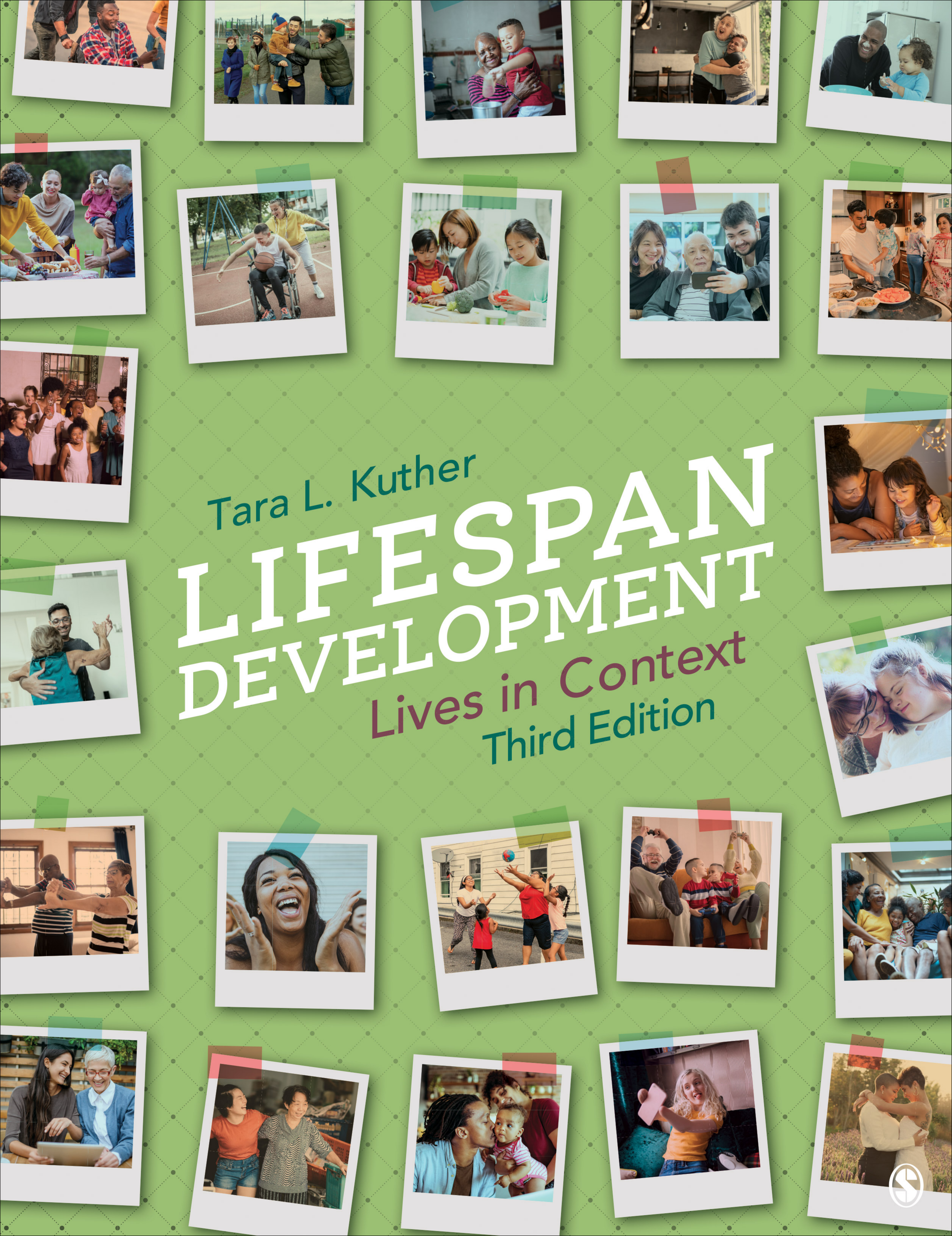


Tara L. Kuther

# LIFESPAN DEVELOPMENT

Lives in Context  
Third Edition



# Lifespan Development

Third Edition

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*To my parents, Philip and Irene Kuther*

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# Lifespan Development

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Third Edition

Tara L. Kuther



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# PREFACE

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*Lifespan Development: Lives in Context* is the result of 25 years of classroom discussions with students about the nature of development during our lifetime. Many students find lifespan development inherently interesting as they have observed, experienced, or anticipate experiencing the topics we discuss. Sharing observations and personal experiences is fun and engaging. But sometimes our individual experiences don't completely match the theoretical and research conclusions we discuss. How do we make sense of the differences? In class, as well as in this text, I adopt a contextual perspective to help students understand variability in development and to make sense of the growing body of findings in lifespan development.

## THEMES: CONTEXT AND APPLICATION

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*Lifespan Development: Lives in Context* focuses on two key themes that promote understanding of how humans develop through the lifespan: the centrality of context and the applied value of developmental science. These two themes are highlighted throughout the text as well as in critical thinking features. In addition, an accessible writing style helps students to grasp these complex issues.

### Contextual Perspective

The most central tenet of development is that it occurs in context. At all points in life, human development is the result of dynamic transactions among individuals, their physical, cognitive, and socioemotional capacities, and the web of interacting contexts in which they are immersed, such as family, peers, school, neighborhood, society, culture, and history. *Lifespan Development: Lives in Context* discusses these processes, emphasizing how individual factors combine with the people, places, circumstances, and time in which we live to influence development. A contextual approach can provide the backstory to development and help us understand why individuals vary. In addition, the emerging body of research on intersectionality in development offers opportunities to shed light on these complex processes and their role in development.

This contextual theme is infused throughout the text and highlighted specifically in critical thinking questions that appear at the end of each section. *Thinking in Context: Biological Influences* items ask students to consider how biological factors, such as brain development, physical development, and health, interact with context to produce developmental outcomes. *Thinking in Context: Lifespan Development* items examine developmental theory and themes, including applying Bronfenbrenner's bioecological systems theory to understand real-world problems, as well as the role of culture in development. New to this third edition is an expansion of discussions of diversity to consider intersectionality and its impact on the development of children, adolescents, and adults. *Thinking in Context: Intersectionality* calls attention to the ways in which race, ethnicity, gender, sexual orientation, and socioeconomic status overlap to determine opportunities and outcomes.

### Applied Emphasis

The field of lifespan developmental science is unique because so much of its content has immediate relevance to our daily lives. Students may wonder: Do the first 3 years shape the brain for a lifetime of experiences? Is learning more than one language beneficial to children? Do people's personalities change over their lifetimes? Do adults go through a midlife crisis? How common is dementia in older adulthood? Moreover, findings from lifespan developmental science have been applied to inform social policies that affect us all. *Lifespan Development: Lives in Context* engages students by exploring these

and many more real-world questions. This theme is integrated throughout the text and highlighted specifically in a fourth type of end-of-section critical thinking question. *Thinking in Context: Applied Developmental Science* items ask students to apply the course content by considering cases, designing research studies, and explaining the material to different audiences and contexts. An *Apply Your Knowledge* case appears at the end of each chapter. These cases invite students to consider how the content may be applied to a realistic scenario.

### Accessible Writing Style

Having taught at a regional public university since 1996, I write in a style intended to engage diverse undergraduate readers like my own students. I attempt to write in the same voice as I teach, carefully structuring sections to build explanations and integrating content with examples that are relevant to students. I regularly use my own texts in class, students work with me in preparing elements of each text, and my students' responses and learning guide my writing. My experience teaching 12 courses during the COVID-19 pandemic in Spring 2020 and the 2020–2021 academic year reinforced (for me) the importance of accessible, concise textbooks. Like many faculty, I was able to record only so many videos for my asynchronous classes, so I relied heavily on my text, asynchronous discussion posts, and, for the classes where available, SAGE Vantage, which enabled students to interactively read the text.

## PEDAGOGICAL FEATURES

My day-to-day experiences in the classroom have helped me to keep college students' interests and abilities at the forefront. Unlike many textbook authors, I teach four classes each semester (and have done so for 25 years). I taught my first online course in 2002. My daily exposure to multiple classes and many students helps keep me grounded in the ever-changing concerns and interests of college students. I teach a diverse group of students. Some live on campus but most commute. Most of my students are ages 18 to 24, but my classes also include many so-called adult learners over the age of 24. Many are veterans, a rapidly increasing population at my institution with unique perspectives and needs. I have many opportunities to try new examples and activities. I believe that what works in my classroom will be helpful to readers and instructors. I use the pedagogical elements of *Lifespan Development: Lives in Context* in my own classes and modify them based on my experiences.

### Critical Thinking Questions

In March 2020, my institution, like most in the United States, suddenly transitioned to an entirely online campus. Like many faculty across the country and world, I taught my four-course load entirely online during the 2020–2021 academic year. Interacting with students in many asynchronous courses (sprinkled with a small handful of classes that met partially on Zoom) inspired the expansion of my critical thinking feature *Thinking in Context* to include four types of items that highlight critical themes in developmental science. *Thinking in Context* items encourage readers to compare concepts, apply theoretical perspectives, and consider applications of the research findings presented. They appear at the end of each main section within each chapter and highlight the following previously described themes:

- Thinking in Context: Biological Influences
- Thinking in Context: Lifespan Development
- Thinking in Context: Applied Developmental Science
- Thinking in Context: Intersectionality

## Case-Based Application

Each chapter closes with a case scenario, *Applying Your Knowledge*, followed by in-depth questions that require students to apply their understanding to address a particular situation or problem.

## Learning Objectives and Summaries

Core learning objectives at the beginning of each section provide clear goals for readers. The end-of-chapter summary returns to each Learning Objective, recapping the key concepts presented in the chapter related to that objective. In this third edition, many learning objectives were revised to guide students' reading more closely. In some chapters, learning objectives were added to break material down into more manageable chunks for students as well as to highlight new material.

## Careers Related to Developmental Science

To say that my students are interested in careers—what they will do after college—is an understatement. Students often don't know where to begin in considering possible careers. This third edition includes a new applied feature, *Lifespan Development at Work*, which introduces students to over 35 careers that are related to or benefit from an understanding of developmental science. Beginning with a discussion of transferrable skills and fields, this feature appears at the end of each part: Beginnings, Infancy, Early Childhood, Middle Childhood, Adolescence, Early Adulthood, Middle Adulthood, Late Adulthood, and Death.

## WHAT'S NEW IN LIFESPAN DEVELOPMENT: LIVES IN CONTEXT, 3E?

I approached writing the third edition of *Lifespan Development: Lives in Context* with three goals:

- 1. Increase the coverage of context, examine development through an intersectional lens, and present an integrated view of development.**

I addressed this multifaceted goal by adding findings and sections covering contextual and intersectional influences, as available, throughout each chapter. A new section of Chapter 1 defines intersectionality and its value for understanding development. I explain that the developmental science literature on intersectionality is in its infancy but rapidly growing. I include information about the interrelations of ethnicity, race, gender, sexuality, socioeconomic status, and more, as available. The *Thinking in Context: Intersectionality* critical thinking items encourage students to examine development through an intersectional lens.

Also, I have removed thematic boxes from this third edition in the interest of presenting an integrated view of development. Boxed content, set apart from the text, can send the unintended message that it is not as important as the text and can be skipped. When boxed features cover themes such as the role of culture, biology, or intersectionality, it may imply that these concepts are not part of “normal” development. In this third addition, context, culture, biology, intersectionality, and application are all infused throughout the text rather than relegated to boxes. To call students' attention to these critical themes, an expanded set of *Thinking in Context* items focus on biology, context, intersectionality, and application and appear within each chapter, as previously described.

- 2. Update the text to include the most current research to date.**

Our knowledge of human development is rapidly expanding. My goal was to select, highlight, and integrate cutting-edge findings with existing theory and research. Because new research has its foundation in classic work, I integrate the two to present a unified story of what is currently known in developmental science. The third edition includes over 2,000 references published since 2018, including over 700 published since 2020.

### 3. Increase coverage while retaining length.

My goal for this third edition was to increase coverage of current research and expand several sections in each chapter to better cover relevant developmental issues (such as the opioid epidemic, spirituality, civic development and critical consciousness, and the experience of discrimination). Despite these additions, the overall length of most chapters has remained the same. I worked to streamline discussions by carefully integrating new material with old, selecting the most appropriate examples and details to include, and paring down excess.

Below I list some of the major revisions reflected in this third edition of *Lifespan Development: Lives in Context*. Each chapter contains many other changes that are not documented here. It is my hope that this volume will improve instructors' and students' experiences in and out of class—and that students will be inspired to apply the findings of developmental science to their lives.

#### Chapter 1

- New learning objective: 1.6 Describe the field of applied developmental science and the role of intersectionality in development.
- New section:
  - Sociohistorical Context
  - Cultural Context
  - Ethical Issues in Studying Lifespan Human Development
  - Applied Developmental Science and Intersectionality
  - Dynamic Systems Theory
- Reorganized/substantive revisions:
  - History Graded Influences
  - Bronfenbrenner's Bioecological Systems Theory
  - Research Ethics

#### Chapter 2

- New learning objectives:
  - 2.4 Compare and contrast characteristics and outcomes of adoption, transracial adoption, and international adoption.
  - 2.5 Summarize prenatal diagnostic methods and how genetic disorders may be treated prenatally.
  - 2.6 Provide an introduction to the field of behavior genetics, including representative findings.
- New section:
  - Adoption
  - Prenatal Diagnosis
  - Assisted Reproductive Technology and Sex Selection
  - Gene–Environment Interactions
- Reorganized/substantive revision: Epigenetic Framework

#### Chapter 3

- New learning objectives:
  - 3.3 Compare the influence of maternal and paternal characteristics on prenatal development.
  - 3.4 Identify barriers to prenatal care and intersectional influences on access to prenatal care.



- 3.6 Examine risks for low birthweight, characteristics of low-birthweight infants, and ways of supporting positive outcomes of low-birthweight infants.
- New section:
  - Opioids
  - Contextual Factors and Teratogens
  - Maternal and Paternal Characteristics and Prenatal Development
  - Low-Birthweight Infants: Preterm and Small-for-Date Babies
  - Contextual and Cultural Influences on Prenatal Care
  - Lifespan Development at Work: Introduction to Careers; Genetic Counselor; Nurse Midwife; Doula
- Reorganized/substantive revisions:
  - Maternal Illness
  - Maternal Emotional Well-Being
  - Cultural Influences on Development
- New Apply Your Knowledge case

#### Chapter 4

- New learning objective: 4.2 Examine threats to infant and toddler health.
- New section:
  - Infant Mortality
  - SIDS
- Reorganized/substantive revisions:
  - Body Growth
  - Growth Faltering
  - Touch
  - Failure to Vaccinate

#### Chapter 5

- New opening vignette
- New learning objectives:
  - 5.2 Evaluate Piaget's sensorimotor reasoning stage in light of research evidence.
  - 5.6 Compare and contrast influences on language development.
- New section:
  - Evaluating Sensorimotor Reasoning
  - Culture and Cognitive Development
  - Contexts for Learning: Screens and Digital Media
  - Child Care and Cognitive Development
  - Poverty and Cognitive Development
  - Infant Gesture and Sign Language
  - Language Development in Bilingual Infants
  - Language Development in Deaf Infants
  - Cultural Differences in Infant-Directed Speech
- New Apply Your Knowledge case

## Chapter 6

- New section:
  - Exposure to Early Life Stress
  - Maternal Depression and Attachment
  - Father–Infant Attachment
  - Lifespan Development at Work: Child Care Director; Social Worker; Pediatric Nurse; Pediatrician
- Reorganized/substantive revisions:
  - Social Interaction and Emotional Development
  - Emotional Socialization
  - Context and Goodness of Fit
  - Cultural Variations in Attachment Classifications

## Chapter 7

- New learning objective: 7.2 Examine the influence of nutrition, physical activity, sleep, and screen use on young children’s health as well as risks to health.
- New section:
  - Health: Physical Activity; Sleep; Nutrition and Eating Habits
  - Health Threats: Screen Use; Illness and Toxins; Unintended Injuries
  - Language: Bilingual Language Learning; Race, Socioeconomic Status, and Language Development
  - Suggestibility
- Reorganized/substantive revisions:
  - Growth
  - Motor Development
  - Private Speech

## Chapter 8

- New section:
  - Transgender Gender Identity
  - Reducing Gender Stereotyping
  - Culture and Play
  - Lifespan Development at Work: Early Childhood Educator; Speech/Language Pathologist; Developmental Psychologist; Toy and Media Research
- Reorganized/substantive revisions:
  - Moral Development (from Chapter 7)
  - Emotional Development
  - Gender Stereotypes, Gender Differences, and Gender Development
  - Play and Peer Relationships in Early Childhood

## Chapter 9

- New learning objectives:
  - 9.2 Examine health behaviors and concerns during middle childhood, including physical activity, injury, and obesity.

- 9.3 Compare common developmental disabilities and discuss the relevance of contextual influences for disability.
- New section:
  - Developmental Disabilities, with subsections on Attention-Deficit/Hyperactivity Disorder, Autism Spectrum Disorder, Specific Learning Disorder, and Context and Disability: Race and Socioeconomic Status
  - Brain Development
  - Adrenarche
  - Physical Activity in Middle Childhood
  - Childhood Injuries and Mortality
  - Context and Cognition
  - Bilingual Language Learning
  - Approaches to Education
  - Access to Digital Technology and Learning
  - Implications of Cognitive Developmental Theory for Education
  - Implications of Information Processing Theory for Education

## Chapter 10

- Revised opening vignette
- New learning objective: 10.3 Discuss gender differences, gender stereotypes and beliefs, and gender identity in middle childhood.
- New section:
  - Gender Development
  - Parental Incarceration
  - Parental Deployment
  - Body Image
  - Only Children
  - Lifespan Development at Work: Elementary Education; Special Education; Child Life Specialist; Applied Behavior Analyst; School Psychologist
- Reorganized/substantive revisions:
  - Moral Development (from Chapter 9)
  - Risk and Resilience in Middle Childhood (revised and expanded; was: Common Socioemotional and Developmental Problems in Middle Childhood)

## Chapter 11

- Updated opening vignette
- New learning objective: 11.2 Identify influences on health and recommendations to improve adolescents' health.
- New section:
  - Experience and the Adolescent Brain
  - Social Cognition
  - Adolescent Health
  - Adolescent Employment
- Reorganized/substantive revisions:
  - Pubertal Timing and Adolescent Development
  - Biological and Contextual Influences on Pubertal Timing

- Brain Development and Behavior
- New Apply Your Knowledge case

## Chapter 12

- New learning objective: 12.2 Describe the progression of and influences on the development of moral reasoning, civic engagement, and critical consciousness.
- New section:
  - Gender Intensification and Transgender Identity
  - Spirituality and Religiosity
  - Moral and Civic Development in Adolescence
  - Peers, Social Media, and Cyberbullying
  - Binge Eating Disorder
  - Sexuality Education
  - Lifespan Development at Work: Secondary Education; School Counselor; Recreation Worker; Intervention Research; Applied Developmental Psychologist
- Reorganized/substantive revisions:
  - Self-Esteem
  - Ethnic–Racial Identity
  - Parenting
  - Dating

## Chapter 13

- New learning objective: 13.2 Discuss common health concerns and the effects of physical activity in early adulthood.
- New section:
  - Students With Developmental Disabilities
  - Intersectionality and the Workplace
- Reorganized/substantive revisions:
  - Theories of Aging: What Causes Aging? (from Chapter 15)
  - Not Attending College (was Forgotten Third)
  - Transition to Work
  - Work–Life Balance (replaces Work and Family)

## Chapter 14

- New learning objective: 14.3 Review the nature of sexual activity in early adulthood and the problem of sexual assault.
- New section:
  - Sexuality
  - Attachment
  - Lifespan Development at Work: ESL Teacher; Substance Counselor; Clinical and Counseling Psychologist; Professor; Resident Director
- Reorganized/substantive revisions:

- Emerging Adulthood (from Chapter 13)
- Identity Versus Role Confusion, revised to include subsections on Moral Identity, Religious Identity, Political Identity, Gender and Sexual Identity, and Racial-Ethnic Identity
- Becoming a Parent
- Nonmarital Childbearing
- Gay and Lesbian Parents

## Chapter 15

- New learning objective: 15.5 Discuss career-related concerns of middle-aged adults, including influences on job satisfaction, experiences with age discrimination, and planning for retirement.
- New section:
  - Mortality
  - Cohort Effects in Intelligence
  - Age Discrimination
- Reorganized/substantive revisions:
  - Stress
  - Planning for Retirement
  - Job Satisfaction

## Chapter 16

- New learning objectives:
  - 16.3 Analyze patterns of stability and change in personality in middle adulthood.
  - 16.4 Examine friendship and spousal relationships in middle adulthood.
  - 16.5 Contrast adults' relationships and roles as parents to young children, adolescents, and adults; as grandparents; and as parents to adult children.
- New section:
  - Personality
  - Search for Meaning
  - Subjective Age
  - Perceived Control
  - Divorce
  - Lifespan Development at Work: Marriage and Family Therapist; Physical Therapist and Assistant; Occupational Therapist and Assistant; Human Resources; Health Psychologist
- Reorganized/substantive revisions:
  - Is Midlife Characterized by Crisis?
  - Expanded and broke into two sections: Friendship and Romantic Relationships and Intergenerational Relationships
  - Sexuality (from Chapter 15)
  - Expanded and updated Parent–Child Relationships to include subsections on Parenting Infants, Parenting Adolescents, and Parenting Adult Children
  - Grandparents

## Chapter 17

- Revised opening vignette

- New section:
  - Race, Ethnicity, and Dementia
  - Ages of Adulthood
- Reorganized/substantive revisions:
  - Exercise
  - Atypical Brain Aging (was Dementia)
  - Updated and expanded The Aging Brain to include Neural Compensation, Promoting Brain Health

## Chapter 18

- New section:
  - Friendships
  - Lifespan Development at Work: Audiologist; Geriatric Nurse; Geriatrician; Geropsychologist; User Design and Usability
- Reorganized/substantive revisions:
  - Sexuality
  - Socioemotional Selectivity Theory
  - Aging in Place
  - Retirement: Deciding to Retire; Transition to Retirement and Adjustment

## Chapter 19

- New learning objectives:
  - 19.1 Identify the leading causes of death and patterns of mortality and life expectancy.
  - 19.6 Describe patterns of adjustment after bereavement.
- New section:
  - Mortality and Life Expectancy
  - Death and End-of-Life Issues
  - Lifespan Development at Work: Grief Counselor; Hospice Services
- Reorganized/substantive revisions:
  - Cultural Rituals and Views of Death
  - Expanded into a new section: Adjustment After the Loss of a Loved One

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# 1

## UNDERSTANDING HUMAN DEVELOPMENT: APPROACHES AND THEORIES



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Think back over your lifetime. How have you grown and changed through the years? Do your parents describe you as a happy baby? Were you fussy? Do you remember your first day of kindergarten? What are some of your most vivid childhood memories? Did you begin puberty early, late, or at about the same time as others your age? Were your adolescent years a stressful time? What types of changes do you expect to undergo in your adult years? Where will you live? Will you have a spouse? Will you have children? What career will you choose? How might these life choices and circumstances influence how you age and your perspective in older adulthood? Will your personality remain the same or change over time? In short, how will you change over the course of your lifespan?

### WHAT IS LIFESPAN HUMAN DEVELOPMENT?

#### LEARNING OBJECTIVE

**1.1 Outline five principles of the lifespan developmental perspective.**

This is a book about **lifespan human development**—the ways in which people grow, change, and stay the same throughout their lives, from conception to death. When people use the term **development**, they often mean the transformation from infant to adult. However, development does not end with adulthood. We continue to change in predictable ways throughout our lifetime, even into old age. Developmental scientists study human development seeking to understand these lifetime patterns of change.

Table 1.1 illustrates the many phases or stages of life through which we progress from conception to death. The stages may have different labels and different sets of developmental tasks, but all have value and influence each other. The changes that we undergo during infancy, for instance, influence how we

**TABLE 1.1 ■ Stages in Human Development**

Life Stage	Approximate Age Range	Description
Prenatal	Conception to birth	Shortly after conception, a single-celled organism grows and multiplies. This is the period of the most rapid physical development as basic body structures and organs form, grow, and begin to function.
Infancy and toddlerhood	Birth to 2 years	The newborn is equipped with senses that help it to learn about the world. Physical growth occurs and motor, perceptual, and intellectual skills develop. Children show advances in language comprehension and use, problem-solving, self-awareness, and emotional control. They become more independent and interested in interacting with other children and form bonds with parents and others.
Early childhood	2 to 6 years	Children grow steadily, their muscles strengthen, and they become better at coordinating their bodies. Memory, language, and imagination improve. Children become more independent and better able to regulate their emotions. Family remains children's primary social tie, but other children become more important and new ties to peers are established.
Middle childhood	6 to 11 years	Growth slows, but strength and athletic ability increase dramatically. Children show improvements in their ability to reason, remember, read, and use arithmetic. As children advance cognitively and gain social experience, they understand themselves in more complex ways compared with younger children. As friendships develop, peers and group memberships become more important.
Adolescence	11 to 18 years	Adolescents' bodies grow rapidly. They become physically and sexually mature. Although some immature thinking persists, adolescents can reason in sophisticated and adult-like ways. Adolescents are driven to learn about themselves and begin the process of discovering who they are, apart from their parents. Peer groups increase in importance.
Early adulthood	18 to 40 years	Physical condition peaks and then shows slight declines with time. Lifestyle choices play a large role in influencing health. Most young adults join the workforce, marry or establish a long-term bond with a spouse, and become parents. The timing of these transitions varies. Adolescents in Western industrialized societies often experience an extended transition to adulthood (called <b>emerging adulthood</b> ), spanning from ages 18 to 25, and as late as age 29.
Middle adulthood	40 to 65 years	In middle adulthood, people notice changes in their vision, hearing, physical stamina, and sexuality. Basic mental abilities, expertise, and practical problem-solving skills peak. Career changes and family transitions require that adults continue to refine their understandings of themselves. Adults help children to become independent, adapt to an empty nest, and assist elderly parents with their own health and personal needs.
Late adulthood	65 years and beyond	Most older adults remain healthy and active. Reaction time slows, and most older adults show a decline in some aspects of memory and intelligence, but an increase in expertise and wisdom compensates for losses. Most older adult friendships are old friendships, and these tend to be very close and a source of support. Adults adjust to retirement, changes in health, and personal losses (such as the death of a loved one), as well as search for meaning in their lives.
Death		Death itself is a process entailing the stopping of heartbeat, circulation, breathing, and brain activity. A person's death causes changes in his or her social context—family members and friends must adjust to and accept the loss.

experience later changes, such as those during adolescence and beyond. Each stage of life is important and accompanied by its own demands and opportunities.

Change is perhaps the most obvious indicator of development. The muscle strength and coordination needed to play sports increases over childhood and adolescence, peaks in early adulthood, and begins to decline thereafter, declining more rapidly from middle to late adulthood (Gabbard, 2018). There also are ways in which we change little over our lifetimes. Some personality traits are highly stable over the lifespan, so that we remain largely the “same person” into old age (Schwaba & Bleidorn, 2018; Wortman et al., 2012).

Lifespan human development can be described by several principles. Development is: (1) multidimensional, (2) multidirectional, (3) plastic, (4) influenced by multiple contexts, and (5) multidisciplinary (Baltes et al., 2006; Overton & Molenaar, 2015).

### Development Is Multidimensional

Consider the many changes that mark each period of development and it is apparent that development is *multidimensional*. That is, development includes changes in multiple areas or **domains of development**. **Physical development** refers to body maturation and growth, such as body size, proportion, appearance, health, and perceptual abilities. **Cognitive development** refers to the maturation of thought processes and the tools that we use to obtain knowledge, become aware of the world around us, and solve problems. **Socioemotional development** includes changes in personality, emotions, views of oneself, social skills, and interpersonal relationships with family and friends. These areas of development overlap and interact. The onset of walking precedes advances in language development in infants in the United States and China (He et al., 2015; Lücke et al., 2019). Brain maturation, a physical development, underlies advances in cognitive development, which might enable adolescents to become better at understanding their best friend’s point of view and show more prosocial helpful behavior (Tamnes et al., 2018). In turn, adolescents might become more empathetic and sensitive to their friends’ needs and develop a more mature friendship, influencing socioemotional development (Tamnes et al., 2018). Figure 1.1 illustrates how the three areas of development interact.

### Development Is Multidirectional

Development is commonly described as a series of improvements in performance and functioning, but in fact development is *multidirectional*, meaning that it consists of both gains and losses, growth and decline, throughout the lifespan (Baltes et al., 2006; Overton & Molenaar, 2015). For example, infants are born with a stepping reflex, an innate involuntary response in which they make step-like movements when held upright over a horizontal surface (for more on infant reflexes, see Chapter 4). The stepping reflex disappears by about 2 months but reemerges as a voluntary action at 8 to 12 months of age as infants begin walking with support (Adolph & Franchak, 2017). Throughout life, there is a shifting balance between gains, improvements in performance (common early in life), and

**FIGURE 1.1** ■ Domains of Development

Advances in physical, cognitive, and socioemotional development interact, permitting children to lay sports, learn more efficiently, and develop close friendships.



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We are born with a stepping reflex, an innate involuntary response. When this infant is held under the arms in a standing position on a flat surface, his legs move in a stepping motion.

Phanie/Alamy Stock Photo



Some plasticity is retained throughout life. Practicing athletic activities can help older adults rebuild muscle and improve balance.

Reuters/Mariana Bazo

declines in performance (common late in life) (Baltes et al., 2006; Zacher et al., 2019). At all ages individuals can compensate for losses by improving existing skills and developing new ones (Boker, 2013). The speed at which people think tends to slow in late adulthood, but increases in knowledge and experience enable older adults to compensate for the loss of speed when completing everyday tasks (Krampe & Charness, 2018; Margrett et al., 2010).

### Development Is Plastic

Development is characterized by **plasticity**: It is malleable, or changeable. Frequently the brain and body can compensate for illness and injury. In children who are injured and experience brain damage, for instance, other parts of the brain may take on new functions (Petranovich et al., 2020). The plastic nature of human development allows people to modify their traits, capacities, and behavior throughout life (Baltes et al., 2006; Overton & Molenaar, 2015). Older adults who have experienced a decline in balance and muscle strength can regain and improve these capabilities through exercise (McAuley et al., 2013; Sañudo et al., 2019). Plasticity tends to decline as we age, but it does not disappear entirely. Short instruction, for instance, can enhance the memory capacities of very old adults, but less so in younger adults (Brehmer et al., 2012; Willis & Belleville, 2016). Plasticity makes it possible for individuals to adjust to change and to demonstrate **resilience**, the capacity to adapt effectively to adverse contexts and circumstances (Luthar et al., 2015; Masten, 2016). The brain naturally adapts to a lifetime of sensory experiences in order to portray the world around us efficiently and accurately as we age into older adulthood (Moran et al., 2014; Zanto & Gazzaley, 2019).

### Development Is Influenced by Multiple Contexts

**Context** refers to where and when a person develops. Context encompasses many aspects of the physical and social environment, including family, neighborhood, country, and historical time period. It includes intangible factors, characteristics that are not visible to the naked eye, such as values, customs, ideals, and culture. To understand individuals' development, we must look at their context, including the subtle, less easily viewed factors.

Were you encouraged to be assertive and actively question the adults around you, or were you expected to be quiet and avoid confrontation? How large a part was spirituality or religion in your family's life? How did religious values shape your parents' childrearing practices and your own values? How did your family's economic status affect your development? These questions examine a critical context for our development: home and family. However, we are embedded in many more contexts that influence us, and that we influence, such as peer group, school, neighborhood or community, and culture. Our development plays out within the contexts in which we live, a theme that we will return to throughout this book.

## Sociohistorical Context

The multitude of contextual factors that interact over the life course can be organized into three categories: age-graded influences, history-graded influences, and non-normative influences (Elder & George, 2016; Elder et al., 2016).

**Age-Graded Influences.** *Age-graded influences* are closely tied to chronological age and are largely predictable. Most individuals walk at about a year of age and reach puberty in early adolescence. Similarly, most women reach menopause in the late 40s or early 50s. Age-graded influences tend to be most influential early and late in life. Although these influences are often tied to biology, social milestones can also form age-graded influences. Most people in the United States enter school at about 5 years of age, graduate high school and enter college at about age 18, and retire during their 60s. Some age-graded influences are context dependent. Adolescents in suburban and rural contexts commonly get driver's licenses at age 16, but this may not be true of adolescents in urban settings where driving may be less common.

**History-Graded Influences.** *History-graded influences* refer to how the time period in which we live and the unique historical circumstances of that time period affect our development. History-graded influences include wars, epidemics, advances in science and technology, and economic shifts such as periods of depression or prosperity (Baltes, 1987). The COVID-19 pandemic of 2020 may shape individuals' health behaviors, such as by wearing face coverings, standing further away from others, and refraining from particular social behaviors, such as handshakes and hugs. School closures during the pandemic posed risks to children's and adolescents' academic and social development as well as their mental health (Golberstein et al., 2020; Lee, 2020). Even temporary changes, such as these, are contextual influences that shape our world and our development. The effect of historical events on development depends in part on when they occur in a person's life (Elder et al., 2015). Older adults may experience the COVID-19 pandemic differently than younger people, given their lifelong experiences as well as their heightened risk for infection (Pfefferbaum & North, 2020). For many older adults, the pandemic is a period of great loneliness.

Contextual influences tied to specific historical eras explain why a generation of people born at the same time, called a **cohort**, is similar in ways that people born at other times are different. Adults who came of age during the Great Depression and World War II are similar in some ways that make them different from later cohorts; they tend to have particularly strong views on the importance of the family, civic mindedness, and social connection (Rogler, 2002). Yet the same historical event may be experienced differently by successive cohorts relatively close in age, reflecting the fact that they are in different life stages, with different social roles, levels of maturity, and life experiences. Researchers examined the influence of the Great Depression (1929–1941) and World War II (1939–1945) on two cohorts of California-born Americans born just 8 years apart in Oakland and Berkeley, and who were followed from childhood to older adulthood, over a 70-year period (Elder & George, 2016).

Boys in the older Oakland cohort (born in 1920–1921) were children during the affluent 1920s, a time of economic growth in California, and they experienced a prosperous and relatively stress-free childhood. They entered adolescence during the Great Depression, a period of severe economic stress in which unemployment skyrocketed and people's savings were depleted. As adolescents during the Great Depression, the Oakland boys tended to behave responsibly and assist their families in coping, such as by working jobs outside the home, which enhanced their independence



The COVID-19 pandemic is an example of a sociohistorical influence that contributes to cohort, or generational, differences in development.

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and sense of responsibility and reduced their exposure to family stress. The Oakland cohort completed high school just prior to the onset of World War II and over time nearly all the young men entered the armed forces.

Unlike the Oakland cohort, boys in the Berkeley Guidance Study (born in 1928–1929) experienced the Great Depression in early childhood, at a time when they were vulnerable and very dependent on family. The Berkeley cohort entered adolescence during World War II, a period of additional economic and emotional stress resulting from empty households (as both parents worked to support the war effort) and the military service and war trauma of older brothers. As adolescents, the Berkeley boys' outlook was bleaker than the boys in the Oakland cohort. Berkeley boys experienced emotional difficulties, poor attitudes toward school, and less hope, self-direction, and confidence about their future.

However, the Berkeley boys were not doomed. Their outlook improved in adulthood, largely because of their experiences in military service. Three-quarters of the Berkeley sample served in the military between 1945 and the end of the Korean War in the early 1950s. The most disadvantaged young men tended to join the military early, and early entry into the military predicted personal growth because of opportunities, such as structure, travel, and to take advantage of the GI Bill of Rights, which enabled them to expand their education and acquire new skills after the war.

These two cohorts of young people offer striking examples of how sociohistorical context influences development. Although boys in both cohorts tended to develop into mature productive adults, they took different paths. Context always plays a role in development—not only in times of social upheaval but every day and for every generation.

Take a moment to think about what role larger historical events have played in your development. Consider the Black Lives Matter movement, begun in 2013; the legalization of same-sex marriage in 2015; the school shooting in Newtown, Connecticut, in 2012; the election of the first African American president of the United States in 2008; and the terrorist attacks of September 11, 2001. How have historical events influenced you and those around you? Can you identify ways in which, because of historical events, your cohort may differ from your parents' cohort? Your grandparents' cohort?

**Non-Normative Influences.** Whereas age-graded and history-graded influences are common to all people, or all members of a cohort, individuals also have experiences that are unique to them. *Non-normative influences* are experiences or events that happen to a person or a few people. Examples of non-normative influences include experiencing the death of a parent in childhood, widowhood in early adulthood, winning the lottery, or illness. Non-normative events are not predictable and are not easily studied, as they are not experienced by most people—and the nature of non-normative events varies widely. With age, non-normative influences become more powerful determinants of development.

### Cultural Context

Like sociohistorical context, the cultural context is a broad influence on the development of all people at all ages in life. **Culture** refers to a set of customs, knowledge, attitudes, and values that are shared by members of a group and are learned early in life through interactions with group members (Markus & Kitayama, 1991). We are immersed in culture, which influences all of our contexts and includes the processes used by people as they make meaning or think through interactions with group members (Mistry et al., 2016; Yoshikawa et al., 2016).

Early studies of culture and human development took the form of *cross-cultural research*, comparing individuals and groups from different cultures to examine how these universal processes worked in different contexts (Mistry & Dutta, 2015). Yet research that defines normative development based on Western samples leads to narrow views of human development that do not consider the variety of contexts in which people live. At the extreme, differences in human development within other cultural groups might be viewed as abnormal and harmful (Cole & Packer, 2015).



Most classic theories and research on human development are based on Western samples because researchers once believed that the processes of human development were universal. More recent observations suggest that development varies dramatically with cultural context (Keller, 2017). Consider milestones, such as the average age that infants begin to walk. In Uganda, infants begin to walk at about 10 months of age, in France at about 15 months, and in the United States at about 12 months. These differences are influenced by parenting practices that vary by culture. African parents tend to handle infants in ways that stimulate walking, by playing games that allow infants to practice jumping and walking skills (Hopkins & Westra, 1989; Super, 1981). The cultural context in which individuals live influences the timing and expression of many aspects of development, even physical developments, such as walking, long thought to be a matter of biological maturation (Mistry, 2013). Applying principles of development derived from Western samples to children of other cultures may yield misleading conclusions about children's capacities (Keller, 2017).

There is a growing trend favoring *cultural research*, which examines how culture itself influences development, over cross-cultural research, which simply examines differences across cultures (Cole & Packer, 2015). Cultural research examines development and culture as fused entities that mutually interact, with culture inherent in all domains of development and a contributor to the context in which we are embedded, transmitting values, attitudes, and beliefs that shape our thoughts, beliefs, and behaviors (Miller et al., 2020; Mistry & Dutta, 2015). The shift toward cultural research permits the examination of the multiple subcultures that exist within a society (Oyserman, 2016, 2017). North American culture is not homogeneous; many subcultures exist, defined by factors such as ethnicity (e.g., African American, Asian American), religion (e.g., Christian, Muslim), geography (e.g., southern, midwestern), and others, as well as combinations of these factors. Current trends in cultural research document diversity and emphasize understanding how the historical, cultural, and subcultural contexts in which we live influence development throughout our lives.

### Developmental Science Is Multidisciplinary

Psychologists, sociologists, anthropologists, biologists, neuroscientists, and medical researchers all conduct research that is relevant to understanding aspects of human development. Consider cognitive development. Children's performance on cognitive measures, such as problem-solving, are influenced by their physical health and nutrition (Anjos et al., 2013; Biddle et al., 2019), interactions with peers (Holmes et al., 2016), and neurological development (Stiles et al., 2015), findings from the fields of medicine, psychology, and neuroscience, respectively. To understand how people develop at all periods in life, developmental scientists must combine insights from all of these disciplines.

### Thinking in Context: Lifespan Development

1. Describe your own development. Provide personal examples that illustrate the multidimensional nature of your own development. In what ways has your development illustrated multidirectionality? Plasticity?
2. Consider the societal and cultural events that your parents may have experienced in their youth. What technology was available? What historical events did they experience? What were the popular fads of their youth? What influence do you think these sociohistorical factors may have had on your parents' development? Compare their sociohistorical context with the one in which you were raised. What historical and societal events may have influenced you? What events have shaped your generation?
3. Consider your own experiences with culture. With which culture or subculture do you identify? How much of a role do you think your cultural membership has had in your own development? Why might some people say that the United States has no culture? What do you think?

## BASIC ISSUES IN LIFESPAN HUMAN DEVELOPMENT

### LEARNING OBJECTIVE

#### 1.2 Explain three basic issues in developmental science.

Developmental scientists agree that people change throughout life and show increases in some capacities and decreases in others, from conception to death. Yet they sometimes disagree about how development proceeds and what causes developmental changes. Developmental scientists' explanations of how people grow and change over their lives are influenced by their perspectives on three basic issues, or fundamental questions, about human development:

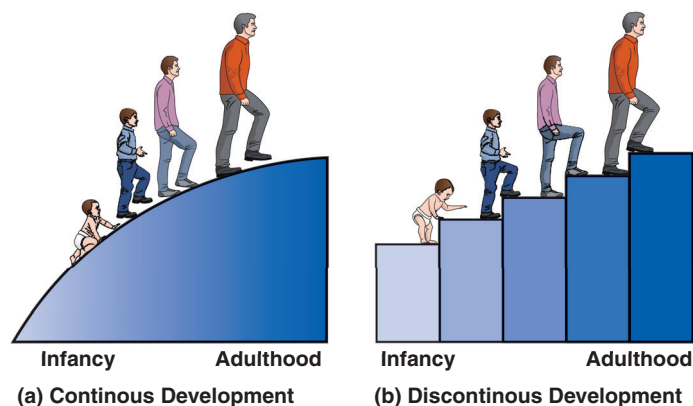
1. Do people change gradually, often imperceptibly, over time, or is developmental change sudden and dramatic?
2. What role do people play in their own development—how much are they influenced by their surroundings, and how much do they influence their surroundings?
3. To what extent is development a function of inborn genetic characteristics, and to what extent is it affected by the environment in which individuals live?

The following sections examine each of these questions.

### Development Is Characterized by Continuous and Discontinuous Change

Do children slowly grow into adults, steadily gaining more knowledge and experience and becoming better at reasoning? Or do they grow in spurts, showing sudden, large gains in knowledge and reasoning capacities? Some aspects of development unfold slowly and gradually over time, demonstrating **continuous change**. Children slowly gain experience and learn strategies to become quicker at problem-solving (Siegler, 2016). Similarly, middle-aged adults experience gradual losses of muscle and strength (Keller & Engelhardt, 2013). Other aspects of development are best described as **discontinuous change**, characterized by abrupt change with individuals of various ages dramatically different from one another. Puberty transforms children's bodies into more adult-like adolescent bodies (Wolf & Long, 2016), infants' understanding and capacity for language is qualitatively different from that of school-aged children (Rudman & Titjen, 2018), and children make leaps in their reasoning abilities over the course of childhood, such as from believing that robotic dogs and other inanimate

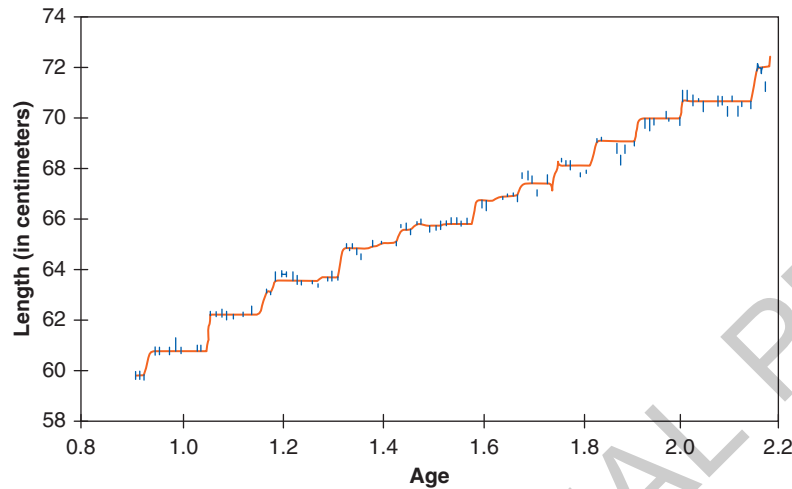
**FIGURE 1.2** ■ Continuous and Discontinuous Development



Source: Adapted from End of the Game (2014). "Child Development 101 - History and Theory," <https://endofthegame.net/2014/04/15/child-development-101-history-and-theory/3/>.

**FIGURE 1.3** ■ Infant Growth: A Continuous or Discontinuous Process

Infants' growth occurs in a random series of roughly 1-centimeter spurts in height that occur over 24 hours or less. The overall pattern of growth entails increases in height, but whether the growth appears to be continuous or discontinuous depends on our point of view.



Source: Lampl et al. (1992).

objects are alive to understanding that life is a biological process (Beran et al., 2011; Zaitchik et al., 2014). As shown in Figure 1.2, a discontinuous view of development emphasizes sudden transformation, whereas a continuous view emphasizes gradual and steady changes.

It was once believed that development was either continuous or discontinuous—but not both. Today, developmental scientists agree that development includes both continuity and discontinuity (Lerner et al., 2014). Whether a particular developmental change appears continuous or discontinuous depends in part on our point of view. Consider physical growth. We often think of increases in height as involving a slow and steady process; each month, an infant is taller than the prior month, illustrating continuous change. However, as shown in Figure 1.3, when researchers measured infants' height every day, they discovered that infants have growth days and nongrowth days, days in which they show rapid change in height interspersed with days in which there is no change in height, illustrating discontinuous change (Lampl et al., 2001). In this example, monthly measurements of infant height suggest gradual increases, but daily measurements show spurts of growth, each lasting 24 hours or less. Thus, whether a given phenomenon, such as height, is described as continuous or discontinuous can vary depending on perspective. Most developmental scientists agree that some aspects of development are best described as continuous and others as discontinuous (Miller, 2016).

### Individuals Are Active in Development

Do people have a role in influencing how they change over their lifetimes? That is, are people active in influencing their own development? Taking an active role means that they interact with and influence the world around them, create experiences that lead to developmental change, and thereby influence how they themselves change over the lifespan. Alternatively, if individuals take a passive role in their development, they are shaped by, but do not influence, the world around them.

The prevailing view among developmental scientists is that people are active contributors to their own development (Lerner et al., 2014; Overton, 2015). People are influenced by the physical and social contexts in which they live, but they also play a role in influencing their development by interacting with, and changing, those contexts (Elder et al., 2016). Even infants influence the world around them and construct their own development through their interactions. Baby Joey smiles at each adult he passes by as his mother pushes his stroller in the park. Adults often respond with smiles, use “baby talk,” and make faces. Baby Joey's actions, even simple smiles, influence adults, bringing them into



It's easy to see how this baby can influence the world around her and construct her own development through her interactions. By smiling at each adult she sees, she influences her world because adults are likely to smile, use "baby talk," and play with her in response.

iStock/monkeybusinessimages

close contact, making one-on-one interactions, and creating opportunities for learning. By engaging the world around them, thinking, being curious, and interacting with people, objects, and their environment, infants and children are "manufacturers of their own development" (Flavell, 1992, p. 998). That is, they play an active role in influencing their own development.

### Nature and Nurture Influence Development

Perhaps the oldest question about development concerns its origin. Referred to as the **nature–nurture debate**, researchers once asked whether development is caused by nature (genetics) or nurture (environment). Explanations that rely on nature point to inborn genetic traits and maturational processes as causes of developmental change. Most infants take their first steps at roughly the same age, suggesting a maturational trend that supports the role of nature in development

(Payne & Isaacs, 2020). An alternative explanation for developmental change emphasizes nurture, the environment. From this perspective, although most begin to walk at about the same age, environmental conditions can speed up or slow down the process. Infants who experience malnutrition may walk later than well-nourished infants, and those who are given practice making stepping or jumping movements may walk earlier (Siekerman et al., 2015; Worobey, 2014). Individuals are molded by the physical and social environment in which they are raised. Many infants may walk at about the same age because they experience similar environmental circumstances and parenting practices.

Today, developmental scientists generally agree that the nature–nurture debate is, in fact, not a debate. Instead, most now agree that *both* nature and nurture are important contributors to development and the question has changed to how do genetics and environment work together to influence child development (Rutter, 2014; Sasaki & Kim, 2017). Thus, walking is heavily influenced by maturation (nature), but experiences and environmental conditions can speed up or slow down the process (nurture). Today, developmental scientists attempt to determine *how* nature and nurture interact and work together to influence how people grow and change throughout life (Bjorklund, 2018a; Lickliter & Witherington, 2017).

### Thinking in Context: Lifespan Development

1. Identify ways in which you have changed very gradually over the years. Are there times in which you showed abrupt change, such as in physical growth, strength and coordination, thinking abilities, or social skills? In other words, in what ways is your development characterized by continuity? Discontinuity?
2. What role did your physical and social environment play in your growth?
3. Identify examples of how a child might play an active role in his or her development. How do children influence the world around them?

### Thinking in Context: Biological Influences

1. How are nature and nurture reflected in your own development? What traits, abilities, or behaviors do you believe are influenced by inborn factors? What role did the physical and social environment play in your development?
2. Consider similarities and differences among family members. How might they reflect the interaction of nature and nurture?

