended to discover whether a statistical relationship between variables exists.

creativity Ability to see situations in a new way, to produce innovations, or to discern previously unidentified problems and find novel solutions.

crisis Marcia's term for period of conscious decision making related to identity formation.

critical period Specific time when a given event or its absence has a specific impact on development.

cross-modal transfer Ability to use information gained by one sense to guide another.

cross-sectional study Study designed to assess age-related differences, in which people of different ages are assessed on one occasion.

crystallized intelligence Type of intelligence, proposed by Horn and Cattell, involving the ability to remember and use learned information; it is largely dependent on education and culture.

cultural socialization Parental practices that teach children about their racial/ethnic heritage and promote cultural practices and cultural pride.

culture A society's or group's total way of life, including customs, traditions, beliefs, values, language, and physical products—all learned behavior, passed on from parents to children.

culture-fair tests Intelligence tests that deal with experiences common to various cultures, in an attempt to avoid cultural bias.

culture-free tests Intelligence tests that, if they were possible to design, would have no culturally linked content.

decenter In Piaget's terminology, to think simultaneously about several aspects of a situation.

decoding Process of phonetic analysis by which a printed word is converted to spoken form before retrieval from long-term memory.

deductive reasoning Type of logical reasoning that moves from a general premise about a class to a conclusion about a particular member or members of the class.

deferred imitation Piaget's term for reproduction of an observed behavior after the passage of time by calling up a stored symbol of it.

dementia Deterioration in cognitive and behavioral functioning due to physiological causes.

Denver Developmental Screening Test Screening test given to children 1 month to 6 years old to determine whether they are developing normally.

deoxyribonucleic acid (DNA) Chemical that carries inherited instructions for the development of all cellular forms of life.

dependent variable In an experiment, the condition that may or may not change as a result of changes in the independent variable.

depth perception Ability to perceive objects and surfaces three-dimensionally.

diabetes (1) One of the most common diseases of childhood. It is characterized by high levels of glucose in the blood as a result of defective insulin production, ineffective insulin action, or both. (2) Disease in which the body does not produce or properly use *insulin,* a hormone that converts sugar, starches, and other foods into energy needed for daily life.

differentiation Process by which cells acquire specialized structures and functions.

"difficult" children Children with irritable temperament, irregular biological rhythms, and intense emotional responses.

discipline Methods of molding children's character and of teaching them to exercise self-control and engage in acceptable behavior.

disengagement theory Theory of aging that holds that successful aging is characterized by mutual withdrawal of the older person and society.

dishabituation Increase in responsiveness after presentation of a new stimulus.

disorganized-disoriented attachment Pattern in which an infant, after separation from the primary caregiver, shows contradictory, repetitious, or misdirected behaviors on his or her return.

divergent thinking Thinking that produces a variety of fresh, diverse possibilities.

dizygotic twins Twins conceived by the union of two different ova (or a single ovum that has split) with two different sperm cells; also called *fraternal twins*; they are no more alike genetically than any other siblings.

dominant inheritance Pattern of inheritance in which, when a child receives different alleles, only the dominant one is expressed.

doula An experienced mentor who furnishes emotional support and information for a woman during labor.

Down syndrome Chromosomal disorder characterized by moderate-to-severe mental retardation and by such physical signs as a downward-sloping skin fold at the inner corners of the eyes. Also called *trisomy-21.*

dramatic play Play involving imaginary people or situations; also called *pretend play, fantasy play,* or *imaginative play*.

drug therapy Administration of drugs to treat emotional disorders.

dual representation hypothesis Proposal that children under age 3 have difficulty grasping spatial relationships because of the need to keep more than one mental representation in mind at the same time.

durable power of attorney Legal instrument that appoints an individual to make decisions in the event of another person's incapacitation.

dynamic systems theory (DST) Esther Thelen's theory, which holds that motor development is a dynamic process of active coordination of multiple systems within the infant in relation to the environment.

dynamic tests Tests based on Vygotsky's theory that emphasize potential rather than past learning.

dyslexia Developmental disorder in which reading achievement is substantially lower than predicted by IQ or age.

early intervention Systematic process of providing services to help families meet young children's developmental needs.

"easy" children Children with a generally happy temperament, regular biological rhythms, and a readiness to accept new experiences.

ecological theory of perception Theory developed by Eleanor and James Gibson, which describes developing motor and perceptual abilities as interdependent parts

of a functional system that guides behavior in varying contexts.

egocentrism Piaget's term for inability to consider another person's point of view; a characteristic of young children's thought.

ego control Self-control and the self-regulation of impulses.

ego integrity versus despair According to Erikson, the eighth and final stage of psychosocial development, in which people in late adulthood either achieve a sense of integrity of the self by accepting the lives they have lived, and thus accept death, or yield to despair that their lives cannot be relived.

ego resiliency (1) Dynamic capacity to modify one's level of ego-control in response to environmental and contextual influences. (2) The ability to adapt flexibly and resourcefully to potential sources of stress.

elaboration Mnemonic strategy of making mental associations involving items to be remembered.

electronic fetal monitoring Mechanical monitoring of fetal heartbeat during labor and delivery.

embryonic stage Second stage of gestation (2 to 8 weeks), characterized by rapid growth and development of major body systems and organs.