## THEORETICAL PERSPECTIVES ON HUMAN DEVELOPMENT

### LEARNING OBJECTIVE

#### 1.3 Summarize five theoretical perspectives on human development.

Over the past century, scientists have learned much about how individuals progress, from infants to children, to adolescents, and to adults, as well as how they change throughout adulthood. Developmental scientists explain their observations by constructing theories of human development. A **theory** is a way of organizing a set of observations or facts into a comprehensive explanation of how something works. Theories are important tools for compiling and interpreting the growing body of research in human development as well as determining gaps in our knowledge and making predictions about what is not yet known.

Effective theories generate specific **hypotheses**, or proposed explanations for a given phenomenon, that can be tested by research. It is important to note that this testing seeks to find flaws in the hypothesis—not to “prove” that it is flawless. A good theory is one that is *falsifiable*, or capable of generating hypotheses that can be tested and, potentially, refuted. As scientists conduct research and learn more about a topic, they modify their theories. Updated theories often give rise to new questions and new research studies, whose findings may further modify theories.

The great body of research findings in the field of lifespan human development has been organized into several theoretical perspectives to account for the developmental changes that occur over the lifespan.

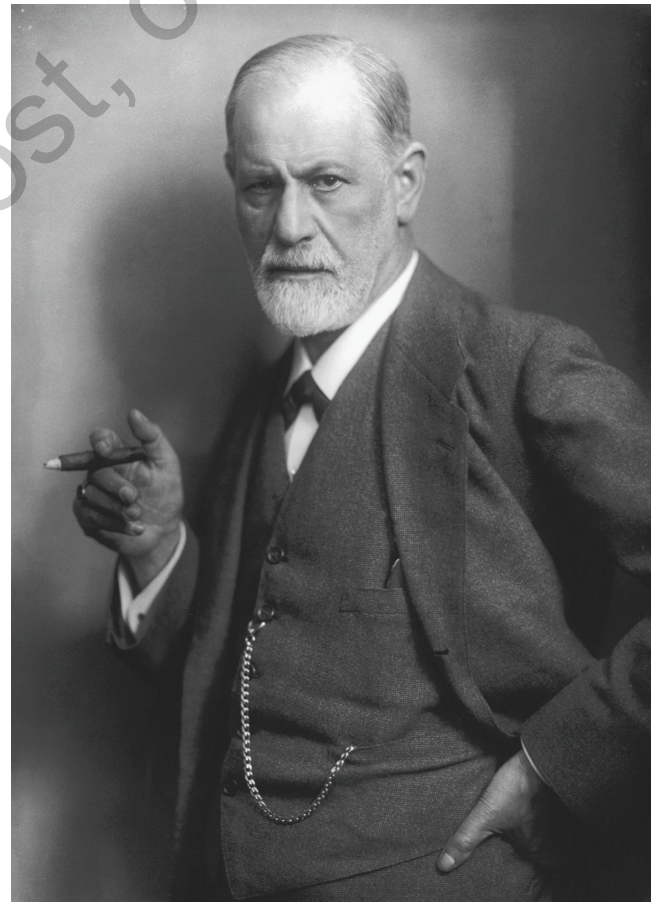
### Psychoanalytic Theories

Are there powerful forces within us that make us behave as we do? Are we pushed by inner drives? **Psychoanalytic theories** describe development and behavior as a result of the interplay of inner drives, memories, and conflicts we are unaware of and cannot control. These inner forces influence our behavior throughout our lives. Freud and Erikson are two key psychoanalytic theorists.

#### Freud's Psychosexual Theory

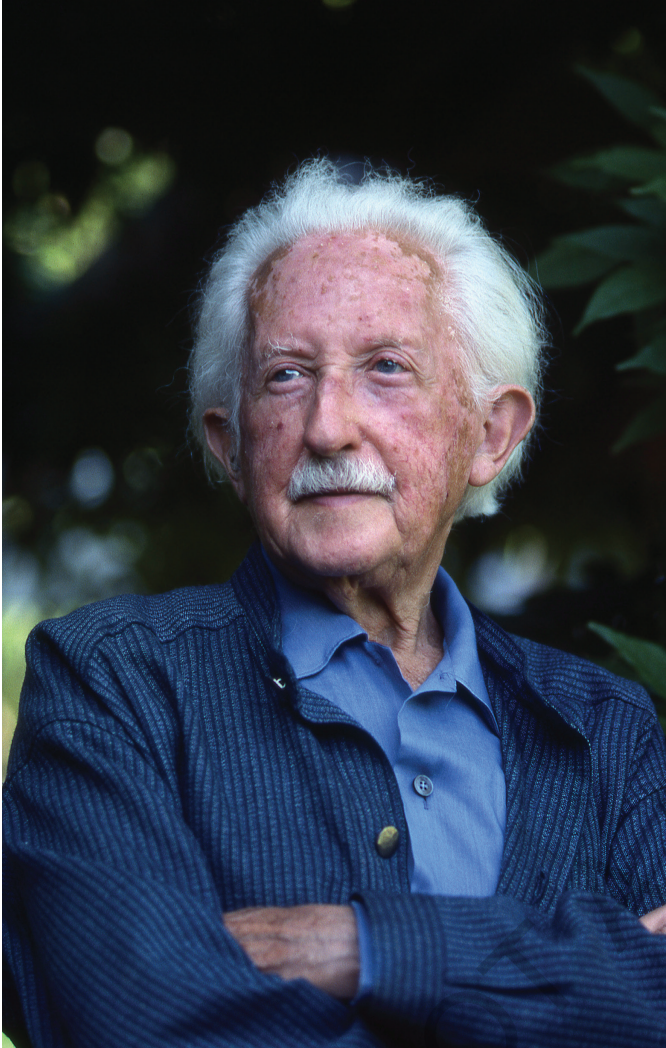
Sigmund Freud (1856–1939), a Viennese physician, is credited as the father of the psychoanalytic perspective. Freud believed that much of our behavior is driven by unconscious impulses that are outside of our awareness. He described development as the progression through a series of *psychosexual stages*, periods in which unconscious drives are focused on different parts of the body, making stimulation to those parts a source of pleasure. Freud explained that the task for parents is to strike a balance between overgratifying and undergratifying a child's desires at each stage to help the child develop a healthy personality with the capacity for mature relationships throughout life. Notably, Freud did not study children; his theory grew from his work with female psychotherapy patients (Crain, 2016).

Many of Freud's ideas, such as the notion of unconscious processes of which we are unaware, have permeated popular culture. Notably, Freud's theory was the first to emphasize the importance of early family experience and especially the parent–child relationship for development (Bargh, 2013). However,



Sigmund Freud (1856–1939), the father of the psychoanalytic perspective, believed that much of our behavior is driven by unconscious impulses.

Library of Congress



Erik Erikson (1902–1994) posited that, throughout their lives, people progress through eight stages of psychosocial development.

Jon Erikson/Science Source

the psychosexual stage framework's emphasis on childhood sexuality, especially the phallic stage, is unpopular and not widely accepted (Westen, 1998). In addition, unconscious drives and other psychosexual constructs are not falsifiable. They are not supported by research because they cannot be directly observed and tested (Miller, 2016). How are we to study unconscious drives, for instance, when we are not aware of them?

### Erikson's Psychosocial Theory

Erik Erikson (1902–1994) was influenced by Freud, but he placed less emphasis on unconscious motivators of development and instead focused on the role of the social world, society, and culture (Table 1.2). According to Erikson, throughout their lives, individuals progress through eight *psychosocial stages* that include changes in how they understand and interact with others, as well as changes in how they understand themselves and their roles as members of society (Erikson, 1950). Each stage presents a unique developmental task, which Erikson referred to as a crisis or conflict that must be resolved. How well individuals address the crisis determines their ability to deal with the demands made by the next stage of development. Children's success in achieving a sense of trust in others influences their progress in developing a sense of autonomy, the ability to be independent and guide their own behavior.

Regardless of their success in resolving a crisis of a given stage, individuals are driven by biological maturation and social expectations to the next psychosocial stage. No crisis is ever fully resolved, and unresolved crises are revisited throughout life. Although Erikson believed that it is never too late to resolve a crisis, resolving a crisis from a previous stage may become more challenging over time as people focus on current demands and the crises of their current psychosocial stages.

As one of the first lifespan views of development, Erikson's psychosocial theory sees development as spanning well beyond childhood. Erikson's theory offers a positive view of development and includes the role of society and culture, largely ignored by Freud. In addition, Erikson based his theory on a broad range of cases, including larger and more diverse samples of people than did Freud. Largely viewed as unfalsifiable, Erikson's theory is criticized as difficult to test. Yet it has nonetheless sparked research on specific stages, most notably on the development of identity during adolescence and the drive to guide youth and contribute to the next generation during middle adulthood (Crain, 2016). Erikson's lifespan theory of development holds implications for every period of life. We will revisit his theory throughout this book.

### Behaviorist and Social Learning Theories

In response to psychoanalytic theorists' emphasis on the unconscious as an invisible influence on development and behavior, some scientists pointed to the importance of studying observable behavior rather than thoughts and emotion, which cannot be seen or objectively verified. Theorists who study

**TABLE 1.2** ■ **Psychoanalytic Theories of Development**

Approximate Age	Freud's Psychosexual Theory		Erikson's Psychosocial Theory	
0 to 18 months	Oral	Basic drives focus on the mouth, tongue, and gums. Feeding and weaning influence personality development. Freud believed that failure to meet oral needs influences adult habits centering on the mouth, such as fingernail biting, overeating, smoking, or excessive drinking.	Trust vs. Mistrust	Infants learn to trust that others will fulfill their basic needs (nourishment, warmth, comfort) or to lack confidence that their needs will be met.
18 months to 3 years	Anal	Basic drives are oriented toward the anus, and toilet training is an important influence on personality development. If caregivers are too demanding, pushing the child before he or she is ready, or if caregivers are too lax, individuals may develop issues of control such as a need to impose extreme order and cleanliness on their environment or extreme messiness and disorder.	Autonomy vs. Shame and Doubt	Toddlers learn to be self-sufficient and independent through toilet training, feeding, walking, talking, and exploring or to lack confidence in their own abilities and doubt themselves.
3 to 6 years	Phallic	In Freud's most controversial stage, basic drives shift to the genitals. The child develops a romantic desire for the opposite-sex parent and a sense of hostility and/or fear of the same-sex parent. The conflict between the child's desires and fears arouses anxiety and discomfort. It is resolved by pushing the desires into the unconscious and spending time with the same-sex parent and adopting his or her behaviors and roles, adopting societal expectations and values. Failure to resolve this conflict may result in guilt and a lack of conscience.	Initiative vs. Guilt	Young children become inquisitive, ambitious, and eager for responsibility or experience overwhelming guilt for their curiosity and overstepping boundaries.
6 years to puberty	Latency	This is not a stage but a time of calm between stages when the child develops talents and skills and focuses on school, sports, and friendships.	Industry vs. Inferiority	Children learn to be hardworking, competent, and productive by mastering new skills in school, friendships, and home life or experience difficulty, leading to feelings of inadequacy and incompetence.

*(Continued)*

Approximate Age	Freud's Psychosexual Theory		Erikson's Psychosocial Theory	
Adolescence	Genital	With the physical changes of early adolescence, the basic drives again become oriented toward the genitals. The person becomes concerned with developing mature adult sexual interests and sexual satisfaction in adult relationships throughout life.	Identity vs. Role Confusion	Adolescents search for a sense of self by experimenting with roles. They also look for answers to the question, "Who am I?" in terms of career, sexual, and political roles or remain confused about who they are and their place in the world.
Early adulthood			Intimacy vs. Isolation	Young adults seek companionship and a close relationship with another person or experience isolation and self-absorption through difficulty developing intimate relationships and sharing with others.
Middle adulthood			Generativity vs. Stagnation	Adults contribute to, establish, and guide the next generation through work, creative activities, and parenting or stagnate, remaining emotionally impoverished and concerned about themselves.
Late adulthood			Integrity vs. Despair	Older adults look back at life to make sense of it, accept mistakes, and view life as meaningful and productive or feel despair over goals never reached and fear of death.

**behaviorism** examine only behavior that can be observed and believe that all behavior is influenced by the physical and social environment. Consider this famous quote from John Watson (1925), a founder of behaviorism:

Give me a dozen healthy infants, well formed, and my own specified world to bring them up in and I'll guarantee to take any one at random and train him to become any type of specialist I might select—doctor, lawyer, artist, merchant, chief, and yes, even beggar-man and thief, regardless of his talents, penchants, tendencies, abilities, vocations, and race of his ancestors. (p. 82)

By controlling an infant's physical and social environment, Watson believed he could control the child's destiny. Behaviorist theory is also known as *learning theory* because it emphasizes how people and animals learn new behaviors as a function of their environment. As discussed in the following sections, classical and operant conditioning are two forms of behaviorist learning; social learning integrates elements of behaviorist theory and information processing theories.

### Classical Conditioning

**Classical conditioning** is a form of learning in which a person or animal comes to associate environmental stimuli with physiological responses. Ivan Pavlov (1849–1936), a Russian physiologist, discovered the principles of classical conditioning when he noticed that dogs naturally salivate when they taste



food, but they also salivate in response to various sights and sounds that occur before they taste food, such as their bowl clattering or their owner opening the food cupboard. Pavlov tested his observation by pairing the sound of a tone with the dog's food; the dogs heard the tone, then received their food. Soon the tone itself began to elicit the dogs' salivation.

Through classical conditioning, a neutral stimulus (in this example, the sound of the tone) comes to elicit a response originally produced by another stimulus (food). Newborn infants can demonstrate classical conditioning when a neutral stimulus (such as stroking the forehead) is paired with an unconditioned stimulus (sugar water, which makes the infant suck vigorously, an unconditioned response) (Figure 1.4). Soon, stroking the newborn's forehead yields the sucking behaviors, indicating that sucking is a conditioned response. Many fears, as well as other emotional associations, are the result of classical conditioning. Some children may fear a trip to the doctor's office because they associate the doctor's office with the discomfort they felt upon receiving a vaccination shot. Classical conditioning applies to physiological and emotional responses only, yet it is a cornerstone of psychological theory. A second behaviorist theory accounts for voluntary, non-physiological responses, as described in the following section.

### Operant Conditioning

Perhaps it is human nature to notice that the consequences of our behavior influence our future behavior. A teenager who arrives home after curfew and is greeted with a severe scolding may be less likely to return home late in the future. A child who is praised for setting the dinner table may be more likely to spontaneously set the table in the future. These two examples illustrate the basic tenet of B. F. Skinner's (1905–1990) theory of **operant conditioning**, which holds that behavior becomes more or less probable depending on its consequences. According to Skinner, a behavior followed by a rewarding or pleasant outcome, called **reinforcement**, will be more likely to recur, but one followed by an aversive or unpleasant outcome, called **punishment**, will be less likely to recur.

Operant conditioning explains much about human behavior, including how we learn skills and habits. Behaviorist ideas about operant conditioning and the nature of human behavior are woven into the fabric of North American culture and are often applied to understand parenting and parent–child interactions (Troutman, 2015). Developmental scientists tend to disagree with operant conditioning's emphasis on external events (reinforcing and punishing consequences) over internal events (thoughts and emotions) as influences on behavior (Crain, 2016). That is, controlling people's environments can influence their development, but change can also occur from within, through people's own thoughts and actions. Children, adolescents, and adults can devise new ideas and learn independently, without experiencing reinforcement or punishment. This is consistent with the lifespan concept that individuals are active contributors to their development.

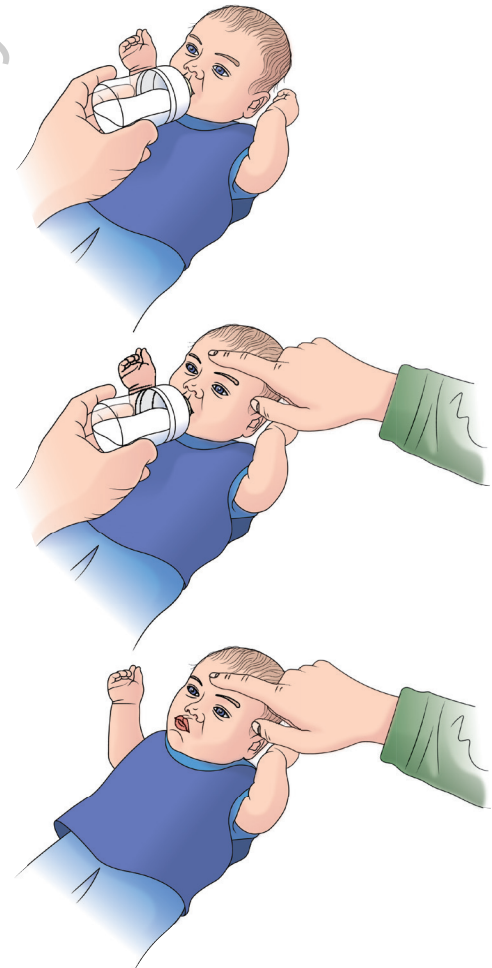


Ivan Pavlov (1849–1936) discovered classical conditioning when he noticed that dogs naturally salivate when they taste food, but they also salivate in response to various sights and sounds that they associate with food.

Sovfoto/Universal Images Group/Newscom

### FIGURE 1.4 ■ Classical Conditioning in a Newborn

Classical conditioning has been observed in newborns, who naturally make sucking movements (unconditioned response) in response to sugar water (unconditioned stimulus). When stroking the forehead (neutral stimulus) is paired with sugar water, infants come to make sucking movements (conditioned response) in response to forehead strokes (conditioned stimulus).





In a classic study conducted by Albert Bandura, children who observed an adult playing with a bobo doll toy roughly imitated those behaviors, suggesting that children learn through observation.

Mirrorpix/Contributor/Getty Images

## Social Learning Theory

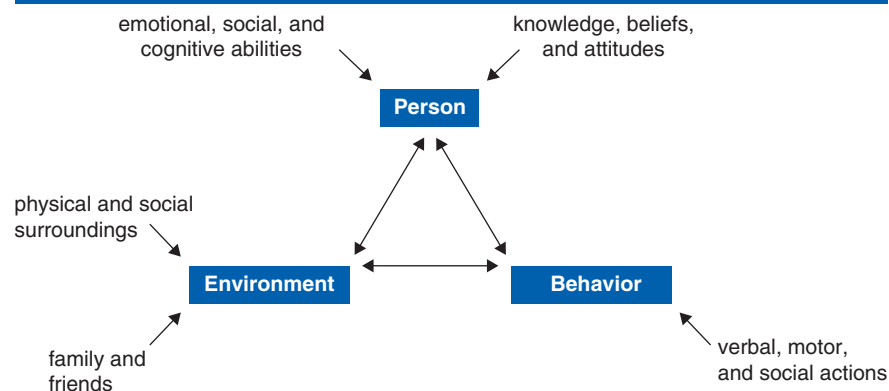
Like behaviorists, Albert Bandura (1925–2021) believed that the physical and social environments are important, but he also advocated for the role of thought and emotion as contributors to development. According to Bandura's **social learning theory**, people actively process information—they think and they feel emotion—and their thoughts and feelings influence their behavior. The physical and social environment influences our behavior through its effect on our thoughts and emotions. The teenager who breaks his curfew and is met by upset parents may experience remorse, which may then make him less likely to come home late in the future. In this example, the social environment (a discussion with upset parents) influenced the teen's thoughts and emotions (feeling bad for upsetting his parents), which then influenced the teen's behavior (not breaking curfew in the future). In other words, our thoughts and emotions about the consequences of our behavior influence our future behavior. We do not need to experience punishment or reinforcement to change our behavior (Bandura, 2012). We can learn by thinking about the potential consequences of our actions.

One of Bandura's most enduring ideas about development is that people learn through observing and imitating others, which he referred to as **observational learning** (Bandura, 2010). This finding suggests that children who observe violence rewarded, such as a child grabbing (and successfully obtaining) another child's

toy, may imitate what they see and use aggressive means to take other children's toys. People also learn by observing the consequences of others' actions. A child observer might be less likely to imitate a child who takes another child's toy if the aggressor is scolded by a teacher and placed in time out. Observational learning is one of the most powerful ways in which we learn.

Bandura has also contributed to the field of lifespan human development through the concept of **reciprocal determinism**, according to which individuals and the environment interact and influence each other (Bandura, 2011, 2018). In contrast with behaviorist theorists, Bandura viewed individuals as active in their development rather than passively molded by their physical and social environments. Specifically, development is a result of interactions between the individual's characteristics, his or her behavior, and the physical and social environment (Figure 1.5).

**FIGURE 1.5** ■ Bandura's Model of Reciprocal Determinism



People's characteristics influence their behavior and the environments they seek. Suppose Issac is inquisitive and assertive, which makes him quick to challenge others in debate. This behavior (challenging others to debate), in turn, stimulates those around him to participate in debate. But suppose, too, that Issac's behavior (being quick to debate) does not result only from his personal characteristics (inquisitiveness and assertiveness). It is also influenced by the environment (e.g., being surrounded by smart people who enjoy debating). Issac's behavior also influences the environment (e.g., people who enjoy debating are more likely to engage Issac, while people who avoid debating are less likely to engage him). This is an example of the complex interplay among person, behavior, and physical and social environment that underlies much of what we will discuss throughout this book.

Behaviorist theories have made important contributions to understanding lifespan human development. Concepts such as observational learning, reinforcement, and punishment are powerful means of explaining human behavior and hold implications for parents, teachers, and anyone who works with people of any age. Social learning theory and reciprocal determinism illustrate the role that individuals have in their own development, a more complex explanation for development and behavior. We will revisit these concepts in later chapters.

### Cognitive Theories

Cognitive theorists view cognition—thought—as essential to understanding people's functioning across the lifespan. In this section, we look at some of the ideas offered by cognitive–developmental theory and information processing theory.

#### Piaget's Cognitive–Developmental Theory

Swiss scholar Jean Piaget (1896–1980) was the first scientist to systematically examine infants' and children's thinking and reasoning. Piaget believed that to understand children, we must understand how they think, because thinking influences all behavior. Piaget's **cognitive–developmental theory** views children and adults as active explorers of their world, driven to learn by interacting with the world around them and organizing what they learn into **cognitive schemas**, or concepts, ideas, and ways of interacting with the world. Through these interactions, they construct and refine their own cognitive schemas, thereby contributing to their own cognitive development.

Piaget proposed that children's drive to explore and understand the world—to construct more sophisticated cognitive schemas—propels them through four stages of cognitive development, as shown in Table 1.3.

Piaget's cognitive–developmental theory transformed the field of developmental psychology and remains one of the most widely cited developmental theories. It was the first to consider *how* infants and children think and to view people as active contributors to their development. In addition, Piaget's concept of cognitive stages and the suggestion that children's reasoning is limited by their stage has implications for education—specifically, the idea that effective instruction must match the child's developmental level.

Some critics of cognitive–developmental theory argue that Piaget focused too heavily on cognition and ignored emotional and social factors in development (Crain, 2016). Others believe that Piaget neglected the influence of contextual factors by assuming that cognitive–developmental stages are universal—that all individuals everywhere progress through the stages in a sequence that does not vary. Some cognitive theorists argue that cognitive development is not a



Jean Piaget (1896–1980) believed that children's drive to explore and understand the world around them propels them through four stages of cognitive development.

Bill Anderson/Science Source

**TABLE 1.3** ■ Piaget's Stages of Cognitive Development

Stage	Approximate Age	Description
Sensorimotor	Birth to 2 years	Infants understand the world and think using only their senses and motor skills, by watching, listening, touching, and tasting.
Preoperations	2 to 6 years	Preschoolers explore the world using their own thoughts as guides and develop the language skills to communicate their thoughts to others. Despite these advances, their thinking is characterized by several errors in logic.
Concrete operations	7 to 11 years	School-aged children become able to solve everyday logical problems. Their thinking is not yet fully mature because they are able to apply their thinking only to problems that are tangible and tied to specific substances.
Formal operations	12 years to adulthood	Adolescents and adults can reason logically and abstractly about possibilities, imagined instances and events, and hypothetical concepts.

discontinuous, stage-like process but instead is a continuous process (Birney & Sternberg, 2011), as described in the following section.

### Information Processing Theory

A developmental scientist presents a 5-year-old child with a puzzle in which a dog, cat, and mouse must find their way to a bone, piece of fish, and hunk of cheese. To solve the puzzle, the child must move all three animals to the appropriate locations. How will the child approach this task? Which item will she move first? What steps will she take? What factors influence whether and how quickly a child completes this task? Finally, how does the 5-year-old child's process and performance differ from that of children older and younger than herself?

The problem described above illustrates the questions studied by developmental scientists who favor **information processing theory**, which posits that the mind works in ways similar to a computer in that information enters and then is manipulated, stored, recalled, and used to solve problems (Halford & Andrews, 2011). Unlike the theories we have discussed thus far, information processing theory is not one theory that is attributed to an individual theorist. Instead, there are many information processing theories, and each emphasizes a different aspect of thinking (Callaghan & Corbit, 2015; Müller et al., 2015; Ristic & Enns, 2015). Some theories focus on how people perceive, focus on, and take in information. Others examine how people store information, create memories, and remember information. Still others examine problem-solving—how people approach and solve problems in school, the workplace, and everyday life.

According to information processing theorists, we are born with the ability to process information. Our mental processes of noticing, taking in, manipulating, storing, and retrieving information do not show the radical changes associated with stage theories. Instead, development is continuous and entails changes in the efficiency and speed of thought. Maturation of the brain and nervous system contributes to changes in our information processing abilities. We tend to become more efficient at attending to, storing, and processing information over the childhood years and to slow over the adult years (Luna et al., 2015). Experience and interaction with others also contribute by helping us learn new ways of managing and manipulating information. We naturally engage in information processing throughout our lives. We will discuss these changes and their implications for children, adolescents, and adults in later chapters.

Information processing theory offers a complex and detailed view of how we think, which permits scientists to make specific predictions about behavior and performance that can be tested in research studies. Indeed, information processing theory has generated a great many research studies and has garnered much empirical support (Halford & Andrews, 2011). Critics of the information processing perspective argue that a computer model cannot capture the complexity of the human mind and

people's unique cognitive abilities. In addition, findings from laboratory research may not extend to everyday contexts in which people must adapt to changing circumstances and challenges to attention (Miller, 2016).

### Contextual Theories

Contextual theories emphasize the role of the sociocultural context in development. People of all ages are immersed in a system of social contexts that interact. They are inseparable from the cultural beliefs and societal, neighborhood, and familial contexts in which they live. Several contextual theorists describe development as a function of interactions between individuals and the contextual systems in which they are embedded.

### Vygotsky's Sociocultural Theory

Writing at the same time as Piaget, Russian scholar Lev Vygotsky (1896–1934) offered a different perspective on development, especially cognitive development, that emphasized the importance of culture. Recall that culture refers to the beliefs, values, customs, and skills of a group; it is a product of people's interactions in everyday settings (Markus & Kitayama, 2010). Vygotsky's (1978) **sociocultural theory** examines how culture is transmitted from one generation to the next through social interaction. Children interact with adults and more experienced peers as they talk, play, and work alongside them. It is through these formal and informal social contacts that children learn about their culture and what it means to belong to it. By participating in cooperative dialogues and receiving guidance from adults and more-expert peers, children adopt their culture's perspectives and practices, learning to think and behave as members of their society (Rogoff, 2016). Over time, they become able to apply these ways of thinking to guide their own actions, thus requiring less assistance from adults and peers (Rogoff et al., 2014).

Vygotsky's sociocultural theory holds important implications for understanding cognitive development. Like Piaget, Vygotsky emphasized that children actively participate in their development by engaging with the world around them. However, Vygotsky also viewed cognitive development as a social process that relies on interactions with adults, more-mature peers, and other members of their culture. Vygotsky also argued that acquiring language is a particularly important milestone for children because it enables them to think in new ways and have more sophisticated dialogues with others, advancing their learning about culturally valued perspectives and activities. We will revisit Vygotsky's ideas about the roles of culture, language, and thought in Chapter 7.

Vygotsky's sociocultural theory is an important addition to the field of lifespan human development because it is the first theory to emphasize the role of the cultural context in influencing people's development. Critics argue that sociocultural theory overemphasizes the role of context, minimizes the role of individuals in their own development, and neglects the influence of genetic and biological factors (Crain, 2016). Another perspective on cognitive development, described next, refocuses attention on the individual.

### Bronfenbrenner's Bioecological Systems Theory

Similar to Vygotsky, Urie Bronfenbrenner (1917–2005) believed that individuals are active in their own development. Specifically, Bronfenbrenner's **bioecological systems theory** poses that development is a result of the ongoing interactions among biological, cognitive, and socioemotional changes within individuals and their changing contexts (Figure 1.6) (Bronfenbrenner & Morris, 2006).



Lev Vygotsky (1896–1934) emphasized the importance of culture in development. Children actively engage their social world, and the social world shapes development by transmitting culturally relevant ways of thinking and acting that guide children's thought and behavior.

Heritage Image Partnership Ltd/Alamy Stock Photo

Bronfenbrenner proposed that all individuals are embedded in, or surrounded by, a series of contexts: home, school, neighborhood, culture and society. Contexts are organized into a series of systems in which individuals are embedded and that interact with one another and the person to influence development.

At the center of the bioecological model is the individual. **Ontogenetic development** refers to the changes that take place within the individual. Ontogenetic development comprises the developing person's interacting biological, cognitive, and socioemotional traits. The developing person's genetic, psychological, socioemotional, and personality traits interact and influence each other. Physical development, such as brain maturation, may influence children's cognitive development, such as reasoning and the ability to consider other people's perspectives, which in turn may influence social development, the ability to have more complex and intimate friendships. In turn, social development may influence cognitive development, as children learn from each other. In this way the various forms of development interact. Ontogenetic development is influenced by, but also influences, the many contexts in which we are embedded (Bronfenbrenner & Morris, 2006).

Perhaps the most visible context is the **microsystem**, the innermost level of the bioecological system, which includes interactions with the immediate physical and social environment surrounding the person, such as family, peers, school, and work. Because the microsystem contains the developing person, it has an immediate and direct influence on his or her development. Peer relationships can influence a person's sense of self-esteem, social skills, and emotional development.

Microsystems naturally interact. Experiences in the home (one microsystem) influence those at school (another microsystem). Parents who encourage and provide support for reading will influence the child's experiences in the classroom. These interactions comprise the **mesosystem**, which refers to the relations among microsystems or connections among contexts, such as home, peer group, school, work, and neighborhood. Like the microsystem, the mesosystem has a direct influence on the individual because he or she is a participant in it.

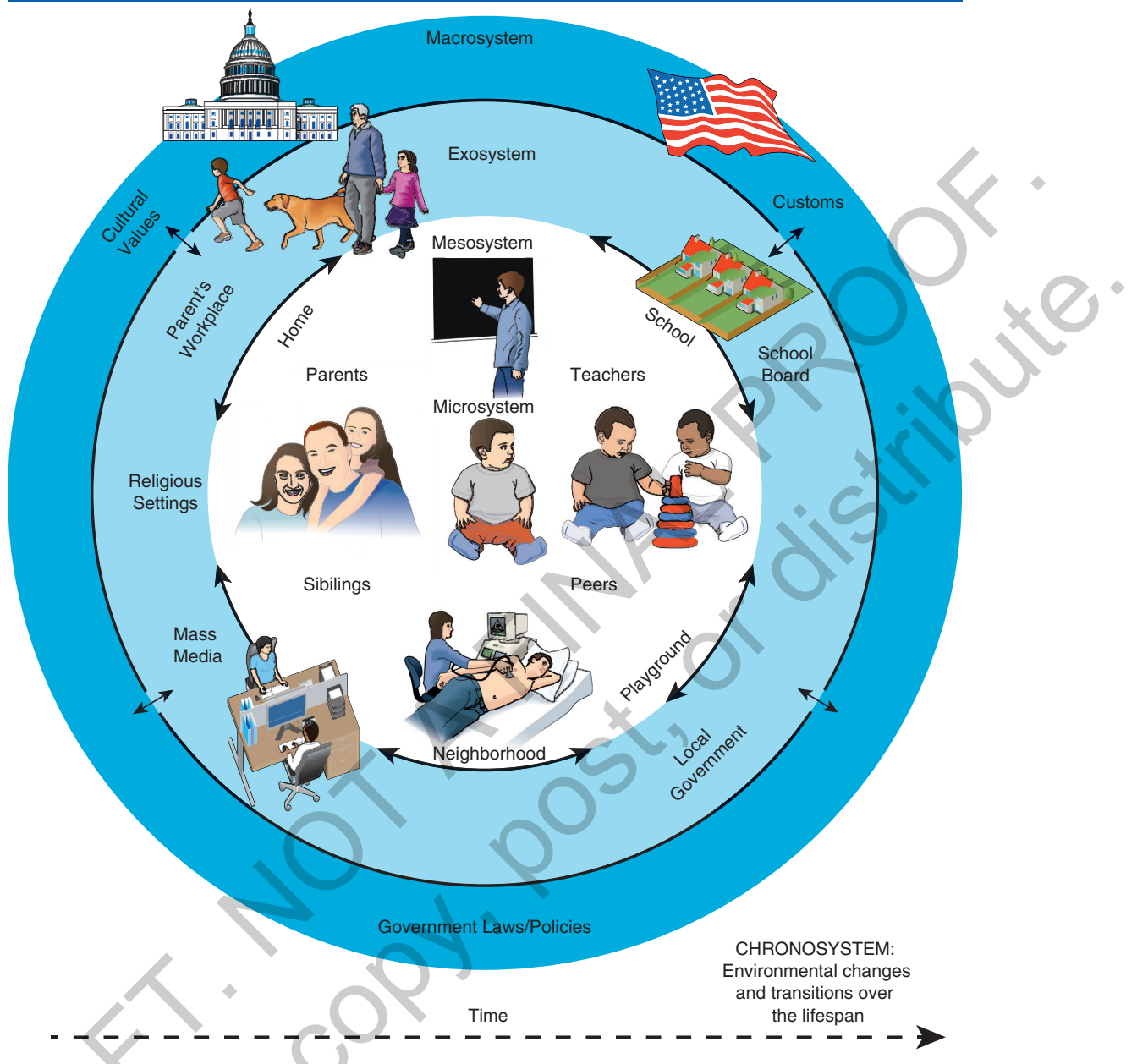
The **exosystem** consists of settings in which the individual is not a participant but that nevertheless influence him or her. A child typically does not participate in a parent's workplace, yet the work setting has an indirect influence on the child because it affects the parent's mood. The availability of funding for schools, another exosystem factor, indirectly affects children by influencing the availability of classroom resources. The exosystem is an important contribution to our understanding of development because it shows us how the effects of outside factors trickle down and indirectly affect individuals.

The **macrosystem** is the greater sociocultural context in which the microsystem, mesosystem, and exosystem are embedded. It includes cultural values, legal and political practices, and other elements of the society at large. The macrosystem indirectly influences the child because it affects each of the other contextual levels. Cultural beliefs about the value of education (macrosystem) influence funding decisions made at national and local levels (exosystem), as well as what happens in the classroom and in the home (mesosystem and microsystem).

By its very nature, the bioecological model is always shifting because individuals and their contexts interact dynamically and perpetually, resulting in a constant state of change. The final element of the bioecological system is the **chronosystem**, which refers to the element of time. The bioecological system changes over time and the time in which we live influences our development. Large-scale social changes, such as those that accompany war, natural disasters, and epidemics, can influence each level of the bioecological system. Neighborhood resources may change over time with changes in local policies and funding. Our relationships with parents, friends, and teachers change over time. As people grow and change, they take on and let go of various roles. Graduating from college, getting married, and becoming a parent involve changes in roles and shifts in microsystems. These shifts in contexts, called *ecological transitions*, occur throughout life.

Recently, the bioecological model has been criticized for its vague explanation of development, especially the role of culture (Vélez-Agosto et al., 2017). Situated in the macrosystem, culture is said to influence development through the interdependence of the systems. Yet current conceptualizations of culture view it as all the processes used by people as they make meaning or think through interactions

FIGURE 1.6 ■ Bronfenbrenner's Bioecological Systems Theory



Source: Adapted from Bronfenbrenner & Morris (2006).

with group members (Mistry et al., 2016; Yoshikawa et al., 2016). Critics therefore argue that since culture is manifested in our daily activities, it is inherent in each bioecological level (Vélez-Agosto et al., 2017). Moreover, cultural changes derive from interactions and pressures at each ecological level, not simply the macrosystem as Bronfenbrenner believed (Varnum & Grossmann, 2017).

A second criticism arises from the sheer complexity of the bioecological model and its attention to patterns and dynamic interactions. We can never measure and account for all of the potential individual and contextual influences on development at once, making it difficult to devise research studies to test the validity of the model. Proponents argue that it is not necessary to test all of the model's components at once. Instead, smaller studies can examine each component over time (Jaeger, 2016; Tudge et al., 2016). In any case, bioecological theory remains an important contribution toward explaining developmental change across the lifespan and is a theory that we will consider throughout this book.

## Dynamic Systems Theory

Some of the major concepts that we have discussed throughout this chapter include the interaction of genetics and environment and the active role of children in their own development. Children are motivated to understand their experiences and control their environment. Each child's characteristics and environmental circumstances and interactions are unique and influence how they approach developmental tasks and problems, resulting in unique patterns of functioning. According to Esther Thelen's **dynamic systems theory**, children's developmental domains, maturation, and environment form an integrated system that is constantly changing, resulting in developmental change and the emergence of new abilities (Thelen, 1995, 2000).

Many childhood milestones, such as an infant's first steps or first word, might look like isolated achievements, but they actually develop systematically and are the result of skill-building, with each new skill (such as pulling up to stand or babbling sounds) preparing an infant to tackle the next (Thelen, 1995, 2000). Simple actions and abilities are combined to provide more complex and effective ways for babies to explore and engage the world. An infant might combine the distinct abilities to sit upright, hold the head upright, match motor movements to vision, reach out an arm, and grasp to coordinate reaching movements to obtain a desired object (Corbetta & Snapp-Childs, 2009; Spencer et al., 2000).

Development reflects goal-oriented behavior because it is initiated by the infant or child's desire to accomplish something, such as picking up a toy or expressing themselves. Infants' abilities and their immediate environments, including environmental supports and constraints, determine whether and how the goal can be achieved (Spencer et al., 2000). Although Thelen described developmental systems theory with motor development in mind, theorists are now applying it to understand children's cognitive and emotional development as well as mental health (Guo et al., 2017; Mascolo et al., 2016).

## Ethology and Evolutionary Developmental Theory

What motivates parents of most species to care for their young? Some researchers argue that caregiving behaviors have an evolutionary basis. **Ethology** is the scientific study of the evolutionary basis of behavior (Bateson, 2015). In 1859, Charles Darwin proposed his theory of evolution, explaining that all species adapt and evolve over time. Specifically, traits that enable a species to adapt, thrive, and mate tend to be passed to succeeding generations because they improve the likelihood of the individual's and species' survival. Several early theorists applied the concepts of evolution to behavior. Konrad Lorenz and Kiko Tinbergen, two European zoologists, observed animal species in their natural environments and noticed patterns of behavior that appeared to be inborn, emerged early in life, and ensured the animals' survival. Shortly after birth, goslings imprint to their mothers, meaning that they bond to her and follow her. Imprinting aids the goslings' survival because it ensures that they stay close to their mother, get fed, and remain protected. In order for imprinting to occur, the mother goose must be present immediately after the goslings hatch; mothers instinctively stay close to the nest so that their young can imprint (Lorenz, 1952).

According to John Bowlby (1969), humans also display biologically preprogrammed behaviors that have survival value and promote development. Caregivers naturally respond to infants' cues. Crying, smiling, and grasping are inborn ways that infants get attention from caregivers, bring caregivers into physical contact, and ensure that they will be safe and cared for. Such behaviors have adaptive significance because they meet infants' needs and promote the formation of bonds with caregivers, ensuring that the caregivers will feel a strong desire and obligation to care for them (Bowlby, 1973). In this way, innate biological drives and behaviors work together with experience to influence adaptation and ultimately an individual's survival.

Another theory, **evolutionary developmental theory**, applies principles of evolution and scientific knowledge about the interactive influence of genetic and environmental mechanisms to understand the changes people undergo throughout their lives (Bjorklund, 2018b; Witherington & Lickliter, 2016). Genetic factors and biological predispositions interact with the physical and social environment to influence development, and Darwinian natural selection determines what genes and traits are passed on to the next generation (Bjorklund, 2018b; Witherington & Lickliter, 2016).



You may have wondered whether you—your abilities, personality, and competencies—result from your genes or from the physical and social environment in which you were raised. Evolutionary developmental scientists explain that this is the wrong question to ask because genes and context interact in an ever-changing way so that it is impossible to isolate the contributions of each to development (Witherington & Lickliter, 2016). Our traits and characteristics are influenced by genes, but contextual factors influence the expression of genetic instructions, determining whether and how genes are shown. Gravity, light, temperature, and moisture can influence how genes are expressed and therefore how individuals develop (Meaney, 2017). In some reptiles, such as crocodiles, sex is determined by the temperature in which the organism develops. Eggs incubated at one range of temperatures produce male crocodiles and at another temperature produce female crocodiles (Pezaro et al., 2017). In this way, a contextual factor—temperature—determines how genes are expressed: sex.

Evolutionary developmental theory views people as active in their development, influencing their contexts, responding to the demands for adaptation posed by their contexts, and constantly interacting with and adapting to the world around them. The relevance of both biological and contextual factors to human development is indisputable, and most developmental scientists appreciate the contributions of evolutionary developmental theory (DelGiudice, 2018; Frankenhuis & Tiokhin, 2018; Legare et al., 2018). The ways in which biology and context interact and their influence on development change over the course of the lifetime, as we will discuss throughout this book.

The many theories of human development offer complementary and contrasting views of how we change throughout our lifetimes. Table 1.4 provides a comparison of theories of human development.



Shortly after birth, goslings imprint to their mothers, meaning that they bond to her and will follow her to ensure they will be fed and remain protected. Ethologists propose that animal and human caregiving behaviors have an evolutionary basis.

iStock/EmilyNorton

**TABLE 1.4** ■ Comparing Theories of Human Development

	Is development influenced by nature or nurture?	Are individuals active or passive in their development?	Is development continuous or discontinuous?
Freud's psychosexual theory	<i>Greater emphasis on nature:</i> People are driven by inborn drives, but the extent to which the drives are satisfied influences developmental outcomes.	<i>Passive:</i> People are driven by inborn instincts and are not active participants in their development.	<i>Discontinuous:</i> Stages
Erikson's psychosocial theory	<i>Both nature and nurture:</i> Biological and social forces propel people through the stages, and social and psychosocial influences determine the outcome of each stage.	<i>Active:</i> People are active in their development because they interact with their social world to resolve psychosocial tasks.	<i>Discontinuous:</i> Stages
Behaviorist theory	<i>Nurture:</i> Environmental influences shape behavior.	<i>Passive:</i> People are shaped and molded by their environment.	<i>Continuous:</i> Gradual process of learning new behaviors

(Continued)

	Is development influenced by nature or nurture?	Are individuals active or passive in their development?	Is development continuous or discontinuous?
Bandura's social learning theory	<i>Both nature and nurture:</i> Inborn characteristics and the physical and social environment influence behavior.	<i>Active:</i> Individuals are influenced by the environment but also play an active role in their development through reciprocal determinism.	<i>Continuous:</i> Gradual process of learning new behaviors
Piaget's cognitive-developmental theory	<i>Both nature and nurture:</i> An innate drive to learn coupled with brain development leads people to interact with the world. Opportunities provided by the physical and social environment influence development.	<i>Active:</i> Individuals actively interact with the world to create their own schemas.	<i>Discontinuous:</i> Stages
Information processing theory	<i>Both nature and nurture:</i> People are born with processing capacities that develop through maturation and environmental influences.	<i>Active:</i> People attend to, process, and store information.	<i>Continuous:</i> Gradual increase of skills and capacities
Vygotsky's sociocultural theory	<i>Both nature and nurture:</i> People learn through interactions with more-skilled members of their culture; capacities are influenced by genes, brain development, and maturation.	<i>Active:</i> Individuals actively interact with members of their culture.	<i>Continuous:</i> Continuous interactions with others lead to developing new reasoning capacities and skills.
Bronfenbrenner's bioecological systems theory	<i>Both nature and nurture:</i> People's inborn and biological characteristics interact with an ever-changing context to influence behavior.	<i>Active:</i> People interact with their contexts, being influenced by their contexts but also determining what kinds of physical and social environments are created and how they change.	<i>Continuous:</i> People constantly change through their interactions with the contexts in which they are embedded.
Dynamic systems theory	<i>Both nature and nurture:</i> Developmental domains, maturation, and environment form an integrated system.	<i>Active:</i> Development reflects goal-oriented behavior by the desire to accomplish goals.	<i>Continuous:</i> New developmental achievements are the result of systematic skill-building.
Ethology and evolutionary developmental theory	<i>Both nature and nurture:</i> Genetic programs and biological predispositions interact with the physical and social environment to influence development, and Darwinian natural selection determines what genes and traits are passed on to the next generation.	<i>Active:</i> People interact with their physical and social environment.	<i>Both continuous and discontinuous:</i> People gradually grow and change throughout life, but there are sensitive periods in which specific experiences and developments must occur.

### Thinking in Context: Applied Developmental Science

Just after delivering a healthy baby girl, Maria and Fernando are overwhelmed by the intense love they feel for her. Like most new parents, they also worry about their new responsibility. They hope that their baby will develop a strong, secure, and close bond to them. They want their baby to feel loved and to love them.

1. What advice would a psychoanalytic theorist give Maria and Fernando? Contrast psychoanalytic with behaviorist perspectives. How might a behaviorist theorist approach this question?
2. How might an evolutionary developmental theorist explain bonding between parents and infants? What advice might an evolutionary developmental theorist give to Maria and Fernando?
3. Considering bioecological systems theory, what microsystem and mesosystem factors influence the parent–child bond? What role might exosystem and macrosystem factors take?

## RESEARCH IN HUMAN DEVELOPMENT

### LEARNING OBJECTIVE

- 1.4 Describe the methods and research designs used to study human development.

The many theories of lifespan human development differ in focus and explanation, but they all result from scientists' attempts to organize observations of people at all ages. Developmental scientists conduct research to gather information and answer questions about how people grow and change over their lives. They devise theories to organize what they learn from research and to suggest new hypotheses to test in research studies. In turn, research findings are used to modify theories. By conducting multiple studies over time, developmental scientists refine their theories about lifespan human development and determine new questions to ask.

### The Scientific Method

Researchers employ the **scientific method**, a process of posing and answering questions by making careful and systematic observations and gathering information. The scientific method provides an organized way of formulating questions, finding answers, and communicating research discoveries. Its basic steps are as follows:

1. Identify the research question or problem to be studied and formulate the hypothesis, or proposed explanation, to be tested.
2. Gather information to address the research question.
3. Summarize the information gathered and determine whether the hypothesis is refuted, or shown to be false.
4. Interpret the summarized information, consider the findings in light of prior research studies, and share findings with the scientific community and world at large.

In practice, the scientific method usually does not proceed in such a straightforward, linear fashion. Frequently, research studies raise as many questions as they answer—and sometimes more. Unexpected findings can prompt new studies. Researchers may repeat an experiment (called a *replication*) to see whether the results are the same as previous ones. Sometimes analyses reveal flaws in data

collection methods or research design, prompting a revised study. Experts may also disagree on the interpretation of a study. Researchers may then conduct new studies to test new hypotheses and shed more light on a given topic. For all of these reasons, scientists often say the scientific method is “messy.”

### Methods of Data Collection

The basic challenge that developmental scientists face in conducting research is determining how to measure their topic of interest. What information is important? How can it be gathered? Scientists use the term *data* to refer to the information they collect. How can we gather data about children, adolescents, and adults? Should we simply talk with our participants? Watch them as they progress through their days? Hook them up to machines that measure physiological activity such as heart rate or brain waves? Developmental scientists use a variety of different methods, or measures, to collect information.

### Observational Measures

Some researchers collect information by watching and monitoring people’s behavior. Developmental scientists employ two types of observational measures: naturalistic observation and structured observation.

Scientists who use **naturalistic observation** observe and record behavior in natural, real-world settings. Coplan et al. (2015) studied peer interaction patterns in children by observing 9- to 12-year-old children in the schoolyard during recess and lunch. They recorded the children’s activity and interaction with peers and found that children who were consistently unengaged with peers tended to show high levels of problems, such as anxiety, depression, and loneliness, as reported by both the children and their mothers.

A challenge of using naturalistic observation is that sometimes the presence of an observer causes those being observed to behave unnaturally. This is known as *participant reactivity*. One way of reducing the effect of participant reactivity is to conduct multiple observations so that the participants get used to the observer and return to their normal behavior. Another promising method of minimizing participant reactivity is to use an *electronically activated voice recorder* (EAR) (Mehl, 2017). Participants carry the EAR as they go about their daily lives. The EAR captures segments of information over time: hours, days, or even weeks. It yields a log of people’s activities as they naturally unfold. The EAR minimizes participant reactivity because the participant is unaware of exactly when the EAR is recording. Researchers who study child trauma use EAR to sample conversations between parents and children to understand how parent–child interactions influence children’s adjustment and how the family environment can aid children’s recovery from trauma (Alisic et al., 2016).



This researcher is using a video camera to observe and record the facial expressions a newborn baby makes while they sleep.