emergent literacy Preschoolers' development of skills, knowledge, and attitudes that underlie reading and writing.

emerging adulthood Proposed transitional period between adolescence and adulthood commonly found in industrialized countries.

emotional intelligence (EI) Salovey and Mayer's term for the ability to understand and regulate emotions; an important component of effective, intelligent behavior.

emotional maltreatment Rejection, terrorization, isolation, exploitation, degradation, ridicule, or failure to provide emotional support, love, and affection; or other action or inaction that may cause behavioral, cognitive, emotional, or mental disorders.

emotion-focused coping In the cognitive-appraisal model, coping strategy directed toward managing the emotional response to a stressful situation so as to lessen its physical or psychological impact.

emotions Subjective reactions to experience that are associated with physiological and behavioral changes.

empathy Ability to put oneself in another person's place and feel what the other person feels.

empty nest Transitional phase of parenting following the last child's leaving the parents' home.

encapsulation In Hoyer's terminology, the process that allows expertise to compensate for declines in information-processing ability by bundling relevant knowledge together.

encoding Process by which information is prepared for long-term storage and later retrieval.

English-immersion approach Approach to teaching English as a second language in which instruction is presented only in English.

enrichment programs Programs for educating the gifted that broaden and deepen knowledge and skills through extra activities, projects, field trips, or mentoring.

enuresis Repeated urination in clothing or in bed.

environment Totality of nonhereditary, or experiential, influences on development.

epigenesis Mechanism that turns genes on or off and determines functions of body cells.

episodic memory Long-term memory of specific experiences or events, linked to time and place.

equilibration Piaget's term for the tendency to seek a stable balance among cognitive elements; achieved through a balance between assimilation and accommodation.

erectile dysfunction Inability of a man to achieve or maintain an erect penis sufficient for satisfactory sexual performance.

ethnic gloss Overgeneralization about an ethnic or cultural group that obscures differences within the group.

ethnic group A group united by ancestry, race, religion, language, or national origins, which contribute to a sense of shared identity.

ethnographic study In-depth study of a culture, which uses a combination of methods including participant observation.

ethology Study of distinctive adaptive behaviors of species of animals that have evolved to increase survival of the species.

evolutionary psychology Application of Darwinian principles of natural selection and survival of the fittest to individual behavior.

evolutionary/sociobiological perspective View of human development that focuses on evolutionary and biological bases of behavior.

executive function Conscious control of thoughts, emotions, and actions to accomplish goals or solve problems.

experiential element Sternberg's term for the insightful or creative aspect of intelligence.

experiment Rigorously controlled, replicable procedure in which the researcher manipulates variables to assess the effect of one on the other.

experimental group In an experiment, the group receiving the treatment under study.

explicit memory Intentional and conscious memory, generally of facts, names, and events.

extended family Multigenerational kinship network of parents, children, and other relatives, sometimes living together in an extended-family household.

externalizing behaviors Behaviors by which a child acts out emotional difficulties; for example, aggression or hostility.

external memory aids Mnemonic strategies using something outside the person.

family therapy Psychological treatment in which a therapist sees the whole family together to analyze patterns of family functioning.

fast mapping Process by which a child absorbs the meaning of a new word after hearing it once or twice in conversation.

fertilization Union of sperm and ovum to produce a zygote; also called *conception*.

fetal alcohol syndrome (FAS) Combination of mental, motor, and developmental abnormalities affecting the offspring of some women who drink heavily during pregnancy.

fetal stage Final stage of gestation (from 8 weeks to birth), characterized by increased differentiation of body parts and greatly enlarged body size.

fictive kin Friends who are considered and behave like family members.

fidelity Sustained loyalty, faith, or sense of belonging that results from the successful resolution of Erikson's *identity versus identity confusion* psychosocial stage of development.

filial crisis In Marcoen's terminology, normative development of middle age, in which adults learn to balance love and duty to their parents with autonomy within a two-way relationship.

fine motor skills Physical skills that involve the small muscles and eye–hand coordination.

five-factor model Theoretical model of personality, developed and tested by Costa and McCrae, based on the "Big Five" factors underlying clusters of related personality traits: neuroticism, extraversion, openness to experience, conscientiousness, and agreeableness.

fluid intelligence Type of intelligence, proposed by Horn and Cattell, that is applied to novel problems and is relatively independent of educational and cultural influences.

foreclosure Identity status, described by Marcia, in which a person who has not spent time considering alternatives (that is, has not been in crisis) is committed to other people's plans for his or her life.

formal games with rules Organized games with known procedures and penalties.

formal operations Piaget's final stage of cognitive development, characterized by the ability to think abstractly.

free radicals Unstable, highly reactive atoms or molecules, formed during metabolism, that can cause internal bodily damage.

functional age Measure of a person's ability to function effectively in his or her physical and social environment in comparison with others of the same chronological age.

functional fitness The ability to perform the physical activities of daily living.

functional play Play involving repetitive large muscular movements.

gender Significance of being male or female.

gender constancy Awareness that one will always be male or female; also called *sex-category constancy.*

gender identity Awareness, developed in early childhood, that one is male or female.

gender roles Behaviors, interests, attitudes, skills, and traits that a culture considers appropriate for each sex; differ for males and females.