Thierry Berrod, Mona Lisa Production/Science Source

Naturalistic observation permits researchers to observe patterns of behavior in everyday settings, such as whether a particular event or behavior typically precedes another. Such observations can help researchers determine which behaviors are important to study in the first place. A scientist who studies bullying by observing children’s play may notice that some victims act aggressively *before* a bullying encounter (Kamper-DeMarco & Ostrov, 2017). The scientist may then decide to examine aggression in victims not only after a bullying incident but also beforehand. Naturalistic observation is a useful way of studying events and behaviors that are common. Some behaviors and events are uncommon or are difficult to observe, such as physical aggression among adults, requiring a researcher to observe for very long periods of time to obtain data on the behavior of interest. For this reason, many researchers make structured observations.

**Structured observation** entails observing and recording behaviors displayed in a controlled environment, a situation constructed by the experimenter. Children might be observed in a laboratory setting as they play with another child or complete a puzzle-solving task. The challenges of identifying and categorizing which behaviors to record are similar to those involved in naturalistic observation. However, the laboratory environment permits researchers to exert more control over the situation than is possible in natural settings. In addition to cataloging observable behaviors, some researchers use technology to measure biological functions such as heart rate, brain waves, and blood pressure. One challenge to conducting structured observations is that people do not always behave in laboratory settings as they do in real life.

### Self-Report Measures

Interviews and questionnaires are known as self-report measures because the person under study answers questions about his or her experiences, attitudes, opinions, beliefs, and behavior. Interviews can take place in person, over the phone, or over the Internet.

One type of interview is the **open-ended interview**, in which a trained interviewer uses a conversational style that encourages the participant, or the person under study, to expand his or her responses. Interviewers may vary the order of questions, probe, and ask additional questions based on responses. The scientist begins with a question and then follows up with prompts to obtain a better view of the person's reasoning (Ginsburg, 1997). An example of this is the Piagetian Clinical Interview, which requires specialized training to administer. Consider this dialogue between Piaget and a 6-year-old child:

You know what a dream is?

*When you are asleep and you see something*

Where does it come from?

*The sky*

Can you see it?

*No! Yes, when you're asleep*

Could I see it if I was there?

*No.*

Why not?

*Because it is in front of us. . . . When you are asleep you dream and you see them, but when you aren't asleep you don't see them.*

(Piaget, 1929, p. 93)

Open-ended interviews permit participants to explain their thoughts thoroughly and in their own words. They also enable researchers to gather a large amount of information quickly. Open-ended interviews are very flexible as well. But their flexibility poses a challenge: When questions are phrased differently for each person, responses may not capture real differences in how people think about a given topic and instead may reflect differences in how the questions were posed and followed up by the interviewer.

In contrast, a **structured interview** poses the same set of questions to each participant in the same way. On



The interviewer may ask a child about their own experiences, opinions, and behavior. Interviews and questionnaires are known as self-report measures.

damircudic/Getty Images

the one hand, structured interviews are less flexible than open-ended interviews. On the other hand, because all participants receive the same set of questions, differences in responses are more likely to reflect true differences among participants and not merely differences in the manner of interviewing. Evans et al. (2002) used a structured interview to examine American children's beliefs about magic. Children between the ages of 3 and 8 were asked the following set of questions:

What is magic? Who can do magic?

Is it possible to have special powers? Who has special powers?

Does someone have to learn to do magic? Where have you seen magic? (p. 49)

After compiling and analyzing the children's responses as well as administering several cognitive tasks, the researchers concluded that even older children, who have the ability to think logically and perform concrete operations, may display magical beliefs.

To collect data from large samples of people, scientists may compile and use **questionnaires**, also called surveys, made up of sets of questions, typically multiple choice. Questionnaires can be administered in person, online, or by telephone, email, or postal mail. Questionnaires are popular data collection methods because they are easy to use and enable scientists to collect information from many people quickly and inexpensively. Scientists who conduct research on sensitive topics, such as sexual interest and experience, often use questionnaires because they can easily be administered anonymously, protecting participants' privacy. The Monitoring the Future Study is an annual survey of 50,000 8th-, 10th-, and 12th-grade students that collects information about their behaviors, attitudes, and values concerning drug and alcohol use (Miech et al., 2017). The survey permits scientists to gather an enormous amount of data yet its anonymity protects the adolescents from the consequences of sharing personal information that they might not otherwise reveal.

Despite their ease of use, self-report measures are not without challenges. Questionnaires rely on a person's ability to read and understand questions and provide responses. Children and individuals who are capacitated may have difficulty completing questionnaires. Sometimes people give socially desirable answers: They respond in ways they would like themselves to be perceived or believe researchers desire. A college student completing a survey about cheating might sometimes look at nearby students' papers during examinations, but she might choose survey answers that do not reflect this behavior. Her answers might instead match the person she aspires to be or the behaviors she believes the world values—that is, someone who does not cheat on exams. Self-report data, then, may not always reflect people's true attitudes and behavior. Some argue that we are not always fully aware of our feelings and therefore cannot always provide useful insight into our own thoughts and behavior with the use of self-report measures (Newell & Shanks, 2014).

### Physiological Measures

Our body responses are an important source of information that can be used to understand psychological phenomena. Physiological measures offer important information increasingly used in developmental research because cognition, emotion, and behavior have physiological indicators. Do you feel your heart beat more rapidly or your palms grow sweaty when you give a class presentation? Increases in heart rate and perspiration are physiological measures of anxiety. Other researchers might measure cortisol, a hormone triggered by the experience of stress (Simons et al., 2017).

Eye movements and pupil dilation can indicate attention and interest. Researchers who tracked participants' eye movements as they viewed Facebook feeds learned that people are naturally attracted to social and news posts that are rich with pictures and links, yet most people are unable to report what they have viewed, even immediately after viewing it (Vraga et al., 2016). Researchers who employ physiological measures might use pupil dilation as a measure of interest in infants and physiological arousal in adults (Feurer et al., 2017; Wetzel et al., 2016).

Physiological measures of brain activity are a particularly promising source of data. Several tools are used to study the brain. **Electroencephalography (EEG)** measures electrical activity patterns produced by the brain via electrodes placed on the scalp. Researchers study fluctuations in activity that

occur when participants are presented with stimuli or when they sleep. EEG recordings measure electrical activity in the brain, but they do not provide information about the location of activity or the brain structures that are the source of brain activity.

**Computerized tomography (CT scan)** compiles multiple x-ray images to create a three-dimensional picture of a person's brain, providing images of brain structures, bone, brain vasculature, and tissue (Cierniak, 2011). CT scans can provide researchers with information about the density of brain structures to illustrate how the thickness of the cortex changes with development. Recording multiple x-ray images, however, exposes research participants to higher levels of radiation than a single x-ray (Davies et al., 2011).

**Positron emission tomography (PET)** involves injecting a small dose of radioactive material into the participant's bloodstream to monitor the flow of blood (Portnow et al., 2013). Blood flows more readily to active areas of the brain and the resulting images can illustrate what parts of the brain are active as participants view stimuli and solve problems.

**Functional magnetic resonance imaging (fMRI)** measures brain activity with a powerful magnet that uses radio waves and to measure blood oxygen level (Bandettini, 2012). Active areas of the brain require more oxygen-rich blood, permitting researchers to determine what parts of the brain are active as individuals complete cognitive tasks. fMRI images are much more detailed than PET scans and do not rely on radioactive molecules, which can only be administered a few times before becoming unsafe.

**Diffusion tensor imaging (DTI)** uses an MRI machine to track how water molecules move in and around the fibers connecting different parts of the brain (Soares et al., 2013). DTI gauges the thickness and density of the brain's connections, permitting researchers to measure the brain's white matter and determine changes that occur with development.

An advantage of physiological measures is they do not rely on verbal reports and generally cannot be faked. A challenge to physiological measures is that, although physiological responses can be recorded, they may be difficult to interpret. Excitement and anger may both cause an increase in heart rate. Data collection methods are summarized in Table 1.5.

**TABLE 1.5** ■ Data Collection Methods

	Advantage	Disadvantage
<b>Observational Measures</b>		
<b>Naturalistic observation</b>	Gathers data on everyday behavior in a natural environment as behaviors occur.	The observer's presence may influence participants' behavior. No control over the observational environment.
<b>Structured observation</b>	Observation in a controlled setting.	May not reflect real-life reactions and behavior.
<b>Self-Report Measures</b>		
<b>Open-ended interview</b>	Gathers a large amount of information quickly and inexpensively.	Nonstandardized questions. Characteristics of the interviewer may influence participant responses.
<b>Structured interview</b>	Gathers a large amount of information quickly and inexpensively.	Characteristics of the interviewer may influence participants' responses.
<b>Questionnaire</b>	Gathers data from a large sample more quickly and inexpensively than by interview methods.	Some participants may respond in socially desirable or inaccurate ways.
<b>Physiological Measures</b>		
	Assesses biological indicators and does not rely on participant report. Difficult to fake responses.	May be expensive, difficult for researchers to access, and difficult to interpret

(Continued)

	Advantage	Disadvantage
<b>Electroencephalography (EEG)</b>	Measures electrical activity patterns produced by the brain	Does not provide information about the brain structures that are the source of brain activity
<b>Computerized tomography (CT scan)</b>	Provides images of brain structures, bone, brain vasculature, and tissue	Exposes participants to low levels of radiation
<b>Positron emission tomography (PET)</b>	Illustrates activity in specific parts of the brain as participants complete cognitive tasks	Exposes participants to low levels of radiation
<b>Functional magnetic resonance imaging (fMRI)</b>	Illustrates activity in specific parts of the brain as participants complete cognitive tasks. More detailed images than PET scans and does not rely on radiation	Expensive and requires participants to be completely still during the scan
<b>Diffusion tensor imaging (DTI)</b>	Measures the thickness and density of brain connections. Less expensive than fMRI	Requires participants to be completely still during the scan

## Research Designs

Just as there are many ways to collect information, scientists have many options for conducting their studies. In addition to determining the research question and deciding what information to collect, scientists must choose a research design—a technique for conducting the research study.

### Case Study

A **case study** is an in-depth examination of a single person (or small group of individuals). It is conducted by gathering information from many sources, such as through observations, interviews, and conversations with family, friends, and others who know the individual. A case study may include samples or interpretations of a person's writing, such as poetry or journal entries, artwork, and other creations. A case study provides a rich description of a person's life and influences on his or her development. It is often employed to study individuals who have unique and unusual experiences, abilities, or disorders. Conclusions drawn from a case study may shed light on an individual's development but may not be generalized or applied to others. Case studies can be a source of hypotheses to examine in large-scale research.



Researchers experimentally manipulate which children play with violent video games to determine their effect on behavior.

istock/sakkmesterke

### Correlational Research

Are children with high self-esteem more likely to excel at school? Are older adults with more friends happier than those with few? Are college students who work part-time less likely to graduate? All of these questions can be studied with **correlational research**, which permits researchers to examine relations among measured characteristics, behaviors, and events. In one study scientists examined the relationship between physical fitness and academic performance in middle school students and found that children with higher aerobic capacity scored higher on achievement tests than did children with poorer aerobic capacity (Bass et al., 2013). Note that this correlation does not tell us *why* aerobic capacity was associated with academic achievement. Correlational research cannot answer this question because it simply describes relationships that exist among variables; it does



not enable us to reach conclusions about the causes of those relationships. It is likely that other variables influence both a child's aerobic ability and achievement (e.g., health), but correlation does not enable us to determine the causes for behavior—for that we need an experiment.

### Experimental Research

Scientists who seek to test hypotheses about *causal* relationships, such as whether media exposure influences behavior or whether hearing particular types of music influences mood, employ **experimental research**. An experiment is a procedure that uses control to determine causal relationships among variables. Specifically, one or more variables thought to influence a behavior of interest are changed, or manipulated, while other variables are held constant. Researchers can then examine how the changing variable influences the behavior under study. If the behavior changes as the variable changes, this suggests that the variable caused the change in the behavior.

Gentile et al. (2017) examined the effect of playing violent video games on children's physiological stress and aggressive thoughts. Children were randomly assigned to play a violent video game (*Superman*) or a nonviolent video game (*Finding Nemo*) for 25 minutes in the researchers' lab. The researchers measured physiological stress as indicated by heart rate and cortisol levels before and after the children played the video game. Children also completed a word completion task that the researchers used to measure the frequency of aggressive thoughts. The researchers found that children who played violent video games showed higher levels of physiological stress and aggressive thoughts than did the children who played nonviolent video games. They concluded that the type of video game changed children's stress reactions and aggressive thoughts.

Let's take a closer look at the components of an experiment. Conducting an experiment requires choosing at least one **dependent variable**, the behavior under study (e.g., physiological stress—heart rate and cortisol—and aggressive thoughts), and one **independent variable**, the factor proposed to change the behavior under study (e.g., type of video game). The independent variable is manipulated or varied systematically by the researcher during the experiment (e.g., a child plays with a violent or a nonviolent video game). The dependent variable is expected to change as a result of varying the independent variable, and how it changes is thought to depend on how the independent variable is manipulated (e.g., physiological stress and aggressive thoughts vary in response to the type of video game).

After the independent variable is manipulated, if the experimental and control groups differ on the dependent variable, it is concluded that the independent variable *caused* the change in the dependent variable. That is, a cause-and-effect relationship has been demonstrated.

In an experiment, the independent variable is administered to one or more *experimental groups*, or test groups. The *control group* is treated just like the experimental group except that it is not exposed to the independent variable. In an experiment investigating whether particular types of music influence mood, the experimental group would experience a change in music (e.g., from “easy listening” to rock), whereas the control group would hear only one type of music (e.g., “easy listening”). **Random assignment**, whereby each participant has an equal chance of being assigned to the experimental or control group, is essential for ensuring that the groups are as equal as possible in all preexisting characteristics (e.g., age, ethnicity, and gender). Random assignment makes it less likely that any observed differences in the outcomes of the experimental and control groups are due to preexisting differences between the groups. After the independent variable is manipulated, if the experimental and control groups differ on the dependent variable, it is concluded that the independent variable *caused* the change in the dependent variable. That is, a cause-and-effect relationship has been demonstrated.

As another example, consider a study designed to examine whether massage therapy improves outcomes in preterm infants (infants who were born well before their due date) (Abdallah et al., 2013). Infants housed in a neonatal unit were assigned to a massage group (independent variable), who were touched and their arms and legs moved for 10-minute periods once each day, or to a control group, which received no massage. Other than the massage/no massage periods, the two groups of infants were cared for in the same way. Infants who were massaged scored lower on the measure of infant pain and discomfort (including indicators such as heart rate, oxygen saturation, and facial responses) at discharge (dependent variable). The researchers concluded that massage therapy reduces pain responses in preterm infants.

Developmental scientists conduct studies that use both correlational and experimental research. Studying development requires that scientists pay close attention to age and how people change over time, which requires the use of specialized research designs, as described in the following sections.

### Developmental Research Designs

Does personality change over the lifespan? Do children outgrow shyness? Are infants' bonds with their parents associated with their adult relationships? These questions require that developmental scientists examine relationships among variables over time. The following sections discuss the designs that researchers use to learn about human development. As you learn about each design, consider how we might employ it to answer a question about development. How does alcohol use among adolescents change from 6th grade through 12th grade?

#### Cross-Sectional Research Design

A **cross-sectional research study** compares groups of people of different ages at a single point in time. Suppose a researcher wanted to know how alcohol use changes from early to late adolescence, from age 12 to 18. To study this question the researcher might visit a school system in 2022 and administer a survey about alcohol use to students ages 12, 14, 16, and 18. By analyzing the survey, the scientist can describe *age differences* in alcohol use and identify how 12-year-olds differ from 18-year-olds today. However, the results do not tell us whether the observed age differences in alcohol use reflect age-related or developmental change. In other words, we do not know whether the 12-year-olds in this sample will show the same patterns of alcohol use as the current 18-year-olds when they are 18, six years from now.

Cross-sectional research permits age comparisons, but participants differ not only in age but in cohort. A **cohort** is a group of people of the same age who are exposed to similar historical events and cultural and societal influences. Cohorts refer to generations, but we can also speak of smaller cohorts based on factors such as the year of entry to school. In this example, the 12-year-olds and the 18-year-olds are different ages, but they are also in different cohorts, so the two groups may differ in reported alcohol use because of development (age-related changes) or cohort (group-related changes). Perhaps the 12-year-olds received a new early prevention program at school that was not available to the 18-year-olds when they were 12. The difference in alcohol use between 12-year-olds and 18-year-olds might then be related to the prevention program, a cohort factor, and not to age. Cross-sectional research is an important source of information about age differences, but it cannot provide information about age-related changes because participants are assessed only once.

#### Longitudinal Research Design

A **longitudinal research study** follows the same group of participants over many points in time. Returning to the previous example, to examine how alcohol use changes from 12 to 18 years of age, a developmental scientist using longitudinal research might administer a survey on alcohol use to 12-year-olds and then follow up two years later when they are 14, again when they are 16, and finally when they are 18. If a researcher began this study in 2022, the last round of data collection would not occur until 2028.

Longitudinal research provides information about age-related change because it follows individuals over time, enabling scientists to describe how the 12-year-olds' alcohol use changed as they progressed through adolescence. However, longitudinal research studies only one cohort, calling into question whether findings indicate developmental change or whether they are an artifact of the cohort under study. Was the group of 12-year-olds that the scientist chose to follow for six years somehow different from the cohorts or groups of students who came before or after? Because only one cohort is assessed, it is not possible to determine whether the observed changes are age-related changes or changes that are unique to the cohort examined.

## Sequential Research Designs

A **sequential research design** combines the best features of cross-sectional and longitudinal research by assessing multiple cohorts over time, enabling scientists to make comparisons that disentangle the effects of cohort and age (Figure 1.7). Consider the alcohol use study once more. A sequential design would begin in 2022 with a survey to students ages 12, 14, 16, and 18. Two years later, in 2024, the initial sample is surveyed again; the 12-year-olds are now 14, the 14-year-olds are now 16, and the 16-year-olds are now 18. The 18-year-olds are now 20 and are not assessed, because they have aged out of the study. Now a new group of 12-year-olds is surveyed. Two years later, in 2026, the participants are surveyed again, and so on.

The sequential design provides information about age, cohort, and age-related change. The cross-sectional data (comparisons of 12-, 14-, 16-, and 18-year-olds from a given year) provide information about age differences, how the age groups differ from one another. The longitudinal data (annual follow-up of participants ages 12 through 18) captures age-related change because participants are followed up over time. The sequential component helps scientists separate cohort effects from age-related change. Because several cohorts are examined at once, the effect of cohort can be studied. The sequential design is complex, but it permits human development researchers to disentangle the effects of age and cohort, and answer questions about developmental change.

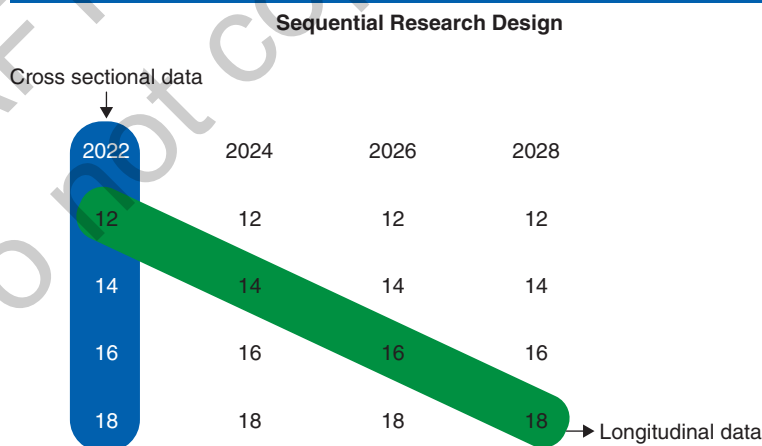
In summary, scientists use the scientific method to systematically ask and seek answers to questions about human development. Researchers' decisions about measures and research designs influence the information that they collect and the conclusions that they make about development. Table 1.6 summarizes the research designs available to developmental scientists. Researchers have responsibilities to conduct sound research and also to adhere to standards of ethical conduct in research, as the next section describes.

### Thinking in Context: Applied Developmental Science

Lua is interested in understanding academic achievement in elementary school students. Specifically, she believes that too much screen time harms students' achievement.

1. How might Lua gather information to address her hypothesis?
2. What are some of the challenges of measuring behaviors such as screen time?

**FIGURE 1.7** Sequential Research Design



Source: Kim & Böckenholt (2000).

TABLE 1.6 ■ Comparing Research Designs

Design	Strengths	Limitations
<b>Research Designs</b>		
Case study	Provides a rich description of an individual.	Conclusions may not be generalized to other individuals.
Correlational	Permits the analysis of relationships among variables as they exist in the real world.	Cannot determine cause-and-effect relations.
Experimental	Permits a determination of cause-and-effect relations.	Data collected in artificial environments may not represent behavior in real-world environments.
<b>Developmental Research Designs</b>		
Cross-sectional	More efficient and less costly than the longitudinal design. Permits the determination of age differences.	Does not permit inferences regarding age change. Confounds age and cohort.
Longitudinal	Permits the determination of age-related changes in a sample of participants assessed for a period of time.	Time-consuming and expensive. Participant attrition may limit conclusions. Cohort-related changes may limit the generalizability of conclusions.
Sequential	Permits thorough analyses of developmental change. Simultaneous longitudinal and cross-sectional comparisons reveal age differences and age change, as well as cohort effects.	Time-consuming, expensive, and complicated data collection and analysis.

3. What kind of research design should Lua use? What are the advantages and disadvantages of this design?
4. Suppose Lua wanted to know the long-term correlates of screen time. How might she study this question?

## RESEARCH ETHICS

### LEARNING OBJECTIVE

- 1.5** Discuss principles of research ethics and the ethical issues that may arise in developmental science research.

Suppose a researcher wanted to study the effects of bullying on emotional development or determine how malnutrition influences development. Would it be possible to design a study in which some children are exposed to bullying or some kindergarteners are deprived of food? Of course not. These studies violate the basic ethical principles that guide developmental scientists' work, as described below.

### Principles of Research Ethics

In addition to conducting research that is scientifically sound, developmental scientists must adhere to standards of ethical conduct in research. Several basic ethical principles guide developmental scientists' work: (1) do good and avoid harm, (2) responsibility, (3) integrity, (4) justice, and (5) **respect for autonomy** (American Psychological Association, 2010; Society for Research in Child Development, 2021).

Developmental scientists are obligated to do good and to avoid doing harm. Researchers must protect and help the individuals, families, and communities they work with by maximizing the benefits and minimizing the potential harms of their work. Participating in research must never pose threats to individuals beyond those they might encounter in everyday life. Researchers also have the responsibility to help participants by directing a distressed participant toward help-seeking resources.

A second principle that guides developmental scientists' work is that they must act responsibly by adhering to professional standards of conduct, clarifying their obligations and roles to others, and avoiding conflicts of interest. A psychologist who conducts research with children and parents must clarify her role as scientist and not counselor and help her participants understand that she is simply gathering information from them rather than conducting therapy.

Researchers' responsibility extends beyond their participants to society at large to ensure that their research findings are accurately portrayed in the media. The principle of responsibility means that researchers must attempt to foresee ways in which their results may be misinterpreted and correct any misinterpretations that occur (Lilienfeld, 2002; Society for Research in Child Development, 2021). Sometimes researchers' findings have social and political implications that they may not expect. For example, one highly publicized study compiled the results of many research studies examining college students who had become sexually involved with an adult prior to reaching the legal age of consent (Rind et al., 1998). After examining the body of research, the scientists determined that young people's coping and development varied depending on a number of factors within the individual, situation, and broader context; not all the young people appeared to be equally harmed. Participants who were older when the relationship began, such as in late adolescence, just prior to reaching the age of consent, showed fewer negative effects and appeared well-adjusted. These findings were misinterpreted by some organizations, media outlets, and politicians as suggesting that sexual involvement with minors was acceptable or even beneficial—clearly not the researchers' conclusions (Garrison & Kobor, 2002).

The principle of integrity requires that scientists be accurate, honest, and truthful in their work by being mindful of the promises they make to participants and making every effort to keep their promises to the people and communities with which they work. Researchers should recognize the participants' right to learn about the results of their research. In addition, the risks and benefits of research participation must be spread equitably across individuals and groups. This is the principle of **justice**. Every participant should have access to the contributions and benefits of research. When a treatment or intervention under study is found to be successful, all participants must be given the opportunity to benefit from it.

Perhaps the most important principle of research ethics is respect for autonomy. Scientists have a special obligation to respect participants' autonomy, their ability to make and implement decisions. Ethical codes of conduct require that researchers protect participants' autonomy by obtaining **informed consent**—participants' informed, rational, and voluntary agreement to participate. Soliciting informed consent requires providing the individuals under study information about the research study, answering questions, and ensuring that they understand that they are free to decide not to participate in the research study and that they will not be penalized if they refuse.

### Ethical Issues in Studying Lifespan Human Development

Each period in the lifespan poses unique ethical concerns for researchers. Common and pressing ethical challenges include soliciting consent, maintaining participant confidentiality, and protecting participants from harm.

#### Informed Consent

Respecting people's autonomy also means protecting those who are not capable of making judgments and asserting themselves. Parents provide parental permission for their minor children to participate because researchers (and lawmakers) assume that minors are not able to meet the rational criteria of informed consent. Although children cannot provide informed consent, researchers respect their growing capacities for decision making in ways that are appropriate to their age by seeking **child assent**, children's agreement to participate (Tait & Geisser, 2017). For toddlers or young children, obtaining assent

may involve simply asking if they want to play with the researcher (Brown et al., 2017). With increasing cognitive and social development, children are better able to understand the nature of science and engage meaningfully in decisions about research participation. Discussions about research participation should be tailored to children's development, including offering more detailed information and seeking more comprehensive assent as children grow older (Roth-Cline & Nelson, 2013). Moreover, seeking assent has the benefit of helping children learn how to make decisions and participate in decision making within safe contexts (Oulton et al., 2016).

Studying adolescents often raises unique ethical questions because they are minors, generally requiring parental consent. Adolescent research participants are often very concerned about how their information and samples will be used, and in particular, whether information would be shared with their parents (Crane & Broome, 2017). Sometimes seeking consent from parents may interfere with researchers' goals or may pose risks to minor participants. In one study, LGBT adolescents believed that participating in research on sexuality and health is important for advancing science, yet they indicated that they would not participate if guardian permission was required, citing negative parental attitudes or not being "out" about their LGBT identity (Macapagal et al., 2017). As one 15-year-old bisexual participant explained:

I believe it could harm some [teens] because the risk of being let out of the closet. I know some people whose family would not approve of any other sexuality [other than heterosexuality]. Such as my own, my mother would turn on me for not being her perfect image.

In response to these ethical challenges, researchers frequently obtain **passive consent** for conducting research on sensitive topics with adolescents. Passive consent procedures typically involve notifying parents about the research and requiring them to reply if they do *not* want their child to participate. Studies that examine sensitive topics, such as risk behaviors, may benefit from the use of passive consent procedures because they are associated with more diverse samples of adolescents that better represent the population (Liu et al., 2017).

In addition to minors, adults sometimes require accommodations for providing informed consent. Traumatic brain injury, dementia, mental illness, some physical illnesses, and advanced age can impair adults' capacities to provide informed consent (Prusaczyk et al., 2017). In such cases, researchers seek assent by providing the participant with meaningful information in a format that they can understand (as well as obtaining consent from a surrogate decision maker). Cognitive capacities can often fluctuate and, in the case of traumatic brain injury patients, often improve (Triebel et al., 2014). Researchers must be prepared to tailor their explanations to the participant's fluctuating competence.

### Confidentiality

Ethical issues may arise when researchers' desire to learn about development and solve problems conflicts with their need to protect research participants. Researchers generally promise participants **confidentiality**, that their responses will remain confidential and will not be disclosed to others. Suppose a researcher studying adolescents learns that a participant is in jeopardy, whether engaging in health-compromising behaviors (e.g., cigarette smoking, unsafe driving, or unhealthy behavior), contemplating suicide, or engaging in illegal or harmful activities (e.g., drug addiction, stealing, or violence). Is the researcher responsible for helping the adolescent? Does the researcher have a duty to disclose the risk to an outside party who can help the adolescent, such as parents? Does the researcher's promise of confidentiality outweigh the duty to disclose? Adolescents and parents tend to have different opinions about research disclosures; parents often want to receive their children's research information, but adolescents tend to report wanting to withhold private and sensitive findings (Brawner et al., 2013).

Researchers who study risky and health-compromising behaviors *expect* to encounter participants who are engaged in potentially dangerous activities. Helping the adolescent might involve removing him or her from the study and potentially compromising the study. Adolescents generally expect that researchers will maintain confidentiality (Fisher et al., 1996); violating their confidentiality may be harmful.

Issues with confidentiality are common when studying adolescents, but they arise throughout the lifespan. Suppose a researcher is studying older adults in a nursing home and discovers illicit substance

**TABLE 1.7** ■ Rights of Research Participants

Right	Description
Protection from harm	Research participants have the right to be protected from physical and psychological harm. Investigators must use the least stressful research procedure in testing hypotheses and, when in doubt, consult with others.
Informed consent	Participants have the right to be informed about the purpose of the research, expected duration, procedures, risks and benefits of participation, and any other aspects of the research that may influence their willingness to participate. When children are participants, a parent or guardian must provide informed consent on behalf of the child, and the investigator should seek assent from the child.
Confidentiality	Participants have the right to privacy and to conceal their identity on all information and reports obtained in the course of research.
Information about the results	Participants have the right to be informed of the results of research in language that matches their level of understanding.
Treatment	If an experimental treatment under investigation is believed to be beneficial, participants in control groups have the right to obtain the beneficial treatment.

Sources: American Psychological Association (2010); Society for Research in Child Development, 2021.

dependence in an adult who is also taking many medications. Or a sexual relationship in an adult who experiences bouts of dementia. Or suicidal thoughts in a middle-aged parent.

Ethical guidelines published by research and medical associations address researchers' obligations to help and not harm and to protect participants' confidentiality, but they generally fail to offer specific recommendations about how researchers can manage the conflicting duties to maintain confidentiality and disclose participant problems (Hiriscou et al., 2014; Sharkey et al., 2017). Instead, researchers must decide for themselves how to balance their sometimes conflicting obligations to their participants. Table 1.7 summarizes the rights of research participants.

### Thinking in Context: Applied Developmental Science

1. Suppose, as part of your research, you wanted to interview children at school. What ethical principles are most relevant to examining school children? What challenges do you anticipate in conducting this work?
2. You are tasked with collecting observations and interviews of older adults to evaluate a health program at a nursing home. What ethical issues can you anticipate? What principles are most pertinent?

### Thinking in Context: Intersectionality

Some ethical concerns are more pressing for some participants and in some studies more than others. Consider a study examining sexuality. People of different ages and characteristics might vary in their concerns about confidentiality in sexuality research.

1. To what extent do you think adolescents, adults, and older adults might vary in their concerns about sharing their sexual interests, beliefs, and behaviors?
2. What other variables might be associated with different perspectives on the value of confidentiality? Might you expect cultural differences in concerns about confidentiality? Might factors like sexual orientation, religion, gender, or ethnicity relate to concerns about confidentiality in sexuality research? Why or why not?

## APPLIED DEVELOPMENTAL SCIENCE AND INTERSECTIONALITY

### LEARNING OBJECTIVE

- 1.6** Describe the field of applied developmental science and the role of intersectionality in development.

In its early years, the study of human development emphasized laboratory research devoted to uncovering universal aspects of development by stripping away contextual influences. This *basic research* was designed to examine how development unfolds, with the assumption that development is a universal process with all people changing in similar ways and in similar time frames. In the early 1980s, influenced by contextual theories (such as Bronfenbrenner's bioecological approach) and the growing assumption that people are active in their development (a cornerstone of lifespan developmental theory), developmental scientists began to examine developmental processes outside of the laboratory (Lerner et al., 2015). As developmental scientists engaged in *applied research*, it quickly became apparent that there are a great many individual differences in development that vary with a myriad of contextual influences. We also learned that developmental research findings can be applied to improve people's lives.

### Applied Developmental Science

**Applied developmental science** is a field of study that examines the lifelong developmental interactions among individuals and their contexts and applies these findings to prevent and intervene in problems and promote positive development (Fisher et al., 2013). Applied developmental scientists study pressing social issues, such as promoting the development of preterm infants, determining children's capacity to provide courtroom testimony, promoting safe sex in adolescents and emerging adults, and aiding older adults' and their adult children's adjustment to disability (Fisher et al., 2013; Lerner, 2012). By its very nature, applied developmental science is multidisciplinary because real-world problems are complex and require the expertise of scientists from many fields, such as human development, psychology, medicine, biology, anthropology, and more.

Applied developmental scientists are especially interested in promoting healthy development over the lifespan. That is, they seek to enhance the life chances of diverse groups of individuals, families, and communities. Many children, adolescents, and adults are affected by social problems that can impede healthy development, such as hunger, poor nutrition, pervasive poverty, and inadequate access to education, health care, and community services (Aizer, 2017; Gauvain, 2018; Golinkoff et al., 2017; Huston, 2018). It is through applied research that scientists have come to appreciate the full range of contextual influences on development and how lifelong opportunities and outcomes vary with factors such as sex, ethnicity, socioeconomic status, and age.

Applied developmental scientists also work to understand and address the systemic disparities in opportunities that people experience over the lifespan (Fisher et al., 2012). They seek to promote equity and social justice, the basic human right of individuals to have access to opportunities, experiences, and resources that maximize their potential for growth, health, and happiness across the life course (Brown et al., 2019; Smith & Smith Lee, 2019). Individuals' access to support and opportunity varies dramatically with race, sex, and other factors. Equity and social justice involve recognizing and addressing these disparities and the complex factors that contribute to them.

### Intersectionality and Development

We are all members of multiple intertwined social categories, such as gender, race, age, and sexual orientation. Our understanding and experience of each category is influenced by our membership in other categories. Adolescents' understanding and experience of gender may be filtered through the lens of their membership in another social category, such as ethnicity. Latina girls' views of



themselves and their worlds may be quite different from those of Latino boys as well as girls of other ethnicities, such as Black and white girls. In this example the intersection of ethnicity and gender combine to influence girls' self-understanding and experience. Power and opportunity are enmeshed with social categories, such as ethnicity and gender. Latina girls' views of themselves reflect not simply their sex and ethnicity but the relative power ascribed to girls and persons of color in U.S. society.

Our unique experiences and perspectives are influenced by **intersectionality**, the dynamic interrelations of social categories—gender, race and ethnicity, sexual orientation, socioeconomic status, immigration status, age, and disabilities—and the interwoven systems of power and privilege that accompany social category membership (Crenshaw, 1989). An intersectional perspective draws attention to inequities in power, opportunity, privilege, and disadvantage that accompany social category membership and are experienced as racism, sexism, classism, heterosexism, and more, to shape individuals' lived experiences (Roy, 2018; Santos & Toomey, 2018; Syed & Ajayi, 2018).

Central to intersectionality are the assumptions that (1) all individuals have multiple identities that converge, (2) within each identity is a dimension of power or oppression, and (3) identities are influenced by the sociocultural context (Abrams et al., 2020; Else-Quest & Hyde, 2016). Identities overlap and systems of oppression, such as racism and sexism, may interlock. Individuals therefore experience multiple overlapping identities and may struggle against intertwined systems of oppression and bias (Rosenthal, 2016).

The effects of social category membership are not experienced universally, but they vary with context (Ghavami et al., 2016; Godfrey & Burson, 2018). Intersectionality is inherently tied to context. Social categories such as gender, race, and sexual orientation may be more salient and meaningful in some contexts and at some times than others, creating distinct experiences for subgroup members with implications for development (Crenshaw, 1989; Syed & Ajayi, 2018). For instance, intersecting expectations about race and gender may uniquely shape the experience of Black boys in classroom settings, how they are perceived and treated, that is unique from those experienced by boys of other races and ethnicities and the experiences of Black girls—with implications for their academic performance, development, and long-term outcomes (Roy, 2018). Likewise, Black boys' classroom experiences might vary with context, whether rural, suburban, or urban, and part of the United States, such as the North, South, Midwest, and coasts.

Until recently, people of color have been largely excluded from research studies or research participants of all ethnicities and races have been grouped, masking differences and contributing to a sense of invisibility among people of color (Grzanka, 2020; Roberts et al., 2020; Syed et al., 2018). One analysis of articles published between 2006 and 2010 in leading developmental science journals (*Developmental Psychology*, *Child Development*, and *Developmental Science*) found that only 14% included samples that were predominantly people of color and a surprisingly high 28% did not mention the racial/ethnic composition at all (Nielsen et al., 2017).

The study of intersectionality sheds light on how discrimination, marginalization, oppression, and privilege combine to influence individuals' experiences in unique ways across the lifespan (Crenshaw, 1989). Intersectionality is an emerging approach in **developmental science** with a small but rapidly growing body of research that recognizes the many ways that gender, ethnicity and race, sexual orientation, socioeconomic status, and disability interact to influence development (Godfrey & Burson, 2018; Grzanka, 2020). Throughout this book we will examine development through an intersectional lens whenever possible.



These students attend the same school, but their experiences may vary greatly with intersectional factors such as race, ethnicity, and gender.

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### Thinking in Context: Intersectionality

1. Consider the social categories of which you are a member (perhaps gender, race or ethnicity, socioeconomic status, or religion). Which are most important to you? How might these social categories interact to influence your experiences?
2. Consider our discussion of research methods earlier in this chapter. What are some of the challenges of studying the real-world problems addressed by applied developmental science? Do any special considerations arise when studying development through an intersectional lens?

#### APPLY YOUR KNOWLEDGE

1. Steven enters the school psychologist's office with a frown, grumbling to himself. His teacher, Ms. Marta, has suggested that he visit the school psychologist for help understanding and treating his academic problems. Steven is a bright fifth grader, but he has great difficulties reading and his mathematics skills lag far behind his peers. Ms. Marta contacts Steven's mother, reassuring her that the school has excellent resources for diagnosing children's learning problems and special education professionals who can intervene and help children overcome learning difficulties. **The school psychologist interviews Steven's mother in order to compile a history of Steven's development. Through this interview, he learns that Steven suffered a great deal of trauma early in life; as an infant, he was physically abused by his biological mother, then taken away and placed in foster care. At age 3, he was adopted into a middle-class, suburban family with two older, nonadopted children.** **As we have seen, each developmental theory has a unique emphasis. How might each theory address Steven's academic difficulties?**
  - a) What factors would psychoanalytic theories point to in order to explain Steven's functioning?
  - b) How would cognitively oriented theories, such as Piaget's cognitive–developmental theory and information processing theory, account for and intervene with Steven's difficulties?
  - c) Identify contextual factors that may play a role in Steven's academic problems; from Bronfenbrenner's bioecological theory, what factors may be addressed?
2. Suppose you wanted to conduct research on academic achievement during elementary and middle school.
  - a) Identify a research question appropriate for a correlational research study.
  - b) How would you address that question with a cross-sectional research study? Longitudinal? Sequential?
  - c) What are the advantages and disadvantages of each type of study?

#### CHAPTER SUMMARY

##### 1.1 Outline five principles of the lifespan developmental perspective.

Development is a lifelong process. It is multidimensional, multidirectional, plastic, influenced by the multiple contexts in which we are embedded, and multidisciplinary.

##### 1.2 Explain three basic issues in developmental science.

Developmental scientists take different perspectives on three views. First, in what ways is developmental change continuous, characterized by slow and gradual change, or discontinuous, characterized by sudden and abrupt change? Second, to what extent do people play an active role in their own development, interacting with and influencing the world around them? Finally, is development caused by nature or nurture? Most developmental scientists agree that some aspects of development appear continuous and others discontinuous, that individuals are active in influencing their development, and that development reflects the interactions of nature and nurture.

### 1.3 Summarize five theoretical perspectives on human development.

Psychoanalytic theories emphasize inner drives. Freud's psychosexual theory explains personality development as progressing through a series of psychosexual stages during childhood. Erikson's psychosocial theory suggests that individuals move through eight stages of psychosocial development across the lifespan, with each stage presenting a unique psychosocial task or crisis. Behaviorist and social learning theory emphasizes environmental influences on behavior, specifically classical conditioning and operant conditioning, as well as observational learning. Bandura's social learning theory suggests that individuals and the environment interact and influence each other through reciprocal determinism. Piaget's cognitive–developmental theory describes cognitive development as an active process and proceeding through four stages. Information processing theorists study the steps involved in cognition: perceiving and attending, representing, encoding, retrieving, and problem-solving. Contextual and systems theories look to the importance of context in shaping development. Vygotsky's sociocultural theory emphasizes interactions with members of our culture in influencing development. Bronfenbrenner's bioecological model explains development as a function of the ongoing reciprocal interaction among biological and psychological changes in the person and his or her changing context. Dynamic systems theory views children's developmental capacities, goals, and context as an integrated system that influences the development of new abilities. Evolutionary developmental psychology integrates Darwinian principles of evolution and scientific knowledge about the interactive influence of genetic and environmental mechanisms.

### 1.4 Describe the methods and research designs used to study human development.

A case study is an in-depth examination of an individual. Interviews and questionnaires are called self-report measures because they ask the persons under study questions about their own experiences, attitudes, opinions, beliefs, and behavior. Observational measures are methods that scientists use to collect and organize information based on watching and monitoring people's behavior. Physiological measures gather the body's physiological responses as data. Scientists use correlational research to describe relations among measured characteristics, behaviors, and events. To test hypotheses about causal relationships among variables, scientists employ experimental research. Developmental designs include cross-sectional research, which compares groups of people at different ages simultaneously, and longitudinal research, which studies one group of participants at many points in time. Sequential designs combine the best features of cross-sectional and longitudinal designs by assessing multiple cohorts over time.

### 1.5 Discuss principles of research ethics and the ethical issues that may arise in developmental science research.

Researchers must maximize the benefits to research participants and minimize the harms, safeguarding participants' welfare. They must be accurate and honest in their work and respect participants' autonomy, including seeking informed consent and child assent. In addition, the benefits and risks of participation in research must be spread equitably across individuals and groups. Specific ethical concerns about informed consent, the use of passive consent, and how to protect participant confidentiality arise in conducting research in lifespan development.

### 1.6 Describe the field of applied developmental science and the role of intersectionality in development.

Applied developmental science examines the lifelong interactions among individuals and their contexts and applies these findings to prevent and intervene in problems and promote positive development in people of all ages. Individuals' access to support and opportunity varies dramatically with race, sex, and other factors. Our unique experiences and perspectives are influenced by intersectionality, the dynamic interrelations of social categories—gender, race and ethnicity, sexual orientation, socioeconomic status, immigration status, and disabilities—and the interwoven systems of power and privilege that accompany social category membership. Central to intersectionality are the assumptions that all individuals have multiple identities that converge, within each identity is a dimension of power or oppression, and identities are

influenced by the sociocultural context. Individuals experience multiple overlapping identities and struggle against intertwined systems of oppression and bias. Intersectionality is inherently tied to context because the personal importance of social categories and the meaning ascribed to them vary with context. The study of intersectionality sheds light on how discrimination, marginalization, oppression, and privilege combine to influence individuals' experiences in unique ways across the lifespan.

## KEY TERMS

Applied developmental science	Informed consent
Behaviorism	Intersectionality
Bioecological systems theory	Justice
Case study	Lifespan human development
Child assent	Longitudinal research study
Chronosystem	Mesosystem
Classical conditioning	Microsystem
Cognitive development	Naturalistic observation
Cognitive–developmental theory	nature–nurture debate
Cognitive schemas	Observational learning
Cohort	Ontogenetic development
Computerized tomography (CT scan)	Open-ended interview
Confidentiality	Operant conditioning
Context	Passive consent
Continuous change	Physical development
Correlational research	Plasticity
Cross-sectional research study	Positron emission tomography (PET scan)
Culture	Psychoanalytic theories
Dependent variable	Punishment
Development	Questionnaire
Developmental science	Random assignment
Diffusion tensor imaging (DTI)	Reciprocal determinism
Discontinuous change	Reinforcement
Domains of development	Resilience
Dynamic systems theory	Respect for autonomy
Electroencephalography (EEG)	Responsibility
Emerging adulthood	Scientific method
Ethology	Sequential research design
Evolutionary developmental theory	Social learning theory
Exosystem	Sociocultural theory
Experimental research	Socioemotional development
Functional magnetic resonance imaging (fMRI)	Structured interview
Hypotheses	Structured observation
Independent variable	Theory
Information processing theory	

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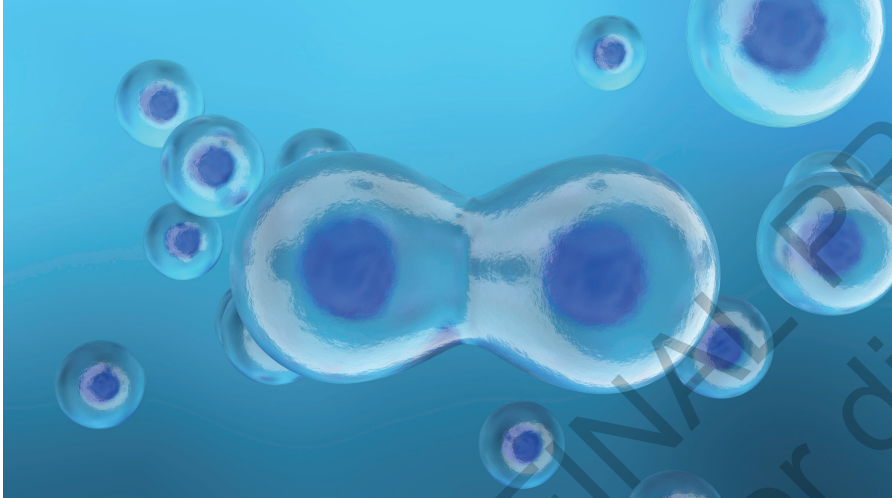
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# 2

## BIOLOGICAL AND ENVIRONMENTAL FOUNDATIONS OF DEVELOPMENT



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“Rico and Remmy couldn’t be more different,” marveled their mother. “People are surprised to find out they are twins.” Rico is tall and athletic, with blond hair and striking blue eyes. He spends most afternoons playing ball with his friends and often invites them home to play in the yard. Remmy is much smaller, thin and wiry. He wears thick glasses over his brown eyes that are nearly as dark as his hair. Unlike his brother, Remmy prefers solitary games and spends most afternoons at home playing video games, building model cars, and reading comic books. How can Rico and Remmy share the same womb, have the same parents, and live in the same home yet differ markedly in appearance, personality, and preferences?

We tend to expect twins like Rico and Remmy to share similarities, as they are often depicted in media as identical in appearance, personality, and interests. Yet twins tend to differ in many unpredictable ways despite sharing parents and a home environment. Twins illustrate the complexity of how characteristics and tendencies are inherited. In this chapter, we discuss the process of genetic inheritance and principles that can help us to understand how members of a family—even twins—can share a great many similarities and also many differences.

### GENETIC FOUNDATIONS OF DEVELOPMENT

#### LEARNING OBJECTIVE

2.1 Discuss the genetic foundations of development.

What determines our traits, such as appearance, physical characteristics, health, and personality? We are born with a hereditary “blueprint” that influences our development. This blueprint is inherited from our biological parents, as discussed in the following sections.

## Genetics

The human body is composed of trillions of units called cells, each with a nucleus containing 23 matching pairs of rod-shaped structures called **chromosomes** (Finegold, 2019). Each chromosome holds the basic units of heredity, known as genes, composed of stretches of **deoxyribonucleic acid (DNA)**, a complex molecule shaped like a twisted ladder or staircase. **Genes** carry the plan for creating all of the traits that organisms carry. It is estimated that 20,000 to 25,000 genes reside within the chromosomes, comprising the human genome and influencing all genetic characteristics (Taneri et al., 2020).

Much of our genetic material is not unique to humans. Every species has a different genome, yet we share some genes with all organisms, from bacteria to primates. We share nearly 99% of our DNA with our closest genetic relative, the chimpanzee. There is even less genetic variation among humans. People around the world share 99.9% of their genes (Lewis, 2017; National Human Genome Research Institute, 2018). Although all humans share the same basic genome, every person has a slightly different code, making them genetically distinct from other humans.

### Cell Reproduction

Most cells in the human body reproduce through a process known as **mitosis**, in which DNA replicates itself, duplicating chromosomes, resulting in new cells with identical genetic material (Sadler, 2018). The process of mitosis accounts for the replication of body cells. Sex cells reproduce in a different way, through **meiosis**. First, the 46 chromosomes begin to replicate as in mitosis, duplicating themselves. But before the cell completes dividing, a critical process called *crossing over* takes place. The chromosome pairs align and DNA segments cross over, moving from one member of the pair to the other, essentially “mixing up” the DNA. Crossing over thereby creates unique combinations of genes (Finegold, 2019). The resulting cell consists of only 23 single, unpaired chromosomes. Known as **gametes**, these cells are specialized for sexual reproduction: sperm in males and ova in females. Ova and sperm join at fertilization to produce a fertilized egg, or **zygote**, with 46 chromosomes, forming 23 pairs with half from the biological mother and half from the biological father. Each gamete has a unique genetic profile, and it is estimated that individuals can produce millions of genetically different gametes (U.S. National Library of Medicine, 2020).

### Sex Determination

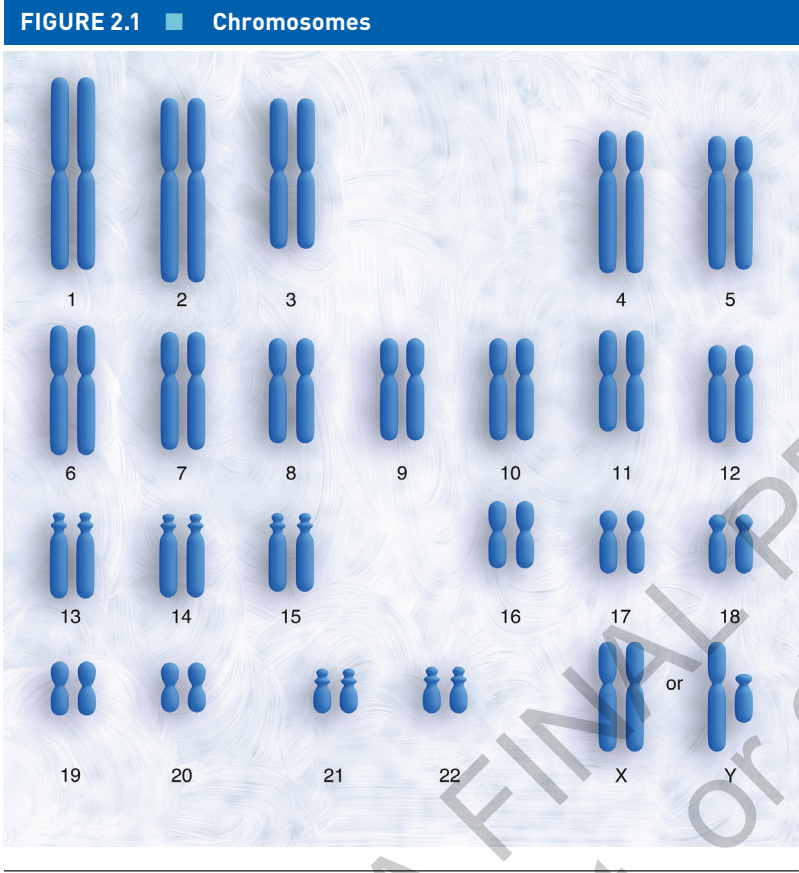
The sex chromosomes determine whether a zygote will develop into a male or female. Twenty-two of the 23 pairs of chromosomes are matched pairs (Figure 2.1). They contain similar genes in almost identical positions and sequence, reflecting the distinct genetic blueprint of the biological mother and father. The 23rd pair of chromosomes are not identical because they are sex chromosomes that specify the genetic sex of the individual. In females, sex chromosomes consist of two large X-shaped chromosomes (XX). Males' sex chromosomes consist of one large X-shaped chromosome and one much smaller Y-shaped chromosome (XY).

Because females have two X sex chromosomes, all their ova contain one X sex chromosome. A male's sex chromosome pair includes both X and Y chromosomes; therefore, one half of the sperm males produce contain an X chromosome and one half contain a Y. The Y chromosome contains genetic instructions that will cause the fetus to develop male reproductive organs. Thus, whether the fetus develops into a boy or girl is determined by which sperm fertilizes the ovum. If the ovum is fertilized by a Y sperm, a male fetus will develop, and if the ovum is fertilized by an X sperm, a female fetus will form (Figure 2.2).

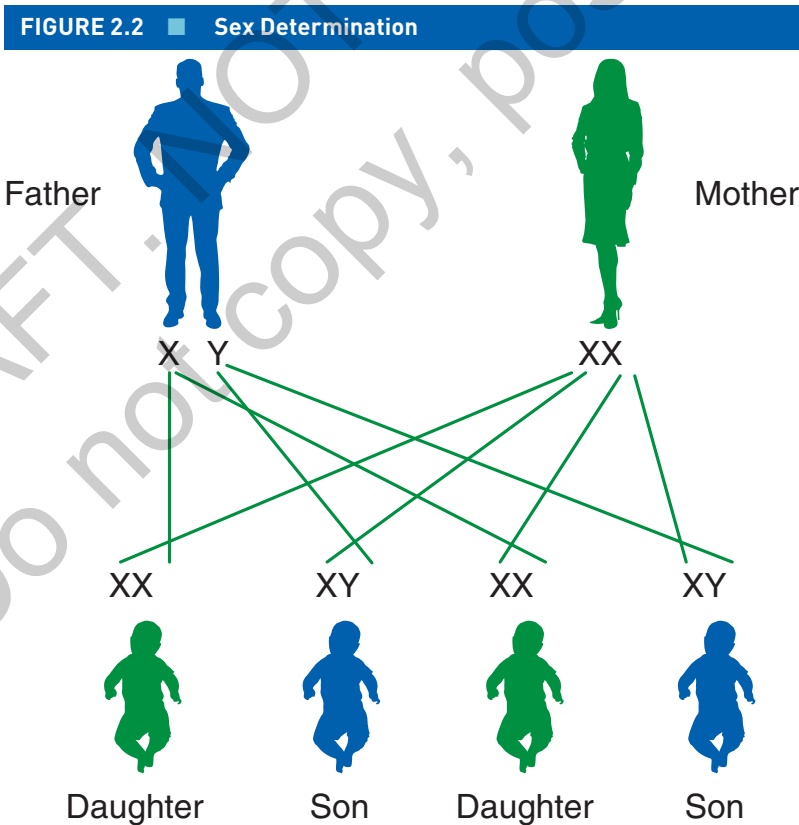
### Genes Shared by Twins

All biological siblings share the same parents, inheriting chromosomes from each. Despite this genetic similarity, siblings are often quite different from one another. Twins are siblings who share the same womb. Twins occur in about 1 out of every 33 births in the United States (Martin et al., 2018).

The majority of naturally conceived twins (over 70%) are dizygotic (DZ) twins, or fraternal twins, conceived when a woman releases more than one ovum and each is fertilized by a different sperm (Gill et al., 2019). DZ twins share about one half of their genes and, like other siblings, most fraternal twins



Source: iStock/somersault18:24





Monozygotic, or identical, twins share 100% of their DNA.

Ray Evans/Alamy Stock Photo

differ in appearance, such as hair color, eye color, and height. In about half of fraternal twin pairs, one twin is a boy and the other a girl. DZ twins tend to run in families, suggesting a genetic component that controls the tendency for a woman to release more than one ovum each month (Hazel et al., 2020). Rates of DZ twins also increase with **in vitro fertilization**, maternal age, and with each subsequent birth (Gill et al., 2019; Pison et al., 2015).

**Monozygotic (MZ) twins**, or identical twins, originate from the same zygote, sharing the same **genotype**, or set of genetic instructions for all physical and psychological characteristics. MZ twins occur when the zygote splits into two distinct separate but identical zygotes that develop into two infants. It is estimated that MZ twins occur in 1 in every 250 births (American College of Obstetricians and Gynecologists, & Society for Maternal-Fetal Medicine, 2014). The causes of

MZ twinning are not well understood (McNamara et al., 2016). Rates of MZ twins are not related to maternal age or the number of births, but in vitro fertilization, discussed later, appears to increase the odds of MZ twins (Busnelli et al., 2019; Knopman et al., 2014). DZ twins have become more common in recent decades with advances in reproductive technology, such as in vitro fertilization (Chapter 3) (Rhea et al., 2017).

### Patterns of Genetic Inheritance

Although the differences among various members of a given family may appear haphazard, they are the result of a genetic blueprint unfolding. Researchers are just beginning to uncover the instructions contained in the human genome, but we have learned that traits and characteristics are inherited in predictable ways.

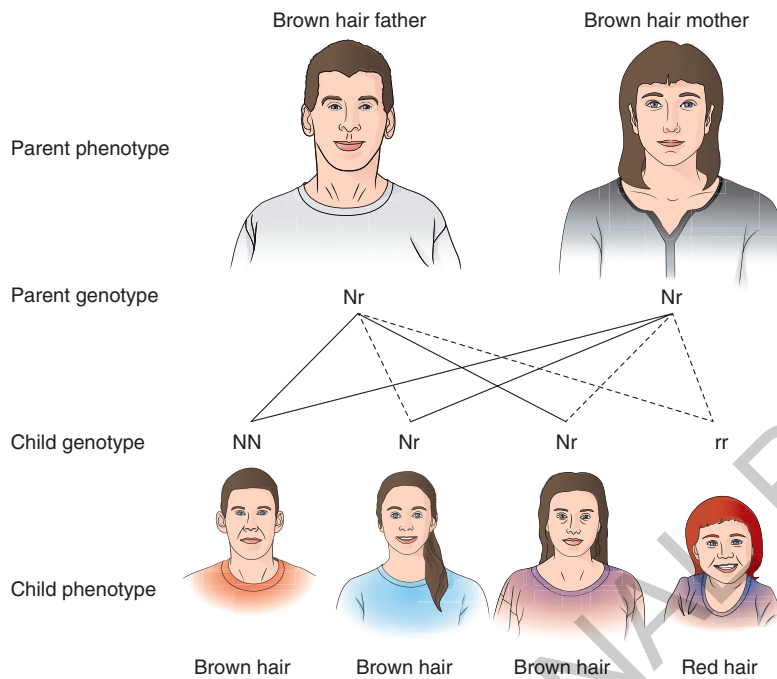
#### Dominant–Recessive Inheritance

Lynn has red hair while her brother, Jim, does not—and neither do their parents. How did Lynn end up with red hair? These outcomes can be explained by patterns of genetic inheritance, how the sets of genes from each parent interact. As we have discussed, each person has 23 pairs of chromosomes, one pair inherited from the mother and one from the father. The genes within each chromosome can be expressed in different forms, or **alleles**, that influence a variety of physical characteristics.

When alleles of the pair of chromosomes are alike with regard to a specific characteristic, such as hair color, the person is said to be homozygous for the characteristic and will display the inherited trait. If they are different, the person is heterozygous, and the trait expressed will depend on the relations among the genes (Plomin, 2019). Some genes are passed through **dominant–recessive inheritance** in which some genes are dominant and are always expressed regardless of the gene they are paired with. Non-red hair is a dominant gene. Other genes, such as for red hair, are recessive and will be expressed only if paired with another recessive gene. Lynn and Jim’s parents are heterozygous for red hair; both have dark hair, but they each carry a recessive gene for red hair.

When an individual is heterozygous for a particular trait, only the dominant gene is expressed, and the person becomes a carrier of the recessive gene. Both parents have non-red hair but may have homozygous or heterozygous genes for hair color because the gene for non-red hair (symbolized by N in Figure 2.3) is dominant over the gene for red hair (r). If both parents are heterozygous for red hair (Nr), children who inherit a homozygous pair of dominant genes (NN) and others who inherit a heterozygous pair (Nr) will have non-red hair, even though the two genotypes are different. Those who inherit a heterozygous pair (NR) carry the gene for red hair and can pass it on to their offspring. Red hair can result only from having two recessive genes (rr), which means that both parents must carry the recessive gene for red hair, even if they display non-red hair.



**FIGURE 2.3** ■ Dominant–Recessive Inheritance

Several characteristics are passed through dominant–recessive inheritance (Table 2.1).

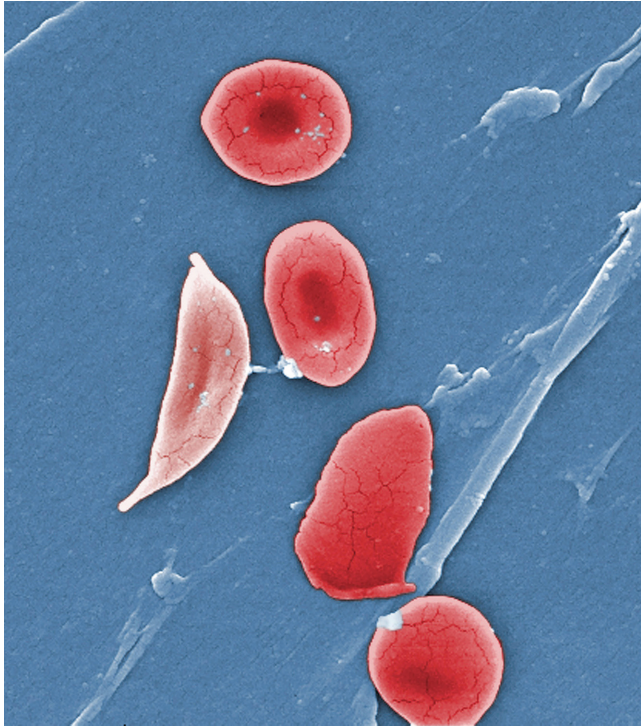
**TABLE 2.1** ■ Dominant and Recessive Characteristics

Dominant Trait	Recessive Trait
Dark hair	Blond hair
Curly hair	Straight hair
Hair	Baldness
Non-red hair	Red hair
Facial dimples	No dimples
Brown eyes	Blue, green, hazel eyes
Second toe longer than big toe	Big toe longer than second toe
Type A blood	Type O blood
Type B blood	Type O blood
Rh-positive blood	Rh-negative blood
Normal color vision	Color blindness

Source: McKusick–Nathans Institute of Genetic Medicine (2020).

### Incomplete Dominance

In most cases, dominant–recessive inheritance is an oversimplified explanation for patterns of genetic inheritance. **Incomplete dominance** is a genetic inheritance pattern in which both genes jointly influence the characteristic (Knopik et al., 2017). Consider blood type. Neither the alleles for blood type A and B dominate each other. A heterozygous person with the alleles for blood type A and B will express both A and B alleles and have blood type AB.



Recessive sickle cell alleles cause red blood cells to become crescent-shaped and unable to distribute oxygen effectively throughout the circulatory system. Alleles for normal blood cells do not mask all of the characteristics of recessive sickle cell alleles, illustrating incomplete dominance.

BSIP SA/Alamy Stock Photo

A different type of inheritance pattern is seen when a person inherits heterozygous alleles in which one allele is stronger than the other yet does not completely dominate. In this situation, the stronger allele does not mask all of the effects of the weaker allele. Therefore some, but not all, characteristics of the recessive allele appear. The trait for developing normal blood cells does not completely mask the allele for developing sickle-shaped blood cells. About 5% of African American newborns (and relatively few Caucasians or Asian Americans) carry the recessive **sickle cell trait** (Ojodu et al., 2014). Individuals who are homozygous for the recessive sickle cell trait develop sickle cell anemia, a disorder in which sickle cell alleles cause red blood cells to become crescent, or sickle, shaped. Cells that are sickle-shaped cannot distribute oxygen effectively throughout the circulatory system and can cause inflammation and damage the blood vessels (Ware et al., 2017). The life expectancy for individuals with sickle cell anemia is 55 years in North America (Pecker & Little, 2018). Alleles for normal blood cells do not mask all of the characteristics of recessive sickle cell alleles, illustrating incomplete dominance. People who carry a single recessive sickle cell gene do not develop full-blown sickle cell anemia (Chakravorty & Williams, 2015). Carriers of the trait for sickle cell anemia tend to function normally but may show some symptoms, such as reduced oxygen distribution throughout the body and exhaustion after exercise (Xu & Thein, 2019).

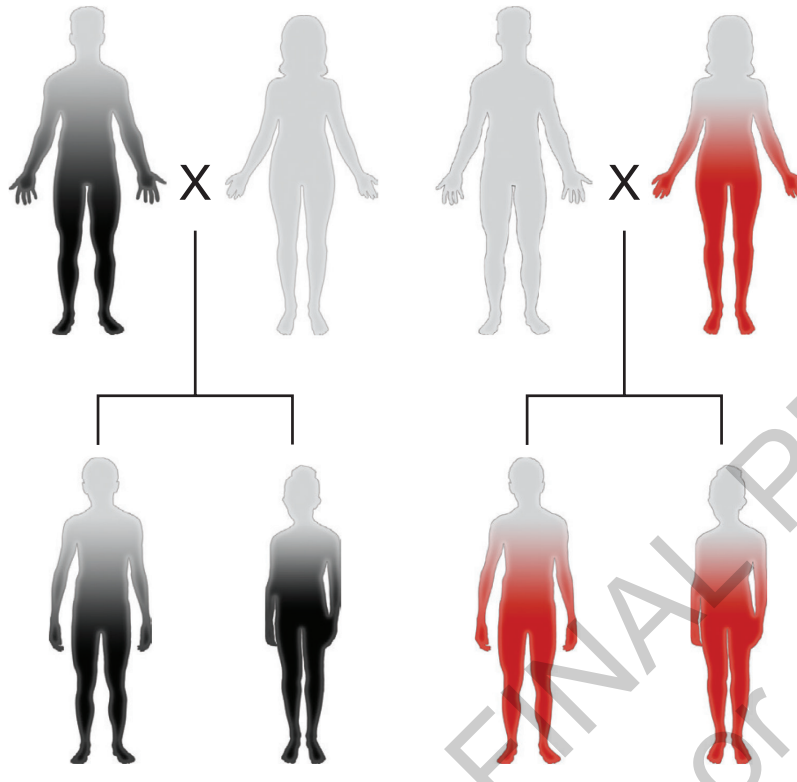
### Polygenic Inheritance

Whereas dominant–recessive and incomplete dominance patterns account for some genotypes, most traits are a function of the interaction of many genes, known as **polygenic inheritance**. Hereditary influences act in complex ways, and researchers cannot trace most characteristics to only one or two genes, but rather, the result of interactions among many genes (Armstrong-Carter et al., 2021). Examples of polygenic traits include height, intelligence, personality, and susceptibility to certain forms of cancer (Bouchard, 2014; Flint et al., 2020; Penke & Jokela, 2016). As the number of genes that contribute to a trait increases, so does the range of possible traits. Genetic propensities interact with environmental influences to produce a wide range of individual differences in human traits.

### Genomic Imprinting

The principles of dominant–recessive and incomplete dominance inheritance can account for over 1,000 human traits (Finegold, 2019). A few traits are determined by a process known as **genomic imprinting**. Genomic imprinting refers to the instance in which the expression of a gene is determined by whether it is inherited from the mother or the father (Kelly & Spencer, 2017; Thamban et al., 2020). Consider two conditions that illustrate genomic imprinting: Prader-Willi syndrome and Angelman syndrome. Both syndromes are caused by an abnormality in the 15th chromosome (Kalsner & Chamberlain, 2015). If the individual acquires the chromosome 15 abnormality from the biological father, the individual, whether a daughter or son, will develop Prader-Willi syndrome (Figure 2.4), a set of specific physical and behavioral characteristics including obesity, insatiable hunger, short stature, motor slowness, and mild to moderate developmental delays (Butler et al., 2016).

If the abnormal chromosome 15 arises from the mother, the individual—again, whether it is a daughter or a son—will develop Angelman syndrome, characterized by hyperactivity, thin body frame, seizures, disturbances in gait, severe developmental delay or intellectual disability, and speech

**FIGURE 2.4** ■ Genomic Imprinting

Source: Adapted from C. Cristofre Martin (1998).

impairment (Buiting et al., 2016; Dagli & Williams, 2017). Prader-Willi and Angelman syndromes are rare, occurring on average in 1 in 12,000 to 20,000 persons (Kalsner & Chamberlain, 2015; Spruyt et al., 2018). Patterns of genetic inheritance can be complex, yet they follow predictable principles (Table 2.2).

### Thinking in Context: Biological Influences

1. From an evolutionary developmental perspective (Chapter 1), why might twins occur? Does twinning serve an adaptive purpose for our species? Why or why not?
2. Consider your own physical characteristics, such as hair and eye color. Are they indicative of recessive traits or dominant ones?
3. Do you think that you might be a carrier of recessive traits? Why or why not?

**TABLE 2.2** ■ Summary: Patterns of Genetic Inheritance

Inheritance Pattern	Description
Dominant-recessive inheritance	Genes that are dominant are always expressed, regardless of the gene they are paired with. Recessive genes are expressed only if paired with another recessive gene.
Incomplete dominance	Both genes influence the characteristic, and aspects of both genes appear.
Polygenic inheritance	Polygenic traits are the result of interactions among many genes.
Genomic imprinting	The expression of a gene is determined by whether it is inherited from the mother or the father.

## CHROMOSOMAL AND GENETIC PROBLEMS

### LEARNING OBJECTIVE

2.2 Identify examples of genetic disorders and chromosomal abnormalities.

Many disorders are passed through genetic inheritance, the result of chromosomal abnormalities. Hereditary and chromosomal abnormalities can often be diagnosed prenatally. Others are evident at birth or can be detected soon after an infant begins to develop. Some are discovered only over a period of many years.

### Genetic Disorders

Disorders and abnormalities that are inherited through the parents' genes are passed through the inheritance processes that we have discussed. These include well-known conditions as sickle cell anemia, as well as others that are rare. Some are highly visible and others go unnoticed throughout an individual's life.

### Dominant–Recessive Disorders

Recall that in dominant–recessive inheritance, dominant genes are always expressed regardless of the gene they are paired with and recessive genes are expressed only if paired with another recessive gene. Some diseases are inherited through dominant–recessive patterns (Table 2.3). Few severe disorders are

**TABLE 2.3** ■ Diseases Inherited Through Dominant–Recessive Inheritance

Disease	Occurrence	Mode of Inheritance	Description	Treatment
Huntington disease	1 in 20,000	Dominant	Degenerative brain disorder that affects muscular coordination and cognition	No cure; death usually occurs 10 to 20 years after onset
Cystic fibrosis	1 in 2,000–2,500	Recessive	An abnormally thick, sticky mucus clogs the lungs and digestive system, leading to respiratory infections and digestive difficulty	Bronchial drainage, diet, gene replacement therapy
Phenylketonuria (PKU)	1 in 10,000–15,000	Recessive	Inability to digest phenylalanine that, if untreated, results in neurological damage and death	Diet
Sickle cell anemia	1 in 500 African Americans	Recessive	Sickling of red blood cells leads to inefficient distribution of oxygen throughout the body that leads to organ damage and respiratory infections	No cure; blood transfusions, treat infections, bone marrow transplant; death by middle age
Tay-Sachs disease	1 in 3,600 to 4,000 descendants of Central and Eastern European Jews	Recessive	Degenerative brain disease	None; most die by 4 years of age

Source: McKusick-Nathans Institute of Genetic Medicine (2020).

inherited through dominant inheritance because individuals who inherit the allele often do not survive long enough to reproduce and pass it to the next generation. One exception is Huntington disease, a fatal disease in which the central nervous system deteriorates (Ghosh & Tabrizi, 2018; McKusick-Nathans Institute of Genetic Medicine, 2020). Individuals with the Huntington allele develop normally in childhood, adolescence, and young adulthood. Symptoms of Huntington disease do not appear until age 35 or later. By then, many individuals have already had children, and one half of them, on average, will inherit the dominant Huntington gene.

**Phenylketonuria (PKU)** is a common recessive disorder that prevents the body from producing an enzyme that breaks down phenylalanine, an amino acid, from proteins (McKusick-Nathans Institute of Genetic Medicine, 2020). Without treatment, the phenylalanine builds up quickly to toxic levels that damage the central nervous system, contributing to intellectual developmental disability, once known as mental retardation, by 1 year of age. The United States and Canada require all newborns to be screened for PKU (Camp et al., 2014).

PKU illustrates how genes interact with the environment to produce developmental outcomes. Intellectual disability results from the interaction of the genetic predisposition and exposure to phenylalanine from the environment (Blau, 2016). Children with PKU can process only very small amounts of phenylalanine. If the disease is discovered, the infant is placed on a diet low in phenylalanine. Yet, it is very difficult to remove nearly all phenylalanine from the diet. Individuals who maintain a strict diet usually attain average levels of intelligence, though they tend to score lower than those without PKU (Hofman et al., 2018; Romani et al., 2017). Some cognitive and psychological problems may appear in childhood and persist into adulthood, particularly difficulty in attention and planning skills, emotional regulation, depression, and anxiety (Christ et al., 2020; Erlich, 2019; Ford et al., 2018; Hawks et al., 2018; Jahja et al., 2017). The emotional and social challenges associated with PKU, such as the pressure of a strict diet and surveillance from parents, may worsen these symptoms and dietary compliance tends to decline in adolescence when young people push boundaries and seek independence (Medford et al., 2017).

### X-Linked Disorders

A special instance of the dominant–recessive pattern occurs with genes that are located on the X chromosome (Shah et al., 2017). Recall that males (XY) have both an X and a Y chromosome. Some recessive genetic disorders, like the gene for red-green colorblindness, are carried on the X chromosome (Table 2.4). Males are more likely to be affected by X-linked genetic disorders because they have only one X chromosome and therefore any genetic marks on their X chromosome are displayed. Females (XX) have two X chromosomes; a recessive gene located on one X chromosome will be masked by a dominant gene on the other X chromosome. Females are thereby less likely to display X-linked genetic disorders because both of their X chromosomes must carry the recessive genetic disorder for it to be displayed.

**Fragile X syndrome** is an example of a dominant–recessive disorder carried on the X chromosome (Hagerman et al., 2017; Salcedo-Arellano et al., 2020). Because the gene is dominant, it needs to appear on only one X chromosome to be displayed. That means that fragile X syndrome occurs in both males and females. Males with fragile X syndrome typically have a long, narrow face; large ears; and large testes. Fragile X syndrome (FXS) is the most commonly known inherited form of intellectual disability (ID) (Doherty & Scerif, 2017), and children with fragile X syndrome tend to show moderate to severe intellectual disability and problems with executive function (Raspa et al., 2017; Schmitt et al., 2019). Cardiac defects are common as well as several behavioral mannerisms, including poor eye



A blood sample to detect PKU is taken from this newborn. Phenylketonuria (PKU) is a genetic disorder in which the body lacks the enzyme that breaks down phenylalanine. Without treatment, the phenylalanine builds up to toxic levels and can damage the central nervous system.

**TABLE 2.4** ■ Diseases Acquired Through X-Linked Inheritance

Syndrome/Disease	Occurrence	Description	Treatment
Color blindness	1 in 12 males	Difficulty distinguishing red from green; less common is difficulty distinguishing blue from green	No cure
Duchenne muscular dystrophy	1 in 3,500 males	Weakness and wasting of limb and trunk muscles; progresses slowly but will affect all voluntary muscles	Physical therapy, exercise, body braces; survival rare beyond late 20s
Fragile X syndrome	1 in 4,000 males and 1 in 8,000 females	Symptoms include cognitive impairment, attention problems, anxiety, unstable mood, long face, large ears, flat feet, and hyperextensible joints, especially fingers	No cure
Hemophilia	1 in 3,000–7,000 males	Blood disorder in which the blood does not clot	Blood transfusions

Source: McKusick-Nathans Institute of Genetic Medicine (2017).

contact and repetitive behaviors such as hand flapping, hand biting, and mimicking others, behaviors common in individuals with autism spectrum disorders (Hagerman et al., 2017; Salcedo-Arellano et al., 2020). Fragile X syndrome is often codiagnosed with autism with estimates of about 40–60% of boys and 16–20% of girls with fragile X syndrome meeting the diagnostic criteria for autism (Bagni & Zukin, 2019; Kaufmann et al., 2017). As carriers, females may show some characteristics of the disorder but tend to display levels of intelligence within the normal or near-normal range.

**Hemophilia**, a condition in which the blood does not clot normally, is another example of a recessive disease inherited through genes on the X chromosome (McKusick-Nathans Institute of Genetic Medicine, 2020; Shah et al., 2017). Daughters who inherit the gene for hemophilia typically do not show the disorder because the gene on their second X chromosome promotes normal blood clotting and is a dominant gene (d’Oiron, 2019). Females, therefore, can carry the gene for hemophilia without exhibiting the disorder. A female carrier has a 50/50 chance of transmitting the gene to each child. Sons who inherit the gene will display the disorder because the Y chromosome does not have the corresponding genetic information to counter the gene. Daughters who inherit the gene, again, will be carriers (unless their second X chromosome also carries the gene).

### Chromosomal Abnormalities

Chromosomal abnormalities are the result of errors during cell reproduction, meiosis or mitosis, or damage caused afterward. Occurring in about 1 of every 1,500 births, the most widely known chromosome disorder is trisomy 21, more commonly called **Down syndrome** (de Graaf et al., 2017; McKusick-Nathans Institute of Genetic Medicine, 2020). Down syndrome occurs when a third chromosome appears alongside the 21st pair of chromosomes. Down syndrome is associated with marked physical, health, and cognitive attributes, including a short, stocky build, and often a round face, almond-shaped eyes, and a flattened nose (Antonarakis et al., 2020; Bull, 2020). Children with Down syndrome tend to show delays in physical and motor development relative to other children, and health problems, such as congenital heart defects, vision impairments, poor hearing, and immune system deficiencies (Diamandopoulos & Green, 2018; Morrison & McMahon, 2018; Roizen et al., 2014; Zampieri et al., 2014).



Down syndrome is the most common cause of intellectual disability. Interventions that encourage children to interact with their physical and social environment can promote motor, social, and emotional development.

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Down syndrome is the most common genetic cause of intellectual developmental disability (Vissers et al., 2016), but children's abilities vary. Generally, individuals with Down syndrome show greater strengths in nonverbal learning and memory relative to their verbal skills (Grieco et al., 2015). Expressive language is delayed relative to comprehension. Infants and children who participate in early intervention and receive sensitive caregiving and encouragement to explore their environment show positive outcomes, especially in the motor, social, and emotion areas of functioning (Bull, 2020; Næss et al., 2017; Wentz, 2017).

Advances in medicine have addressed many of the physical health problems associated with Down syndrome, so that today the average life expectancy is 60 years of age, as compared with about 25 in the 1980s (Glasson et al., 2014; National Association for Down Syndrome, 2020). Many individuals live into their 70s and 80s. However, Down syndrome is associated with premature aging and an accelerated decline of cognitive functioning (Covelli et al., 2016; Ghezzi et al., 2014; Hithersay et al., 2017). Individuals with Down syndrome are at risk to show signs of Alzheimer's disease very early relative to other adults (Antonarakis et al., 2020; Tramutola et al., 2020). This is an example of how disorders and illnesses can be influenced by multiple genes and complex contextual interactions; in this case, Down syndrome and Alzheimer's disease share genetic markers (Handen, 2020; Lee et al., 2017).

Some chromosomal abnormalities concern the 23rd pair of chromosomes: the sex chromosomes. These abnormalities result from either an additional or missing sex chromosome. Given their different genetic makeup, sex chromosome abnormalities yield different effects in males and females (Table 2.5)

One of the most common sex chromosome abnormalities, with prevalence estimates between 1 in 500 and 1 in 1,000 males, is **Klinefelter syndrome**, in which males are born with an extra X chromosome (XXY) (McKusick-Nathans Institute of Genetic Medicine, 2020; Wistuba et al., 2017). Symptoms range in severity such that some males experience symptoms that impair daily life, but most may be unaware of the disorder until they are tested for infertility (Bird & Hurren, 2016; Gravholt et al., 2018). Severe symptoms include a high-pitched voice, feminine body shape, breast enlargement, and infertility. Many boys and men with Klinefelter syndrome have short stature, a tendency to be overweight, and language and short-term memory impairments that can cause difficulties in learning (Bonomi et al., 2017). As adults, men with Klinefelter syndrome are at risk for a variety of disorders that are more common in women, such as osteoporosis (Juil et al., 2011).

**TABLE 2.5** ■ Sex Chromosome Abnormalities

Female Genotype	Syndrome	Description	Prevalence
XO	Turner	Abnormal growth patterns, delayed puberty, lack prominent female secondary sex characteristics, and infertility. Short adult stature, webbing around their neck.	1 in 2,500 females
XXX	Triple X	Grow about an inch or so taller than average with unusually long legs and slender torsos, and show normal development of sexual characteristics and fertility. Because many cases of triple X syndrome often go unnoticed, little is known about the syndrome.	Unknown; many cases go unnoticed
Male Genotype	Syndrome	Description	Prevalence
XXY	Klinefelter	High-pitched voice, short stature, feminine body shape, and infertility. Increased risk for osteoporosis and other disorders that are more common in women.	1 in 1,000 males
XYY	Jacob's syndrome	Accompanied by high levels of testosterone.	Unknown; many cases go unnoticed

A second type of sex chromosome abnormality experienced by men is XYY syndrome, or **Jacob's syndrome**, a condition that causes men to produce high levels of testosterone (McKusick-Nathans Institute of Genetic Medicine, 2017; Pappas et al., 2017). In adolescence, they tend to be slender and show severe acne and poor coordination, but most men with XYY syndrome are unaware that they have a chromosomal abnormality. The prevalence of XYY syndrome is uncertain given that most men go undiagnosed. Females are susceptible to a different set of sex chromosome abnormalities. About 1 in 1,000 females are born with three X chromosomes, known as **triple X syndrome** (McKusick-Nathans Institute of Genetic Medicine, 2020; Wigby et al., 2016). Women with triple X syndrome show an appearance within the norm. They tend to be about an inch or so taller than average, with unusually long legs and slender torsos, as well as normal development of sexual characteristics and fertility. Some may score lower on intelligence tests or have learning difficulties. Because many cases of triple X syndrome often go unnoticed, little is known about the syndrome.

The sex chromosome abnormality known as **Turner syndrome** occurs when a female is born with only one X chromosome (McKusick-Nathans Institute of Genetic Medicine, 2020). Girls with Turner syndrome show abnormal growth patterns. They show delayed puberty, their ovaries do not develop normally, they do not ovulate, and they are infertile (Culen et al., 2017; Davis et al., 2020). As adults, they are short in stature and often have small jaws with extra folds of skin around their necks (webbing) and lack prominent female secondary sex characteristics such as breasts (Gravholt et al., 2019). Malformations of the heart, diabetes, autoimmune disorders, and early osteoporosis are common (Gravholt et al., 2019). Children with Turner syndrome may show difficulty with visual-spatial reasoning and memory, attention, executive functioning, and motor and math skills (Hutaff-Lee et al., 2019). They are also prone to social difficulties, anxiety, and depression (Christopoulos et al., 2008; Powell & Schulte, 2011). Current estimates put its frequency at 1 in 2,500 worldwide (National Library of Medicine, 2019). If Turner syndrome is diagnosed early, regular injections of human growth hormones can increase stature, and hormones administered at puberty can result in some breast development and menstruation (Culen et al., 2017; Klein et al., 2020).

### Mutation

Not all inborn characteristics are inherited. Some result from **mutations**, sudden changes and abnormalities in the structure of genes that occur spontaneously or may be induced by exposure to environmental toxins such as radiation and agricultural chemicals in food. A mutation may involve only one gene or many. It is estimated that as many as one half of all conceptions include mutated chromosomes (Taneri et al., 2020). Most mutations are fatal—the developing organism often dies very soon after conception, often before the woman knows she is pregnant (Sadler, 2018).

Sometimes mutations are beneficial. This is especially true if the mutation is induced by stressors in the environment and provides an adaptive advantage to the individual. The sickle cell gene (discussed earlier in this chapter) is a mutation that originated in areas where malaria is widespread, such as Africa (Ware et al., 2017), and serves a protective role against malaria (Uyoga et al., 2019).

Children who inherited a single sickle cell allele were more resistant to malarial infection and more likely to survive and pass it along to their offspring (Croke et al., 2017; Gong et al., 2013). The sickle cell gene is not helpful in places where malaria is not a risk. The frequency of the gene is decreasing in areas of the world where malaria is uncommon. Only 8% of African Americans are carriers, compared with as many as 30% of Black Africans in some African countries (Maakaron et al., 2012). Therefore, the developmental implications of genotypes—and mutations—are context specific, posing benefits in some contexts and risks in others.

### Thinking in Context: Biological Influences

Recall from Chapter 1 that most developmental scientists agree that nature and nurture interact to influence development. Choose a genetic or chromosomal disorder discussed in this section and explain how it illustrates the interaction of genes and context.



### Thinking in Context: Lifespan Development

Chromosomal and genetic problems can result in a variety of impairments. How might contextual factors, such as a supportive environment, aid individuals' development? Describe a specific problem or mutation. What environmental conditions might best promote healthy adjustment for individuals with this disorder?

## REPRODUCTIVE CHOICES: GENETIC COUNSELING ASSISTED REPRODUCTIVE TECHNOLOGY

### LEARNING OBJECTIVE

- 2.3** Explain the choices of reproductive technology available to individuals and couples who wish to conceive by alternative means.

The likelihood of genetic disorders often can be predicted before conception. Our growing understanding of genetic inheritance has led many couples to consider their own genetic inheritance and what genes they will pass on to their children. Advances in technology permit abnormalities to be detected, and sometimes treated, earlier than ever before.

### Genetic Counseling

The popularity of DNA tests has provided many people with information about their genetic makeup. Many prospective parents seek **genetic counseling** to determine the risk that their children will inherit genetic defects and chromosomal abnormalities (Ioannides, 2017). Candidates for genetic counseling include those whose relatives have a genetic condition, couples who have had difficulties bearing children, women over the age of 35, and couples from the same ethnic group. Genetic testing can also determine whether a couple's difficulties conceiving or recurrent miscarriages are influenced by chromosomal abnormalities in the male's sperm (Kohn et al., 2016; Softness et al., 2020).

The genetic counselor interviews the couple to construct a family history of heritable disorders for both prospective biological parents. This service is particularly valuable when one or both prospective parents have relatives with inborn disorders. If a disorder is common in either parent's family or it appears that they are likely to carry a genetic disorder, genetic screening blood tests may be carried out on both parents to detect the presence of dominant and recessive genes and chromosomal abnormalities associated with various disorders. The tests determine whether each parent is a carrier for recessive disorders, such as Huntington disease, and estimate the likelihood that a child may be affected by a genetic disorder (Nance, 2017). The genetic counselor interprets the results and helps the parents understand genetic concepts by tailoring the explanation to match the parents' knowledge (Abacan et al., 2019).

Once prospective parents learn about the risk of conceiving a child with a disorder, they can determine how to proceed—whether it is to conceive a child naturally or through the use of in vitro fertilization after screening gametes for the disorders of concern. Given advances in our knowledge of genetic disorders and ability to screen



Parents meet with a genetic counselor to determine the risk that their children will inherit genetic defects and chromosomal abnormalities.

Michelle Del Guercio/Science Source

for them, some experts propose that genetic counseling should be available to all prospective parents (Minkoff & Berkowitz, 2014). Others argue that abnormalities are rare and so few would be discovered that universal screening is of little utility (Larion et al., 2016). Whether to seek genetic counseling is a personal decision for prospective parents based on their history, view of their risks, and their values. Adults who carry significant risks of conceiving a child with a genetic disorder sometimes consider alternative methods of reproduction.

### Assisted Reproductive Technology

Couples turn to assisted reproductive technology (ART), alternative methods of conception that rely on medical technology, for a variety of reasons. Almost 2% of infants in the United States are conceived through ART (Centers for Disease Control and Prevention, 2020). As noted, some couples at risk for bearing children with genetic or chromosomal abnormalities seek ART. About 15% of couples in the United States experience infertility, the inability to conceive naturally after 1 year of unprotected intercourse (Anwar & Anwar, 2016; Lindahl, 2018). About 35% of the time, factors within the male are identified as contributors to infertility (Centers for Disease Control and Prevention, 2017). In addition, single men and women, as well as gay and lesbian couples, often opt to conceive with the use of ART. There are racial, ethnic, and socioeconomic disparities in the use of ART. White, Asian American, college-educated, and high socioeconomic status women are more likely to give birth with ART than Black and Hispanic women (Janitz et al., 2016; Tierney & Cai, 2019). Race and ethnicity are often linked with socioeconomic status and disparities in health care in the United States. Socioeconomic factors play a large role in access to infertility treatment and reproductive technology (Dieke et al., 2017).

#### Artificial Insemination

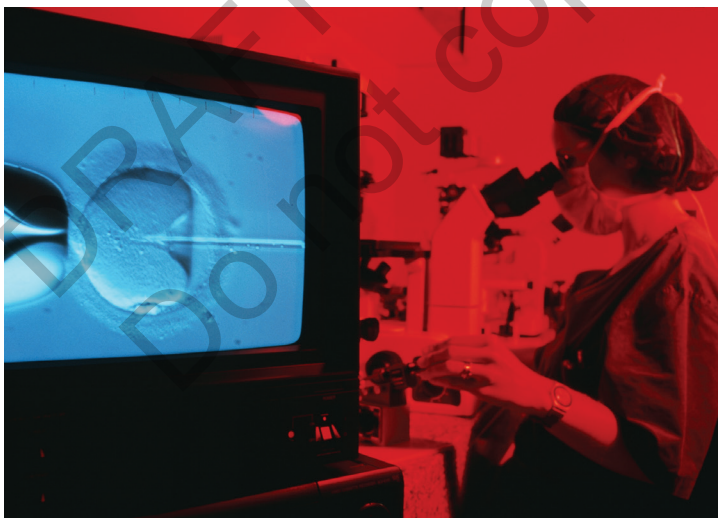
The simplest, least invasive type of alternative conception is **artificial insemination**, the injection of sperm into a woman. The male partner's sperm may be used or, if the male experiences reproductive difficulties, a donor's sperm may be used. Artificial insemination through a donor also enables women without male partners, whether single or lesbian, to conceive. Artificial insemination is the least expensive alternative method of conception, but the success rate is low, usually requiring multiple cycles. The injection costs range from about \$300 to \$1,000 per cycle (Harris, 2020). Women and couples who seek donor sperm may also expect to pay about \$700 to \$1,000 per vial.

#### In Vitro Fertilization

In contrast with artificial insemination, where conception occurs inside of the women's body, in vitro fertilization, introduced in the United States in 1981, initiates conception outside of the woman's body.

A woman is prescribed hormones that stimulate the maturation of several ova, which are surgically removed. The ova are placed in a dish and sperm are added. One or more ova are fertilized and the resulting cell begins to divide. After several cell divisions, the cluster of cells is placed in the woman's uterus. If they implant into the uterus and begin to divide, a pregnancy has occurred.

The success rate of in vitro fertilization is about 50% and varies with the mother's age (Centers for Disease Control and Prevention, 2019). For example, the percentage of embryo transfers resulting in live births is 53% for 35- to 37-year-old women, 36% in 38–40-year-old women, 25% in 41–42-year-old women, and 11% in women over age 43. In vitro fertilization is expensive, costing an average of over \$12,400 per trial, not including medication, and often requires multiple cycles, posing a financial burden too great for low SES women and couples (Asch & Marmor, 2020; Teoh & Maheshwari, 2014).



In vitro fertilization is a form of reproductive technology in which an ovum is fertilized outside of the womb.

Mauro Fermariello/Science Source

Infants conceived by in vitro fertilization are at higher risk of low birth weight (Centers for Disease Control and Prevention, 2019), although it has been suggested that it is because of maternal factors such as advanced age and health, and not in vitro fertilization per se (Seggers et al., 2016). Infants conceived by in vitro fertilization show no differences in growth, health, development, and cognitive function relative to infants conceived naturally (Farhi et al., 2019; Fauser et al., 2014). Because in vitro fertilization permits cells to be screened for genetic problems prior to implantation, in vitro infants are not at higher risk of birth defects (Fauser et al., 2014). More than one-third of births from artificial insemination included more than one infant (Sunderam et al., 2019). Multiple gestations increase the risk for low birth weight, prematurity, and other poor outcomes (Sullivan-Pyke et al., 2017).

### Surrogacy

**Surrogacy** is an alternative form of reproduction; a woman (the surrogate) is impregnated and carries a fetus to term and agrees to turn the baby over to a woman, man, or couple who will raise it. Single parents, same-sex couples, and couples in which one or both members are infertile may choose surrogacy. Sometimes the surrogate carries a zygote composed of one or both of the couple's gametes. Other times, the ova, sperm, or zygote are donated. Despite several highly publicized cases of surrogate mothers deciding not to relinquish the infant, most surrogacies are successful.

In 2015, 2,807 babies were born through surrogacy in the United States, up from 738 in 2004, according to the American Society for Reproductive Medicine (Beitsch, 2017). Longitudinal research suggests no psychological differences through age 14 between children born through surrogacy compared with other methods, including children born to gay father and lesbian mother families (Carone et al., 2018, 2020; Golombok, 2013; Golombok et al., 2017). In addition, mothers of children who were the product of surrogates do not differ from those conceived using other methods and surrogate mothers show no negative effects (Jadva et al., 2015; Söderström-Anttila et al., 2015).

We have seen that reproductive technology is expensive. Surrogacy is often prohibitively expensive for most prospective parents, limiting its access to high socioeconomic status parents. Prospective parents pay for the surrogate's medical care, attorney, travel expenses, health care, and more, which can amount to \$100,000 or more (Caron, 2020). Finally, surrogacy may pose ethical issues. Carrying a fetus to term poses physical and mental health risks to the surrogate. Relinquishing a newborn is difficult, even with fore planning, posing emotional risks to the surrogate. The financial incentives to surrogate a fetus are substantial. Women are often paid at least \$30,000 to \$55,000 to surrogate a fetus (Beitsch, 2017), sums that may be difficult for low socioeconomic status women to resist (Harrison, 2017).

### Assisted Reproductive Technology and Sex Selection

Gender-reveal parties, in which prospective parents learn about and share the biological sex of their fetus by popping balloons, breaking apart piñatas, lighting fireworks, and other creative means, are popular and signify the relevance of biological sex for many parents. Parents have long shown a preference for giving birth to a girl or boy, depending on circumstances such as cultural or religious traditions, the availability of men or women to perform certain kinds of work important to the family or society, or the sex of the couple's other children. Today, many parents cannot only know their child's sex but might choose it. The introduction of sex selection has been a boon to couples carrying a genetically transmitted disease (i.e., a disease carried on the sex chromosomes), enabling them to have a healthy baby of the sex unaffected by the disease they carry.

There are two methods of sex selection: preconception sperm sorting and pre-implantation genetic diagnosis (PGD) (Bhatia, 2018). Preconception sperm sorting involves staining the sperm with a fluorescent dye and then leading them past a laser beam where the difference in DNA content between X- and Y-bearing sperm is visible. PGD creates zygotes within the laboratory by removing eggs from the woman and fertilizing them with sperm. Three days after fertilization a cell from each cluster of cells is extracted to examine the chromosomes and determine whether or not it contains a Y chromosome (i.e., whether it is female or male). The desired male or female embryos are then implanted into the woman's uterus. The second type of sex selection, sperm sorting, entails spinning sperm in a centrifuge to separate those that carry an X or Y chromosome. Sperm with the desired chromosomes are then used to fertilize the ovum either vaginally or through in vitro fertilization.

As sex selection becomes more widely available, parents may seek to choose the sex of their child because of personal desires, such as to create family balance or to conform to cultural valuing of one sex over the other, rather than to avoid transmitting genetic disorders (Bowman-Smart et al., 2020; Robertson & Hickman, 2013). Without the ability to choose a child's sex, some parents might choose not to reproduce (Bowman-Smart et al., 2020). Critics argue that sex selection can lead down a “slippery slope” of selecting for other characteristics—hair color, eye color, intelligence, and more (Dondorp et al., 2013). Moreover, a children's biological sex is different from their gender, the gender-associated behaviors that they adopt (as we will discuss later in this book). (Brown & Stone, 2016). Might children born from gender selection be expected to act in certain sex-typical ways and if they do not, might that disappoint parents?

Others express concerns about societal sex ratio imbalances if sex selection becomes widely practiced (Colls et al., 2009; Robertson & Hickman, 2013). Asian and Eastern European cultures, such as China, South Korea, India, and Azerbaijan, traditionally favor boys over girls (Tafuro & Guilmo, 2020). Sex ratio imbalances favoring males have occurred in India and China because of female infanticide, neglect and maltreatment, gender-driven abortion, and China's one-child family policy (discussed in Chapter 10) (Bhatia, 2010; Ethics Committee of the American Society for Reproductive Medicine, 2001; Ritchie & Roser, 2019). Thirty-six countries have national laws or policies on sex selection (Mohapatra, 2013). Most prohibit sex selection for nonmedical reasons—Austria, New Zealand, South Korea, Switzerland, Australia, Belgium, Netherlands, India, China, Portugal, Russia, Spain, Turkey, the United Kingdom, and Vietnam ban sex selection (Mohapatra, 2013). The European Union bans socially, nontherapeutically motivated prenatal sex selection (Council of Europe, 1997). The United States does not have a formal policy regarding sex selection (Deeney, 2013). Most fertility clinics offer it (Bayefsky, 2018). Sex selection remains hotly debated in medical journals, with hospital and university ethics boards, and the public.

### Thinking in Context: Applied Developmental Science

1. Provide advice to Eduardo and Natia, a couple in their mid-30s who are seeking reproductive assistance. What are their options, and what are the advantages and disadvantages of each?
2. What do you think about parents choosing the sex of their children? In your view, under what conditions is sex selection acceptable?
3. If you were able to choose and selectively reproduce characteristics, apart from sex, what might you choose? Why or why not? What are some practical or ethical issues in selecting a child's characteristics or “designing” a child?

### Thinking in Context: Intersectionality

Assisted reproductive technology is not easily available to all individuals and couples. What are some of the barriers to obtaining assisted reproductive technology? Which barriers are most challenging? To what degree is there a need for equity in access to reproductive technology? Why? If so, how might we begin?

## REPRODUCTIVE CHOICES: ADOPTION

### LEARNING OBJECTIVE

- 2.4 Compare and contrast characteristics and outcomes of adoption, transracial adoption, and international adoption.

Another reproductive option for prospective parents is **adoption**. Adults, heterosexual and same-sex individuals and couples, have similar motives for adopting children as those who raise biological children (Jennings et al., 2014; Malm & Welti, 2010). They include reasons such as valuing family ties,

continuing a family line, feeling that parenting is a life task, and the desire for a nurturing relationship with a child (Costa & Tasker, 2018; Goldberg et al., 2012).