gender-schema theory Theory, proposed by Bem, that children socialize themselves in their gender roles by developing a mentally organized network of information about what it means to be male or female in a particular culture.

gender segregation Tendency to select playmates of one's own gender.

gender stereotypes Preconceived generalizations about male or female role behavior.

gender-typing Socialization process by which children, at an early age, learn appropriate gender roles.

generalized anxiety disorder Anxiety not focused on any single target.

generativity Erikson's term for concern of mature adults for finding meaning through contributing to society and leaving a legacy for future generations.

generativity versus stagnation Erikson's seventh stage of psychosocial development, in which the middle-aged adult develops a concern with establishing, guiding, and influencing the next generation or else experiences stagnation (a sense of inactivity or lifelessness).

generic memory Memory that produces scripts of familiar routines to guide behavior.

genes Small segments of DNA located in definite positions on particular chromosomes; functional units of heredity.

genetic code Sequence of bases within the DNA molecule; governs the formation of proteins that determine the structure and functions of living cells.

genetic counseling Clinical service that advises prospective parents of their probable risk of having children with hereditary defects.

genetic-programming theories Theories that explain biological aging as resulting from a genetically determined developmental timetable.

genotype Genetic makeup of a person, containing both expressed and unexpressed characteristics.

genotype-environment correlation Tendency of certain genetic and environmental influences to reinforce each other; may be passive, reactive (evocative), or active. Also called *genotype-environment covariance.*

genotype-environment interaction The portion of phenotypic variation that results from the reactions of genetically different individuals to similar environmental conditions.

geriatrics Branch of medicine concerned with processes of aging and medical conditions associated with old age.

germinal stage First 2 weeks of prenatal development, characterized by rapid cell division, blastocyst formation, and implantation in the wall of the uterus.

gerontology Study of the aged and the process of aging.

gestation Period of development between conception and birth.

gestational age Age of an unborn baby, usually dated from the first day of an expectant mother's last menstrual cycle.

glaucoma Irreversible damage to the optic nerve caused by increased pressure in the eye.

goodness of fit Appropriateness of environmental demands and constraints to a child's temperament.

grief Emotional response experienced in the early phases of bereavement.

grief work Working out of psychological issues connected with grief.

gross motor skills Physical skills that involve the large muscles.

guided participation Adult's participation in a child's activity that helps to structure it and bring the child's understanding of it closer to the adult's.

habituation Type of learning in which familiarity with a stimulus reduces, slows, or stops a response.

handedness Preference for using a particular hand.

haptic perception Ability to acquire information about properties of objects, such as size, weight, and texture, by handling them.

Hayflick limit Genetically controlled limit, proposed by Hayflick, on the number of times cells can divide in members of a species.

heredity Inborn traits or characteristics inherited from the biological parents.

heritability Statistical estimate of contribution of heredity to individual differences in a specific trait within a given population.

heterozygous Possessing differing alleles for a trait.

historical generation A group of people strongly influenced by a major historical event during their formative period.

holophrase Single word that conveys a complete thought.

Home Observation for Measurement of the Environment (HOME) Instrument to measure the influence of the home environment on children's cognitive growth.

homozygous Possessing two identical alleles for a trait.

hormone therapy (HT) Treatment with artificial estrogen, sometimes in combination with the hormone progesterone, to relieve or prevent symptoms caused by decline in estrogen levels after menopause.

hospice care Personal, patient- and family-centered care for a person with a terminal illness.

hostile attribution bias Tendency to perceive others as trying to hurt one and to strike out in retaliation or self-defense.

human development Scientific study of processes of change and stability throughout the human life span.

human genome Complete sequence of genes in the human body.

hypertension Chronically high blood pressure.

hypotheses Possible explanations for phenomena, used to predict the outcome of research.

hypothetical-deductive reasoning Ability, believed by Piaget, to accompany the stage of formal operations, to develop, consider, and test hypotheses.

ideal self The self one would like to be.

identification In Freudian theory, the process by which a young child adopts characteristics, beliefs, attitudes, values, and behaviors of the parent of the same sex.

identity According to Erikson, a coherent conception of the self, made up of goals, values, and beliefs to which a person is solidly committed.

identity accommodation Whitbourne's term for adjusting the self-concept to fit new experience.

identity achievement Identity status, described by Marcia, that is characterized by commitment to choices made following a crisis, a period spent in exploring alternatives.

identity assimilation Whitbourne's term for effort to fit new experience into an existing self-concept.

identity balance Whitbourne's term for a tendency to balance assimilation and accommodation.

identity diffusion Identity status, described by Marcia, that is characterized by absence of commitment and lack of serious consideration of alternatives.

identity process theory (IPT) Whitbourne's theory of identity development based on processes of assimilation and accommodation.

identity schemas Accumulated perceptions of the self shaped by incoming information from intimate relationships, work-related situations, and community and other experiences.

identity versus identity confusion Erikson's fifth stage of psychosocial development, in which an adolescent seeks to develop a coherent sense of self, including the role she or he is to play in society. Also called *identity versus role confusion.*

implantation The attachment of the blastocyst to the uterine wall, occurring at about day 6.