Adoptive children tend to be raised by parents with higher levels of education and income than other children (Drozd et al., 2018). This is partly due to self-selection and partly because of the screening that adoptive parents must undergo before they can adopt. Adoptive parents have a strong desire and are highly motivated to become parents.

### Adoption and Child Outcomes

Overall, adoptive children tend to spend more time with their parents and have more educational resources than other children (Zill, 2015). In kindergarten, they do not differ from nonadopted children in reading and math scores (Tan et al., 2017). Yet many adopted children show less engagement in class and tend to have more academic difficulties than other children. Longitudinal research suggests that adoption is associated with lower academic attainment achievement across childhood, adolescence, and emerging adulthood compared with nonadopted comparison groups (Brown et al., 2017; Wiley, 2017).

Adopted children may show more behavior problems and adjustment difficulties than their non-adoptive peers, in some cases persisting into adulthood (Brown et al., 2017; Palacios & Brodzinsky, 2010). For many children, emotional difficulties are transitional, perhaps accounting for mixed findings in outcomes. Some research suggests no differences between adopted and nonadopted children in internalizing problems, such as anxiety and depression (Brown et al., 2019; Wiley, 2017). This is supported by longitudinal research that followed adoptees into middle adulthood and showed few differences in psychological distress; differences were accounted for by differences in childhood family circumstances (Sehmi et al., 2020).

Children's experiences prior to adoption, especially neglect and maltreatment, and their developmental status at the time of adoption influence their short- and long-term adjustment (Balenzano et al., 2018; Finet et al., 2018; Hornfeck et al., 2019). Adopted children tend to experience greater stress prenatally, early in life, prior to adoption, and during the adoption process that influences their long-term adjustment after adoption (Grotevant & McDermott, 2014; Wiley, 2017). The quality of adoptive parent-child relationships influences children's outcomes and the long-term effects of preadoption adversity (Farr & Grotevant, 2019). Children who develop a close bond with adoptive parents tend to show better emotional understanding and regulation, social competence, and also self-esteem (Drozd et al., 2018; Juffer & van IJzendoorn, 2007; Schoemaker et al., 2019). This is true also of children who have experienced emotional neglect, and those effects hold regardless of the age at adoption (Barone et al., 2017).

### Transracial Adoption

It is estimated that transracial adoptions, in which a child (typically of color) is adopted by parents of a different race (most often white), account for about one-quarter of adoptions (Marr, 2017). Transracial adoption is associated with academic delays, social and emotional risks such as bullying, racial and ethnic microaggression, and adoption stigma (Branco & Brott, 2018).

Transracial adoptive children, and especially adolescents, may face challenges in ethnic and racial socialization and identity development (Wiley, 2017). Although racial identity development may happen more slowly and entail more challenges for transracially adopted adolescents than nonadopted racial minority adolescents, most develop a firm sense of identity (Hrapczynski & Leslie, 2019). Racial and ethnic socialization is associated with healthy adoptee outcomes, including well-being and positive self-esteem (Montgomery & Jordan, 2018).



Adults choose to adopt for a variety of reasons, such as infertility, the desire to raise a child alone or with a same-sex partner, and to provide a home for a child in need.

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Parents can foster their adoptive children's ethnic and racial socialization by exposing children to their racial and ethnic heritage and provide opportunities for children to learn about and interact with people who identify with their birth race and ethnicity (Hrapczynski & Leslie, 2019). Research with transracially adopted Mexican American adoptees suggests that ethnic identity was associated with living in diverse neighborhoods, parents' awareness of the children's culture, and encouragement for children to learn about and participate in their culture (Montgomery & Jordan, 2018). Close relationships with adoptive parents who engage them with cultural activities are positively associated with academic performance (Montgomery et al., 2020). Transracially adopted children show the most positive self-esteem and well-being outcomes and the least distress when they integrate their racial and cultural heritage with their adoptive culture rather than denying either their adoptive or racial heritage (Mohanty, 2015).

### International Adoption

In many countries throughout the world, children without parents are reared in orphanages, often with substandard conditions—without adequate food, clothing, or shelter and with poorly trained caregivers. Such orphanages in countries such as China, Ethiopia, Ukraine, Congo, and Haiti, account for over two-thirds of internationally adopted children (U.S. Department of State, 2014). Underfunded and understaffed orphanages often provide poor, nonnurturing care for children, increasing the risks for malnutrition, infections, physical handicaps, and growth retardation (The Leiden Conference on the Development and Care of Children Without Permanent Parents, 2012). With high infant-to-caregiver ratios, children available for adoption often spend a significant amount of time deprived of consistent human contact.

Few internationally adopted children enter the United States healthy and at age-appropriate developmental norms. Physical growth stunting is directly associated with the length of institutionalization, but catch-up growth is commonly seen after adoption (Wiley, 2017; Wilson & Weaver, 2009). As with growth, the time spent in an orphanage predicts the degree of developmental delay (Jacobs et al., 2010). Longer institutionalization is associated with delays in development of language, fine motor skills, social skills, attention, and other cognitive skills (Mason & Narad, 2005; Wiik et al., 2011).

Speech and language delays are among the most consistent deficiencies experienced by internationally adopted children, especially those adopted after the age of 1 (Eigsti et al., 2011). Many children reach normative age expectations 1 to 2 years postadoption (Glennen, 2014; Rakhlin et al., 2015). Generally, the younger the child is at adoption, the more quickly he or she will adapt to the new language and close any gaps in language delays (Glennen & Masters, 2002; Mason & Narad, 2005). Virtually all internationally adopted children of all ages show catch-up cognitive growth but many may show long-term deficits in executive function related to the neurological effects of their preadoption experiences, such as deprivation (Canzi et al., 2018; Finet et al., 2019; Merz et al., 2016). The presence of a high-quality parent-child relationship promotes development of language, speech, and academic outcomes (Glennen, 2014; Harwood et al., 2013).

As adolescents, all children struggle to come to a sense of identity, to figure out who they are. This struggle may be challenging for internationally adopted children who may wonder about their native culture and homeland (Rosnati et al., 2015). Frequently, adolescents may want to discuss and learn more yet inhibit the desire to talk about this with parents (Garber & Grotevant, 2015). Parents who assume a multicultural perspective and provide opportunities for their children to learn about their birth culture support adopted children's development and promote healthy outcomes (Pinderhughes et al., 2015). Like transracially adopted children, internationally adopted children seek to understand their birth



International adoption has become more common in the United States, and there are important challenges that adopted children and families face.

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culture and integrate their birth and adopted cultures into their sense of self (Grotevant et al., 2017). A positive sense of ethnic identity is associated with positive outcomes such as self-esteem in international adoptees (Mohanty, 2015). Although there are individual differences in the degree of resilience and in functioning across developmental domains, adopted children overall show great developmental gains and resilience in physical, cognitive, and emotional development (Misca, 2014; Palacios et al., 2014; Wilson & Weaver, 2009).

### Thinking in Context: Intersectionality

1. After many unsuccessful attempts to conceive, a couple in their 40s is considering adopting a child of a different race. What can they expect? What challenges might they encounter?
2. In what ways might the match between the race or ethnicity of the child and parent influence the family's adaptation? Might you expect differences depending on the match between an adoptive parent or child who is Black, white, Latinx, or Asian?
3. Do other factors, such as child's and parent's age, socioeconomic status, or geographic location influence adaptation? Why or why not?
4. What can parents do to support their adopted child of a different race?

### Thinking in Context: Lifespan Development

1. In your view, what are the most important challenges internationally adopted infants and their families face? Identify sources and forms of support that might help adopted infants and their parents.
2. At what point in development does an understanding of culture become important in aiding children's adjustment to an adoptive home?
3. As adolescents, many adopted children are driven to learn about their biological origins. How can adoptive parents help their children understand their heritage and adapt to their environment?

## PRENATAL DIAGNOSIS

### LEARNING OBJECTIVE

- 2.5 Summarize prenatal diagnostic methods and how genetic disorders may be treated prenatally.

Virtually all pregnant women undergo examinations to determine the health of the fetus. Some women experienced heightened risk for fetal abnormalities. Prenatal testing is recommended when genetic counseling has determined a risk for genetic abnormalities, when the woman is older than age 35, when both parents are members of an ethnicity at risk for particular genetic disorders, or when fetal development appears abnormal (Barlow-Stewart & Saleh, 2012). Technology has advanced rapidly, equipping professionals with an array of tools to assess the health of the fetus.

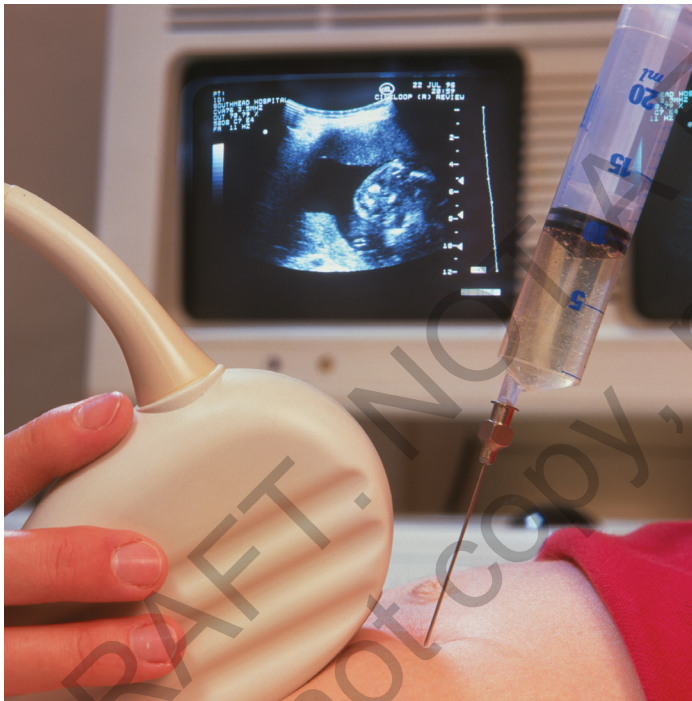
### Methods of Prenatal Diagnosis

The most widespread and routine diagnostic procedure is **ultrasound**, in which high-frequency sound waves directed at the mother's abdomen provide clear images of the womb represented on a video monitor. Ultrasound enables physicians to observe the fetus, measure fetal growth, judge gestational



Ultrasound technology provides clear images of the womb, permitting physicians to observe the fetus, measure fetal growth, judge gestational age, reveal the sex of the fetus, detect multiple pregnancies, and determine physical abnormalities in the fetus.

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During amniocentesis, ultrasound is used to guide the insertion of a long, hollow needle into the mother's abdomen in order to extract a sample of the amniotic fluid that surrounds the fetus. The amniotic fluid contains fetal cells, which are grown in a laboratory dish and tested for genetic and chromosomal anomalies and defects.

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age, reveal the sex of the fetus, detect multiple pregnancies (twins, triplets, etc.), and determine physical abnormalities in the fetus. Many deformities can be observed, such as cardiac abnormalities, cleft palate, and microencephaly (small head size). At least 80% of women in the United States receive at least one prenatal ultrasound scan (Sadler, 2018). Three or four screenings over the duration of pregnancy are common in order to evaluate fetal development. Repeated ultrasound of the fetus does not appear to affect growth and development (Abramowicz, 2019; Stephenson, 2005).

**Fetal MRI** applies MRI technology to image the fetus' body and diagnose malformations (Aertsen et al., 2020). It is often used as a follow-up to ultrasound imaging in order to provide more detailed views of any suspected abnormalities (Milani et al., 2015). Fetal MRI can detect abnormalities throughout the body, including the central nervous system (Griffiths et al., 2017; Masselli et al., 2020). MRI in the obstetrical patient is safe for mother and fetus in the second and third trimesters, but it is expensive and has limited availability in some areas (Patenaude et al., 2014).

**Amniocentesis** is a prenatal diagnostic procedure in which a small sample of the amniotic fluid that surrounds the fetus is extracted from the mother's uterus through a long, hollow needle that is guided by ultrasound as it is inserted into the mother's abdomen (Odibo, 2015). The amniotic fluid contains fetal cells, which are grown in a laboratory dish in order to create enough cells for genetic analysis. Genetic analysis is then performed to detect genetic and chromosomal anomalies and defects. Amniocentesis is less common than ultrasound, as it poses greater risk to the fetus, but it is safe (Homola & Zimmer, 2019). It is recommended for women aged 35 and over, especially if the woman and partner are both known carriers of genetic diseases (Vink & Quinn, 2018a). Usually amniocentesis is conducted between the 15th and 18th week of pregnancy. Conducted any earlier, an amniocentesis may increase the risk of miscarriage (Akolekar et al., 2015). Test results generally are available about two weeks after the procedure because it takes that long for the genetic material to grow and reproduce to the point where it can be analyzed.

**Chorionic villus sampling (CVS)** also samples genetic material and can be conducted earlier than amniocentesis, between 9 and 12 weeks of pregnancy (Vink & Quinn, 2018b). CVS requires studying a small amount of tissue from the chorion, part of the membrane surrounding the fetus. The tissue sample is obtained through a long needle

inserted either abdominally or vaginally, depending on the location of the fetus. Results are typically available about one week following the procedure. CVS is relatively painless and, like amniocentesis, has a 100% diagnostic success rate. Generally, CVS poses few risks to the fetus (Salomon et al., 2019; Shim et al., 2014). But CVS should not be conducted prior to 10 weeks gestation as some studies suggest an increased risk of limb defects and miscarriages (Shahbazian et al., 2012).



**Noninvasive prenatal testing (NIPT)** screens the mother's blood to detect chromosomal abnormalities. Cell-free fetal DNA (chromosome fragments that result in the breakdown of fetal cells) circulates in maternal blood in small concentrations that can be detected and studied by sampling the mother's blood (Hartwig et al., 2017; Warsof et al., 2015). Testing can be done after 10 weeks, typically between 10 and 22 weeks. Given that the test involves drawing blood from the mother, there is no risk to the fetus. The use of NIPT has increased dramatically in the United States and other countries (Hui et al., 2017). NIPT can provide accurate sex determination, but NIPT cannot detect as many chromosomal abnormalities as amniocentesis or CVS and is less accurate (Hartwig et al., 2017; Villela et al., 2019). Researchers have identified the entire genome sequence using NIPT, suggesting that someday, NIPT may be as effective as other, more invasive techniques (Tabor et al., 2012). Pregnant women and their partners, in consultation with their obstetrician, should carefully weigh the risks and benefits of any procedure designed to monitor prenatal development. Table 2.6 summarizes methods of prenatal diagnosis.

**TABLE 2.6** ■ Methods of Prenatal Diagnosis

	Explanation	Advantages	Disadvantages
<b>Ultrasound</b>	High-frequency sound waves directed at the mother's abdomen provide clear images of the womb projected onto a video monitor.	Ultrasound enables physicians to observe the fetus, measure fetal growth, reveal the sex of the fetus, and to determine physical abnormalities in the fetus.	Many abnormalities and deformities cannot be easily observed.
<b>Amniocentesis</b>	A small sample of the amniotic fluid that surrounds the fetus is extracted from the mother's uterus through a long, hollow needle inserted into the mother's abdomen. The amniotic fluid contains fetal cells. The fetal cells are grown in a laboratory dish in order to create enough cells for genetic analysis.	It permits a thorough analysis of the fetus's genotype. There is a 100% diagnostic success rate.	Safe, but poses a greater risk to the fetus than ultrasound. If conducted before the 15th week of pregnancy, it may increase the risk of miscarriage.
<b>Chorionic villus sampling (CVS)</b>	Chorionic villus sampling requires studying a small amount of tissue from the chorion, part of the membrane surrounding the fetus, for the presence of chromosomal abnormalities. The tissue sample is obtained through a long needle inserted either abdominally or vaginally, depending on the location of the fetus.	It permits a thorough analysis of the fetus' genotype. CVS is relatively painless, and there is a 100% diagnostic success rate. Can be conducted earlier than amniocentesis, between 10 and 12 weeks.	It may pose a higher rate of spontaneous abortion and limb defects when conducted prior to 10 weeks' gestation.
<b>Fetal MRI</b>	Uses a magnetic scanner to record detailed images of fetal organs and structures.	Provides the most detailed and accurate images available.	It is expensive. At present there is no evidence to suggest that it is harmful to the fetus.
<b>Noninvasive prenatal testing (NIPT)</b>	Cell-free fetal DNA are examined by drawing blood from the mother.	There is no risk to the fetus. It can diagnose several chromosomal abnormalities.	It cannot yet detect the full range of abnormalities. It may be less accurate than other methods. Researchers have identified the entire genome sequence using NIPT, suggesting that someday NIPT may be as effective as other, more invasive techniques.

Sources: Akolekar et al., 2015; Chan et al., 2013; Gregg et al., 2013; Odibo, 2015; Shahbazian et al., 2012; Shim et al., 2014; Theodora et al., 2016.

## Prenatal Treatment of Genetic Disorders

What happens when a genetic or chromosomal abnormality is found? Advances in genetics and in medicine have led to therapies that can be administered prenatally to reduce the effects of many genetic abnormalities. **Fetoscopy** is a technique that utilizes a small camera, inserted through a small incision on the mother's abdomen or cervix and placed into the amniotic sac, which encases the fetus, to examine and perform procedures on the fetus during pregnancy. Risks of fetoscopy include infection, rupture of the amniotic sac, premature labor, and fetal death. However, when serious abnormalities are suspected, fetoscopy permits a visual assessment of the fetus, which aids in diagnosis and treatment. Hormones and other drugs, as well as blood transfusions, can be given to the fetus by inserting a needle into the uterus (Fox & Saade, 2012; Lindenburg et al., 2014). Surgeons rely on the images provided by fetoscopy to surgically repair defects of the heart, lungs, urinary tract, and other areas (Deprest et al., 2010; Peiro & Scorletti, 2019; Sala et al., 2014).

In addition, researchers believe that one day we may be able to treat many heritable disorders through the use of gene therapy by synthesizing normal genes to replace defective ones. It may someday be possible to sample cells from an embryo, detect harmful genes and replace them with healthy ones, then return the healthy cells to the embryo where they reproduce and correct the genetic defect (Coutelle & Waddington, 2012; Peranteau & Flake, 2020). This approach has been used to correct certain heritable disorders in animals and holds promise for treating humans (Neff, 2019).

## Thinking in Context: Applied Developmental Science

Suppose that you are a health care provider tasked with explaining prenatal diagnostic choices to a 38-year-old woman pregnant with her first child. How would you explain the various choices? What information would you provide about their purpose and the advantages and disadvantages of each? Which tests are most relevant to your patient? What would you advise? Why?

## HEREDITY AND ENVIRONMENT: BEHAVIOR GENETICS

### LEARNING OBJECTIVE

2.6 Provide an introduction to the field of behavior genetics, including representative findings.

Our brief introduction to the processes of heredity illustrates the complexity of genetic inheritance. Our genotype, or genetic makeup, inherited from our biological parents, is a biological contributor to all of our observable traits, from hair and eye color to personality, health, and behavior. However, genotypes alone do not determine our **phenotype**, the traits, characteristics, or personalities that we display. Phenotypes result from the interaction of genotypes and our experiences.

### Methods of Behavior Genetics

**Behavior genetics** is the field of study that examines how genes and experience combine to influence the diversity of human traits, abilities, and behaviors (Knopik et al., 2017; Plomin, 2019). Behavior geneticists have discovered that even traits with a strong genetic component, such as height, are modified by environmental influences (Jelenkovic et al., 2016). Moreover, most human traits, such as intelligence, are influenced by multiple genes, and there are often multiple variants of each gene and each might interact with the environment in a different way (Briley et al., 2019; Plomin, 2019).

Behavior geneticists seek to estimate the heritability of specific traits and behaviors. **Heritability** refers to the extent to which variation among people on a given characteristic is due to genetic differences. The remaining variation not due to genetic differences is instead a result of the environment and experiences. Heritability research therefore examines the contributions of the genotype but also provides information on the role of experience in determining phenotypes (Fowler-Finn & Boutwell, 2019; Nivard et al., 2017). Behavior geneticists assess the hereditary contributions to behavior by conducting selective breeding and family studies.

Selective breeding studies entail deliberately modifying the genetic makeup of animals to examine the influence of heredity on attributes and behavior. Mice can be bred to be very physically active or sedentary by mating highly active mice only with other highly active mice and, similarly, breeding mice with very low levels of activity with each other. Over subsequent generations, mice bred for high levels of activity become many times more active than those bred for low levels of activity (Schwartz et al., 2018). Selective breeding in rats, mice, and other animals such as chickens has revealed genetic contributions to many traits and characteristics, such as aggressiveness, emotionality, sex drive, and even maze learning (Bubac et al., 2020).

For many reasons, especially ethical reasons, people cannot be selectively bred. However, we can observe people who naturally vary in shared genes and environment. Behavior geneticists conduct family studies to compare people who live together and share varying degrees of relatedness. Two kinds of family studies are common: twin studies and adoption studies (York, 2020). Twin studies compare identical and fraternal twins to estimate how much of a trait or behavior is attributable to genes. Recall that identical (monozygotic) twins share 100% of their genes because they originated from the same zygote. Like all nontwin siblings, fraternal (dizygotic) twins share 50% of their genes as they resulted from two different fertilized ova and two genetically different zygotes. If genes affect a given attribute, identical twins should be more similar than fraternal twins because identical twins share 100% of their genes, whereas fraternal twins share about half.

Adoption studies, on the other hand, compare the degree of similarity between adopted children and their biological parents whose genes they share (50%) and their adoptive parents with whom they share an environment but not genes (York, 2020). If the adopted children share similarities with their biological parents, even though they were not raised by them, it suggests that the similarities are genetic. The similarities are influenced by the environment if the children are more similar to their adoptive parents. Observations of adoptive siblings also shed light on the extent to which attributes and behaviors are influenced by the environment. The degree to which two genetically unrelated adopted children reared together are similar speaks to the role of environment. Comparisons of identical twins reared in the same home with those reared in different environments can also illustrate environmental contributions to phenotypes. If identical twins reared together are more similar than those reared apart, an environmental influence can be inferred.

### Genetic Influences on Personal Characteristics

Research examining the contribution of genotype and environment to intellectual abilities has found a moderate role for heredity. Twin studies have shown that identical twins consistently have more highly correlated intelligence scores than do fraternal twins (Plomin, 2019). A classic study of intelligence in over 10,000 twin pairs showed a correlation of .86 for identical and .60 for fraternal twins (Plomin & Spinath, 2004). Table 2.7 summarizes the results of comparisons of intelligence scores from individuals

**TABLE 2.7** ■ Average Correlation of Intelligence Scores From Family Studies for Related and Unrelated Kin Reared Together or Apart

	Reared Together	Reared Apart
MZ twins (100% shared genes)	.86	.72
DZ twins (50% shared genes)	.60	.52
Siblings (50% shared genes)	.47	.24
Biological parent/child (50% shared genes)	.42	.22
Half-siblings (25% shared genes)	.31	—
Unrelated (adopted) siblings (0% shared genes)*	.34	—
Nonbiological parent/child (0% shared genes)*	.19	—

Source: Adapted from Bouchard & McGue (1981).

Notes: \* Estimated correlation for individuals sharing neither genes nor environment = .0; MZ = monozygotic; DZ = dizygotic.

who share different genetic relationships with each other. Note that correlations for all levels of kin are higher when they are reared together, supporting the role of environment. Average correlations also rise with increases in shared genes.

Genes contribute to many other traits, such as sociability, temperament, emotionality, and susceptibility to various illnesses such as obesity, heart disease and cancer, anxiety, poor mental health, and a propensity to be physically aggressive (Bralten et al., 2019; Goodarzi, 2018; Morneau-Vaillancourt et al., 2019; Purves et al., 2019; Trucco et al., 2018). Yet even traits that are thought to be heavily influenced by genetics can be modified by physical and social interventions. Growth, body weight, and body height are largely predicted by genetics, yet environmental circumstances and opportunities influence whether genetic potentials are realized (Dubois et al., 2012; Jelenkovic et al., 2016). Even identical twins who share 100% of their genes are not 100% alike. Those differences are due to the influence of environmental factors, which interact with genes in a variety of ways.

### Thinking in Context: Applied Developmental Science

Imagine that you are a researcher planning to conduct a twin and an adoption study on intelligence, personality, academic achievement, or another topic.

1. What are the advantages and disadvantages of each method?
2. What are some challenges in obtaining participants for these studies?
3. Using the twin approach, how might you determine the genetic and environmental influence on your topic of interest? How does this differ in adoptive studies?
4. What conclusions do you draw about these two types of studies? Which do you prefer and why?

## GENE–ENVIRONMENT INTERACTIONS

### LEARNING OBJECTIVE

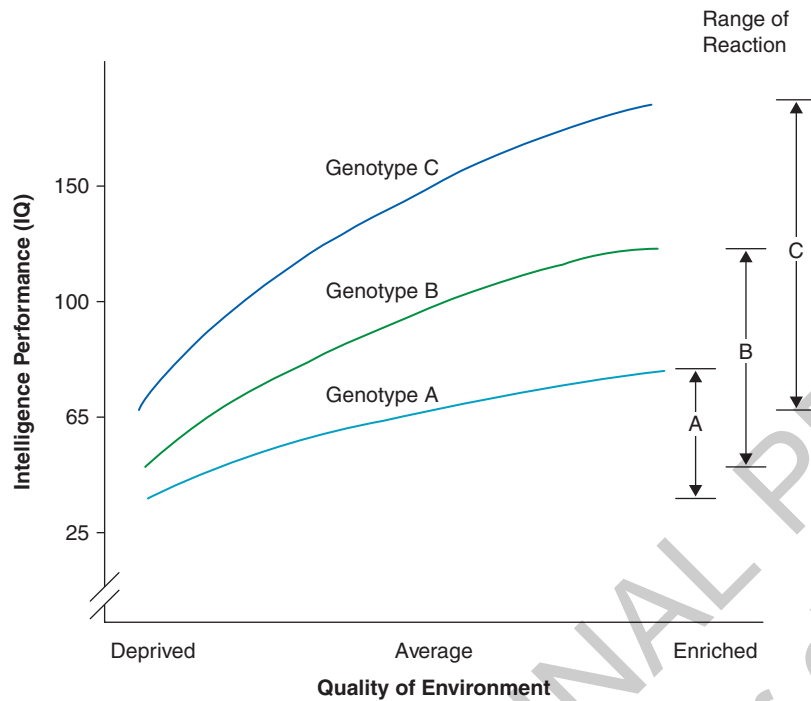
- 2.7 Describe the interaction of heredity and environment, including gene–environment correlations, gene–environment interactions, and the epigenetic framework.

“You two are so different, Deondre and Denzel, are you sure you’re twins?” kidded their aunt. As fraternal twins, Deondre and Denzel share 50% of their genes and are reared in the same home. One might expect them to be quite similar, but their similar genes are not the whole story. Genes and the environment work together in complex ways to determine our characteristics, behavior, development, and health (Morgan et al., 2020; Ritz et al., 2017). **Gene–environment interactions** refer to the dynamic interplay between our genes and our environment. Several principles illustrate these interactions.

### Range of Reaction

The effects of the environment depend on the genetic makeup of the individual (Briley et al., 2019). Everyone has a different genetic makeup and therefore responds to the environment in a unique way. In addition, any one genotype can be expressed in a variety of phenotypes. There is a **range of reaction** (see Figure 2.5), a wide range of potential expressions of a genetic trait, depending on environmental opportunities and constraints (Gottlieb, 2007). Consider height. Height is largely a function of genetics, yet an individual may show a range of sizes depending on environment and behavior (Jelenkovic et al., 2016). Consider children born to two very tall parents. They may have the genes to be tall, but unless they have adequate nutrition, they will not fulfill their genetic potential for height. In societies in which nutrition has improved dramatically over a generation, it is common

FIGURE 2.5 ■ Range of Reaction



Source: Adapted from Gottlieb [2007].

for children to tower over their parents. The enhanced environmental opportunities, in this case nutrition, enabled the children to fulfill their genetic potential for height. Therefore, a genotype sets boundaries on the range of possible phenotypes, but the phenotypes ultimately displayed vary in response to different environments (Manuck & McCaffery, 2014; Morgan et al., 2020). In this way, genetics sets the range of development outcomes and the environment influences where, within the range, that person will fall. However, gene–environment interactions are complex and often difficult to predict, partly because individuals vary in their sensitivity to environmental stimuli (Belsky & Hartman, 2014). Some children may be more affected by environmental stimuli due to their genetic makeup (Briley et al., 2019).

### Canalization

Some traits illustrate a wide reaction range. Others are examples of **canalization**, in which heredity narrows the range of development to only one or a few outcomes. Canalized traits are biologically programmed, and only powerful environmental forces can change their developmental path (Flatt, 2005; Posadas & Carthew, 2014; Takahashi, 2019). Infants follow an age-related sequence of motor development, from crawling, to walking, to running. Around the world, most infants walk at about 12 months of age. Generally, only extreme experiences or changes in the environment can prevent this developmental sequence from occurring (Adolph & Franchak, 2017). Children reared in impoverished international orphanages and exposed to extreme environmental deprivation demonstrated delayed motor development, with infants walking 5 months to a year later than expected (Miller et al., 2008; Chaibal et al., 2016).

Motor development is not entirely canalized because some minor changes in the environment can subtly alter its pace and timing. Practice facilitates stepping movements in young infants, prevents the disappearance of stepping movements in the early months of life, and leads to an earlier onset of walking (Adolph & Hoch, 2019). These observations demonstrate that even highly canalized traits, such as motor development, which largely unfolds via maturation, can be subtly influenced by contextual factors.

## Gene–Environment Correlations

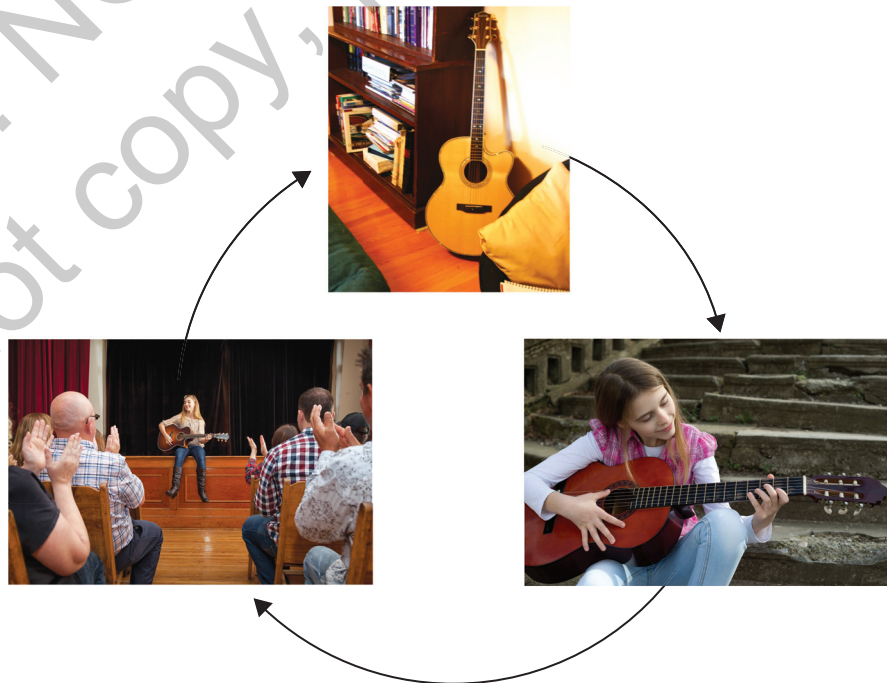
Heredity and environment are each powerful influences on development. Not only do they interact, but environmental factors often support hereditary traits (Briley et al., 2019; Saltz, 2019; Scarr & McCartney, 1983). **Gene–environment correlation** refers to the finding that many genetically influenced traits tend to be associated with environmental factors that promote their development (Lynch, 2016). That is, genetic traits influence children’s behavior, which is often supported or encouraged by the environment (Knafo & Jaffee, 2013). There are three types of gene–environment correlations: passive, reactive, and active.

Parents create homes that reflect their own genotypes. Because parents are genetically similar to their children, the homes that parents create support their own preferences but they also correspond to their child’s genotype—an example of a passive gene–environment correlation (Wilkinson et al., 2013). It is a passive gene–environment correlation because it occurs regardless of the child’s behavior. Parents might provide genes that predispose a child to develop music ability and create a home environment that supports the development of music ability, such as by playing music in the home and owning musical instruments (Corrigall & Schellenberg, 2015) (Figure 2.6). This type of gene–environment correlation tends to occur early in life because parents create rearing environments for their infants and young children.

People naturally evoke responses from others and the environment, just as the environment and the actions of others evoke responses from the individual. In an evocative gene–environment correlation, a child’s genetic traits (e.g., personality characteristics including openness to experience) influence the social and physical environment, which shape development in ways that support the genetic trait (Pieters et al., 2015; Saltz, 2019). Active, happy infants tend to receive more adult attention than do passive or moody infants (Deater-Deckard & O’Connor, 2000), and even among infant twins reared in the same family, the more outgoing and happy twin receives more positive attention than does the more subdued twin (Deater-Deckard, 2001). Why? Babies who are cheerful and smile often influence their social world by evoking smiles and affection from others, including their parents, which in turn

**FIGURE 2.6** ■ Gene–Environmental Correlation

The availability of instruments in the home corresponds to the child’s musical abilities, and they begin to play guitar (passive gene–environment correlation). As they play guitar, they evoke positive responses in others, increasing their interest in music (evocative gene–environment correlation). Over time, they seek opportunities to play, such as performing in front of an audience (niche-picking).



Sources: iStock/Signature; iStock/Essentials; iStock/Essentials

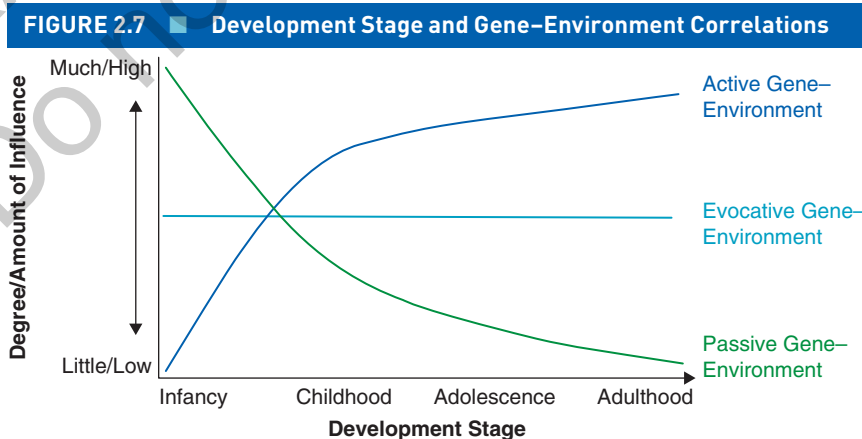
support the tendency to be cheerful (Klahr et al., 2013). In this way, genotypes influence the physical and social environment to respond in ways that support the genotype. To return to the music example, a child with a genetic trait for music talent will evoke pleasurable responses (e.g., parental approval) when the child plays music; this environmental support, in turn, encourages further development of the child's musical trait.

Children also take a hands-on role in shaping their development. Recall from Chapter 1 that a major theme in understanding human development is the finding that individuals are active in their development; here we have an example of this theme. As children grow older, they have increasing freedom in choosing their own activities and environments. An active gene–environment correlation occurs when the child actively creates experiences and environments that correspond to and influence his genetic predisposition. The child with a genetic trait for interest and ability in music actively seeks experiences and environments that support that trait, such as friends with similar interests and after-school music classes (Corrigan & Schellenberg, 2015). This tendency to actively seek out experiences and environments compatible and supportive of our genetic tendencies is called **niche-picking** (Saltz, 2019; Scarr & McCartney, 1983).

The strength of passive, evocative, and active gene–environment correlations changes with development, as shown in Figure 2.7 (Lynch, 2016; Scarr, 1992). Passive gene–environment correlations are common at birth as caregivers determine infants' experiences. Correlations between their genotype and environment tend to occur because their environments are made by genetically similar parents (Armstrong-Carter et al., 2021). Evocative gene–environment correlations also occur from birth, as infants' inborn traits and tendencies influence others, evoking responses that support their own genetic predispositions. In contrast, active gene–environment correlations take place as children grow older and more independent. As they become increasingly capable of controlling parts of their environment, they engage in niche-picking by choosing their own interests and activities, actively shaping their own development. Niche-picking contributes to the differences we see in siblings, including fraternal twins, as they grow older. But identical twins tend to become more similar over time perhaps because they are increasingly able to select the environments that best fit their genetic propensities. As they age, identical twins—even those reared apart—become alike in attitudes, personality, cognitive ability, strength, mental health, and preferences, as well as select similar spouses and best friends (McGue & Christensen, 2013; Plomin & Von Stumm, 2018; York, 2020).

### Gene–Environment (G x E) Interactions

We have seen that behavior is influenced by gene–environment interactions. Genes may provide a reaction range through which environmental factors act. Some genes severely limit developmental outcomes (canalization). Although behavior geneticists have learned a great deal about genetic influences on behavior, effects are often unpredictable (Flint et al., 2020). The effects of genes vary with environmental influences and not all genotypes respond to environmental influences in the same way (Fowler-Finn & Boutwell, 2019).



In a classic study, Caspi et al. (2002) followed a sample of boys from birth until adulthood. Although children who experience child maltreatment, or abuse, tend to show developmental and behavioral problems, the effects of maltreatment varied among the boys. Upon further study, the researchers were surprised to find that the link between maltreatment and violence varied with the gene that controls monoamine oxidase A (MAOA), an enzyme that regulates specific chemicals in the brain. Only boys who carried a certain form of this gene were at risk for becoming violent after experiencing maltreatment. Specifically, there are two versions of the gene that controls MAOA: one produces high levels of the enzyme, and the other produces low levels.

Boys who experienced abuse and other traumatic experiences were about twice as likely to develop problems with aggression, violence, and to even be convicted of a violent crime—but only if they carried the low-MAOA gene. Maltreated boys who carried the high-MAOA gene were no more likely to become violent than nonmaltreated boys. In addition, the presence of the low-MAOA gene itself was not associated with violence. The low-MAOA gene predicted violence only for boys who experience abuse early in life. These findings have been replicated in another 30-year longitudinal study of boys (Fergusson et al., 2011) as well as a meta-analysis of 27 studies (Byrd & Manuck, 2014).

Similar findings of an MAOA gene  $\times$  environment interaction in which low MAOA, but not high MAOA, predicts negative outcomes in response to childhood adversity has been extended to include other mental health outcomes such as antisocial personality disorder and depression (Beach et al., 2010; Cicchetti et al., 2007; Manuck & McCaffery, 2014; Nikulina et al., 2012). Many of these studies have examined only males. Females show a more mixed pattern, with some studies showing that girls display the MAOA gene  $\times$  environment interaction on emotional reactivity and aggression but to a much lesser extent than boys, whereas other studies suggest no relationship (Byrd & Manuck, 2014; Byrd et al., 2018). The MAOA gene illustrates gene–environment interactions, but gene–environment interactions determine the effects of many genes. The 5-HTTLPR gene, responsible for regulating specific chemicals in the brain, interacts with environmental factors to influence parenting sensitivity, depression, stress, and responses to trauma (Baião et al., 2020; Li et al., 2013).

We have seen that gene–environment interactions influence development and behavior. Genes may provide a reaction range through which environmental factors act. Some genes severely limit developmental outcomes (canalization). Although behavior geneticists have learned a great deal about genetic influences on behavior, their effects are often unpredictable (Flint et al., 2020). Just as some genes might increase our susceptibility to environmental risks, others might increase our sensitivity to, and the effectiveness of, environmental interventions (Bakermans-Kranenburg & van IJzendoorn, 2015; Chhangur et al., 2017). The effects of genes vary with environmental influences and not all genotypes respond to environmental influences in the same way (Fowler-Finn & Boutwell, 2019). Conclusions about gene–environment interactions pertain to populations, not individuals. Therefore,

findings from behavior genetic research cannot predict individual behavior (Turkheimer, 2019). A final important criticism of behavior genetic research is that, like many other areas of research, its samples are not diverse. Ethnically diverse samples and those of low socioeconomic status are underrepresented, limiting conclusions (Sirugo et al., 2019).

### Epigenetic Framework

Development is the product of a dynamic interaction of biological and contextual forces. Genes provide a blueprint for development, but phenotypic outcomes, individuals' characteristics, are not predetermined but vary with environmental factors. Recently, scientists have determined that environmental factors do not simply interact with genes to determine people's traits, but they can determine how genes are expressed through a process



Not all children exposed to adversity experience negative outcomes. Genes, such as MAOA, influence children's sensitivity to maltreatment.

FatCamera/Getty Images



**FIGURE 2.8 ■ Altering the Epigenome**

These two mice are genetically identical. Both carry the agouti gene but in the yellow mouse the agouti gene is turned on all the time. In the brown mouse, it is turned off.



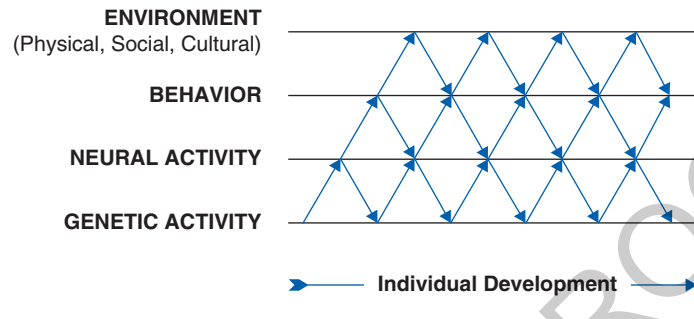
Source: Wikimedia/Randy Jirtle and Dana Dolinoy/Creative Commons 3.0

known as **epigenetics** (Carlberg & Molnar, 2019; Moore, 2017). The term epigenetics literally means “above the gene.” The epigenome is a molecule that stretches along the length of DNA and provides instructions to genes, determining how they are expressed—whether they are turned on or off. The epigenome carries the instructions that determine what each cell in your body will become, whether heart cell, muscle cell, or brain cell. Those instructions are carried out by turning genes on and off.

At birth, each cell in our body turns on only a fraction of its genes. The epigenome instructs genes to be turned on and off over the course of development and also in response to the environment (Meaney, 2017). Epigenetic mechanisms determine how genetic instructions are carried out to determine the phenotype (Lester et al., 2016; Pinel et al., 2018). Environmental factors such as toxins, injuries, crowding, diet, and responsive parenting can influence the expression of genetic traits by determining what genes are turned on and off (O’Donnell & Meaney, 2020). In this way, even traits that are highly canalized can be influenced by the environment.

One of the earliest examples of epigenetics is the case of agouti mice, which carry the agouti gene. Mice that carry the agouti gene have yellow fur, are extremely obese, are shaped much like a pincushion, and are prone to diabetes and cancer. When agouti mice breed, most of the offspring are identical to the parents—yellow, obese, and susceptible to life-shortening disease. A groundbreaking study showed that yellow agouti mice can produce offspring that look very different (Waterland & Jirtle, 2003). The mice in Figure 2.8 both carry the agouti gene, yet they look very different; the brown mouse is slender, lean, and has a low risk of developing diabetes and cancer, living well into old age. Why are these mice so different? Epigenetics. In the case of the yellow and brown mice, the phenotype of the brown mice has been altered, but the DNA remains the same. Both carry the agouti gene, but in the yellow mouse, the agouti gene is turned on all the time. In the brown mouse, it is turned off.

In 2003, Waterland and Jirtle discovered that the pregnant agouti female’s diet can determine her offspring’s phenotype. In this study, female mice were fed foods containing chemicals that attach to a gene and turn it off. These chemical clusters are found in many foods such as onions, garlic, beets, soy, and the nutrients in prenatal vitamins. Yellow agouti mothers fed extra nutrients passed along the agouti gene to their offspring, but it was turned off. The mice looked radically different from them (brown) and were healthier (lean and not susceptible to disease) even though they carried the same genes.

**FIGURE 2.9** ■ Epigenetic Framework**BIDIRECTIONAL INFLUENCES**

Source: Gottlieb (2007).

Epigenetic processes also influence human development. Consider brain development (O'Donnell & Meaney, 2020). Providing infants with a healthy diet and opportunities to explore the world will support the development of brain cells, governed by epigenetic mechanisms that switch genes on and off. Conversely, epigenetic changes that accompany exposure to toxins or extreme trauma might suppress the activity of some genes, potentially negatively influencing brain development. In this way, individuals' neurological capacities are the result of epigenetic interactions among genes and contextual factors (Lerner & Overton, 2017) (Figure 2.9). Interactions between heredity and environment change throughout development as does the role we play in constructing environments that support our genotypes, influence our epigenome, and determine who we become (Lickliter & Witherington, 2017).

Perhaps the most surprising finding emerging from animal studies of epigenetics is that not only can the epigenome be influenced by the environment before birth but it can be passed by males and females from one generation to the next (Legoff et al., 2019; Szyf, 2015). This means that what you eat and do today could affect the epigenome—the development, characteristics, and health—of your children, grandchildren, and great-grandchildren (Bošković & Rando, 2018; Grover & Jenkins, 2020; Vanhees et al., 2014).

### Thinking in Context: Lifespan Development

1. Describe a skill or ability in which you excel. How might your ability be influenced by your genes and your context?
  - a. Identify a passive gene–environment correlation that may contribute to your ability. How has your environment influenced your ability?
  - b. Provide an example of an evocative gene–environment correlation. How have you evoked responses from your context that influenced your ability?
  - c. Explain how your ability might reflect an active gene–environment correlation.
  - d. Which of these types of gene–environment correlations do you think best accounts for your ability? Why?

### Thinking in Context: Biological Influences

1. Considering the research on epigenetics, what can you do to protect your epigenome? What kinds of behavioral and contextual factors might influence your epigenome?
2. If some genes may be protective in particular contexts, should scientists learn how to turn them on? Should scientists learn to turn off genes that might increase risks in particular contexts? Why or why not?

## APPLY YOUR KNOWLEDGE

Strapped in and buckled in the rear seat of her mother's bicycle, 1-year-old Jenna patted her helmet as her mother zoomed along the bike path to the beach. She giggled and kicked her legs as her mother whooshed her through the water. As a child, Jenna loved to be outside and especially in the water. Jenna practiced swimming at the local YMCA nearly every day and became quite skilled. Jenna's proud mother encouraged her daughter's athleticism by enrolling her in swim classes. As a teenager, Jenna decided that if she were going to become an exceptional swimmer, she would have to go to a summer swimming camp. She researched camps and asked her mother if she could attend. Jenna further honed her skills as a swimmer and won a college scholarship for swimming.

Many years later, Jenna was surprised to learn that she had a twin sister, Tasha. Separated at birth, Jenna and Tasha became aware of each other in their early 40s. Jenna was stunned yet couldn't wait to meet her twin sister. Upon meeting, Jenna and Tasha were surprised to find that they were not exactly the same. Whereas Jenna was athletic and lithe, Tasha was more sedentary and substantially heavier than Jenna. Unlike Jenna, Tasha grew up in a home far from the beach and with little access to outdoor activities. Instead, Tasha's interest was writing. As a child, she'd write stories and share them with others. She sought out opportunities to write and chose a college with an exceptional writing program. Both Jenna and Tasha excelled in college, as they did throughout their education, and earned nearly identical scores on the SAT.

Jenna and Tasha look very similar. Even the most casual observer could easily tell that they are sisters as both have blond hair, blue eyes, and a similar facial structure. Tasha's skin, however, is more fair and unlined. Jenna's face is sprinkled with freckles and darker spots formed after many days spent swimming outside. Jenna and Tasha both are allergic to peanuts, and they both take medication for high blood pressure. The more that Jenna and Tasha get to know each other, the more similarities they find.

1. Considering Jenna and Tasha, provide examples of three types of gene–environment correlations: passive, evocative, and active.
2. Do you think Jenna and Tasha are monozygotic or **dizygotic twins**? Why or why not?
3. What role might epigenetic influences play in determining Jenna's and Tasha's development?

## CHAPTER SUMMARY

### 2.1 Discuss the genetic foundations of development.

Genes are composed of stretches of deoxyribonucleic acid (DNA). Most cells in the human body reproduce through mitosis, but sex cells reproduce by meiosis, creating gametes with 23 single, unpaired chromosomes. Some genes are passed through dominant–recessive inheritance, in which some genes are dominant and will always be expressed, and others are recessive and will only be expressed if paired with another recessive gene. Other patterns include incomplete dominance and genomic imprinting. Most traits are polygenic, the result of interactions among many genes.

### 2.2 Identify examples of genetic disorders and chromosomal abnormalities.

Genetic disorders carried through dominant–recessive inheritance include PKU, a recessive disorder, and Huntington disease, carried by a dominant allele. Some recessive genetic disorders, like the gene for hemophilia, are carried on the X chromosome. Males are more likely to be affected by X-linked genetic disorders. Fragile X syndrome is an example of a dominant–recessive disorder carried on the X chromosome. Other X-linked genetic disorders include Klinefelter syndrome, Jacob's syndrome, triple X syndrome, and Turner syndrome. Some disorders, such as trisomy 21, known as Down syndrome, are the result of chromosomal abnormalities. Others result from mutations.

### 2.3 Explain the choices of reproductive technology available to individuals and couples who wish to conceive by alternative means.

Individuals and couples turn to assisted reproductive technology (ART) for a variety of reasons, including infertility, to reduce the risk of genetic or chromosomal abnormalities, or to conceive without a partner. Artificial insemination, the simplest ART, involves injecting sperm into a woman. In vitro fertilization involves fertilizing ova with sperm in a dish and implanting the resulting cluster of cells in the woman's uterus. Surrogacy is an alternative form of reproduction in which a woman (the surrogate) is impregnated and carries a fetus to term and agrees to turn the baby over to a woman, man, or couple who will raise it.

**2.4 Compare and contrast characteristics and outcomes of adoption, transracial adoption, and international adoption.**

Adoptive children tend to be raised by parents with higher levels of education and have more educational resources than other children. Yet adoption is associated with lower academic attainment achievement and sometimes transient behavior problems. For internationally adopted children, the time spent in an orphanage predicts the degree of developmental delay, but virtually all internationally adopted children show some catch-up cognitive growth. For both transracial and internationally adopted children, racial and ethnic socialization is associated with healthy outcomes, including well-being, positive self-esteem, and identity. Children's experiences prior to adoption, especially neglect and maltreatment, and their developmental status at the time of adoption, influence their short- and long-term adjustment. Generally, adopted children overall show great developmental gains and resilience in physical, cognitive, and emotional development.

**2.5 Summarize prenatal diagnostic methods and how genetic disorders may be treated prenatally.**

Ultrasound enables physicians to observe the fetus, measure fetal growth, judge gestational age, and determine physical abnormalities in the fetus. Fetal MRI applies MRI technology to image the fetus' body and diagnose malformations, and it is often used as a follow-up to ultrasound imaging. Amniocentesis involves extracting a small sample of the amniotic fluid that surrounds the fetus. The extracted fetal cells are grown in a laboratory dish and then analyzed. Chorionic villus sampling (CVS) also samples genetic material and can be conducted earlier than amniocentesis. Noninvasive prenatal testing (NIPT) screens the mother's blood to detect chromosomal abnormalities, but it is not as accurate as amniocentesis and CVS. Fetoscopy involves inserting a camera into the womb to examine and perform procedures, including surgery, on the fetus during pregnancy.

**2.6 Provide an introduction to the field of behavior genetics, including representative findings.**

Behavior genetics is the field of study that examines how genes and experience combine to influence the diversity of human traits, abilities, and behaviors. Heritability research examines the contributions of the genotype in determining phenotypes but also provides information on the role of experience through three types of studies: selective breeding studies, family studies, and adoption studies. Genetics contributes to many traits, such as intellectual ability, sociability, anxiety, agreeableness, activity level, obesity, and susceptibility to various illnesses.

**2.7 Describe the interaction of heredity and environment, including gene–environment correlations, gene–environment interactions, and the epigenetic framework.**

Passive, evocative, and active gene–environment correlations illustrate how traits often are supported by both our genes and environment. Reaction range refers to the idea that there is a wide range of potential expressions of a genetic trait, depending on environmental opportunities and constraints. Some traits illustrate canalization and require extreme changes in the environment to alter their course. People's genes and environment interact in complex ways such that the effects of experience may vary with a person's genes. The epigenetic framework is a model for understanding the dynamic, ongoing interactions between heredity and environment whereby the epigenome's instructions to turn genes on and off throughout development are influenced by the environment.

## KEY TERMS

Adoption	Hemophilia
Alleles	Heritability
Amniocentesis	Incomplete dominance
Artificial insemination	In vitro fertilization
Behavior genetics	Jacob's syndrome
Canalization	Klinefelter syndrome
Chorionic villus sampling (CVS)	Meiosis
Chromosomes	Mitosis
Dizygotic twins	Monozygotic twins
DNA (deoxyribonucleic acid)	Mutations
Dominant–recessive inheritance	Niche-picking
Down syndrome	Noninvasive prenatal testing
Epigenetics	Phenotype
Fetal MRI	Phenylketonuria (PKU)
Fetoscopy	Polygenic inheritance
Fragile X syndrome	Range of reaction
Gametes	Sickle cell trait
Gene–environment correlation	Surrogacy
Gene–environment interactions	Triple X syndrome
Genes	Turner syndrome
Genetic counseling	Ultrasound
Genomic imprinting	Zygote
Genotype	

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# 6

## SOCIOEMOTIONAL DEVELOPMENT IN INFANCY AND TODDLERHOOD



Halfpoint Images/Getty Images

As a newborn, Terrence expressed distress by spreading his arms, kicking his legs, and crying. When he did this, his mother or father would scoop him up and hold him, trying to comfort him. Terrence began to prefer interacting with attentive adults who cared for him. Soon, baby Terrence began to smile and gurgle when held. In turn, Terrence's parents played with him and were delighted to see his animated, excited responses. As a toddler, his emerging language skills enabled Terrence to express his needs in words. He quickly learned that words are powerful tools that can convey emotions ("I love you, Mommy"). Without realizing it, Terrence began using words to help him manage strong emotions and difficult situations. He learned to distract himself from stressful stimuli, like the neighbor's scary dog, by singing to himself. Terrence became able to express his ideas and feelings to everyone around him, making for new and more complex relationships with his parents and siblings.

As Terrence illustrates, in the first two years of life, babies learn new ways of expressing their emotions. They become capable of new and more complex emotions and develop a greater sense of self-understanding, social awareness, and self-management. These abilities influence their interactions with others and their emerging social relationships. These processes collectively are referred to as socioemotional development. In this chapter, we examine the processes of socioemotional development in infancy and toddlerhood.

### PSYCHOSOCIAL DEVELOPMENT IN INFANCY AND TODDLERHOOD

#### LEARNING OBJECTIVE

6.1 Summarize the psychosocial tasks of infancy and toddlerhood.

According to Erik Erikson (1950), as we travel through the lifespan we proceed through a series of psychosocial crises, or developmental tasks. As discussed in Chapter 1, how well each crisis is resolved influences psychological development and how the individual approaches the next crisis or developmental task. Erikson believed that infants and toddlers progress through two psychosocial stages that influence their personality development: **trust versus mistrust** and **autonomy versus shame and doubt**.

### Trust Versus Mistrust

From the day she was born, each time Carla cried, her mother or father would come to her bassinet and hold her, check her diaper, and feed her if necessary. Soon, Carla developed the basic expectation that her parents would meet her needs. According to Erikson (1950), developing a sense of trust versus mistrust is the first developmental task of life. Infants must develop a view of the world as a safe place where their basic needs will be met. Throughout the first year of life, infants depend on their caregivers for food, warmth, and affection. If parents and caregivers attend to the infant's physical and emotional needs and consistently fulfill them, the infant will develop a basic sense of trust in her caregivers and, by extension, in the world in general.

If caregivers are neglectful or inconsistent in meeting an infant's needs, the infant will develop a sense of mistrust, feeling that they cannot count on others for love, affection, or the fulfillment of other basic human needs. The sense of trust or mistrust developed in infancy influences how people approach the subsequent stages of development. Specifically, when interaction with adults inspires trust and security, babies are more likely to feel comfortable exploring the world, which enhances their learning, social development, and emotional development (Gedge & Abell, 2020).

### Autonomy Versus Shame and Doubt

Two-and-a-half-year-old Shane is an active child who vigorously explores his environment, tests new toys, and attempts to learn about the world on his own. At dinnertime, he wants to feed himself and gets angry when his parents try to feed him. Each morning, Shane takes pleasure in attempting to dress himself and expresses frustration when his mother helps. Shane is progressing through the second stage in Erikson's scheme of psychosocial development—autonomy versus shame and doubt—which is concerned with establishing a sense of autonomy, or the feeling that one can make choices and direct oneself.

Toddlers walk on their own, express their own ideas and needs, and become more independent. Their developmental task is to learn to do things for themselves and feel confident in their ability to maneuver in their environment. According to Erikson (1950), if parents encourage toddlers' initiative and allow them to explore, experiment, make mistakes, and test limits, toddlers will develop autonomy, self-reliance, self-control, and confidence. If parents are overprotective or disapprove of their toddlers' struggle for independence, the children may begin to doubt their abilities to do things

by themselves, may feel ashamed of their desire for autonomy, may passively observe, and may not develop a sense of independence and self-reliance.

Both trust and autonomy develop out of warm and sensitive parenting and developmentally appropriate expectations for exploration and behavioral control (Lewis & Abell, 2020). Without a secure sense of trust in caregivers, toddlers will struggle to establish and maintain close relationships with others and will find it challenging to develop autonomy. Much of the research on parenting examines mothers, but fathers' interactions with infants also support autonomy development (Hughes et al., 2018). Parenting practices that promote the development of autonomy in infants and toddlers include explaining problems in developmentally appropriate ways, teaching different ways of communicating empathy, and modeling desired behaviors (Andreadakis et al., 2019). These practices also help infants and toddlers internalize rules and learn how to regulate or direct their



Children take pride in completing self-care tasks, such as tooth brushing, all by themselves, developing a sense of autonomy.

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behavior (Meuwissen & Carlson, 2019). Children who develop a sense of individuality and confidence in their own abilities to meet new challenges are better equipped to interact with and adapt to the world around them.

### Thinking in Context: Applied Developmental Science

1. What kinds of behaviors on the part of parents promote a sense of trust in infants? How would you advise new parents who wish to help their infants develop trust?
2. Do trust-promoting activities, such as attentiveness and cuddling, also foster a sense of autonomy in infants? Why or why not?

### Thinking in Context: Lifespan Development

Families are immersed in contexts that differ in many ways: urban, suburban, or rural, with varying levels of socioeconomic status, access to health resources, safety, and exposure to racism and discrimination.

1. How might these differences and parents' experiences influence their interactions with infants and their infants' psychosocial development?
2. Would you expect infants in each of these contexts to demonstrate trust and autonomy in similar ways? Why or why not?

## EMOTIONAL DEVELOPMENT IN INFANCY AND TODDLERHOOD

### LEARNING OBJECTIVE

- 6.2** Describe emotional development and the role of contextual influences on emotional development in infants and toddlers.

What emotions do infants feel? Infants cannot describe their experiences and feelings, which makes studying their emotional development quite challenging. Most people show their emotions on their faces, such as by smiling or frowning. If we use facial expressions as a guide to what emotions infants might feel, the first and most reliable emotion that newborns show is distress. They cry, wail, and flail their arms and bodies, alerting caregivers to their need for attention. Newborns also show interest with wide-eyed gazes when something catches their attention, and they smile when they are happy.

### Infants' Emotional Experience

Are we born with the ability to feel emotions? Newborns show facial expressions that are associated with interest, distress, disgust, and happiness or contentment (Izard et al., 2010). Infants' facial expressions are remarkably similar to those of adults (Sullivan & Lewis, 2003), but we do not know whether internal emotional states accompany their facial expressions. We cannot ask infants what they feel, so it is not clear whether newborns experience the emotions that their faces show.



Even young infants exhibit a wide range of emotions. Observation of newborn facial expressions suggests that newborns experience interest, distress, disgust, and happiness or contentment. Between 2 and 7 months of age, they begin to display other emotions, such as anger, sadness, surprise, and fear.

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## Basic Emotions

**Basic emotions**, also known as primary emotions (happiness, sadness, interest, surprise, fear, anger, and disgust), are universal—experienced by people around the world (Cordaro et al., 2018; Lench et al., 2018). Basic emotions emerge in all infants at about the same ages and are seen and interpreted similarly in all cultures that have been studied, suggesting that they are inborn (Izard et al., 2010). Between 2 and 7 months of age, infants begin to display anger, sadness, joy, surprise, and fear.

Research with adults suggests that emotions are the result of interactions among richly connected, subcortical brain structures, including the brainstem and the limbic system, as well as parts of the cerebral cortex (Celeghin et al., 2017; Kragel & LaBar, 2016). These structures develop prenatally and are present in animals, suggesting that emotions serve a biological purpose, are crucial to survival, and are likely experienced by infants (Rolls, 2017; Turner, 2014).

Emotions develop in predictable ways (Table 6.1). Although basic emotions are thought to be inborn, the ways that they are expressed and the conditions that elicit them change during the first few months of life. Newborns smile, and smiling is one of the most important emotional expressions in infancy. Newborn smiles are reflexive, involuntary, and linked with shifts in arousal state (e.g., going from being asleep to drowsy wakefulness), and they occur frequently during periods of rapid eye movement (REM) sleep (Challamel et al., 2020; Kawakami et al., 2008). At about 3 weeks, infants smile while awake and alert and in response to familiarity—familiar sounds, voices, and tastes (Sroufe & Waters, 1976).

During the second month of life, as infants' vision improves, they smile more in response to visual stimuli—sights that catch their attention, such as bright objects coming into view (Sroufe & Waters, 1976). The **social smile**, which occurs in response to familiar people, emerges between 6 and 10 weeks of age and is an important milestone in infant development because it shows social engagement (Messinger & Fogel, 2007). The social smile plays a large role in initiating and maintaining social interactions between infants and adults, especially by enhancing caregiver–child bonding. Parents are enthralled when their baby shows delight in seeing them, and the parents' happy response encourages their baby to smile even more (Beebe et al., 2016).

As infants grow, laughs begin to accompany their smiles, and they laugh more often and at more things. Infants may show clear expressions of joy, intense happiness, as early as 2½ months of age while playing with a parent and at 3 to 4 months of age in response to stimuli that they find highly arousing (Messinger et al., 2019). At 6 months of age, an infant might laugh at unusual sounds or sights, such as when Mommy puts a bowl on her head or makes a funny face. Laughing at unusual events illustrates the baby's increasing cognitive competence as he or she knows what to expect and is surprised when something unexpected occurs. By 1 year of age infants can smile deliberately to engage an adult.

Negative emotions change over time as well. Distress is evident at birth when newborns experience the discomfort of hunger, a heel prick, or a chilly temperature. Anger appears at about 6 months of age and develops rapidly, becoming more complex in terms of elicitors and responses (Dollar & Calkins,

**TABLE 6.1** ■ Milestones in Emotional Development

Approximate Age	Milestone
Birth	Basic emotions Discriminates mother
2–3 months	Social smile Distinguishes happiness, anger, surprise, and sadness
6–8 months	Fear, stranger anxiety, and separation protest occur
7–12 months	Social referencing
18–24 months	Self-conscious emotions appear. Develops vocabulary for talking about emotions

2019). Initially, physical restrictions such as being restrained in a high chair or when being dressed can elicit anger. The inability to carry out a desired action, such as unsuccessfully reaching to obtain a desired toy, can also provoke frustration and anger. Between 8 and 20 months of age, infants gradually become more reactive, and anger is more easily aroused (Braungart-Rieker et al., 2010). They become aware of the actions of others, so that anger can be elicited by others' behavior. For example, an infant may become upset when Mommy goes to the door to leave, or when Grandma takes out the towels in preparation for bath time. During the second year of life, temper tantrums become common when the toddler's attempts at autonomy are thwarted and he or she experiences frustration or stress. The anger escalates with the child's stress level (Potegal et al., 2007). Some toddlers show extreme tantrums, lie on the floor, scream, and jerk their arms and legs. Other children's tantrums are more subtle. They may whine, mope, and stick out their lower lip. Similar to adults, infants' emotional expressions are tied to their own experiences and infants display emotional responses to stimuli that are unique to them (Camras, 2019).



Smiling is one of the most important emotional expressions in infancy because it plays a role in initiating and maintaining social interactions between infants and adults.

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### Self-Conscious Emotions

Emotional development is an orderly process in which complex emotions build on the foundation of simple emotions. The development of **self-conscious emotions**, or secondary emotions—such as empathy, pride, embarrassment, shame, and guilt—depends on cognitive development, as well as an awareness of self. Self-conscious emotions do not begin to emerge until about 15 to 18 months, and they largely develop during the second and third years of life (Lewis, 2019). In order to experience self-conscious emotions, toddlers must be able to have a sense of self, observe themselves and others, be aware of standards and rules, and compare their behavior with those standards (Lewis, 2016). Feelings of pride arise from accomplishing a personally meaningful goal, whereas guilt derives from realizing that one has violated a standard of conduct. Parental evaluations are the initial basis for many secondary emotions (Goodvin et al., 2015).

### Emotion Regulation

As children become aware of social standards and rules, **emotion regulation**—the ability to control their emotions—becomes important. How do infants regulate emotions? During the first 2 to 3 months of life, infants manage negative emotions by sucking vigorously on their hands or objects. At about 3 months of age infants start to use voluntary motor behaviors, such as turning their bodies away from distressing stimuli (Baker, 2018).

Smiling is also thought to serve a purpose in regulating emotions, as it allows infants to control aspects of a situation without losing touch with it. When infants get excited and smile, they often look away briefly. This involuntary behavior may be a way of breaking themselves away from the stimulus and allowing them to regroup, preventing overstimulation. Smiling is associated with a decline in heart rate, suggesting that it is a relaxation response to decrease infants' level of arousal.

Whereas 6-month-old infants are more likely to use gaze aversion and fussing as primary emotion regulatory strategies, 12-month-old infants are more likely to use self-soothing (e.g., thumb sucking, rocking themselves) and distraction (chewing on objects, playing with toys). Responsive caregiving that acts on behalf of children's responses, helping them orient or move toward or away from overwhelming stimuli, can help infants and toddlers regulate their emotions (Stifter & Augustine, 2019). With advances in cognition and motor control, the infant can explore the environment by walking, initiate social interactions, and remember past experiences (Baker, 2018).



By 18 months of age, toddlers actively attempt to change the distressing situation, such as by moving away from upsetting stimuli, and they begin to use distraction, such as by playing with toys or talking (Crockenberg & Leerkes, 2004; Feldman et al., 2011). The caregiving environment plays a large role in infants' and toddlers' emerging abilities to engage in self-regulation. Warm and supportive interactions with parents and other caregivers can help infants understand their emotions and learn how to manage them.

## Social Interaction and Emotional Development

Infants and young children often need outside assistance in regulating their emotions. Interactions with parents and caregivers help infants understand and learn to manage their emotions.

### Sensitive Caregiving

Caregivers help infants regulate their emotions by using soothing behaviors and minimizing their exposure to overwhelming stimuli. Sensitive responses coupled with soft vocalizations aid 3-month-old infants in regulating distress (Spinelli & Mesman, 2018). Sensitive caregivers respond to infants' emotional reactions and try to satisfy their needs, attempt to elicit positive responses and minimize negative ones, and seek to maintain an optimal level of arousal (stimulating but not overwhelming) in their infant (Baker, 2018). When mothers responded promptly to their 2-month-old infants' cries, these same infants, at 4 months of age, cried for shorter durations, were better able to manage their emotions, and stopped crying more quickly than other infants (Jahromi & Stifter, 2007). Caregiver sensitivity predicts self-regulation in infancy into middle childhood (Morawska et al., 2019). Responsive parenting that is attuned to infants' needs helps infants develop skills in emotion regulation, especially in managing negative emotions like anxiety, as well as their physiological correlates, such as accelerated heart rate (Feldman et al., 2011).

Parents help their infants learn to manage emotions through a variety of strategies, including direct intervention, modeling, selective reinforcement, control of the environment, verbal instruction, and touch (Stifter & Augustine, 2019; Waters et al., 2017). These strategies change as the infants grow older. Touching becomes a less common regulatory strategy with age, whereas vocalizing and distracting techniques increase (Meléndez, 2005). When mothers provide guidance in helping infants regulate their emotions, the infants tend to engage in distraction and mother-oriented strategies, such as seeking help, during frustrating events (Thomas et al., 2017). Parents who model emotion regulation strategies, such as using distraction, are more likely to have toddlers who use those strategies to soothe themselves in stressful situations (Schoppmann et al., 2019).

### Parent–Infant Interaction

Parent–infant interactions undergo continuous transformations as infants develop. Infants' growing motor skills influence their interactions with parents, as well as their socioemotional development. Crawling, creeping, and walking introduce new challenges to parent–infant interaction and socioemotional growth (Adolph & Franchak, 2017). As crawling begins, parents and caregivers respond with happiness and pride, positive emotions that encourage infants' exploration. As infants gain motor competence, they wander further from their parents (Thurman & Corbetta, 2017). Crawling increases a toddler's capability to attain goals—a capability that, while often satisfying to the toddler, may involve hazards.

As infants become more mobile, emotional outbursts become more common. Parents report that advances in locomotion are accompanied by increased frustration as toddlers attempt to move in ways that often exceed their abilities or are not permitted by parents (Clearfield, 2011; Pemberton Roben et al., 2012). When mothers recognize the dangers posed to toddlers by objects such as houseplants, vases, and electrical appliances, they sharply increase their expressions of anger and fear, often leading to fear and frustration in their toddlers. At this stage, parents actively monitor toddlers' whereabouts, protect them from dangerous situations, and expect them to comply—a dynamic that is often a struggle, amounting to a test of wills. At the same time, these struggles help the child to begin to develop a grasp of mental states in others that are different from his or her own.

Changes in emotional expression and regulation are dynamic, because the changing child influences the changing parent. In particular, mothers and infants systematically influence and regulate each other's emotions and behaviors. Mothers regulate infant emotional states by interpreting their emotional signals, providing appropriate arousal, and reciprocating and reinforcing infant reactions. Infants regulate their mother's emotions through their receptivity to her initiations and stimulation, and by responding to her emotions (Bornstein et al., 2011, 2012). By experiencing a range of emotional interactions—times when their emotions mirror those of their caregivers and times when their emotions are different from those of their caregivers—infants learn how to transform negative emotions into neutral or positive emotions and regulate their own emotional states (Guo et al., 2015).



Responsive parenting helps infants learn to manage their emotions and self-regulate.  
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### Social Referencing

Early in life, infants become able to discriminate facial expressions that indicate emotion. In one study, 2-day-old infants initially did not show a preference for a happy or disgusted face, but after being habituated to either a happy or disgusted face they successfully discriminated between the two, suggesting an early sensitivity to dynamic faces expressing emotions (Addabbo et al., 2018). Likewise, newborns are able to discriminate happy faces from fearful ones (Farroni et al., 2007). It is thought that infants are innately prepared to attend to facial displays of emotion, because such displays are biologically significant and the ability to recognize them is important for human survival (Leppanen, 2011). Between 2 and 4 months of age, infants can distinguish emotional expressions including happiness as opposed to anger, surprise, and sadness (Bornstein et al., 2013). Six-and-one-half-month-old infants can identify and match happy, angry, and sad emotions portrayed on faces, but also body movements indicating emotion (Hock et al., 2017).

Beyond recognizing the emotional expressions of others, infants also respond to them. Between 6 and 10 months of age, infants begin to use **social referencing**, looking to caregivers' or other adults' emotional expressions to find clues for how to interpret and respond to ambiguous events (Ruba & Repacholi, 2019; Walle et al., 2017). Social referencing influences infants' emotional reactions and, ultimately, behavior. When toddlers grab the sofa to pull themselves up, turn, and then tumble over as they take a step, they look to their caregivers to determine how to interpret their fall. If caregivers respond with fearful facial expressions, infants are likely to also be fearful, but if caregivers instead smile, infants will probably remain calm and return to their attempts at walking. The use of social referencing is one way that infants demonstrate their understanding that others experience emotions and thoughts.

Older infants tend to show a negativity bias when it comes to social referencing. That is, they attend to and follow social referencing cues more closely when the cues indicate negative attitudes toward an object, compared with neutral or happy attitudes (Vaish et al., 2008). Infants' behavior may be more influenced by the emotional message conveyed in the vocal information than the facial expressions themselves, especially within the context of fearful messages (Biro et al., 2014; Ruba & Repacholi, 2019).

How infants employ social referencing changes with development. Ten-month-old infants show selective social referencing. They monitor the caregiver's attention and do not engage in social referencing when the adult is not attending or engaged (Stenberg, 2017). At 12 months, infants use referential cues such as the caregiver's body posture, gaze, and voice direction to determine to what objects caregivers' emotional responses refer (Brooks & Meltzoff, 2008). Twelve-month-old infants are more likely to use a caregiver's cues as guides in ambivalent situations when the caregiver responds promptly to the

infant's behavior (Stenberg, 2017). Social referencing reflects infants' growing understanding of the emotional states of others; it signifies that infants can observe, interpret, and use emotional information from others to form their own interpretation and response to events.

### Exposure to Early Life Stress

Many infants live in stressful contexts and are exposed to adversity, including maltreatment, poverty, and violence. Very young infants likely do not recall specific experiences and events, but early exposure to trauma may affect infants' development in ways that can last a lifetime. Whereas maladaptive contexts may pose risks of physical harm to children, with negative influences on brain development, trauma poses invisible long-term risks to children's emotional development and mental health (Jurueña et al., 2020; Mueller & Tronick, 2019).

Early trauma may exert a biological effect on emotional development. The experience of early social adversity may have epigenetic effects on the genes that regulate the endocrine system, which controls hormone production and release at all ages in life (Agorastos et al., 2019; Conradt, 2017). Infancy may be a particularly plastic time in development, with heightened potential for epigenetic changes that may sensitize individuals' responses to stress throughout a lifetime (Laurent et al., 2016).

However, not all infants respond to early life stress with heightened reactivity. Some infants exposed to trauma show lower levels of stress hormones and reduced reactivity to stress (Turecki & Meaney, 2016). The timing and intensity of adversity influence developmental outcomes. Exposure to particularly intense chronic stress early in development can lead to hyperactive stress responses that may be followed by blunted responses (Laurent et al., 2016). Blunted responses may reflect adaptations to chronically stressful situations. Unpredictable stressors, on the other hand, may lead to heightened stress reactivity as the individual adapts to volatile and unexpected situations (Blair, 2010). Both heightened and blunted stress responses may be adaptive attempts to optimize survival in nonoptimal caregiving environments, yet these adaptations may carry behavioral costs, such as heightened distress when confronted with stress and longer-term anxiety and depressive symptoms, which negatively affect developmental trajectories (Laurent et al., 2016).

Early life stress poses risks to emotional development, but the caregiving environment also influences the developing stress response system. Mothers buffer and regulate infants' hormonal and behavioral responses to threats (Howell et al., 2017). Sensitive mothers tend to have infants who display better self-regulation during stressful events; intrusive mothers tend to have the opposite effect (Enlow et al., 2014). Sensitive caregiving can reduce the negative epigenetic effects of early life stress (Janusek et al., 2019; Provenzi et al., 2020). Warm parenting within a predictable stimulating environment with supportive adults and family can help infants develop the self-regulation skills to adapt to adverse contexts. Unfortunately, trauma often disrupts the caregiving system, making adaptation quite difficult.

### Cultural Influences on Emotional Development

As we have already seen, emotional development does not occur in a vacuum. Contextual factors, including culture, influence how infants interpret and express emotions, as well as what emotions they feel.

### Caregiver Responsiveness

Cultures often have particular beliefs about how much responsiveness is appropriate when babies cry and fuss, as well as expectations about infants' abilities to regulate their own emotions (Halberstadt & Lozada, 2011). The !Kung hunter-gatherers of Botswana, Africa, respond to babies' cries nearly immediately (within 10 seconds), whereas Western mothers tend to wait a considerably



Experiencing adversity early in life may have epigenetic effects on the genes that regulate responses to stress. The caregiving environment also influences the developing stress response system and can buffer the negative effects of trauma.

Reuters/Alamy Stock Photo

longer period of time before responding to infants' cries (e.g., 10 minutes) (Barr et al., 1991). Fijian mothers tend to be more responsive than U.S. mothers to negative facial expressions in their infants (Broesch et al., 2016). Gusii mothers believe that constant holding, feeding, and physical care are essential for keeping an infant calm, which in turn protects the infant from harm and disease; therefore, like !Kung mothers, Gusii mothers respond immediately to their babies' cries (LeVine et al., 1994). Infants from non-Western cultures are thought to cry very little because they are carried often (Bleah & Ellett, 2010). In one study, infants born to parents who were recent immigrants from Africa cried less than U.S. infants, illustrating the role of culture in influencing infant cries (Bleah & Ellett, 2010).

Caregivers' responses to infant cries influence infants' capacity for self-regulation and responses to stress. Babies who receive more responsive and immediate caregiving when distressed show lower rates of persistent crying, spend more time in happy and calm states, and cry less overall as they approach their first birthday (Axia & Weisner, 2002; Papoušek & Papoušek, 1990). Yet, the form that responsiveness takes can vary with culture and socialization goals.

### Emotional Socialization

Every society has a set of **emotional display rules** that specify the circumstances under which various emotions should or should not be expressed (Safdar et al., 2009). We are socialized to learn and enact these rules very early in life through interactions with others. Interactions among parents and infants are shaped by the culture in which they live, which, in turn, influences the emotional expressions they share and display (Bornstein et al., 2013).

Western cultures tend to emphasize autonomy and independence. Parents in these cultures tend to encourage emotional expression in their children, often through modeling. When North American mothers play with their 7-month-old babies, for instance, they tend to model positive emotions, restricting their own emotional displays to show joy, interest, and surprise (Malatesta & Haviland, 1982). They also are more attentive to infants' expression of positive emotions, such as interest or surprise, and respond less to negative emotions (Broesch et al., 2016). Italian mothers tend to welcome and encourage infants' self-expressive smiles and coos (Bornstein et al., 2012). Through early interactions with caregivers, children learn about situations that elicit emotions and how to regulate emotions (Yang & Wang, 2019).

East Asian cultures tend to deemphasize emotional expression, viewing it as disruptive to group harmony. Parents in these cultures tend to express emotion less frequently. Thus, babies are socialized to respond and display their emotions in culturally acceptable ways. Parents' cultural orientation influences their emotional expressivity. In one study, Chinese immigrant parents' emotional expressivity was related to their cultural orientation (Chen et al., 2015). Parents who were positively oriented toward American culture tended to show more emotional expression whereas those who were oriented more toward Chinese culture tended to be less emotionally expressive. Similar observations of emotional expressivity of mothers and their 4-month-old infants during face-to-face interactions showed European American mothers spent more time displaying positive affect and less time expressing neutral or negative affect than did Chinese mothers who recently immigrated to the United States (Liu et al., 2013). Mothers' cultural orientation influenced their interactions. Second-generation Chinese immigrant mothers or those who had immigrated more than 10 years ago showed similar patterns of emotional expressivity as European American mothers (Liu et al., 2013).

Which emotions are considered acceptable, as well as how they should be expressed, differ by culture and context (Yang & Wang, 2019). Whereas North



In some cultures, infants cry very little, perhaps because they are in constant contact with their mothers.

VW Pics/Contributor/Getty Images

American parents tickle and stimulate their babies, encouraging squeals of pleasure, the Gusii and Aka people of Central Africa prefer to keep babies calm and quiet. They engage in little face-to-face play and look away as infants display peaks of positive emotion (Hewlett et al., 1998; LeVine et al., 1994). Cameroonian Nso parents, members of a rural farming culture, expect calmness from children (Keller & Otto, 2009). Infants' emotional expressions are not reciprocated by adults, and Cameroonian Nso infants soon learn to display calm, sober faces. Although at surface glance it might appear as if Nso adults ignore their infants' emotional expressions, that is not the case. Instead, Nso parents and infants display a different path toward emotional expression and emotional regulation than Western infants (Lavelli et al., 2019). Nso infants are often in body contact with their mothers and their emotional expressions are monitored more by maternal body attention than visual attention (Keller, 2019). It is through these patterns of body contact that Nso infants experience interactional warmth and learn emotional regulation, as compared with the visual interactions that characterize Western infant–parent dyads

The specific emotional display rules that infants learn, whether to express or restrain strong positive and negative emotions, varies with culture. Cultures also specify the conditions under which emotions should be shown and the stimuli that should evoke emotion, as discussed next.

### Stranger Wariness

Many infants around the world display **stranger wariness** (also known as *stranger anxiety*), a fear of unfamiliar people. In many, but not all cultures, stranger wariness emerges at about 6 months and increases throughout the first year of life, beginning to decrease after about 15 months of age (Bornstein et al., 2013; Sroufe, 1977). Locomotion, infant success in crawling or walking, tends to precede the emergence of stranger wariness, suggesting interconnections among motor and emotional development (Brand et al., 2020). From an evolutionary perspective, stranger wariness may have emerged to protect infants as they became able to initiate new interactions with unknown and potentially unsafe adults (Hahn-Holbrook et al., 2010).

Whether infants show stranger wariness depends on the infants' overall temperament, their past experience, and the situation in which they meet a stranger (Thompson & Limber, 1991). The pattern of stranger wariness varies among infants. Some show rapid increases and others show slow increases in stranger wariness; once wariness has been established, some infants show steady decline and others show more rapid changes. Twin studies suggest that these patterns are influenced by genetics, because the patterns of change are more similar among monozygotic twins (identical twins who share 100% of their genes) than dizygotic twins (fraternal twins who share 50% of their genes) (Brooker et al., 2013).

Among North American infants, stranger wariness is generally expected by parents and caregivers. However, infants of the Efe people of Zaire, Africa, show little stranger wariness. This is likely related to the Efe collective caregiving system, in which Efe babies are passed from one adult to another, relatives and nonrelatives alike (Tronick et al., 1992), and the infants form relationships with the many people who care for them (Meehan & Hawks, 2013). In contrast, babies reared in Israeli kibbutzim (cooperative agricultural settlements that tend to be isolated and subjected to terrorist attacks), tend to demonstrate widespread wariness of strangers. By the end of the first year, when infants look to others for cues about how to respond emotionally, kibbutz babies display far greater anxiety than babies reared in Israeli cities (Saarni et al., 1998). In this way, stranger wariness may be adaptive, modifying infants' drive to explore in light of contextual circumstances (Easterbrooks et al., 2012).

Stranger wariness illustrates the dynamic interactions between the individual and context (LoBue & Adolph, 2019). Infant's emotionality and temperamental style, tendencies toward social interaction, and, of



As attachments form, infants become more wary and display stranger anxiety when in the presence of unfamiliar people. In many, but not all cultures, stranger wariness emerges at about 6 months and increases throughout the first year of life.

Yoshikazu Tsuno/AFP/Getty Images

course, past experience with strangers are important. Parental expectations and anxiety also matter. Infants whose mothers report greater stress reactivity, who experience more anxiety and negative affect in response to stress, show higher rates of stranger wariness (Brooker et al., 2013; Waters et al., 2014). Characteristics of the stranger (e.g., his or her height), the familiarity of the setting, and how quickly the stranger approaches influence how the infant appraises the situation (LoBue et al., 2019). Infants are more open when the stranger is sensitive to the infant's signals and approaches at the infant's pace (Mangelsdorf, 1992). Not all infants show stranger wariness. Instead, whether, how, and how long infants demonstrate emergence of stranger wariness is the result of the complex interplay among individual characteristics, experiences, and context (LoBue & Adolph, 2019).

Over the first few months of life, infants display the full range of basic emotions. As their cognitive and social capabilities develop, they can experience complex social emotions, such as embarrassment. The social world plays a role in emotional development. Adults interact with infants, provide opportunities to observe and practice emotional expressions, and assist in regulating emotions. Much of emotional development is the result of the interplay of infants' emerging capacities and the contexts in which they are raised.

### Thinking in Context: Lifespan Development

1. Identify examples of how infants' emotional development is influenced by their interactions within their social and cultural contexts. Identify two examples of factors or experiences that promote healthy emotional development and one that might hinder emotional development. Explain your choices.
2. How might social referencing and stranger wariness reflect adaptive responses to a particular context? Why does stranger wariness vary among children and cultures?
3. In what ways might emotional display rules, such as those regarding the display of positive and negative emotions, illustrate adaptive responses to a particular context? Consider the context in which you were raised. What emotional displays do you think are most adaptive for infants?

## TEMPERAMENT IN INFANCY AND TODDLERHOOD

### LEARNING OBJECTIVE

- 6.3** Discuss the styles and stability of temperament, including the role of goodness of fit in infant development.

“Joshua is such an easygoing baby!” gushed his babysitter. “He eats everything, barely cries, and falls asleep without a fuss. I wish all my babies were like him.” The babysitter is referring to Joshua's temperament. **Temperament**, the characteristic way in which an individual approaches and reacts to people and situations, is thought to be one of the basic building blocks of emotion and personality (Strelau, 2020). Temperament has strong biological determinants; behavior genetics research has shown genetic bases for temperament (Saudino & Micalizzi, 2015). Yet the expression of temperament reflects reciprocal interactions among genetic predispositions, maturation, and experience (Goodvin et al., 2015; ). Every infant behaves in a characteristic, predictable style that is influenced by his or her inborn tendencies toward arousal and stimulation, as well as by experiences with adults and contexts (Planalp & Goldsmith, 2020). In other words, every infant displays a particular temperament style.

### Styles of Temperament

Begun in 1956, the New York Longitudinal Study is a pioneering study of temperament that followed 133 infants into adulthood. Early in life, the infants in the study demonstrated differences in nine

characteristics that are thought to capture the essence of temperament (Buss & Plomin, 1984; Chess & Thomas, 1991; Goldsmith et al., 1987).

- *Activity level.* Some babies wriggle, kick their legs, wave their arms, and move around a great deal, whereas other babies tend to be more still and stay in one place.
- *Rhythmicity.* Some infants are predictable in their patterns of eating, sleeping, and defecating; other babies are not predictable.
- *Approach-withdrawal.* Some babies tend to approach new situations, people, and objects, whereas others withdraw from novelty.
- *Adaptability.* Some babies get used to new experiences and situations quickly; others do not.
- *Intensity of reaction.* Some babies have very extreme reactions, giggling exuberantly and crying with piercing wails. Other babies show more subdued reactions, such as simple smiles and soft, whimpering cries.
- *Threshold of responsiveness.* Some babies notice many types of stimuli—sights, sounds, and touch sensations—and react to them. Other infants notice few types of stimuli and seem oblivious to changes.
- *Quality of mood.* Some babies tend toward near-constant happiness while others tend toward irritability.
- *Distractibility.* Some babies can be easily distracted from objects or situations while others cannot.
- *Attention span.* Some babies play with one toy for a long time without becoming bored, whereas others get bored easily.

Some aspects of infant temperament, particularly activity level, irritability, attention, and sociability or approach-withdrawal, show stability for months and years at a time and in some cases even into adulthood (Lemery-Chalfant et al., 2013; Papageorgiou et al., 2014). Infants' growing ability to regulate their attention and emotions holds implications for some components of temperament, such as rhythmicity, distractibility, and intensity of reaction. The components of infant temperament cluster into three profiles (Thomas & Chess, 1977; Thomas et al., 1970):

- **Easy temperament:** Easy babies are often in a positive mood, even-tempered, open, adaptable, regular, and predictable in biological functioning. They establish regular feeding and sleeping schedules easily.
- **Difficult temperament:** Difficult babies are active, irritable, and irregular in biological rhythms. They are slow to adapt to changes in routine or new situations, show intense and frequent unpleasant moods, react vigorously to change, and have trouble adjusting to new routines.
- **Slow-to-warm-up temperament:** Just as it sounds, slow-to-warm-up babies tend to be inactive, moody, and slow to adapt to new situations and people. They react to new situations with mild irritability but adjust more quickly than do infants with difficult temperaments.

Although it may seem as if all babies could be easily classified, about one-third of the infants in the New York Longitudinal Study did not fit squarely into any of the three categories but displayed a mix of characteristics, such as eating and sleeping regularly but being slow to warm up to new situations (Thomas & Chess, 1977; Thomas et al., 1970).

Another influential model of temperament, by Mary Rothbart, includes three dimensions (Rothbart, 2011a; Rothbart & Bates, 2007):

- Extraversion/surgency—the tendency toward positive emotions. Infants who are high in extraversion/surgency approach experiences with confidence, energy, and positivity, as indicated by smiles, laughter, and approach-oriented behaviors.
- Negative affectivity—the tendency toward negative emotions, such as sadness, fear, distress, and irritability.
- Effortful control—the ability to focus attention, shift attention, and inhibit responses in order to manage arousal. Infants who are high in effortful control are able to regulate their arousal and soothe themselves.

From this perspective, temperament reflects how easily we become emotionally aroused or our reactivity to stimuli, as well as how well we are able to control our emotional arousal (Rothbart, 2011). Some infants and children are better able to distract themselves, focus their attention, and inhibit impulses than others. The ability to self-regulate and manage emotions and impulses is associated with positive long-term adjustment, including academic achievement, social competence, and resistance to stress, in both Chinese and North American samples (Chen & Schmidt, 2015). Generally speaking, a difficult temperament poses risks to adjustment (MacNeill & Pérez-Edgar, 2020). Preterm infants are predisposed to experience difficult temperaments as they tend to show greater arousal, difficulty focusing their attention, and trouble regulating their arousal than full-term infants (Cassiano et al., 2020; Reyes et al., 2019).

Infant temperament tends to be stable over the first year of life but less so than childhood temperament, which can show stability over years, even into adulthood (Bornstein et al., 2019; Strelau, 2020). In infancy, temperament is especially open to environmental influences, such as interactions with others (Bornstein et al., 2015; Gartstein et al., 2016). Young infants' temperament can change with experience, neural development, and sensitive caregiving (e.g., helping babies regulate their negative emotions) (Jonas et al., 2015; Thompson et al., 2013). As infants gain experience and learn how to regulate their states and emotions, those who are cranky and difficult may become less so. By the second year of life, styles of responding to situations and people are better established, and temperament becomes more stable. Temperament at age 3 remains stable, predicting temperament at age 6 and personality traits at age 26 (Dyson et al., 2015).

### Context and Goodness of Fit

Like all aspects of development, temperament is influenced by reciprocal reactions among individuals and their contexts. An important influence on socioemotional development is the **goodness of fit** between the child's temperament and the environment around him or her, especially the parents' temperaments and childrearing methods (Chess & Thomas, 1991).

The specific behaviors that comprise adaptive parenting vary with the infants' temperament (MacNeill & Pérez-Edgar, 2020). Infants are at particular risk for poor outcomes when their temperaments show poor goodness of fit to the settings in which they live (Rothbart & Bates, 1998). If an infant who is fussy, difficult, and slow to adapt to new situations is raised by a patient and sensitive caregiver who provides time for him or her to adapt to new routines, the infant may become less cranky and more flexible over time. The infant may adapt her temperament style to match her context so that later in childhood she may no longer be classified as difficult and no longer display behavioral problems (Bates et al., 1998). If, on the other hand, a child with a difficult temperament is reared by a parent who is insensitive, coercive, and difficult in temperament, the child may not learn how to regulate her emotions and may have behavioral problems and adjustment difficulties that worsen with age, even into early adolescence and beyond (Pluess et al., 2010). When children are placed in low-quality caregiving environments, those with difficult temperaments respond more negatively and show more behavior problems than do those with easy temperaments (Poehlmann et al., 2011).

Infant temperament both is influenced by and influences the bond with caregivers (Le Bas et al., 2020). Goodness of fit at 4 and 8 months of age predicts a close bond with caregivers at 15 months



(Seifer et al., 2014; Takács et al., 2020). An infant's temperament tends to be stable over time because certain temperamental qualities evoke certain reactions from others, promoting goodness of fit. Easy babies usually get the most positive reactions from others, whereas babies with a difficult temperament receive mixed reactions (Chess & Thomas, 1991). An easy baby tends to smile often, eliciting smiles and positive interactions from others, including parents, which in turn reinforce the baby's easy temperamental qualities (Planalp et al., 2017; Wittig & Rodriguez, 2019). Conversely, a difficult baby may evoke more frustration and negativity from caregivers as they try unsuccessfully to soothe the baby's fussing. Mothers who view their 6-month-old infants as difficult may be less emotionally available to them (Kim & Teti, 2014). Babies' emotionality and negative emotions predict their mothers' perception of parenting stress and poor parenting behaviors (Oddi et al., 2013; Paulussen-Hoogeboom et al., 2007). Mothers of difficult infants may question their own parenting competence (Takács et al., 2019).

Temperament can also be related to mothers' own temperament, as well as their expectations about their infants and their ability to parent (Grady & Karraker, 2017). In one study, mothers who, *prior to giving birth*, considered themselves less well equipped to care for their infants were found to be more likely to have infants who showed negative aspects of temperament, such as fussiness, irritability, and difficulty being soothed (Verhage et al., 2013). This suggests that perceptions of parenting may shape views of infant temperament—and thereby shape temperament itself. In other research, three months after giving birth, new mothers' feelings of competence were positively associated with infant temperament. Mothers' beliefs about their ability to nurture are shaped by the interaction between their infants' traits and their own parenting self-efficacy, as well as their opportunities for developing successful caregiving routines (Verhage et al., 2013). This contextual dynamic has been found to hold true across cultures. Both British and Pakistani mothers in the United Kingdom reported fewer problems with their infants' temperaments at 6 months of age when the mothers had a greater sense of parenting efficacy and displayed more warm and less hostile parenting styles (Prady et al., 2014).

Socioemotional development is a dynamic process in which infants' behavior and temperament styles influence the family processes that shape their development. Sensitive and patient caregiving is not always easy with a challenging child, and adults' own temperamental styles influence their caregiving. A poor fit between the caregiver's and infant's temperament can make an infant fussier and crankier. When a difficult infant is paired with a parent with a similar temperament—one who is impatient, irritable, and forceful—behavioral problems in childhood and adolescence are likely (Rubin et al., 1998; Strelau, 2020).

### Cultural Differences in Temperament

Researchers have observed consistent cultural differences in temperament that are rooted in cultural norms for how individuals are perceived. Japanese mothers view their infants as interdependent beings who must learn the importance of relationships and connections with others (Rothbaum et al., 2000). North American mothers, on the other hand, view their task as shaping babies into autonomous beings (Kojima, 1986). Whereas Japanese mothers tend to interact with their babies in soothing ways, discouraging strong emotions, North American mothers are active and stimulating (Rothbaum et al., 2000). Differences in temperament result, such that Japanese infants tend to be more passive, less irritable and vocal, and more easily soothed when upset than North American infants (Kojima, 1986; Lewis et al., 1993; Rothbaum et al., 2000). Culture influences the behaviors that parents view as desirable and the means that parents use to socialize their infants (Chen & Schmidt, 2015; Kagan, 2013). Culture, therefore, plays a role in how emotional development—in this case, temperament—unfolds.

Asian cultures often prioritize low arousal and emotionality and socialize infants in line with these values. Chinese American, Japanese American, and Hmong children tend to display lower levels of irritability, less physical activity, but also lower levels of positive emotions, and they engage in more self-quieting and self-control than do European American children (Friedlmeier et al., 2015; Slobodskaya et al., 2013; Super & Harkness, 2010). Similarly, a recent comparison of toddlers from Chile, South Korea, Poland, and the United States showed that the South Korean toddlers scored

highest on measures of control, combined with low levels of activity (Krassner et al., 2017).

If infants from Asian cultures engage in more self-soothing, are they more temperamentally resistant to stress? One study examined levels of the hormone cortisol in infants receiving an inoculation (Lewis et al., 1993). Cortisol, which is released as part of the fight-or-flight response, is often used as a marker of stress. Four-month-old Japanese infants showed a pronounced cortisol response, suggesting that they were experiencing great stress, coupled with little crying. The U.S. infants, on the other hand, displayed intense behavioral reactions to the pain and took longer to calm down, yet they displayed a lower cortisol response. In other words, although the Japanese babies appeared quiet and calm, they were more physiologically stressed than the U.S. infants. It seems that cultural views of the nature of arousal and emotional regulation influence parenting behaviors and ultimately infants' responses to stressors (Friedlmeier et al., 2015).

What constitutes an adaptive match between infant temperament and context—goodness of fit—is sometimes surprising. Consider the Maasai, an African semi-nomadic ethnic group. In times of drought, when the environment becomes extremely hostile, herds of cattle and goats die, and infant mortality rises substantially. Under these challenging conditions, infants with difficult temperaments tend to survive at higher rates than do those with easy temperaments. Infants who cry and are demanding are attended to, are fed more, and are in better physical condition than easy babies, who tend to cry less and therefore are assumed to be content (Gardiner & Kosmitzki, 2018). Thus, the Maasai infants with difficult temperaments demonstrate higher rates of survival because their temperaments better fit the demands of the hostile context in which they are raised. Temperament, therefore, must be considered in context.

### Thinking in Context: Lifespan Development

1. Under what conditions might temperament change, if at all? Is it possible for an infant with a difficult temperament to grow into a young child with an easy temperament? Why or why not? What experiences might cause temperament to mellow, or become more easygoing?
2. Can an easy child shift to show a difficult temperament? Explain.
3. In what ways do temperaments—and preferences for particular forms of temperament—vary across cultures? How might these differences reflect adaptations to specific contextual conditions?
4. To what extent do temperaments and preferences for particular temperaments occur across the many contexts within the United States? Are some infant temperaments a better fit for some contexts than others? Why or why not?



Culture plays a role in emotional development. Japanese mothers tend to encourage their infants to develop close ties and depend on their assistance whereas North American mothers tend to emphasize autonomy.

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## ATTACHMENT IN INFANCY AND TODDLERHOOD

### LEARNING OBJECTIVE

**6.4** Examine the development of attachment and influences on attachment stability and outcomes in infancy and toddlerhood.