implicit memory Unconscious recall, generally of habits and skills; sometimes called *procedural memory.*

imprinting Instinctive form of learning in which, during a critical period in early development, a young animal forms an attachment to the first moving object it sees, usually the mother.

incomplete dominance Pattern of inheritance in which a child receives two different alleles, resulting in partial expression of a trait.

independent variable In an experiment, the condition over which the experimenter has direct control.

individual differences Differences in characteristics, influences, or developmental outcomes.

individual psychotherapy Psychological treatment in which a therapist sees a troubled person one-on-one.

inductive reasoning Type of logical reasoning that moves from particular observations about members of a class to a general conclusion about that class.

inductive techniques Disciplinary techniques designed to induce desirable behavior by appealing to a child's sense of reason and fairness.

industry versus inferiority Erikson's fourth stage of psychosocial development, in which children must learn the productive skills their culture requires or else face feelings of inferiority.

infant mortality rate Proportion of babies born alive who die within the 1st year.

infertility Inability to conceive a child after 12 months of sexual intercourse without the use of birth control.

information-processing approach (1) Approach to the study of cognitive development by observing and analyzing the mental processes involved in perceiving and handling information. (2) Approach to the study of cognitive development that analyzes processes involved in perceiving and handling information.

initiative versus guilt Erikson's third stage in psychosocial development, in which children balance the urge to pursue goals with reservations about doing so.

instrumental aggression Aggressive behavior used as a means of achieving a goal.

integration Process by which neurons coordinate the activities of muscle groups.

intellectual disability Significantly subnormal cognitive functioning. Also referred to as cognitive disability or mental retardation.

intelligent behavior Behavior that is goal oriented and adaptive to circumstances and conditions of life.

internalization During socialization, process by which children accept societal standards of conduct as their own.

internalizing behaviors Behaviors by which emotional problems are turned inward; for example, anxiety or depression.

intimacy versus isolation Erikson's sixth stage of psychosocial development, in which young adults either form strong, long-lasting bonds with friends and romantic partners or face a possible sense of isolation and self-absorption.

IQ (intelligence quotient) tests Psychometric tests that seek to measure intelligence by comparing a test-taker's performance with standardized norms.

irreversibility Piaget's term for a preoperational child's failure to understand that an operation can go in two or more directions.

joint attention A shared attentional focus, typically initiated with eye gaze or pointing.

kangaroo care Method of skin-to-skin contact in which a newborn is laid face down between the mother's breasts for an hour or so at a time after birth.

Kaufman Assessment Battery for Children (K-ABC-II) Nontraditional individual intelligence test designed to provide fair assessments of minority children and children with disabilities.

kinship care Care of children living without parents in the home of grandparents or other relatives, with or without a change of legal custody.

laboratory observation Research method in which all participants are observed under the same controlled conditions.

language Communication system based on words and grammar.

language acquisition device (LAD) In Chomsky's terminology, an inborn mechanism that enables children to infer linguistic rules from the language they hear.

lateralization Tendency of each of the brain's hemispheres to have specialized functions.

learning disabilities (LDs) Disorders that interfere with specific aspects of learning and school achievement.

learning perspective View of human development that holds that changes in behavior result from experience or from adaptation to the environment.

life expectancy Age to which a person in a particular cohort is statistically likely to live (given his or her current age and health status), on the basis of average longevity of a population.

life review Reminiscence about one's life in order to see its significance.

life span The longest period that members of a species can live.

life-span development Concept of human development as a lifelong process, which can be studied scientifically.

literacy (1) Ability to read and write. (2) In an adult, ability to use printed and written information to function in society, achieve goals, and develop knowledge and potential.

longevity Length of an individual's life.

longitudinal study Study designed to assess age changes in a sample over time.

long-term memory Storage of virtually unlimited capacity that holds information for long periods.

low-birth-weight babies Weight of less than 5½ pounds (2500 grams) at birth because of prematurity or being small- for-date.

mammography Diagnostic X-ray examination of the breasts.

marital capital Financial and emotional benefits built up during a long-standing marriage, which tend to hold a couple together.

maturation Unfolding of a natural sequence of physical and behavioral changes.

mechanistic model Model that views human development as a series of predictable responses to stimuli.

menarche Girl's first menstruation.

menopause Cessation of menstruation and of ability to bear children.

metacognition Thinking about thinking, or awareness of one's own mental processes.

metamemory Understanding of processes of memory.

midlife crisis In some normative-crisis models, stressful life period precipitated by the review and reevaluation of one's past, typically occurring in the early to middle 40s.

midlife review Introspective examination that often occurs in middle age, leading to reappraisal and revision of values and priorities.

mirror neurons Neurons that fire when a person does something or observes someone else doing the same thing.

mnemonic device Strategy to aid memory.

monozygotic twins Twins resulting from the division of a single zygote after fertilization; also called *identical twins*; they are genetically similar.

moratorium Identity status, described by Marcia, in which a person is currently considering alternatives (in crisis) and seems headed for commitment.

multifactorial transmission Combination of genetic and environmental factors to produce certain complex traits.

mutations Permanent alterations in genes or chromosomes that may produce harmful characteristics.

mutual regulation Process by which infant and caregiver communicate emotional states to each other and respond appropriately.

myelination Process of coating neural pathways with a fatty substance called myelin, which enables faster communication between cells.

myopia Nearsightedness.

nativism Theory that human beings have an inborn capacity for language acquisition.

natural childbirth Method of childbirth that seeks to prevent pain by eliminating the mother's fear through education about the physiology of reproduction and training in breathing and relaxation during delivery.

naturalistic observation Research method in which behavior is studied in natural settings without intervention or manipulation.

neglect Failure to meet a dependent's basic needs.

neonatal jaundice Condition, in many newborn babies, caused by immaturity of liver and evidenced by yellowish appearance; can cause brain damage if not treated promptly.

neonatal period First 4 weeks of life, a time of transition from intrauterine dependency to independent existence.

neonate Newborn baby, up to 4 weeks old.

neurofibrillary tangles Twisted masses of protein fibers found in brains of persons with Alzheimer's disease.

neurons Nerve cells.

niche-picking Tendency of a person, especially after early childhood, to seek out environments compatible with his or her genotype.

nonnormative Characteristic of an unusual event that happens to a particular person or a typical event that happens at an unusual time of life.

nonorganic failure to thrive Slowed or arrested physical growth with no known medical cause, accompanied by poor developmental and emotional functioning.

nonshared environmental effects The unique environment in which each child grows up, consisting of distinctive influences or influences that affect one child differently than another.

normative Characteristic of an event that occurs in a similar way for most people in a group.

normative life events In the timing-of-events model, commonly expected life experiences that occur at customary times.

normative-stage models Theoretical models that describe psychosocial development in terms of a definite sequence of age-related changes.

nuclear family Two-generational kinship, economic, and household unit consisting of one or two parents and their biological children, adopted children, or stepchildren.

obesity Extreme overweight in relation to age, sex, height, and body type as defined by having a body mass index at or above the 95th percentile.

object permanence Piaget's term for the understanding that a person or object still exists when out of sight.

observational learning Learning through watching the behavior of others.

obsessive-compulsive disorder (OCD) Anxiety aroused by repetitive, intrusive thoughts, images, or impulses, often leading to compulsive ritual behaviors.

operant conditioning (1) Learning based on association of behavior with its consequences. (2) Learning based on reinforcement or punishment.

operational definition Definition stated solely in terms of the operations or procedures used to produce or measure a phenomenon.

oppositional defiant disorder (ODD) Pattern of behavior, persisting into middle childhood, marked by negativity, hostility, and defiance.

organismic model Model that views human development as internally initiated by an active organism and as occurring in a sequence of qualitatively different stages.

organization (1) Piaget's term for the creation of categories or systems of knowledge. (2) Mnemonic strategy of categorizing material to be remembered.

osteoporosis Condition in which the bones become thin and brittle as a result of rapid calcium depletion.

Otis-Lennon School Ability Test (OLSAT 8) Group intelligence test for kindergarten through 12th grade.

overt (direct) aggression Aggression that is openly directed at its target.

palliative care Care aimed at relieving pain and suffering and allowing the terminally ill to die in peace, comfort, and dignity.

Parkinson's disease Progressive, irreversible degenerative neurological disorder, characterized by tremor, stiffness, slowed movement, and unstable posture.

participant observation Research method in which the observer lives with the people or participates in the activity being observed.

parturition The act or process of giving birth.

passive euthanasia Withholding or discontinuation of life-prolonging treatment of a terminally ill person in order to end suffering or allow death with dignity.

perimenopause Period of several years during which a woman experiences physiological changes of menopause; includes first year after end of menstruation; also called *climacteric.*

permissive parenting In Baumrind's terminology, parenting style emphasizing self-expression and self-regulation.

personality The relatively consistent blend of emotions, temperament, thought, and behavior that makes a person unique.

phenotype Observable characteristics of a person.

phonetic (code-emphasis) approach Approach to teaching reading that emphasizes decoding of unfamiliar words.

physical abuse Action taken deliberately to endanger another person, involving potential bodily injury.

physical development Growth of body and brain, including patterns of change in sensory capacities, motor skills, and health.

Piagetian approach Approach to the study of cognitive development that describes qualitative stages in cognitive functioning.

plasticity (1) Range of modifiability of performance. (2) Modifiability, or "molding," of the brain through experience.

play therapy Therapeutic approach that uses play to help a child cope with emotional distress.

polygenic inheritance Pattern of inheritance in which multiple genes at different sites on chromosomes affect a complex trait.

postconventional morality (or morality of autonomous moral principles) Third level of Kohlberg's theory of moral reasoning, in which people follow internally held moral principles and can decide among conflicting moral standards.

postformal thought Mature type of thinking that relies on subjective experience and intuition as well as logic and allows room for ambiguity, uncertainty, inconsistency, contradiction, imperfection, and compromise.

postmature A fetus not yet born as of 2 weeks after the due date or 42 weeks after the mother's last menstrual period.

power assertion Disciplinary strategy designed to discourage undesirable behavior through physical or verbal enforcement of parental control.

pragmatics (1) The practical knowledge needed to use language for communicative purposes. (2) The social context of language.

preconventional morality First level of Kohlberg's theory of moral reasoning in which control is external and rules are obeyed in order to gain rewards or avoid punishment or out of self-interest.

prejudice Unfavorable attitude toward members of certain groups outside one's own, especially racial or ethnic groups.