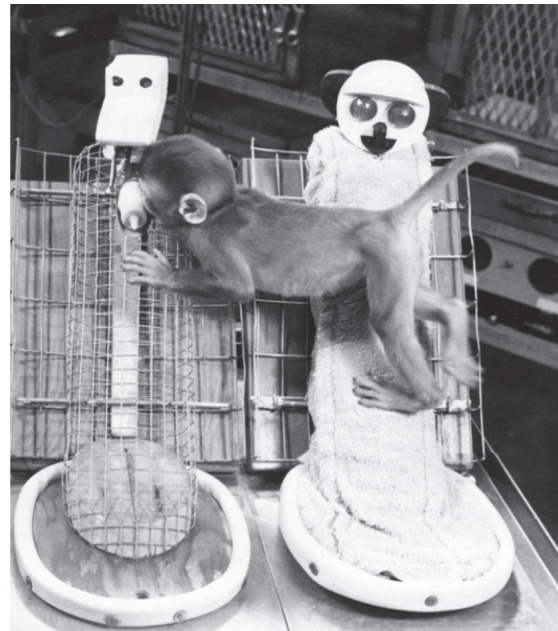
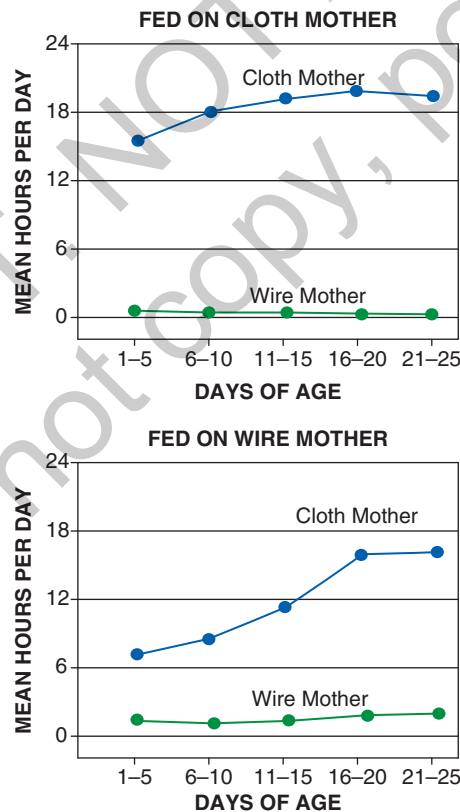
Raj gurgles and cries out while lying in his crib. As his mother enters the room, he squeals excitedly. Raj’s mother smiles as she reaches into the crib, and Raj giggles with delight as she picks him up. Raj and his mother have formed an important emotional bond, called attachment. **Attachment** refers to a lasting emotional tie between two people who each strive to maintain closeness to the other and act to ensure that the relationship continues.

Attachment relationships serve as an important backdrop for emotional and social development. Our earliest attachments are with our primary caregivers, most often our mothers. It was once thought that feeding determined patterns of attachment. Freud, for example, emphasized the role of feeding and successful weaning on infants’ personality and well-being. Behaviorist theorists explain attachment as the result of infants associating their mothers with food, a powerful reinforcer that satisfies a biological need. Certainly, feeding is important for infants’ health and well-being and offers opportunities for the close contact needed to develop attachment bonds, but feeding itself does not determine attachment.

In one famous study, baby rhesus monkeys were reared with two inanimate surrogate “mothers”: one made of wire mesh and a second covered with terrycloth (Figure 6.1). The baby monkeys clung to

**FIGURE 6.1** ■ Harlow’s Study: Contact Comfort and the Attachment Bond

This infant monkey preferred to cling to the cloth-covered mother even if fed by the wire mother. Harlow concluded that attachment is based on contact comfort rather than feeding.



Source: Harlow (1958); Photo Researchers, Inc./Science Source

the terrycloth mother despite being fed only by the wire mother, suggesting that attachment bonds are not based on feeding but rather on contact comfort (Harlow & Zimmerman, 1959). So how does an attachment form, and what is its purpose?

### Bowlby's Ethological Theory of Attachment

John Bowlby, a British psychiatrist, posed that early family experiences influence emotional disturbances not through feeding practices, conditioning, or psychoanalytic drives but via inborn tendencies to form close relationships. Specifically, Bowlby (1969, 1988) developed an ethological theory of attachment that characterizes it as an adaptive behavior that evolved because it contributed to the survival of the human species. Inspired by ethology, particularly by Lorenz's work on the imprinting of geese (Chapter 1) and by observations of interactions of monkeys, Bowlby posited that humans are biologically driven to form attachment bonds with other humans. An attachment bond between caregivers and infants ensures that the two will remain in close proximity, thereby aiding the survival of the infant and, ultimately, the species. From this perspective, caregiving responses are inherited and are triggered by the presence of infants and young children.

### Infants' Signals and Adults' Responses

From birth, babies develop a repertoire of behavior signals to which adults naturally attend and respond, such as smiling, cooing, and clinging. Crying is a particularly effective signal because it conveys negative emotion that adults can judge reliably, and it motivates adults to relieve the infants' distress. Adults are innately drawn to infants, find infants' signals irresistible, and respond in kind. One recent study found that nearly 700 mothers in 11 countries (Argentina, Belgium, Brazil, Cameroon, France, Kenya, Israel, Italy, Japan, South Korea, and the United States) tended to respond to their infants' cries and distress by picking up, holding, and talking to their infants (Bornstein et al., 2017). Infants' behaviors, immature appearance, and even smell draw adults' responses (Kringelbach et al., 2016). Infants, in turn, are attracted to caregivers who respond consistently and appropriately to their signals. During the first months of life, infants rely on caregivers to regulate their states and emotions—to soothe them when they are distressed and help them establish and maintain an alert state (Thompson, 2013). Attachment behaviors provide comfort and security to infants because they bring babies close to adults who can protect them.

Magnetic resonance imaging (MRI) scans support a biological component to attachment because first-time mothers show specific patterns of brain activity in response to infants. Mothers' brains light up with activity when they see their own infants' faces, and areas of the brain that are associated with rewards are activated in response to happy, but not sad, infant faces (Strathearn et al., 2008). In response to their infants' cries, U.S., Chinese, and Italian mothers show brain activity in regions associated with auditory processing, emotion, and the intention to move and speak, suggesting automatic responses to infant expressions of distress (Bornstein et al., 2017).

### Phases of Attachment

Bowlby proposed that attachment formation progresses through several developmental phases during infancy, from innate behaviors that bring the caregiver into contact to a mutual attachment relationship. With each phase, infants' behavior becomes increasingly organized, adaptable, and intentional.

**Phase 1: Pre-Attachment—Indiscriminate Social Responsiveness (birth to 2 months).** Infants instinctively elicit caregiving responses from caregivers by crying, smiling, and making eye contact with adults. Infants respond to any caregiver who reacts to their signals, whether parent, grandparent, child care provider, or sibling.

**Phase 2: Early Attachments—Discriminating Sociability (2 to 6–7 months).** When caregivers are sensitive and consistent in responding to babies' signals, babies learn to associate their caregivers with the relief of distress, forming the basis for an initial bond. Babies begin to discriminate among adults and prefer familiar people. They direct their responses toward a particular adult or adults who are best able to soothe them.

**Phase 3: Attachments (7 to 24 months).** Infants develop attachments to specific caregivers who attend, accurately interpret, and consistently respond to their signals. Infants can gain proximity to caregivers through their own motor efforts, such as crawling.

**Phase 4: Reciprocal Relationships (24 to 30 months and onward).** With advances in cognitive and language development, children can engage in interactions with their primary caregiver as partners, taking turns and initiating interactions within the attachment relationship. They begin to understand others' emotions and goals and apply this understanding through strategies such as social referencing.

### Secure Base, Separation Anxiety, and Internal Working Models

The formation of an attachment bond is crucial for infants' development because it enables infants to begin to explore the world, using their attachment figure as a **secure base**, or foundation, to return to when frightened. When infants are securely attached to their caregivers, they feel confident to explore the world and to learn by doing so. As clear attachments form, starting at about 7 months, infants are likely to experience **separation anxiety** (sometimes called *separation protest*), a reaction to separations from an attachment figure that is characterized by distress and crying (Lamb & Lewis, 2015). Infants may follow, cling to, and climb on their caregivers in an attempt to keep them near.

Separation anxiety tends to increase between 8 and 15 months of age, and then it declines. This pattern appears across many cultures and environments as varied as those of the United States, Israeli kibbutzim, and !Kung hunter-gatherer groups in Africa (Kagan et al., 1994). It is the formation of the attachment bond that makes separation anxiety possible, because infants must feel connected to their caregivers in order to feel distress in the caregivers' absence. Separation anxiety declines as infants develop reciprocal relationships with caregivers, increasingly use them as secure bases, and can understand and predict parents' patterns of separation and return, reducing their confusion and distress.

The attachment bond developed during infancy and toddlerhood influences personality development because it comes to be represented as an **internal working model**, which includes the children's expectations about whether they are worthy of love, of whether their attachment figures will be available during times of distress, and how they will be treated. The internal working model influences the development of self-concept, or sense of self, in infancy and becomes a guide to later relationships throughout life (Bretherton & Munholland, 2016).

### Ainsworth's Strange Situation

Virtually all infants form an attachment to their parents, but Canadian psychologist Mary Salter Ainsworth proposed that infants differ in **security of attachment**—the extent to which they feel that parents can reliably meet their needs. Like Bowlby, Ainsworth believed that infants must develop a dependence on parents, viewing them as a metaphorical secure base, in order to feel comfortable exploring the world (Salter, 1940). To examine attachment, Mary Ainsworth developed the **Strange Situation**, a structured observational procedure that reveals the security of attachment when the infant is placed under stress. As shown in Table 6.2, the Strange Situation is a heavily structured observation task consisting of eight 3-minute-long episodes. In each segment, the infant is with the parent (typically the mother), with a stranger, with both parent and stranger, or alone. Researchers observe infants' exploration of the room, their reaction when the mother leaves the room, and, especially, their responses during reunions, when the mother returns.

On the basis of responses to the Strange Situation, infants are classified into one of several attachment types (Ainsworth et al., 1978).

- **Secure Attachment:** The securely attached infant uses the parent as a secure base, exploring the environment and playing with toys in the presence of the parent, but regularly checking in (e.g., by looking at the parent or bringing toys). The infant shows mild distress when the parent leaves. On the parent's return, the infant greets the parent enthusiastically, seeks comfort, and then returns to individual play. About two-thirds of North American infants who complete the Strange Situation are classified as securely attached (Lamb & Lewis, 2015).

**TABLE 6.2** ■ The Strange Situation

Event	Attachment Behavior Observed
Experimenter introduces mother and infant to playroom and leaves.	
Infant plays with toys and parent is seated.	Mother as secure base
Stranger enters, talks with caregiver, and approaches infant.	Reaction to unfamiliar adult
Mother leaves room; stranger responds to baby if upset.	Reaction to separation from mother
Mother returns and greets infant.	Reaction to reunion
Mother leaves room.	Reaction to separation from mother
Stranger enters room and offers comfort to infant.	Reaction to stranger and ability to be soothed by stranger
Mother returns and greets infant. Tries to interest the infant in toys.	Reaction to reunion

- **Insecure–Avoidant Attachment:** Infants who display an insecure–avoidant attachment show little interest in the mother and busily explore the room during the Strange Situation. The infant is not distressed when the mother leaves and may react to the stranger in similar ways as to the mother. The infant ignores or avoids the mother on return or shows subtle signs of avoidance, such as failing to greet her or turning away from her. About 15% of samples of North American infants’ responses to the Strange Situation reflect this style of attachment (Lamb & Lewis, 2015).
- **Insecure–Resistant Attachment:** Infants with an insecure–resistant attachment show a mixed pattern of responses to the mother. The infant remains preoccupied with the mother throughout the procedure, seeking proximity and contact, clinging even before the separation. When the mother leaves, the infant is distressed and cannot be comforted. During reunions, the infant’s behavior suggests resistance, anger, and distress. The infant might seek proximity to the mother and cling to her while simultaneously pushing her away, hitting, or kicking. About 10% of North American infants tested in the Strange Situation fall into this category (Lamb & Lewis, 2015).
- **Insecure–Disorganized Attachment:** A fourth category was added later to account for the small set of infants (10% or below) who show inconsistent, contradictory behavior in the Strange Situation. The infant with insecure–disorganized attachment shows a conflict between approaching and fleeing the caregiver, suggesting fear (Main & Solomon, 1986). Infants showing insecure–disorganized attachment experience the greatest insecurity, appearing disoriented and confused. They may cry unexpectedly and may show a flat, depressed emotion and extreme avoidance or fearfulness of the caregiver.

### Attachment-Related Outcomes

Secure parent–child attachments are associated with positive socioemotional development in infancy, childhood, and adolescence. Preschool and school-age children who were securely attached as infants tend to be more curious, empathetic, self-confident, and socially competent, and they will have more positive interactions



Mary Ainsworth (1913–1999) believed that infants differ in the security of attachment. She created the Strange Situation to measure infants’ security of attachment.

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and close friendships with peers (Groh et al., 2017; VerÍssimo et al., 2014). The advantages of secure attachment continue into adolescence. Adolescents who were securely attached in infancy and early childhood are more socially competent, tend to be better at making and keeping friends and functioning in a social group, and demonstrate greater emotional health, self-esteem, ego resiliency, and peer competence (Boldt et al., 2014; Sroufe, 2016; Stern & Cassidy, 2018).

In contrast, insecure attachment is associated with heightened physiological reactivity and maladaptive responses to interpersonal stressors, including elevated cortisol levels, a response to stress (Groh & Narayan, 2019). Insecure attachment in infancy, particularly disorganized attachment, is associated with long-term negative outcomes, including less positive and more negative affect, poor emotional regulation, poor peer relationships, poor social competence, and higher rates of antisocial behavior, depression, and anxiety from childhood into adulthood (Cooke et al., 2019; Groh et al., 2017; Wolke et al., 2014; Zajac et al., 2020). Insecure attachments tend to correlate with difficult life circumstances and contexts, such as parental problems, low socioeconomic status (SES), and environmental stress, that persist throughout childhood and beyond, that influence the continuity of poor outcomes (Granqvist et al., 2017). One longitudinal study suggested that infants with an insecure-disorganized attachment at 12 and 18 months of age were, as adults, more likely to have children with insecure-disorganized attachment, suggesting the possibility of intergenerational transmission of insecure attachment (and associated negative outcomes) (Raby et al., 2015).

Conversely, attachment is not set in stone. Quality parent–child interactions can at least partially make up for poor interactions early in life. Children with insecure attachments in infancy who experience subsequent sensitive parenting show more positive social and behavioral outcomes in childhood and adolescence than do those who receive continuous care of poor quality (Sroufe, 2016). In addition, infants can form attachments to multiple caregivers with secure attachments, perhaps buffering the negative effects of insecure attachments (Boldt et al., 2014).

### Influences on Attachment

The most important determinant of infant attachment is the caregiver’s ability to consistently and sensitively respond to the child’s signals (Ainsworth et al., 1978; Behrens et al., 2011). Infants become securely attached to mothers who are sensitive and offer high-quality responses to their signals, who accept their role as caregiver, who are accessible and cooperative with infants, who are not distracted by their own thoughts and needs, and who feel a sense of efficacy (Gartstein & Iverson, 2014). Mothers of securely attached infants provide stimulation and warmth and consistently synchronize or match their interactions with their infants’ needs (Beebe et al., 2010). Secure mother–infant dyads show more positive interactions and fewer negative interactions compared with insecure dyads (Guo et al., 2015).

The goodness of fit between the infant’s and parent’s temperament influences attachment, supporting the role of reciprocal interactions in attachment (Seifer et al., 2014).

Infants who are insecurely attached have mothers who tend to be more rigid, unresponsive, inconsistent, and demanding (Gartstein & Iverson, 2014). The insecure-avoidant attachment pattern is associated with parental unavailability or rejection. Insecure-resistant attachment is associated with inconsistent and unresponsive parenting. Parents may respond inconsistently, offering overstimulating and intrusive caregiving at times and unresponsive care that is not attentive to the infant’s signals at other times. Frightening parental behavior (at the extreme, child abuse) is thought to play a role in insecure-disorganized attachment (Duschinsky, 2015). Disorganized attachment is more common among infants who have been abused or raised



The most important determinant of infant attachment is the caregiver’s ability to respond to the child’s signals consistently and sensitively.

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in particularly poor caregiving environments, but disorganized attachment itself is not an indicator of abuse (Granqvist et al., 2017; Lamb & Lewis, 2015).

Attachment is complex and influenced by the contextual factors outside of the parent–infant relationship. Conflict among parents is associated with lower levels of attachment security (Tan et al., 2018). Insecure attachment responses may represent adaptive responses to poor caregiving environments (Weinfield et al., 2008). Not relying on an unsupportive parent (such as by developing an insecure-avoidant attachment) may represent a good strategy for infants. Toddlers who show an avoidant attachment tend to rely on self-regulated coping rather than turning to others, perhaps an adaptive response to an emotionally absent parent (Zimmer-Gembeck et al., 2017). Mental health problems can influence parents' emotional availability.

### Maternal Depression and Attachment

Caregiver depression poses risks for attachment. Depression is not simply sadness; rather, it is characterized by a lack of emotion and a preoccupation with the self that makes it difficult for depressed mothers to recognize their infants' needs and provide care. Both mothers and fathers can become depressed, but most of the research examines mothers. The hormonal and social changes that accompany pregnancy and new motherhood place women at risk for postpartum depression, depression that occurs in the months after childbirth. However, depression can occur at any time in life.

Mothers who are depressed tend to view their infants differently than nondepressed mothers and independent observers (Newland et al., 2016). They are more likely to identify negative emotions (i.e., sadness) than positive emotions (i.e., happiness) in infant faces (Webb & Ayers, 2015). Challenging behaviors, such as fussiness and crying, and difficult temperaments tend to elicit more negative responses from depressed mothers (Newland et al., 2016). When depressed and nondepressed mothers were shown images of their own and unfamiliar infants' joy and distressed faces, mothers with depression showed blunted brain activity in response to their own infants' joy and distressed faces, suggesting muted responses to infants' emotional cues (Laurent & Ablow, 2013). Depressed women tend to disengage faster from positive and negative infant emotional expressions (Webb & Ayers, 2015).

In practice, mothers who are depressed tend to be less responsive to their babies, show less affection, use more negative forms of touch, and show more negative emotions and behaviors such as withdrawal, intrusiveness, hostility, coerciveness, and insensitivity (Jennings et al., 2008). Given the poor parent–child interaction styles that accompany maternal depression, it may not be surprising that infants of depressed mothers show a variety of negative outcomes, including insecure attachment, overall distress, withdrawn behavior, poor social engagement, and difficulty regulating emotions (Barnes & Theule, 2019; Granat et al., 2017; Leventon & Bauer, 2013). They tend to show greater physiological arousal in response to stressors, difficulty reading and understanding others' emotions, and are at risk for later problems in development (Liu et al., 2017; Prenoveau et al., 2017; Suurland et al., 2017).

The ongoing reciprocal interactions between mothers and infants account for the long-term negative effects of maternal depression (Granat et al., 2017). In one study, maternal depressive symptoms 9 months after giving birth predicted infants' negative reactions to maternal behavior at 18 months of age and, in turn, higher levels of depressive symptoms on the part of mothers when the children reached 27 months of age (Roben et al., 2015).

Yet low sensitivity is not always associated with poor outcomes. Infants sometimes develop secure attachments to caregivers who are less sensitive as long as their basic needs are met and they maintain a calm regulated state (Cassidy et al., 2005). One study of 4.5-month-old infants from predominantly Black, white, and Hispanic



Depression is characterized by a lack of emotion and a preoccupation with the self that makes it challenging for depressed mothers to care for their infants and recognize their infants' needs.

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low socioeconomic status homes, found that caregiver provision of a secure base (meeting basic needs and fostering a sense of calm) predicted attachment even in the presence of caregiver insensitivity (Woodhouse et al., 2020). Infants' brains may be predisposed to form attachments, regardless of the quality of care (Opendak & Sullivan, 2019). In addition, infants develop attachments to other members of the family system, such as fathers (Cabrera et al., 2014; Lickenbrock & Braungart-Rieker, 2015). (Dagan & Sagi-Schwartz, 2018).

### Father–Infant Attachment

At birth, fathers interact with their newborns much like mothers do. They provide similar levels of care by cradling the newborn and performing tasks like diaper changing, bathing, and feeding the newborn (Combs-Orme & Renkert, 2009). This is true of fathers in Western contexts as well as those in non-Western contexts, such as the Kadazan of Malaysia and Aka and Bofi of Central Africa (Hewlett & MacFarlan, 2010; Hossain et al., 2007; Tamis-LeMonda et al., 2009).

Early in an infant's life fathers and mothers develop different play and communicative styles. Fathers tend to be more stimulating and physical while mothers are more soothing (Feldman, 2003; Grossmann et al., 2002). Fathers tend to engage in more unpredictable rough-and-tumble play that is often met with more positive reactions and arousal from infants; when young children have a choice of an adult play partner, they tend to choose their fathers (Feldman, 2003; Lamb & Lewis, 2016).

Differences in mothers' and fathers' interaction styles appear in many cultures, including France, Switzerland, Italy, and India, as well as among white non-Hispanic, African American, and Hispanic American families in the United States (Best et al., 1994; Hossain et al. 1997; Roopnarine et al., 1992). Interaction styles differ more in some cultures than in others. For example, German, Swedish, and Israeli kibbutzim fathers, as well as fathers in the Aka ethnic group of Africa's western Congo basin, are not more playful than mothers (Frodi et al., 1983; Hewlett, 2008; Hewlett et al., 1998; Sagi et al., 1985). Furthermore, overall and across cultures, most of the differences between mothers and fathers are not large (Lamb & Lewis, 2016).

Father–child interaction is associated with social competence, independence, and cognitive development in children (Cabrera et al., 2018; Sethna et al., 2016). Fathers provide opportunities for babies to practice arousal management by providing high-intensity stimulation and excitement, like tickling, chasing, and laughing (Flanders et al., 2009). Fathers who are sensitive, supportive, and appropriately challenging during play promote father–infant attachment relationships (Lickenbrock & Braungart-Rieker, 2015; Olsavsky et al., 2020).

When fathers are involved in the caregiving of their infants, their children are more likely to enjoy a warm relationship with their father as they grow older, carry out responsibilities, follow parents' directions, and be well adjusted. Similar to findings with mothers, sensitive parenting on the part of fathers predicts secure attachments with their children through age 3 (Brown et al., 2012; Lucassen et al., 2011; Olsavsky et al., 2020). The positive social, emotional, and cognitive effects of father–child interaction continues from infancy into childhood and adolescence (Cabrera et al., 2018; Sarkadi et al., 2008). In addition, an infant's secure attachment relationship with a father can compensate for the negative effects of an insecure attachment to a mother (Boldt et al., 2014; Dagan & Sagi-Schwartz, 2018; Kochanska & Kim, 2013).



Fathers tend to have different interaction styles than mothers. Father–infant interaction tends to be play-oriented. This is true of fathers in Western contexts as well as those in non-Western contexts, such as the Kadazan of Malaysia and Aka and Bofi of Central Africa.

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### Stability of Attachment

Attachment patterns tend to be stable over infancy and early childhood, especially when securely attached

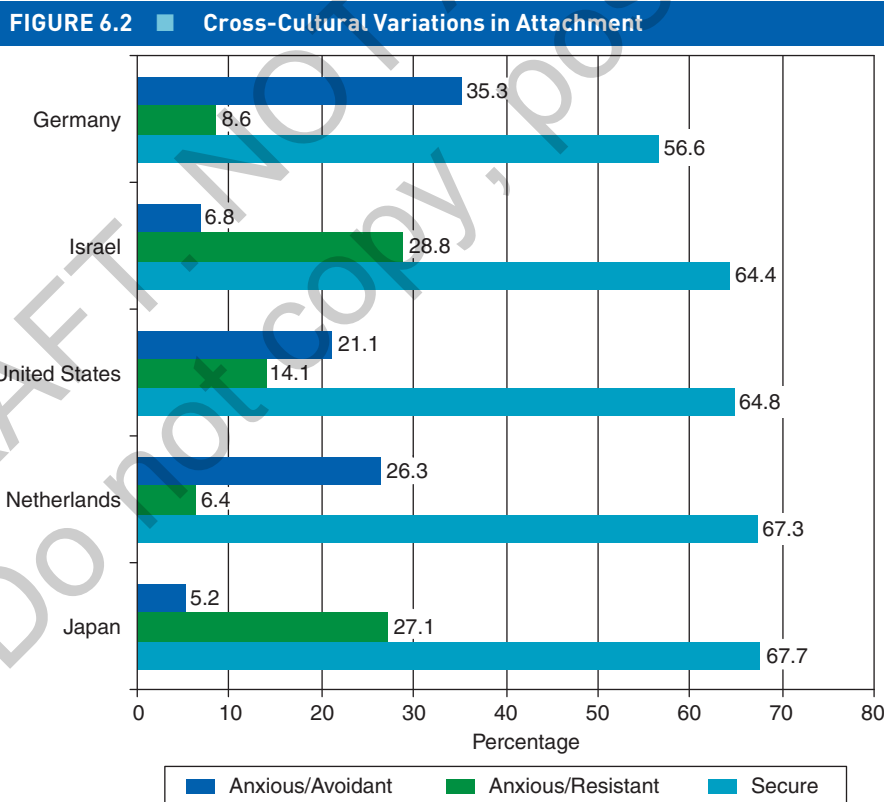
infants receive continuous responsive care (Ding et al., 2014; Marvin et al., 2016). The loss of a parent, parental divorce, a parent's psychiatric disorder, and physical abuse, as well as changes in family stressors, adaptive processes, and living conditions, can transform a secure attachment into an insecure attachment pattern later in childhood or adolescence (Feeney & Monin, 2016; Lyons-Ruth & Jacobvitz, 2016).

Contextual factors such as low SES, family and community stressors, and the availability of supports influence the stability of attachment through their effect on parents' emotional and physical resources and the quality of parent–infant interactions (Booth-LaForce et al., 2014; Thompson, 2016; Van Ryzin et al., 2011). Securely attached infants reared in contexts that pose risks to development may develop insecure attachments, and insecure attachments tend to continue in risky contexts (Pinquart et al., 2013). An insecure attachment between child and parent can be overcome by changing maladaptive interaction patterns, increasing sensitivity on the part of the parent, and fostering consistent and developmentally appropriate responses to children's behaviors.

### Cultural Variations in Attachment Classifications

Attachment occurs in all cultures, but whether the Strange Situation is applicable across cultural contexts is a matter of debate. Research has shown that infants in many countries, including Germany, Holland, Japan, and the United States, approach the Strange Situation in similar ways (Sagi et al., 1991). In addition, the patterns of attachment identified by Ainsworth occur in a wide variety of cultures in North America, Europe, Asia, Africa, and the Middle East (Bornstein et al., 2013; Cassibba et al., 2013; Huang et al., 2012; Jin et al., 2012; Thompson, 2013).

Nevertheless, there are differences. Insecure-avoidant attachments are more common in Western European countries, and insecure-resistant attachments are more prevalent in Japan and Israel (Van Ijzendoorn & Kroonenberg, 1988) (Figure 6.2). This pattern may result from the fact that Western cultures tend to emphasize individuality and independence, whereas Eastern cultures are more likely



Source: Adapted from Van Ijzendoorn & Kroonenberg (1988).

to emphasize the importance of relationships and connections with others, collectivism. Individualist and collectivist cultural perspectives interpret children's development in different ways (Keller, 2018). Western parents might interpret insecure-resistant behavior as clingy, whereas Asian parents might interpret it as successful bonding (Gardiner & Kosmitzki, 2018).

The behaviors that characterize sensitive caregiving vary with culturally specific socialization goals, values, and beliefs of the parents, family, and community (Keller, 2019; Mesman et al., 2016). For example, Puerto Rican mothers often use more physical control in interactions with infants, such as picking up crawling infants and placing them in desired locations, over the first year of life than do European American mothers. They actively structure interactions in ways consistent with long-term socialization goals oriented toward calm, attentive, and obedient children. Typically, attachment theory conceptualizes this type of control as insensitive, yet physical control is associated with secure attachment status at 12 months in Puerto Rican infants (but not white non-Hispanic infants) (Carlson & Harwood, 2003; Harwood et al., 1999). Similarly, German mothers operate according to the shared cultural belief that infants should become independent at an early age and should learn that they cannot rely on the mother's comfort at all times. German mothers may seem unresponsive to their children's crying, yet they are demonstrating sensitive childrearing within their context (Grossmann et al., 1985). In other words, the behaviors that reflect sensitive caregiving vary with culture because they are adaptations to different circumstances (Rothbaum et al., 2000).

Many Japanese and Israeli infants become highly distressed during the Strange Situation and show high rates of insecure resistance. Resistance in Japanese samples of infants can be attributed to cultural childrearing practices that foster mother–infant closeness and physical intimacy that leave infants unprepared for the separation episodes; the Strange Situation may be so stressful for them that they resist comforting (Takahashi, 1990). In other words, the Strange Situation may not accurately measure the attachment of these infants. Similarly, infants who are raised in small, close-knit Israeli kibbutz communities do not encounter strangers in their day-to-day lives, so the introduction of a stranger in the Strange Situation procedure can be overly challenging for them. At the same time, kibbutz-reared infants spend much of their time with their peers and caregivers and see their parents infrequently and therefore may prefer to be comforted by people other than their parents (Sagi et al., 1985).

Dogon infants from Mali, West Africa, show rates of secure attachment that are similar to those of Western infants, but the avoidant attachment style is not observed in samples of Dogon infants (McMahan True et al., 2001). Dogon infant care practices diminish the likelihood of avoidant attachment because the infant is in constant proximity to the mother. Infant distress is promptly answered with feeding and infants feed on demand, so mothers cannot behave in ways that would foster avoidant attachment.

Although most research on attachment has focused on the mother–infant bond, we know that infants form multiple attachments (Dagan & Sagi-Schwartz, 2018). Consider the Efe foragers of the Democratic Republic of Congo, in which infants are cared for by many people, as adults' availability varies with their hunting and gathering duties (Morelli, 2015). Efe infants experience frequent changes in residence and camp, exposure to many adults, and frequent interactions with multiple caregivers. It is estimated that the Efe infant will typically come into contact with 9 to 14 and as many as 20 people within a 2-hour period. Efe infants are reared in an intensely social community and develop many trusting relationships—many attachments to many people (Morelli, 2015). The Western emphasis on mother–infant attachment may fail to acknowledge the many



Dogon infants from Mali, West Africa, show rates of secure attachment that are similar to those of Western infants, but the avoidant attachment style is not observed in samples of Dogon infants because infants are in constant proximity to mothers who respond to infant distress promptly and feed infants on demand.

Danita Delimont/Alamy Stock Photo

other attachment bonds that Efe infants form. It is important that all infants develop attachments with some caregivers, but which caregivers—whether mothers, fathers, or other responsive adults—matters less than the bonds themselves.

### Thinking in Context: Biological Influences

Examine attachment from an evolutionary developmental perspective. In an evolutionary sense, what purpose might infant–caregiver attachment serve? Is there biological or adaptive value to forming an attachment with a caregiver? Considering emotional development and the development of attachment, what evidence can you identify to support a biological aspect to attachment?

### Thinking in Context: Applied Developmental Science

Children reared in impoverished orphanages are at risk of receiving little attention from adults and experiencing few meaningful interactions with caregivers.

1. What might these experiences mean for the development of attachment? What outcomes and behaviors might you expect from children reared under such conditions?
2. Suppose that you are a developmental scientist. How might you help children reared under conditions of deprivation? How can you help them develop secure attachments? Would you develop an intervention? Work with infants case-by-case? What do you think?
3. There are many children in the United States who experience neglect, trauma, and poor interactions with caregivers. Compare these cases with the extreme deprivation of children reared in impoverished orphanages. What similarities and differences might you expect? Would you intervene and treat these two groups of children in the same way?

### Thinking in Context: Intersectionality

Many conclusions about infant–parent interactions and attachment are based on research conducted with white non-Hispanic families.

1. To what extent do you think observations of infant–parent interactions in white non-Hispanic families apply to families of color?
2. Consider interactions among race and ethnicity, socioeconomic status, religion, and cultural views of parenting. What similarities and differences in infant–parent interactions might you expect?
3. How might parents’ experiences within the community, such as exposure to violence, discrimination and racism, and poverty, as well as social support and connection, influence their interactions with infants and young children?

## THE SELF IN INFANCY AND TODDLERHOOD

### LEARNING OBJECTIVE

- 6.5 Differentiate the roles of self-concept, self-recognition, and self-control in infant development.

What do babies know about themselves? When do they begin to know that they have a “self”—that they are separate from the people and things that surround them? We have discussed the challenges that researchers who study infants face. Infants cannot tell us what they perceive, think, or feel. Instead, researchers must devise ways of inferring infants’ states, feelings, and thoughts. As you

might imagine, this makes it very challenging to study infants' conceptions of self, as well as their awareness and understanding of themselves.

### Self-Awareness

Camille, 4 months of age, delights in seeing that she can make the mobile above her crib move by kicking her feet. Her understanding that she can influence her world suggests that she has a sense of herself as different from her environment (Rochat, 1998). Before infants can take responsibility for their own actions, they must begin to see themselves as physically separate from the world around them.

Some developmental researchers believe that infants are born with a capacity to distinguish the self from the surrounding environment (Meltzoff, 1990; Rochat, 2018). Newborns show distress at hearing a recording of another infant's cries but do not show distress at hearing their own cries, suggesting that they can distinguish other infants' cries from their own and thereby have a primitive notion of self (Dondi et al., 1999). Newborns' facial imitation, that is, their ability to view another person's facial expression and produce it (see Chapter 4), may also suggest a primitive awareness of self and others (Meltzoff, 2007; Rochat, 2013, 2018). It is unclear whether these findings suggest that newborns have self-awareness because infants cannot tell us what they know.

Others argue that an awareness of oneself is not innate but emerges by 3 months of age (Neisser, 1993). Infants' sense of body awareness emerges through interactions and body contact with their mothers (Montirosso & McGlone, 2020). Some researchers believe that this emergence is indicated by infants' awareness of the consequences of their own actions on others (Langfur, 2013). As infants interact with people and objects, they learn that their behaviors have effects. With this awareness, they begin to experiment to see how their behaviors influence the world around them, begin to differentiate themselves from their environments, and develop a sense of self (Bigelow, 2017).

### Self-Recognition

How do we know whether self-awareness is innate or develops in the early months of life? One way of studying self-awareness in infants is to examine infants' reactions to viewing themselves in a mirror. **Self-recognition**, the ability to recognize or identify the self, is assessed by the "rouge test." In this experiment, a dab of rouge or lipstick is applied to an infant's nose without the infant's awareness—such as under the pretext of wiping his or her face. The infant is then placed in front of a mirror (Bard et al., 2006). Whether the infant recognizes himself or herself in the mirror depends on cognitive development, especially the ability to engage in mental representation and hold images in one's mind. Infants must be able to retain a memory of their own image in order to display self-recognition in the mirror task. If the infant has an internal representation of her face and recognizes the infant in the mirror as herself, she will notice the dab of rouge and reach for her own nose.

Mirror recognition develops gradually and systematically (Brandl, 2018). From 3 months of age, infants pay attention and react positively to their mirror image, and by 8 to 9 months of age they show awareness of the tandem movement of the mirror image with themselves and play with the image, treating it as if it is another baby (Bullock & Lutkenhaus, 1990). Some 15- to 17-month-old infants show signs of self-recognition, but it is not until 18 to 24 months that most infants demonstrate self-recognition by touching their nose when they notice the rouge mark in the mirror (Cicchetti et al., 1997). Does experience with mirrors influence how infants respond to the rouge test? Interestingly, infants from nomadic tribes with no experience with mirrors demonstrate self-recognition at the same ages as infants reared in surroundings with mirrors (Priel & deSchonen, 1986). This suggests that extensive experience with a mirror is not needed to demonstrate self-recognition in the mirror task. In addition, research with Canadian toddlers shows that their performance on the mirror task is unrelated to their experience with mirrors in the home (Courage et al., 2004).

Mirror recognition is not the only indicator of a sense of self—and may not be the earliest indicator. A recent study suggests that self-recognition may develop before infants can succeed on the mirror task (Stapel et al., 2017). Eighteen-month-old infants viewed photographs of their own face, the face of an unfamiliar infant, the face of their caregiver, and the face of an unfamiliar caregiver, while their brain activity was registered via electroencephalography (EEG). The infants showed more brain activity in

response to their own face, suggesting self-recognition, yet only one-half of these infants succeeded on the mirror task. By 18 to 24 months of age, children begin to recognize themselves in pictures and refer to themselves in the pictures as “me” or by their first names (Lewis & Brooks-Gunn, 1979). One study of 20- to 25-month-old toddlers showed that 63% could pick themselves out when they were presented with pictures of themselves and two similar children (Bullock & Lutkenhaus, 1990). By 30 months of age, nearly all of the children could pick out their own picture.

The mirror-recognition task recruits areas in the brain associated with self-reflection in adults. Toddlers who exhibit mirror self-reflection show increased functional connectivity between frontal and temporoparietal regions of the brain, relative to those toddlers who do not yet show mirror self-recognition, suggesting that mirror self-recognition may be a good indicator of a sense of self in infancy (Bulgarelli et al., 2019).

With advances in self-awareness, toddlers begin to experience more complex emotions, including self-conscious emotions, such as embarrassment, shame, guilt, jealousy, and pride (Lewis & Carmody, 2008). An understanding of self is needed before children can be aware of being the focus of attention and feel embarrassment, identify with others’ concerns and feel shame, or desire what someone else has and feel jealousy toward them. In a study of 15- to 24-month-old infants, only those who recognized themselves in the mirror looked embarrassed when an adult gave them overwhelming praise. They smiled, looked away, and covered their faces with their hands. The infants who did not recognize themselves in the mirror did not show embarrassment (Lewis, 2011). A developing sense of self and the self-conscious emotions that accompany it leads toddlers to have more complex social interactions with caregivers and others—all of which contribute to the development of self-concept.



This toddler recognizes herself in the mirror, as shown by her touching the rouge mark on her face.

Thierry Berrod, Mona Lisa Production/Science Source

### Emerging Self-Concept

In toddlerhood, between 18 and 30 months of age, children’s sense of self-awareness expands beyond self-recognition to include a **categorical self**, a self-description based on broad categories such as sex, age, and physical characteristics (Stipek et al., 1990). Toddlers describe themselves as “big,” “strong,” “girl/boy,” and “baby/big kid.” Children use their categorical self as a guide to behavior. Once toddlers label themselves by gender, they spend more time playing with toys stereotyped for their own gender. Applying the categorical self as a guide to behavior illustrates toddlers’ advancing capacities for self-control.

At about the same time as toddlers display the categorical self, they begin to show another indicator of their growing self-understanding. As toddlers become proficient with language and their vocabulary expands, they begin to use many personal pronouns and adjectives, such as “I,” “me,” and “mine,” suggesting a sense of self in relation to others (Bates, 1990). Claims of possession emerge by about 21 months and illustrate children’s clear representation of “I” versus other (Levine, 1983), a milestone in self-definition and the beginnings of self-concept (Rochat, 2010).

### Self-Control

Self-awareness and the emerging self-concept permit self-control, as one must be aware of oneself as separate from others to comply with requests and modify behavior in accordance with caregivers’

**TABLE 6.3 ■ The Developing Self**

Concept	Description	Emergence
Self-concept	Self-description and thoughts about the self	Begins as a sense of awareness in the early months of life
Self-awareness	Awareness of the self as separate from the environment	Innate or develops in the early months of life
Self-recognition	The ability to recognize or identify the self; typically tested in mirror-recognition tasks	18–24 months
Categorical self	Self-description based on broad categories such as sex, age, and physical characteristics; indicates the emergence of self-concept	18–30 months

Source: Adapted from Butterworth (1992).

demands. In order to engage in self-control, the infant must be able to attend to a caregiver's instructions, shift his or her attention from an attractive stimulus or task, and inhibit a behavior. Cortical development, specifically the development of the frontal lobes, is responsible for this ability (Posner & Rothbart, 2018). Between 12 and 18 months, infants begin to demonstrate self-control by their awareness of, and compliance to, caregivers' simple requests (Kaler & Kopp, 1990).

Although toddlers are known for asserting their autonomy, such as by saying no and not complying with a caregiver's directive, compliance is much more common (Kochanska, 2000). Paradoxically, when parents encourage autonomous, exploratory behavior, their children are more likely to show compliance to parental instructions in toddlerhood through early childhood (Laurin & Joussemet, 2017). Secure attachment relationships and warm parenting are associated with effortful control, likely as securely attached infants feel comfortable exploring their environment, which promotes autonomy (Frick et al., 2018; Pallini et al., 2018). Toddlers' capacities for self-control improve rapidly. Delay of gratification tasks suggests that between 18 and 36 months toddlers become better able to control their impulses and wait before eating a treat or playing with a toy (Bialecka-Pikul et al., 2018; Cheng et al., 2018).

Infants make great strides in socioemotional development over the first two years of life, as summarized in Table 6.3. Infants' advances in emotional expression and regulation represent the interaction of biological predispositions, such as inborn capacities for basic emotions and temperament, and experience—particularly parent–child interactions—the contexts in which they are raised, and the goodness of fit between infants' needs and what their contexts provide. Infants' gains in emotional and social development and a growing sense of self form a socioemotional foundation for the physical and cognitive changes that they will experience in the early childhood years.

### Thinking in Context: Lifespan Development

1. Provide examples of how infants' developing sense of self reflects interactions among temperament, emotional development, and attachment.
2. Compare families in Western cultures that emphasize individuality and Eastern cultures that value collectivism. How might parents and other adults interact with babies and promote a sense of self? How might babies in each of these cultures come to understand themselves? Might you expect differences within a culture, such as intersectional differences among infants in the United States?
3. How might contextual factors, such as those that accompany being raised in an inner city, suburban neighborhood, rural environment, or nomadic society, influence infants' developing sense of self? Would you expect the same pattern of development for self-recognition, self-concept, and self-control across all contexts? Why or why not?

## APPLY YOUR KNOWLEDGE

A friendly lab assistant escorts 12-month-old Cassie and her mother into a research playroom containing special mirrors and hidden equipment to videotape their interactions. After providing instructions, the lab assistant leaves the mother and Cassie alone, beginning a short procedure to study the security of their attachment relationship. A female stranger enters the room to play with Cassie. Soon after, the mother leaves and Cassie is alone with the stranger. The mother returns briefly, then leaves again; finally, the stranger leaves the room and Cassie is left alone. During each short separation from her mother, Cassie cries and wails. Surprised and disturbed to find Cassie so upset, her mother returns almost immediately. She cannot soothe Cassie, who alternates between clinging to her mother and pushing her away angrily, crying all the time.

“Is Cassie upset today?” asks the lab assistant.

“No, she’s always this way,” her mother smiled softly, “My Cassie is quite a handful. She’s what my mother calls spirited. She’s unpredictable and strong willed. She’ll eat and nap when she’s ready—and that changes all the time. My mother says I was the same way. I love my little girl, but sometimes I look forward to her growing up.”

1. What was this procedure intended to study? How? Why?
2. What might Cassie’s behavior indicate about her security of attachment relationship to her mother and her emotional development? Why?
3. What do we know about the stability of infant attachment? What is the likelihood that these observations will influence Cassie’s attachment in childhood? Adulthood?
4. Comment on the goodness of fit between Cassie’s temperament and the parenting.
5. Laboratory methods such as this are intended to place participants, infants, under distress. The parent’s behavior is the source of that distress, and the procedure also is distressful to parents. From your perspective, what do researchers learn from such research? Should researchers use procedures that elicit distress from children and parents? If you were a parent to an infant, would you be willing to participate in such an experiment?

## CHAPTER SUMMARY

### 6.1 Summarize the psychosocial tasks of infancy and toddlerhood.

The psychosocial task of infancy is to develop a sense of trust. If parents and caregivers are sensitive to the infant’s physical and emotional needs and consistently fulfill them, the infant will develop a basic sense of trust in his or her caregivers and the world. The task for toddlers is to learn to do things for themselves and feel confident in their ability to maneuver themselves in their environment. Psychosocial development is supported by warm and sensitive parenting and developmentally appropriate expectations for exploration and behavioral control.

### 6.2 Describe emotional development and the role of contextual influences on emotional development in infants and toddlers.

Newborns display some basic emotions, such as interest, distress, and disgust. Self-conscious emotions, such as empathy, embarrassment, shame, and guilt, depend on cognitive development, as well as an awareness of self, and do not emerge until about late infancy. With development, infants use different and more effective strategies for regulating their emotions. At about 6 months old, infants begin to use social referencing. Social referencing occurs in ambiguous situations, provides children with guidance in how to interpret the event, and influences their emotional responses and subsequent actions. Parents socialize infants to respond to and display their emotions in socially acceptable ways. The emotions that are considered acceptable, as well as ways of expressing them, differ by culture and context.



### 6.3 Discuss the styles and stability of temperament, including the role of goodness of fit in infant development.

Temperament, the characteristic way in which an individual approaches and reacts to people and situations, has a biological basis. Children are classified into three temperament styles: easy, slow-to-warm-up, and difficult. Temperament is influenced by the interaction of genetic predispositions, maturation, and experience. Temperament tends to be stable but there are developmental and individual differences. An important influence on socioemotional development is the goodness of fit between the child's temperament and the environment around him or her, especially the parent's temperament and childrearing methods.

### 6.4 Examine the development of attachment and influences on attachment stability and outcomes in infancy and toddlerhood.

From an ethological perspective, attachment is an adaptive behavior that evolved because it ensures that the infant and caregiver will remain in close proximity, aiding the survival of the infant. Using the Strange Situation, infants are categorized as securely attached or insecurely attached (insecure-avoidant, insecure-resistant, or disorganized-disoriented). Secure attachments in infancy are associated with social competence and socioemotional health. Attachment patterns are seen in a wide variety of cultures around the world, but the behaviors that make up sensitive caregiving vary depending on the socialization goals, values, and beliefs of the family and community, which may vary by culture. Generally, infants become securely or insecurely attached to caregivers based on the caregiver's ability to respond sensitively to the child's signals.

### 6.5 Differentiate the roles of self-concept, self-recognition, and self-control in infant development.

The earliest notion of self-concept, self-awareness, is evident in a primitive fashion at 3 months of age. Self-recognition, as indicated by mirror self-recognition, develops gradually and systematically in infants, but it is not until 18 to 24 months that a majority of infants demonstrate self-recognition in the mirror test. Once children have a sense of self, they can experience more complex emotions, such as self-conscious emotions. Self-awareness permits self-control as one must be aware of oneself as an agent apart from others to comply with requests and modify behavior in accord with caregivers' demands.

#### KEY TERMS

Attachment	Secure Attachment
Autonomy versus shame and doubt	Secure base
Basic emotions	Security of attachment
Categorical self	Self-conscious emotions
Difficult temperament	Self-recognition
Easy temperament	Separation anxiety
Emotional display rules	Slow-to-warm-up temperament
Emotion regulation	Social referencing
Goodness of fit	Social smile
Insecure-Avoidant Attachment	Strange Situation
Insecure-Disorganized Attachment	Stranger wariness
Insecure-Resistant Attachment	Temperament
Internal working model	Trust versus mistrust

#### LIFESPAN DEVELOPMENT AT WORK PART 2: INFANCY AND TODDLERHOOD

There are many opportunities to work with infants and their families. Some include daily contact, such as through child care, and others entail more infrequent contact, such as in the health fields.

### Child Care Director

Visitors to child care centers are most familiar with the child care worker or teacher who cares for infants and toddlers. Who hires and supervises the child care workers? Who creates and administers programs? Who oversees the operations of the center? Child care directors or administrators may not have daily contact with each infant, but their work affects infants and parents each day.

Child care directors are responsible for the operating and leading the work of a child care center. They play a lead role in constructing the center's mission statement, the philosophy that guides the center's work. Child care directors lead teachers in creating instructional resources to use in class and develop policies such as scheduling of outside time, naps, and other activities. They are also responsible for the running the business, including advertising, maintaining financial records, and directing human resources. Directors may market the center, take parents on tours of the facility, write budgets, and prepare annual reports. Human resource activities include hiring, overseeing and evaluating employees, and mediating disputes.

The requirements for becoming a child care director vary by state and center. Some require a bachelor's degree (or higher) in early childhood education. Others require a high school diploma. Some states and centers may require experience as a child care staff member before becoming a director. Most require directors of child care centers to have certification, such as the National Administration Credential (NAC), which requires completion of a 45-hour course. The 2020 median salary for child care directors was about \$49,000 (U.S. Bureau of Labor Statistics, 2021).

### Social Worker

Social workers work with individuals and families of all ages, providing counseling and identifying and helping them access needed resources. Social workers are advisers who advocate for others during transitions, crisis situations, and challenging circumstances. They help families navigate often confusing federal and state programs to obtain needed assistance, such as access to the WIC program, a federal program to promote the health of low-income *women, infants, and children* by providing nutritious food, housing assistance, medical treatment, and other aid. Social workers may engage in education and counseling, such as individual and group counseling sessions on topics such as parenting and coping skills. A bachelor's degree may offer preparation for entry-level positions in social work; a master's degree in social work (MSW) will provide many more opportunities, including independent practice as a *clinical social worker*.

Clinical social workers obtain master's degrees, additional supervised experience, and pass a certification exam to become licensed clinical social workers (LCSW). Clinical social workers provide psychological treatment, including diagnosing and treating psychological, emotional, and behavioral disorders and working with doctors and other medical professionals. They are employed in a variety of settings, including hospitals, schools, community mental health centers, social service agencies, and private practice. The median salary for clinical social workers was about \$57,000 in 2019 (Graves, 2020).