prelinguistic speech Forerunner of linguistic speech; utterance of sounds that are not words. Includes crying, cooing, babbling, and accidental and deliberate imitation of sounds without understanding their meaning.

premenstrual syndrome (PMS) Disorder producing symptoms of physical discomfort and emotional tension for up to 2 weeks before a menstrual period.

preoperational stage In Piaget's theory, the second major stage of cognitive development, in which symbolic thought expands but children cannot yet use logic.

prepared childbirth Method of childbirth that uses instruction, breathing exercises, and social support to induce controlled physical responses to uterine contractions and reduce fear and pain.

presbycusis Age-related, gradual loss of hearing, which accelerates after age 55, especially with regard to sounds at higher frequencies.

presbyopia Age-related, progressive loss of the eyes' ability to focus on nearby objects due to loss of elasticity in the lens.

pretend play Play involving imaginary people and situations; also called *fantasy play, dramatic play,* or *imaginative play.*

preterm (premature) infants Infants born before completing the 37th week of gestation.

primary aging Gradual, inevitable process of bodily deterioration throughout the life span.

primary sex characteristics Organs directly related to reproduction, which enlarge and mature during adolescence.

private speech Talking aloud to oneself with no intent to communicate with others.

problem-focused coping In the cognitive-appraisal model, coping strategy directed toward eliminating, managing, or improving a stressful situation.

procedural memory Long-term memory of motor skills, habits, and ways of doing things, which can be recalled without conscious effort; sometimes called *implicit memory.*

prosocial behavior Any voluntary behavior intended to help others.

protective factors Influences that reduce the impact of potentially negative influences and tend to predict positive outcomes.

proximodistal principle Principle that development proceeds from within to without, that is, that parts of the body near the center develop before the extremities.

psychoanalytic perspective View of human development as shaped by unconscious forces that motivate human behavior.

psychometric approach Approach to the study of cognitive development that seeks to measure intelligence quantitatively.

psychosexual development In Freudian theory, an unvarying sequence of stages of childhood personality development in which gratification shifts from the mouth to the anus and then to the genitals.

psychosocial development (1) Pattern of change in emotions, personality, and social relationships. (2) In Erikson's eight-stage theory, the socially and culturally influenced process of development of the ego, or self.

puberty Process by which a person attains sexual maturity and the ability to reproduce.

punishment The process by which a behavior is weakened, decreasing the likelihood of repetition.

qualitative change Discontinuous changes in kind, structure, or organization.

qualitative research Research that focuses on nonnumerical data, such as subjective experiences, feelings, or beliefs.

quantitative change Changes in number or amount, such as in height, weight, size of vocabulary, or frequency of communication.

quantitative research Research that deals with objectively measurable data.

random assignment Assignment of participants in an experiment to groups in such a way that each person has an equal chance of being placed in any group.

random selection Selection of a sample in such a way that each person in a population has an equal and independent chance of being chosen.

reaction range Potential variability, depending on environmental conditions, in the expression of a hereditary trait.

real self The self one actually is.
recall Ability to reproduce material from memory.
recentering Process that underlies the shift to an adult identity.
receptive cooperation Kochanska's term for eager willingness to cooperate harmoniously with a parent in daily interactions, including routines, chores, hygiene, and play.
recessive inheritance Pattern of inheritance in which a child receives identical recessive alleles, resulting in expression of a nondominant trait.
reciprocal determinism Bandura's term for bidirectional forces that affect development.
recognition Ability to identify a previously encountered stimulus.
reflective thinking Type of logical thinking that becomes more prominent in adulthood, involving continuous, active evaluation of information and beliefs in the light of evidence and implications.
reflex behaviors Automatic, involuntary, innate responses to stimulation.
rehearsal Mnemonic strategy to keep an item in working memory through conscious repetition.
reinforcement The process by which a behavior is strengthened, increasing the likelihood that the behavior will be repeated.
relational (social or indirect) aggression Aggression aimed at damaging or interfering with another person's relationships, reputation, or psychological well-being.
representational ability Piaget's term for capacity to store mental images or symbols of objects and events.
representational systems In neo-Piagetian terminology, the third stage in development of self-definition, characterized by breadth, balance, and the integration and assessment of various aspects of the self.
reserve capacity Ability of body organs and systems to put forth 4 to 10 times as much effort as usual under acute stress; also called *organ reserve.*
resilient children Children who weather adverse circumstances, function well despite challenges or threats, or bounce back from traumatic events.
retrieval Process by which information is accessed or recalled from memory storage.
revolving door syndrome Tendency for young adults who have left home to return to their parents' household in times of financial, marital, or other trouble.
risk factors Conditions that increase the likelihood of a negative developmental outcome.
risky drinking Consuming more than 14 drinks a week or 4 drinks on any single day for men, and more than 7 drinks a week or 3 drinks on any single day for women.
rough-and-tumble play Vigorous play involving wrestling, hitting, and chasing, often accompanied by laughing and screaming.
sample Group of participants chosen to represent the entire population under study.
sandwich generation Middle-aged adults squeezed by competing needs to raise or launch children and to care for elderly parents.
scaffolding Temporary support to help a child master a task.
schemes Piaget's term for organized patterns of thought and behavior used in particular situations.
schizophrenia Mental disorder marked by loss of contact with reality; symptoms include hallucinations and delusions.
school phobia Unrealistic fear of going to school; may be a form of *separation anxiety disorder* or *social phobia.*
scientific method System of established principles and processes of scientific inquiry, which includes identifying a problem to be studied, formulating a hypothesis to be tested by research, collecting data, analyzing the data, forming tentative conclusions, and disseminating findings.
script General remembered outline of a familiar, repeated event, used to guide behavior.
secondary aging Aging processes that result from disease and bodily abuse and disuse and are often preventable.
secondary sex characteristics Physiological signs of sexual maturation (such as breast development and growth of body hair) that do not involve the sex organs.
secular trend Trend that can be seen only by observing several generations, such as the trend toward earlier attainment of adult height and sexual maturity, which began a century ago in some countries.
secure attachment Pattern in which an infant is quickly and effectively able to obtain comfort from an attachment figure in the face of distress.
selective optimization with compensation (SOC) Enhancing overall cognitive functioning by using stronger abilities to compensate for those that have weakened.
self-awareness Realization that one's existence and functioning are separate from those of other people and things.
self-concept Sense of self; descriptive and evaluative mental picture of one's abilities and traits.
self-conscious emotions Emotions, such as embarrassment, empathy, and envy, that depend on self-awareness.
self-definition Cluster of characteristics used to describe oneself.
self-efficacy Sense of one's capability to master challenges and achieve goals.
self-esteem The judgment a person makes about his or her self-worth.
self-evaluative emotions Emotions, such as pride, shame, and guilt, that depend on both self-awareness and knowledge of socially accepted standards of behavior.
self-regulation A child's independent control of behavior to conform to understood social expectations.
semantic memory Long-term memory of general factual knowledge, social customs, and language.
senescence Period of the life span marked by declines in physical functioning usually associated with aging; begins at different ages for different people.
sensitive periods Times in development when a person is particularly open to certain kinds of experiences.
sensorimotor stage Piaget's first stage in cognitive development, in which infants learn through senses and motor activity.
sensory memory Initial, brief, temporary storage of sensory information.
separation anxiety Distress shown by someone, typically an infant, when a familiar caregiver leaves.
separation anxiety disorder Condition involving excessive, prolonged anxiety concerning separation from home or from people to whom a person is attached.
sequential study Study design that combines cross-sectional and longitudinal techniques.
seriation Ability to order items along a dimension.
sex chromosomes Pair of chromosomes that determines sex: XX in the normal human female, XY in the normal human male.
sex-linked inheritance Pattern of inheritance in which certain characteristics carried on the X chromosome inherited from the mother are transmitted differently to her male and female offspring.
sexual abuse Physically or psychologically harmful sexual activity or any sexual activity involving a child and an older person.

sexually transmitted infections (STIs) Infections and diseases spread by sexual contact.

sexual orientation Focus of consistent sexual, romantic, and affectionate interest, either heterosexual, homosexual, or bisexual.

shaken baby syndrome Form of maltreatment in which shaking an infant or toddler can cause brain damage, paralysis, or death.

situational compliance Kochanska's term for obedience of a parent's orders only in the presence of signs of ongoing parental control.

"slow-to-warm-up" children Children whose temperament is generally mild but who are hesitant about accepting new experiences.

small-for-date (small-for-gestational-age) infants Infants whose birth weight is less than that of 90 percent of babies of the same gestational age, as a result of slow fetal growth.

social capital Family and community resources on which a person can draw.

social clock Set of cultural norms or expectations for the times of life when certain important events, such as marriage, parenthood, entry into work, and retirement, should occur.

social cognition The ability to understand that others have mental states and to gauge their feelings and actions.

social cognitive theory Albert Bandura's expansion of social learning theory; holds that children learn gender roles through socialization.

social construction A concept or practice that may appear natural and obvious to those who accept it, but that in reality is an invention of a particular culture or society.

social-contextual approach Approach to the study of cognitive development that focuses on environmental influences, particularly parents and other caregivers.

social convoy theory Theory, proposed by Kahn and Antonucci, that people move through life surrounded by concentric circles of intimate relationships on which they rely for assistance, well-being, and social support.

social emotions Emotions involved in the regulation of social behavior that require self-awareness and the understanding of others' viewpoints.

social interaction model Model, based on Vygotsky's sociocultural theory, that proposes children construct autobiographical memories through conversation with adults about shared events.

socialization Development of habits, skills, values, and motives shared by responsible, productive members of a society.

social learning theory Theory that behaviors are learned by observing and imitating models. Also called *social cognitive theory.*

social phobia Extreme fear and/or avoidance of social situations.

social referencing Understanding an ambiguous situation by seeking another person's perception of it.

social smiling Beginning in the 2nd month, newborn infants gaze at their parents and smile at them, signaling positive participation in the relationship.

social speech Speech intended to be understood by a listener.

sociocultural theory Vygotsky's theory of how contextual factors affect children's development.

socioeconomic status (SES) Combination of economic and social factors describing an individual or family, including income, education, and occupation.

socioemotional selectivity theory Theory, proposed by Carstensen, that people select social contacts on the basis of the changing relative importance of social interaction as a source of information, as an aid in developing and maintaining a self-concept, and as a source of emotional well-being.

spermarche Boy's first ejaculation.

spillover hypothesis Hypothesis that there is a carryover of cognitive gains from work to leisure that explains the positive relationship between activities in the quality of intellectual functioning.

spontaneous abortion Natural expulsion from the uterus of an embryo that cannot survive outside the womb; also called *miscarriage.*

Stanford-Binet Intelligence Scales Individual intelligence tests for ages 2 and up used to measure fluid reasoning, knowledge, quantitative reasoning, visual-spatial processing, and working memory.

state of arousal An infant's physiological and behavioral status at a given moment in the periodic daily cycle of wakefulness, sleep, and activity.

stillbirth Death of a fetus at or after the 20th week of gestation.

storage Retention of information in memory for future use.

stranger anxiety Wariness of strange people and places, shown by some infants during the second half of the 1st year.

Strange Situation Laboratory technique used to study infant attachment.

stress (1) Physical or psychological demands on a person or organism. (2) Response to physical or psychological demands.

stressors Perceived environmental demands that may produce stress.

substance abuse Repeated, harmful use of a substance, usually alcohol or other drugs.

substance dependence Addiction (physical, or psychological, or both) to a harmful substance.

substantive complexity Degree to which a person's work requires thought and independent judgment.

sudden infant death syndrome (SIDS) Sudden and unexplained death of an apparently healthy infant.

survival curve A curve on a graph showing the percentage of people or animals alive at various ages.

symbolic function Piaget's term for ability to use mental representations (words, numbers, or images) to which a child has attached meaning.

syntax Rules for forming sentences in a particular language.

systems of action Increasingly complex combinations of motor skills, which permit a wider or more precise range of movement and more control of the environment.

tacit knowledge Sternberg's term for information that is not formally taught but is necessary to get ahead.

telegraphic speech Early form of sentence use consisting of only a few essential words.

temperament Characteristic disposition, or style of approaching and reacting to situations.

teratogen Environmental agent, such as a virus, a drug, or radiation, that can interfere with normal prenatal development and cause developmental abnormalities.

terminal drop A frequently observed decline in cognitive abilities near the end of life. Also called *terminal decline.*

thanatology Study of death and dying.

theory Coherent set of logically related concepts that seeks to organize, explain, and predict data.

theory of mind Awareness and understanding of mental processes.

theory of multiple intelligences Gardner's theory that each person has several distinct forms of intelligence.

theory of sexual selection Darwin's theory that gender roles developed in response to men's and women's differing reproductive needs.

timing-of-events model Theoretical model of personality development that describes adult psychosocial development as a response to the expected or unexpected occurrence and timing of important life events.

trait models Theoretical models of personality development that focus on mental, emotional, temperamental, and behavioral traits, or attributes.

transduction Piaget's term for a preoperational child's tendency to mentally link particular phenomena, whether or not there is logically a causal relationship.

transitive inference Understanding the relationship between two objects by knowing the relationship of each to a third object.

triangular theory of love Sternberg's theory that patterns of love hinge on the balance among three elements: intimacy, passion, and commitment.

triarchic theory of intelligence Sternberg's theory describing three elements of intelligence: componential, experiential, and contextual.

turning points Psychological transitions that involve significant change or transformation in the perceived meaning, purpose, or direction of a person's life.

two-way (dual-language) learning Approach to second-language education in which English speakers and non-English-speakers learn together in their own and each other's languages.

typological approach Theoretical approach that identifies broad personality types, or styles.

ultrasound Prenatal medical procedure using high-frequency sound waves to detect the outline of a fetus and its movements, so as to determine whether a pregnancy is progressing normally.

variable-rate theories Theories that explain biological aging as a result of processes that involve damage to biological systems and that vary from person to person.

violation-of-expectations Research method in which dishabituation to a stimulus that conflicts with experience is taken as evidence that an infant recognizes the new stimulus as surprising.

visual cliff Apparatus designed to give an illusion of depth and used to assess depth perception in infants.

visual guidance Use of the eyes to guide movements of the hands or other parts of the body.

visually based retrieval Process of retrieving the sound of a printed word when seeing the word as a whole.

visual preference Tendency of infants to spend more time looking at one sight than another.

visual recognition memory Ability to distinguish a familiar visual stimulus from an unfamiliar one when shown both at the same time.

vital capacity Amount of air that can be drawn in with a deep breath and expelled.

Wechsler Adult Intelligence Scale (WAIS) Intelligence test for adults that yields verbal and performance scores as well as a combined score.

Wechsler Intelligence Scale for Children (WISC-IV) Individual intelligence test for school-age children, which yields verbal and performance scores as well as a combined score.

Wechsler Preschool and Primary Scale of Intelligence, Revised (WPPSI-IV) Individual intelligence test for children ages 2½ to 7 that yields verbal and performance scores as well as a combined score.

whole-language approach Approach to teaching reading that emphasizes visual retrieval and use of contextual clues.

withdrawal of love Disciplinary strategy that involves ignoring, isolating, or showing dislike for a child.

working memory Short-term storage of information being actively processed.

zone of proximal development (ZPD) Vygotsky's term for the difference between what a child can do alone and what the child can do with help.

zygote One-celled organism resulting from fertilization.

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