### Pediatric Nurse

There are many different kinds of nurses. Some specialize to work with specific populations, such as infants and children. Becoming a nurse requires earning an associate degree or bachelor's degree in nursing, obtaining experience, and passing a licensing exam. The associate degree prepares nurses for entry-level positions. Some employers prefer nurses with bachelor's degrees in nursing. Bachelor's degrees provide more opportunities to advance. Becoming certified as a registered nurse (RN) opens additional opportunities (and higher salaries). Certification as an RN requires two years of experience and passing an exam. Opportunities and salaries increase with education and experience.

Pediatric nurses are registered nurses who specialize in caring for patients from infancy through adolescence. Pediatric nurses perform physical examinations, measure vital statistics, educate parents and caregivers, and work alongside other health care providers, such as physicians, to promote children's health and well-being. Because their patients are so young, pediatric nurses often develop close connections with them and their families. An understanding of development is critical to the work of pediatric nurses because infants, children, and adolescents have different abilities and needs—and these change with development.

Pediatric nurses are found in hospitals, clinics, private practice, schools, and more. Becoming a pediatric nurse entails completing nursing school, gaining experience, and completing a licensure exam. In addition, pediatric nurses typically complete Certified Pediatric Nurse Examination to demonstrate their competence. In 2020 the median pay for all registered nurses was about \$75,000, but salaries vary with education, experience, and geographic location (U.S. Bureau of Labor Statistics, 2021).

### Pediatrician

Just as there are many types of nurses, there are many medical specialties and types of physicians (or doctors). Becoming a physician requires attending medical school, which requires four years of education beyond the bachelor's degree. In addition to passing a licensure examination, physicians complete a 3-year or longer residency program to gain hands-on experience and training within a specialty. Some seek additional specialty certification by completing a board examination. Pediatricians complete this process and specialize in treating infants, children, and adolescents.

Pediatricians provide treatment to infants, children, and adolescents to treat illnesses but also to improve their overall health and well-being. They perform tasks like routine checkups, provide immunizations and medications, order tests, refer patients to specialists for specific injuries or illnesses, and speak with parents about their child's treatment options. They assess children's growth, determine whether it is in the appropriate range, and if it is not, devise treatment plans. Pediatricians work in hospital settings, clinics, and independent practice. Pediatricians earned a median salary of about \$185,000 in 2020 (U.S. Bureau of Labor Statistics, 2021).

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# 19

## DEATH AND DYING



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At its simplest, death is the absence of life. It is unavoidable, comes hand-in-hand with life, and is the final state of the lifespan. In this chapter, we examine death and death-related issues across the lifespan, including evolving definitions of death, how people of varying ages understand and experience death, and the bereavement processes. The circumstances that surround death and its timing in the lifespan have changed radically over the last century, alongside advances in life expectancy.

### PATTERNS OF MORTALITY AND DEFINING DEATH

#### LEARNING OBJECTIVE

**19.1** Identify the leading causes of death and patterns of mortality and life expectancy.

Most babies born in 1900 did not live past age 50, but infants born in the United States today can expect to live to about age 80—and even longer in some countries, such as Japan (85 years) (Central Intelligence Agency, 2021). The rapid decline in mortality rates over the past century can be attributed to advances in medicine and sanitation. Many once-fatal conditions and diseases are now treatable. In 1900, the leading causes of death were infectious diseases, specifically pneumonia and flu, tuberculosis, and gastrointestinal infections (National Institute of Aging, 2011). Today, each of these illnesses can be prevented and treated. Although the trend over the last century is toward longer lives, in 2015, for the first time in recorded history, life expectancy declined—and has declined each year since. In 2017, the life expectancy at birth was 78.6 (Kochanek et al., 2019).

## Mortality and Life Expectancy

In the United States, mortality across all ages declined by over two-thirds between 1935 and 2014 (Figure 19.1) (Hoyert, 2012; Kochanek et al., 2017).

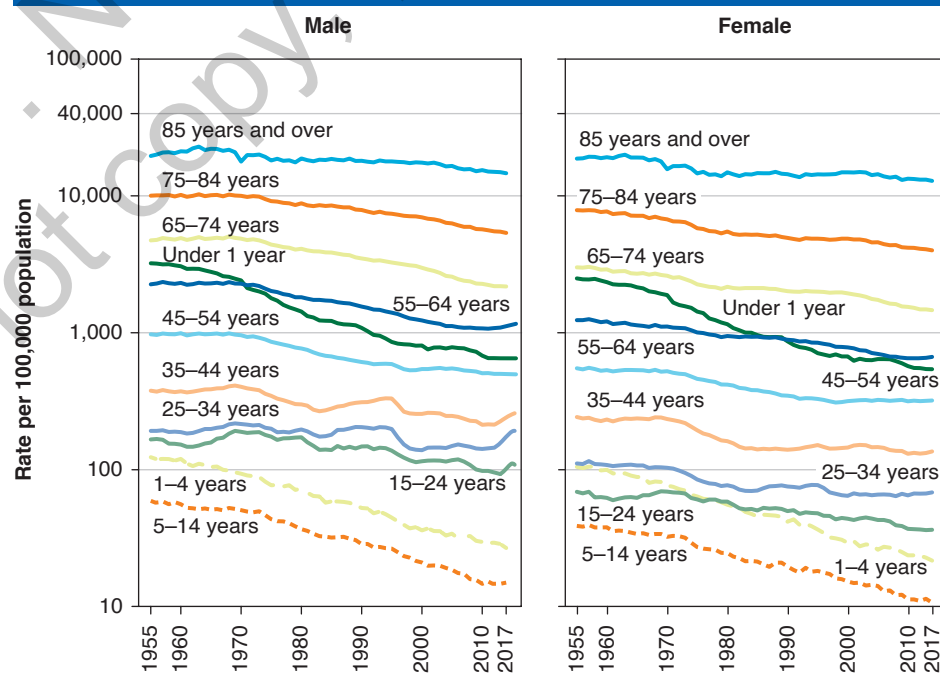
People of all ages demonstrate a reduced mortality rate, but the risk of dying has especially plummeted for infants and young children, with a roughly 15% decline in infant, neonatal, and postneonatal mortality since 2005 (Figure 19.2) (Ely & Driscoll, 2019). Similar changes have also occurred in the United Kingdom and other Western countries (Mathers et al., 2014; Office for National Statistics, 2014). Today women are less likely to die in childbirth, infants are more likely to survive their first year, children and adolescents are more likely to grow to adulthood, and adults are likely to overcome conditions that were once fatal.

However, there are large racial disparities in infant mortality (Figure 19.3). The mortality rate for Black non-Hispanic infants is more than twice that of Hispanic and non-Hispanic white infants (Ely & Driscoll, 2019). Racial differences in infant mortality are related to longstanding differences in access to resources, health care, education and wealth, and the cumulative effects of racism and discrimination.

Likewise, although the average life expectancy for infants born in the United States today is nearly 80, there are substantial racial and ethnic differences (Figure 19.4) (Kochanek et al., 2019). Hispanic women have the greatest expected lifespan (84 years), followed by non-Hispanic white women (81 years) and Black women (78 years).

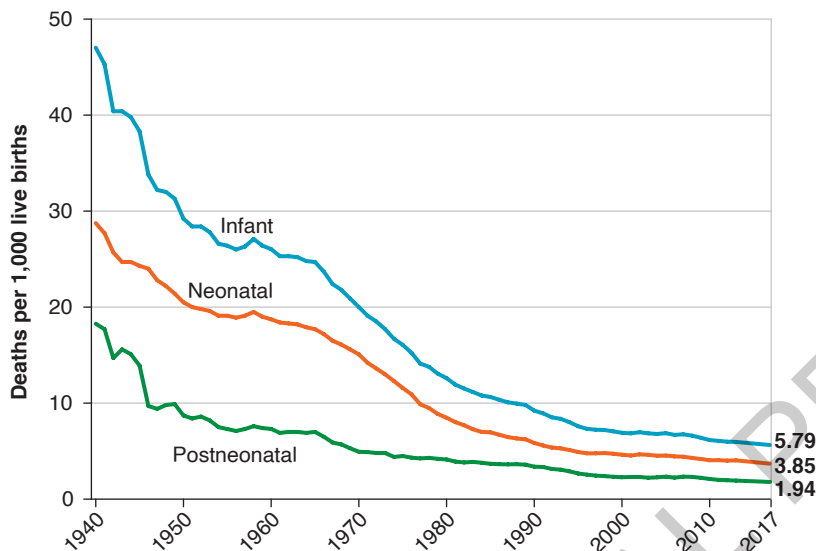
We have discussed the role of contextual factors as contributors to intersectional differences, such as access to resources, feelings of safety, and exposure to discrimination. Interestingly, although Hispanic women as members of a marginalized group are often exposed to risks to health and well-being, they have the greatest lifespan of women and men. Similar to the Latina paradox, there are likely cultural factors at play, such as the social support and the valuing of mothers and the maternal role. In contrast, Black women and men tend to accumulate more experiences with adversity throughout their lifetime, such as racial and gender discrimination, exposure to segregated schools and communities, and other forms of injustice. It is noteworthy that Black men have a lower life expectancy than other men and about 5 years less than white men.

**FIGURE 19.1** ■ Death Rates by Age and Sex in the United States, 1955 to 2017



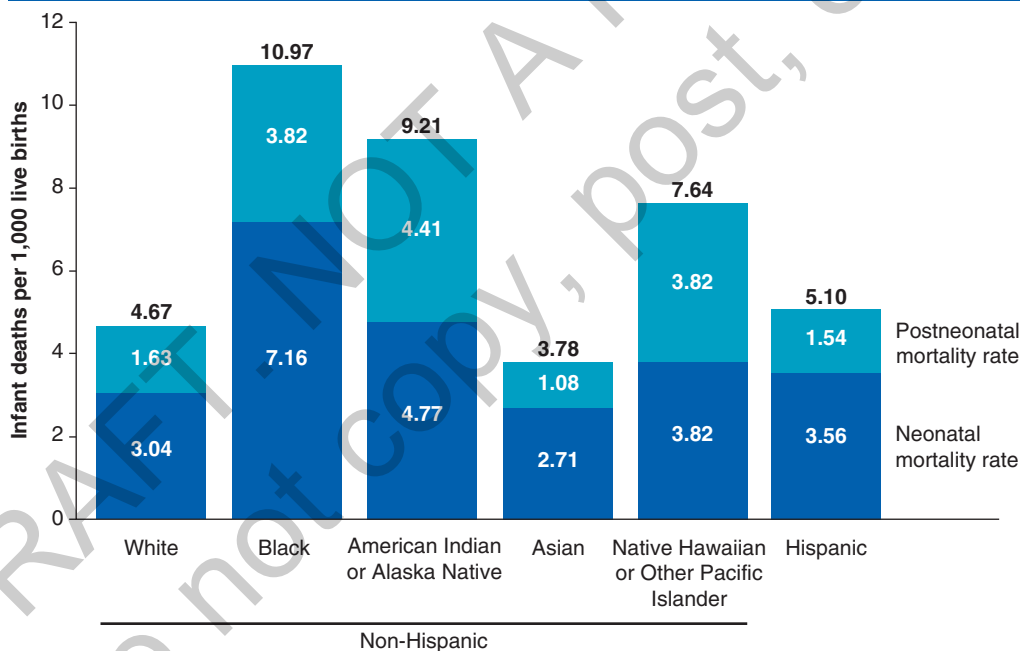
Source: Kochanek et al. (2019).

**FIGURE 19.2** ■ Infant, Neonatal, and Postneonatal Mortality Rates, 1940 to 2017



Sources: Ely & Driscoll (2019); Kochanek et al. (2017).

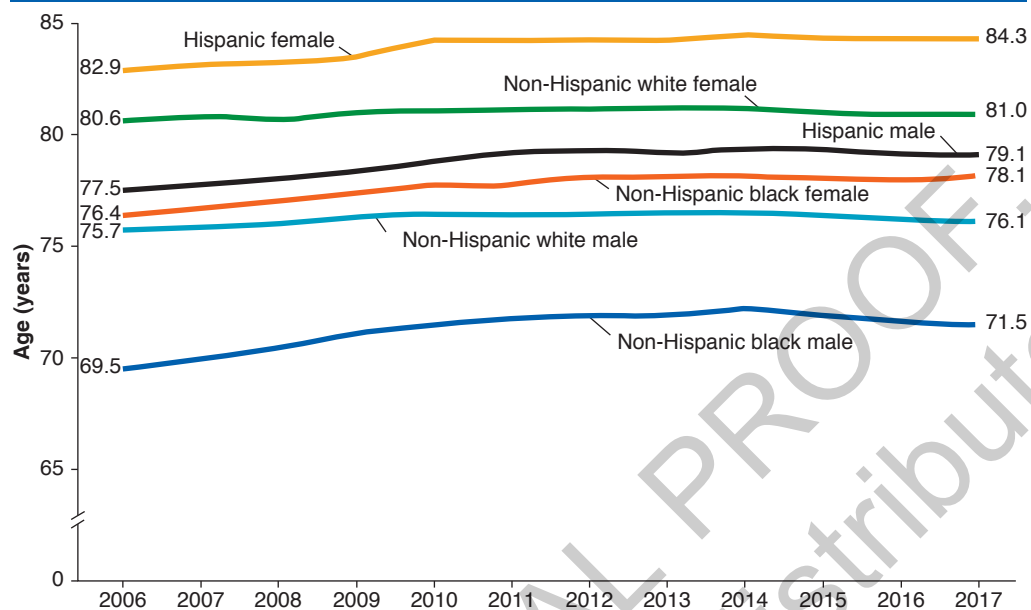
**FIGURE 19.3** ■ Infant Mortality Rates by Race and Hispanic Origin, 2017



Source: Ely & Driscoll (2019).

### Leading Causes of Death

As shown in Figure 19.5, the leading causes of death vary by age. Infants under a year of age are most likely to die from genetic, prenatal, and birth complications, followed by sudden infant death syndrome. Childhood deaths are most often due to accidents, illnesses, and alarmingly, homicide (which is most often the result of child maltreatment). Figure 19.5

**FIGURE 19.4** ■ Life Expectancy by Race, Hispanic Origin, and Sex, 2006–2017

Source: Kochanek et al. (2019).

Adolescents and adults through age 44 are most likely to die from unintentional injuries, such as falls and traffic accidents, but most often from drug overdose. In early adolescence, suicide is the second leading cause of death and remains so in early adulthood and into the mid-30s. Illnesses are a leading source of mortality throughout life, but homicide is a more common source of injury death from ages 15–34.

Over middle adulthood, cancer, heart disease, and injury become the top three causes of death, respectively. Suicide, the number four killer of adults age 45–54, becomes less common in the later middle adulthood years, dropping to eighth place. Chronic illnesses such as diabetes and diseases of the liver and respiratory system emerge as sources of mortality in midlife, particularly late midlife. Older adults over the age of 65 are most likely to die of chronic illnesses, with heart disease as the number one killer, followed by cancer. Alzheimer's disease emerges as the fifth most common cause of death in adults age 65 and older.

Although unintentional injuries are the leading causes of death through age 44, the most common sources of injuries vary with age. Accidental suffocation is common in infancy and childhood, and drowning is a top source of unintentional death in childhood and adolescence, and declines into middle adulthood. Unintentional poisoning, most often through drug overdose, is the second leading cause of injury death from ages 15–24 and the leading cause of injury deaths throughout early and middle adulthood, from ages 25–64.

Today, most overdose deaths can be attributed to the opioid crisis. It is estimated that two-thirds of overdose deaths are from opioids and one-half are from prescription drugs (including prescribed opioids) (Centers for Disease Control and Prevention, 2017; Katz, 2017). Drugs classified as opioids have a sedative effect, and in high doses they can impair the part of the brain that regulates breathing, slowing and ceasing breathing, leading to death. Therefore, in addition to being highly addictive, opioids carry a high risk of overdose. Moreover, overdoses continue to rise, increasing up to 30% in a 1-year period in some areas of the United States (Centers for Disease Control and Prevention, 2018). Canada has experienced similar increases, with a 2017 report noting that emergency department visits as a result of opiate overdose rose 1,000% in the 5 years prior (Ubelacker, 2017).

The most common causes of accidents and deaths tend to change over time with shifts in sociohistorical context. The COVID-19 pandemic is likely the most notable sociohistorical event over the past

**FIGURE 19.5 ■ Leading Causes of Death by Age, 2018**

Rank	<1	1–4	5–9	10–14	15–24	25–34	35–44	45–54	55–64	65+	Total
1	Congenital Anomalies 4,473	Unintentional Injury 1,226	Unintentional Injury 734	Unintentional Injury 692	Unintentional Injury 12,044	Unintentional Injury 24,614	Unintentional Injury 22,667	Malignant Neoplasms 37,301	Malignant Neoplasms 113,947	Heart Disease 526,509	Heart Disease 655,381
2	Short Gestation 3,679	Congenital Anomalies 384	Malignant Neoplasms 393	Suicide 596	Suicide 6,211	Suicide 8,020	Malignant Neoplasms 10,640	Heart Disease 32,220	Heart Disease 81,042	Malignant Neoplasms 431,102	Malignant Neoplasms 599,274
3	Maternal Pregnancy Comp. 1,358	Homicide 353	Congenital Anomalies 201	Malignant Neoplasms 450	Homicide 4,607	Homicide 5,234	Heart Disease 10,532	Unintentional Injury 23,056	Unintentional Injury 23,693	Chronic Low. Respiratory Disease 135,560	Unintentional Injury 167,127
4	SIDS 1,334	Malignant Neoplasms 326	Homicide 121	Congenital Anomalies 172	Malignant Neoplasms 1,371	Malignant Neoplasms 3,684	Suicide 7,521	Suicide 8,345	Chronic Low. Respiratory Disease 18,804	Cerebro-vascular 127,244	Chronic Low. Respiratory Disease 159,486
5	Unintentional Injury 1,168	Influenza & Pneumonia 122	Influenza & Pneumonia 71	Homicide 168	Heart Disease 905	Heart Disease 3,561	Homicide 3,304	Liver Disease 8,157	Diabetes Mellitus 14,941	Alzheimer's Disease 120,658	Cerebro-vascular 147,810

Source: Centers for Disease Control and Prevention (2020).



Deemed an epidemic by the U.S. Department of Health and Human Services, opioid overdoses are responsible for the decline in life expectancy since 2015.

iStock/BackyardProduction

century, with long-lasting effects. As of this writing, final data on deaths in 2020 are not available, but early estimates suggest that the death rate rose by about 16% to 18%, and COVID-19 was the third leading cause of death, overall, in 2020 (Ahmad et al., 2021; Ahmad & Anderson, 2021).

### Thinking in Context: Intersectionality

Considering what you know about development and health over the lifespan, apply a bioecological systems perspective (see Chapter 1) to account for the wide racial and ethnic disparities in rates of mortality and expected lifespan. What factors contribute to health over our lifetimes, and how might these relationships vary with intersectional factors like race, ethnicity, sex, or socioeconomic status? Specifically, consider the following:

1. What microsystem factors contribute to health and influence risks for mortality in infancy? Childhood? Adolescence? Adulthood?
2. How might these microsystem factors interact (mesosystem) to influence mortality rates?
3. Give examples of how exosystem factors influence individuals' health. How might these factors vary with differences in neighborhoods and neighborhood SES?
4. What risks do disadvantaged communities pose for individuals' health over the lifespan? How might exposure to these factors change with age, from infancy through late adulthood?
5. Considering the macrosystem, how might societal attitudes, cultural values, and a country's legal system influence life expectancy and racial differences in mortality rates?

## DEATH AND END-OF-LIFE ISSUES

### LEARNING OBJECTIVE

**19.2** Examine definitions of death and end of life considerations.

People of all ages desire a sense of control over what happens to them, whether it is as simple as an infant's choice of play toy or as complex as an older adult's choice of living situation. This is especially true when it comes to the many decisions that surround death. **Death with dignity** refers to ending life in a way that is true to one's preferences, controlling one's end-of-life care (Guo & Jacelon, 2014; Kastenbaum & Moreman, 2018). End-of-life issues are particularly important to consider because death itself is not easily defined.

### Defining Death

The actual moment of death is not easy to determine. In prior centuries, death was defined as the cessation of cardiopulmonary function. A person was dead once the heart stopped beating, now referred to as **clinical death**. When the heart stops beating, blood, and thereby oxygen, no longer circulates throughout the body and permanent brain damage can occur after 3 minutes of oxygen deprivation (Dennis, 2008). Today's medical practices, including the widespread dissemination of cardiopulmonary resuscitation (CPR) techniques, have permitted many people to regain a heartbeat and be "revived" from clinical death. A heartbeat is no longer a clear marker of life, or in its absence, death.

Advances in technology have led to new ways of defining death. As mechanical ventilators became commonplace in operating rooms and intensive care settings, it became possible to artificially maintain patients who had irreversible injuries, to keep patients alive on ventilators. It is possible for the heart to continue to beat even though the person cannot eat, think, or breathe on his or her own. Therefore, more precise definitions of death are needed. A 1968 physician-led committee at Harvard Medical School concluded that patients who meet criteria for specific severe neurological injuries may be pronounced dead before cardiopulmonary cessation occurs (Harvard Medical School Ad Hoc Committee, 1968)—that is, **whole brain death**, which is the irreversible loss of functioning in the entire brain. Whole brain death is the death of the higher and lower brain regions, the cortex and brainstem, without possibility of resuscitation (McMahan True et al., 2001). Death is declared if all criteria are met and other conditions that may mimic death, such as a drug overdose or deep coma, are ruled out. Patients who are brain dead may be temporarily sustained artificially for the purpose of organ donation.

The President's Commission for the Ethical Study of Problems in Medicine, Biomedical, and Behavioral Research 1981 established the criteria used to diagnose whole brain death:

1. No spontaneous movement in response to stimuli
2. No spontaneous respiration for at least one hour
3. Total lack of responsiveness to even the most painful stimuli
4. No eye movements, blinking or pupil responses
5. No postural activity, swallowing, yawning, or vocalizing
6. No motor reflexes
7. A flat electroencephalogram (EEG) for at least 10 minutes
8. No change in any of these criteria when they are tested again 24 hours later

The 2008 report of the President's Council on Bioethics reaffirmed the whole brain definition of death. Under the Uniform Determination of Death Act, all 50 U.S. states and the District of Columbia apply the whole brain standard in defining death, thereby permitting a person to be declared legally dead and removed from life support.

The most controversial definition of death looks beyond the whole brain standard. In the late 19th century, several researchers and physicians noted instances in which brain damage caused a cease in cortical functioning while the heart continued to beat. The cortex is the part of the brain most vulnerable to conditions of *anoxia*, the loss of oxygen. Inadequate blood supply to the brain after heart attack, stroke, drowning, or traumatic brain injury can irreparably damage the cortex while leaving the brainstem intact and functional. The neurons of the brainstem often survive stressors that kill cortex neurons (Brisson et al., 2014), resulting in cortical death, or a **persistent vegetative state (PVS)**, in which the person appears awake but is not aware, due to the permanent loss of all activity in the cortex (Laureys et al., 2010). Despite cortical death, PVS patients retain an intact brainstem, which permits heart rate, respiration, and gastrointestinal activity to continue.

The PVS patient is neither clinically dead nor meets the criteria for whole brain death. He or she remains biologically alive despite lacking the



Nieves Melendez tends to her son, former professional boxer Prichard Colón, while he lies in a vegetative state after suffering a traumatic brain injury during his bout against Terrell Williams.

The Washington Post/Contributor/Getty Images



capacity to regain awareness and cognitive capacities. The patient may open his or her eyelids and show sleep-wake cycles but does not show cognitive function, as indicated by measures of brain activity, such as MRI, EEG, and PET scans (Bender et al., 2015). Loved ones may be misled by spontaneous reflexive movements of the arms and legs and random facial expressions to believe that the patient is capable of cognitive functions and experiences emotions (Cranford, 2004). Reflexes are controlled by the spinal cord and lower regions of the brain that are not involved in conscious awareness. When the condition first appears it is referred to as a vegetative state, but after 4 weeks the patient is diagnosed with persistent vegetative state (The Multi-Society Task Force on PVS, 1994). Approximately 30,000 U.S. patients are held captive in this condition (Brisson et al., 2014).

Although the medical community typically considers a PVS patient as dead, given the irrevocable lack of awareness and loss of cortical function, PVS does not meet the criteria for whole brain death and is not recognized as death by U.S. legal statute (McMahan, 2001). Canada and several other countries acknowledge cortical death (Teitelbaum & Shemie, 2016). Supporters of the cortical definition of death argue that the cortex is responsible for what makes us human—thought, emotion, and personality. From this view, when higher cortical functions have ceased, these capacities are lost. Courts require authoritative medical opinion that recovery is not possible before terminating life-prolonging activities (Cranford, 2004). Several lengthy and dramatic court cases have caused many people to consider and communicate their own wishes regarding how they want to die.

### Advance Directives

Planning and communication are key to helping people die with dignity. The individuals' wishes must be known ahead of time because dying patients are usually unable to express their wishes. Without prior communication, dying patients often cannot participate in decisions about their own end-of-life care, such as pain management, life-prolonging treatment, and memorial services. These decisions will likely be made by the persons who surround them—spouse, children, family members, friends, or health care workers—and these persons may well have views that differ from those of the patients. The Patient Self-Determination Act (PSA) of 1990 guaranteed the right of all competent adults to have a say in decisions about their health care by putting their wishes regarding end-of-life and life-sustaining treatment in writing.

Advance directives, including a living will and a durable power of attorney, are an important way of ensuring that people's preferences regarding end-of-life care are known and respected.

A **living will** is a legal document that permits people to make known their wishes regarding medical care if they are incapacitated by an illness or accident and are unable to speak for themselves. The individuals can identify what, if any, medical intervention should be used to prolong their lives if they are unable to express a preference. For example, should artificial respiration or a feeding tube be used? They can also explicitly designate the medical treatment they do not want. A **durable power of attorney** for health care is a document in which individuals legally authorize a trusted relative or friend (called a *health care proxy*) to make health care decisions on their behalf if they are unable to do so. It is important to have both a living will and a durable power of attorney, as they each fulfill different functions.

Determining final wishes and communicating them in advance directives can ease the process of dying, both for dying persons and for their families. Advance directives permit patients to take control over their health care, their deaths, and what happens to their bodies and possessions after death. They facilitate communication about health care needs and preferences and can reduce anxiety on the part of patients (Nelson & Nelson, 2014). Advance directives foster patients' autonomy and help them to retain a sense of dignity as they die. Caregivers benefit from advance directives because an understanding of the patients' wishes can help in decision-making, and in reducing stress, emotional strain, and, potentially, guilt (Radwany et al., 2009).

Despite the many benefits of advance directives, they are underused. Overall, about one in three U.S. adults have written some form of advance directive (Yadav et al., 2017). Older adults are most likely to have completed advance directives (about 40% to 50%), and they are typically the ones to initiate conversations with family members about end-of-life issues (Gamertsfelder et al., 2016; Rao et al., 2014). About one-third of 50- to 64-year-old adults and only about one-fifth of 30- to 49-year-old

adults report having written down their wishes for end-of-life treatment (Pew Research Center, 2009). Yet advance directives are not just for the old or the ill. Many argue that it is the healthy—especially the young and healthy—who benefit most from living wills and health care proxies (Khan, 2014). Young people and their families are often unprepared for the decisions that may accompany the sudden loss of decision-making capacities and consciousness, such as from an accident or serious illness. Advance directives can spare spouses and families the anguish, guilt, and potential conflict among family members of making decisions for a loved one without knowing his or her wishes.

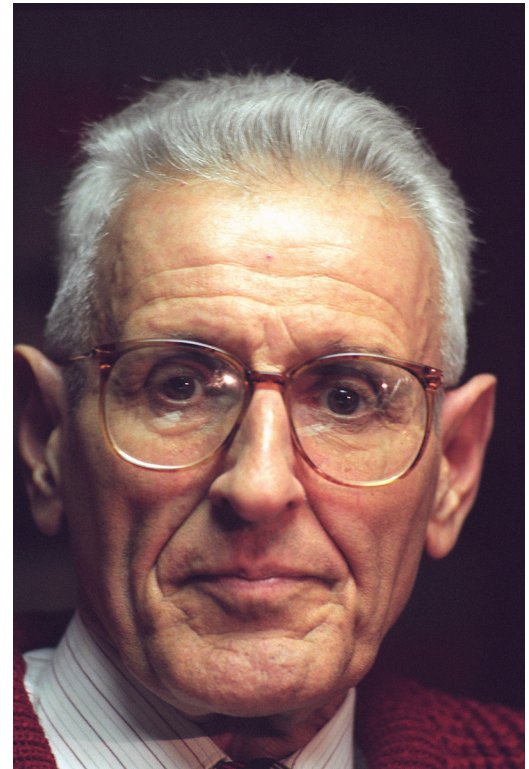
### Euthanasia

Through a living will, one might articulate when life-prolonging care may be withdrawn and under what conditions euthanasia is acceptable. **Euthanasia** (“easy death”) refers to the practice of assisting terminally ill people in dying more quickly (Jecker, 2006; van der Maas, 1991). It is controversial, but the courts have permitted euthanasia in many hopeless cases, such as that of a patient named Nancy Cruzan. On January 11, 1983, then-25-year-old Nancy Cruzan lost control of her car, was thrown from the vehicle, and landed face down in a water-filled ditch. She was resuscitated by paramedics after about 15 minutes without breathing. After 3 weeks in a coma, Nancy was diagnosed as being in a persistent vegetative state. She remained alive as a PVS patient until 1987, when Nancy’s parents asked that her feeding tube be removed. Although a county judge authorized the request, the state of Missouri contested it. The resulting Supreme Court decision in *Cruzan v. Director, Missouri Department of Health* held that treatment can be refused in extraordinary circumstances, but clear and convincing evidence of Nancy’s own wishes would be needed. The court accepted testimony from friends and family that Nancy had told them she would not want to live in a disabled condition. Nancy Cruzan died 2 weeks after her feeding tube was removed, in December 1990. The Cruzan case was pivotal in supporting the right-to-die movement.

Distinctions are commonly made between passive and active euthanasia (Jecker, 2006). **Passive euthanasia** occurs when life-sustaining treatment, such as a ventilator, is withheld or withdrawn, allowing a person to die naturally, as happened in the case of Nancy Cruzan. In **active euthanasia**, death is deliberately induced, such as by administering a fatal dose of pain medication. More than two-thirds of U.S. adults and 95% of physicians support passive euthanasia (Curlin et al., 2008; Pew Research Center, 2013). Most adults say there are at least some situations in which they, personally, would want to halt medical treatment and be allowed to die. For example, 57% say they would tell their doctors to stop treatment if they had a disease with no hope of improvement and were suffering a great deal of pain. And about half (52%) say they would ask their doctors to stop treatment if they had an incurable disease and were totally dependent on someone else for their care. Yet, about a third of adults (35%) say they would tell their doctors to do everything possible to keep them alive—even in dire circumstances, such as having a disease with no hope of improvement and experiencing a great deal of pain (Pew Research Center, 2013). These are difficult questions, and there is no clear consensus on solutions.

### Physician-Assisted Suicide

**Physician-assisted suicide** is a type of voluntary active euthanasia in which terminally ill patients make the conscious decision that they want their life to end before dying becomes a protracted process. Patients receive from physicians the medical tools needed to end their lives. The patient self-administers the medication. Physician-assisted suicide is legal in the Netherlands, Luxembourg, and Switzerland (Grosse & Grosse, 2015) and is often tacitly accepted in other countries. Until recently, assisting a suicide was illegal throughout North America; Canada adopted physician-assisted suicide starting in 2016, and physician-assisted suicide is legal in several U.S. states (Fine, 2015; Ollove, 2015).



Dr. Jack Kevorkian (1928–2011) helped over 100 terminally ill patients end their lives, prompting a continuing debate over physician-assisted suicide.

ZUMA Press, Inc./Alamy Stock Photo

The most widely publicized cases of physician-assisted suicide involved Dr. Jack Kevorkian, a Michigan physician who helped over 100 terminally ill patients end their lives. Kevorkian created a “suicide machine” that allowed a patient to press a button to self-administer anesthesia and medication that stops the heart. In 1998, Kevorkian was arrested after a segment televised on the program *60 Minutes* aired in which he assisted in the death of a 52-year-old man who suffered from a terminal neurological disease. Although it was flagrantly displayed on television, the procedure was illegal and led to Kevorkian’s arrest, trial, and conviction on second-degree murder charges. He was released from prison in 2007 after serving 8 years of a 10- to 25-year sentence. He died in 2011 after being diagnosed with liver cancer.

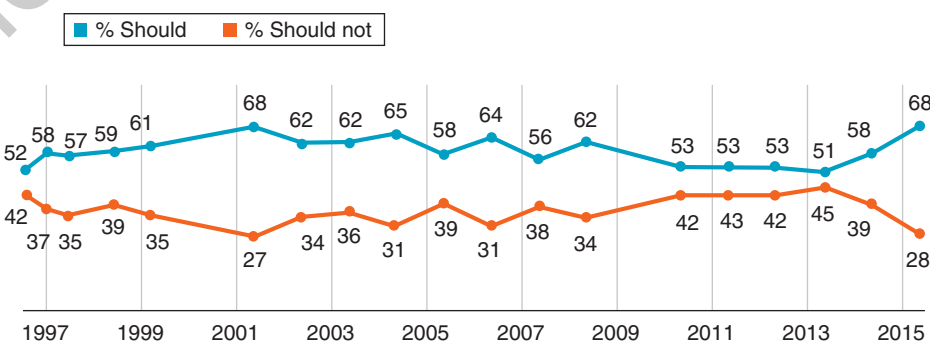
As of 2021, the practice of physician-assisted suicide is legal in the U.S. states of California, Colorado, Hawaii, Maine, New Jersey, New Mexico, Oregon, Vermont, and Washington and the District of Columbia (Houghton, 2021). Oregon was the first U.S. state to legalize assisted suicide. Under Oregon’s Death with Dignity Act, enacted in 1997, terminally ill Oregonians may end their lives through the voluntary self-administration of lethal medications, expressly prescribed by a physician for that purpose. Under the Oregon law, an adult Oregon resident who has been diagnosed by a physician with a terminal illness that will kill the patient within 6 months may request in writing a prescription for a lethal dose of medication for ending the patient’s life. The patient must initiate the request and must be free of any mental condition that might impair judgment. The request must be confirmed by two witnesses and at least one of them (1) must not be related to the patient, (2) must not be entitled to any portion of the patient’s estate, (3) must not be the patient’s physician, and (4) must not be employed by a health care facility caring for the patient. After the request is made, a second physician must examine the patient’s medical records and confirm the diagnosis. If the request is authorized, the patient must wait an additional 15 days to make a second oral request before the prescription can be written.

Since the Oregon law was enacted in 1997, a total of 2,895 people have had prescriptions written and 1,905 patients have died from ingesting medication prescribed under the act (Oregon Public Health Division, 2021). Three-quarters of patients who died were over the age of 65 and the median age at time of death for all people was 72. Over three-quarters had been diagnosed with cancer. The top three concerns reported by patients as influences on their decisions were being less able to engage in activities to enjoy life, loss of autonomy, and loss of dignity (Oregon Public Health Division, 2021).

The Oregon Death with Dignity Act has permitted many suffering adults to end their lives on their own timetable, but physician-assisted suicide remains controversial in the United States. As shown in Figure 19.6, most U.S. adults in 2016 (69%) agreed that euthanasia should be legal and that doctors should be allowed to end a patient’s life by painless means. Moreover, 51% said they would consider ending their lives if faced with terminal illness (Swift, 2016). Yet debates regarding physician-assisted suicide are unlikely to be resolved at any time soon.

**FIGURE 19.6** ■ Physician-Assisted Suicide

*When a person has a disease that cannot be cured and is living in severe pain, do you think doctors should or should not be allowed by law to assist the patient to commit suicide if the patient requests it?*



Source: Lipka (2015).

## Hospice

The desire to die with dignity, minimal pain, and on one's own terms has advanced the hospice movement. **Hospice** is an approach to end-of-life care that emphasizes dying patients' needs for pain management; psychological, spiritual, and social support; and death with dignity (Connor, 2018). The philosophy of the hospice approach does not emphasize prolonging life but rather prolonging quality of life. Although death occurs most often in hospitals, most dying people express the desire to die at home with family and friends (Weitzen et al., 2003). Dying persons have needs that set them apart from other hospital patients, and hospital settings are often not equipped to meet these needs. Rather than medical treatment, dying patients require **palliative care**, focusing on controlling pain and related symptoms. Hospice services are enlisted after the physician and patient believe that the illness is terminal and no treatment or cure is possible.

Hospice services may be provided on an inpatient basis, at a formal hospice site that provides all care to patients, but they are frequently provided on an outpatient basis in a patient's home (Connor, 2018). Outpatient hospice service is becoming more common because it is cost-effective and enables the patient to remain in the familiar surroundings of his or her home. Home hospice care is associated with increased satisfaction by patients and families (Candy et al., 2011). Whether hospice care is given on an inpatient or outpatient basis, the patient care team typically includes physicians, nurses, social workers, and counselors who act as spiritual and bereavement counselors and support the patient in facing his or her impending death and help the patient's loved ones cope with the loss.



Hospice services permit dying patients to remain in their home, comfortable, and feel a sense of control in the death process. Counseling services help families assist the dying person, cope with their own needs, and strengthen connections with the dying person. Hospice services permit death with dignity that honors a loved one's wishes.

John Moore/Getty Images

### Thinking in Context: Lifespan Development

1. In what ways might the developmental tasks of identity and autonomy, developing a sense of self and the ability to make and carry out choices, be embodied in end-of-life choices, such as advance directives, euthanasia, physician-assisted suicide, and hospice?
2. How might context, including culture and historical time, influence choices individuals make about end-of-life care?

## CONCEPTIONS OF DEATH ACROSS THE LIFESPAN

### LEARNING OBJECTIVE

**19.3** Contrast views of death, including children's, adolescents', and adults' understanding of death.

There are many ways of conceptualizing death, and cultural beliefs about the nature of death vary. People's understanding of death also shifts over the lifespan.

## Cultural Rituals and Views of Death

There is great variability in cultural views of the meaning of death and the rituals or other behaviors that express grief (Rosenblatt, 2008). Many cultures within the South Pacific do not differentiate death as a separate category of functioning. Melanesians use the term *mate* to refer to the very old, the very sick, and the dead; all other living people are referred to as *toa* (Counts & Counts, 1985). Other South Pacific cultures explain that the life force leaves the body during sleep and illness; therefore, people experience forms of death over the course of their lifetime before experiencing a final death (Counts & Counts, 1985). The Kwanga of Papua New Guinea believe that most deaths are the result of magic and witchcraft (Brison, 1995).

Perhaps the most well-known death rituals were practiced by the ancient Egyptians. They believed that the body must be preserved through mummification to permanently house the spirit of the deceased in his or her new eternal life. The mummies were surrounded by valued objects and possessions and buried in elaborate tombs. Family members would regularly visit, bringing food and necessities to sustain them in the afterlife. Egyptian mummies are the most familiar, but mummies have been found in other parts of the world such as the Andes mountains of Peru (Whitbourne, 2007).

The Bornu of Nigeria enlist family members to wash the deceased, wrap the body in a white cloth, and carry it to the burial ground (Cohen, 1967). In the French West Indies, the deceased's neighbors wash the body with rum, pour a liter or more of rum down the throat, and place the body on a bed (Horowitz, 1967). The Hopi Indians of North America view life and death as phases of a cycle (Oswalt, 2009), with death representing an altered state.

In South Korea today, a small minority of people still choose to employ the services of a *mudang* (Korean "shaman") to conduct a lengthy ritual known as *Ogu Kut*, in which the *mudang* summons the deceased's spirit into the ritual space; expresses the deceased's feelings of unhappiness through song, dance, and the spoken word; and encourages the bereaved to express their own grievances within sym-

bolic psychodrama. Once the emotional ties between the bereaved and the deceased have been loosened, prayers for protection are offered to various deities, and the *mudang* guides the spirit toward the Buddhist paradise. Finally, the deceased's earthly possessions are cremated and the bereaved are left better able to move on in their lives (Mills, 2012).

Death rituals vary among religions. Among Hindus, a good death is a holy death, one that is welcomed by the dying person, who rests on the ground and is surrounded by family and friends chanting prayers (Dennis, 2008). Buddhists believe that the dying person's task is to gain insight. Death is not an end, as the individual will be reincarnated in the hopes of reaching nirvana, an ultimate, perfect state of enlightenment. Among Jews, the dying person remains part of the community and is never left alone before or immediately after death. Christians generally believe that death is the entry to an eternity in heaven or hell, and thereby is an event to be welcomed (generally) or feared (rarely). In Islam, death is united with life, because it is believed that the achievements and concerns of this life are fleeting, and everyone should be mindful and ready for death. Muslim death rituals, such as saying prayers and washing the body, aid in the dying person's transition to the afterlife.

Many cultures express beliefs in **noncorporeal continuation**, the view that some form of life and personal continuity exists after the physical body has died (Kenyon, 2001). A spirit may endure, life may persist in heaven, or a soul may be reincarnated into another body. These beliefs are consistent with the doctrine of many religions and can coexist with mature understandings of death as the irreversible and inevitable ceasing of biological functioning (Corr & Corr, 2013). Researchers generally agree that, in Western cultures, a person has a mature understanding of death when the following four components are understood (Barrett & Behne, 2005; Kenyon, 2001; Panagiotaki et al., 2015; Slaughter & Griffiths, 2007).



The Cremation Ceremony held in Bali, Indonesia, is a ritual performed to send the deceased to the next life. The body is placed in a wood coffin inside a temple-like structure made of paper and wood. The structure and body are burned to release the deceased's spirit and enable reincarnation.

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1. *Nonfunctionality*, the understanding that death entails the complete and final end of all life-defining abilities or functional capacities, internal and external, that are typically attributed to a living body.
2. *Irreversibility*, the understanding that the processes involved in the transition from being alive to being dead and the resulting state of being dead cannot be undone. Once a thing dies, its physical body cannot be made alive again.
3. *Inevitability*, the understanding that death is universal, that all living things will someday die.
4. *Biological causality*, the understanding that death is caused by events or conditions that trigger natural processes within the organism and that it is not caused by bad behavior or wishes.

### Children's Understanding of Death

Children encounter death in many ways. Grandparents, parents, other important adults, siblings, and friends may die. Pets are often children's first experience with unconditional love, and most children will experience the death of a pet as a significant event (Leming & Dickinson, 2020). Children have more exposure to death and death themes than many adults realize. They overhear adults talking about the deaths of elderly relatives or public figures. Television reports describe homicides and mass shootings, car crashes, disasters, and war. During the COVID-19 pandemic in 2020–2021, discussions of death tolls were widespread in the media and many children were exposed to death firsthand through family friends, relatives, and even parents.

Considering such exposure to the subject of death, it is not surprising that children's play is riddled with death-related themes (Bettelheim, 1977; Opie & Opie, 1969). We have seen that play is the work of childhood, and as such it is a way that children make sense of the world, including death (Corr, 2010a). Children often act out crashes with their cars or killing with toy soldiers. Death themes appear in children's rhymes, songs, and fairy tales (Lamers, 1995). The song *Rock-a-Bye, Baby* culminates with a falling cradle and the child's prayer "*Now I lay me down to sleep*" asks for safekeeping against danger and death (Achté et al., 1989). The wicked stepmother demands Snow White's heart as proof of her death, and the big bad wolf in the "Three Little Pigs" falls down the chimney of the third pig's house into a pot of boiling water. Death themes in rhymes and play may help children work through fears related to loss in safe ways.

Although children do not understand loss and death in the same way as adults, they often have a more mature understanding of these events than many adults realize (Gaab et al., 2013). Even infants can sense that something unusual is happening when the adults around them grieve. They notice changes in the emotional tone of their families, the presence of caregivers, and the degree to which their emotional needs are met or interrupted (Leming & Dickinson, 2020). Separation from a caregiver is felt as loss. Severe loss might affect infants' resolution of a psychosocial task of infancy: developing a sense of trust in caregivers and the world.

Young children perceive events around them before they have developed the ability to understand or explain them. They may understand death as a departure, but not as permanent (Rapa et al., 2020). Instead, young children between the ages of 3 and 5 tend to view death as temporary and reversible. They believe dead things can become alive spontaneously and as the result of medical intervention, after eating or drinking, and by magic, wishful thinking, or prayer (Corr, 2010a; Slaughter, 2005). They may imagine that the person who has



Children visit a relative's grave during the *día de los muertos* celebration.

iStock/Joel Carillet

died is actually still living but under alternative circumstances (Barrett & Behne, 2005; Slaughter & Griffiths, 2007). They may describe death as sleep, with the corresponding ability to wake up, or a trip from which a person can return. They may personify death as a figure, a spirit that comes and “gets” you (Leming & Dickinson, 2020). They may believe that only people who want to die or who are bad die. Before they understand nonfunctionality, children view dead things as possessing reduced or diminished capacities, but retaining some abilities such as to feel hunger pangs, wishes, beliefs, and love (Bering & Bjorklund, 2004). Before they understand the inevitability of death, young children think that there are actions they could take to avoid death, such as being clever enough to outsmart it or being lucky (Speece & Brent, 1984). A mature understanding of biological death gradually emerges alongside cognitive development.

By 5 to 6 years of age, children understand that death is irreversible (Rapa et al., 2020). Children come to see death as inevitable and may even recognize that they will someday die. Biological causality is the most complex element of the death concept and the final element to be acquired, emerging as early as 6 or 7, but often in late childhood (Bonoti et al., 2013; Longbottom & Slaughter, 2018). Advances in executive function are closely related with the emergence of a biological theory of death, as these cognitive capacities permit the abstract thinking needed for mature conceptions of death (Zaitchik et al., 2014). Typically, an understanding of the biological nature of death is mastered by about age 10 (Bonoti et al., 2013; Renaud et al., 2015). Research comparing white British, Muslim British, and Muslim Pakistani children suggests that this pattern of change in biological explanations for death occurs cross-culturally (Panagiotaki et al., 2015). Such findings are consistent with those from children in Australia (Slaughter & Griffiths, 2007), the United States (Lazar & Torney-Purta, 1991), and Israel (Schonfeld & Smilansky, 1989).

Despite cross-cultural similarities in biological conceptions of death, there are contextual differences in children’s exposure to death and these differences influence children’s understanding of death. Some children receive more exposure to death through media depictions of pandemics, war, accidents, and devastating living conditions. Others experience death firsthand. Many children in all parts of the world, including North America, are exposed directly to violence within their families and communities and may witness or be aware of traumatic events and deaths at home and in their neighborhoods. Children who reside in war-torn and poverty-stricken nations often experience multiple losses (Masten et al., 2015). How children make sense of these events and how they understand death changes with age and experience. Children who have direct, personal experience of death tend to show a more advanced and realistic understanding of death than their peers (Bonoti et al., 2013; Hunter & Smith, 2008; Longbottom & Slaughter, 2018).

How parents talk to children about death, and whether they talk about death, influences children’s understanding. Parents of young children, age 3 to 6, tend to report believing that their children are not capable of grasping or coping with the concept of death (Miller & Rosengren, 2014a; Nguyen & Rosengren, 2004). U.S. parents often shield their young children from death by not taking them to funerals or memorial services, controlling their access to death in television and movies, and talking with them about death minimally, indirectly, or not at all (Leming & Dickinson, 2020; Miller & Rosengren, 2014b). Parents are most likely to report having discussed death when the child has experienced a death of some kind, regardless of age; more conversations took place as the child’s age increased (Renaud et al., 2015).

Although parents may not initiate talk about death, children ask about death as early as age 3, frequently after a death in the family (Renaud et al., 2015). Children tend to ask general questions about death, such as what happens to people when they die, as well as its causes. While children often ask about the biology of death, parents tend to emphasize information about religious and spiritual elements (Menendez et al., 2020).

Culture is a powerful influence on conceptions of death. European American parents often shield their children from death. In contrast, Mexican and Mexican American parents are likely to believe that children should become familiar with death and are likely to include them as active participants in rituals related to death, such as wakes and funerals (Gutiérrez et al., 2014b). These attitudes are supported by traditional Mexican practices, such as the *día de los muertos* (Day of the Dead), a national holiday held each year from October 31 to November 2. At this time, dead relatives are said to return

to their homes to eat, drink, and visit with the living. The celebration includes images such as skeletons in festive outfits engaging in everyday activities: dancing, playing instruments, getting married, and so forth. Children participate with other community members in celebrations and vigils held in cemeteries (Gutiérrez, 2009). The *día de los muertos* holiday is intended to welcome the dead and to celebrate death as the continuation of life. Most children who participate in this celebration indicate that their dead relatives visit and eat, even though they understand that death is irreversible and physical functions cease (Gutiérrez et al., 2020).

Diverse beliefs about death often coexist. Harris and Gimenez (2005) found that belief in the afterlife among Spanish children increased between the ages of 7 and 11, along with religious explanations for death. However, children were more likely to offer religious explanations for death in response to vignettes highlighting religious themes than in response to vignettes highlighting medical themes indicating that children hold multiple conceptions of death, depending on context. Children who grow up in cultures that endorse both religious and biological views of death may hold both spiritual and biological explanations about death (Busch et al., 2017; Gutiérrez et al., 2014a; Legare et al., 2012; Panagiotaki et al., 2015, 2018). The extent to which children use religious or biological terms may vary by culture and circumstance (Harris & Gimenez, 2005; Nguyen & Rosengren, 2004). Children's understanding and ability to integrate these views is limited by their cognitive abilities and experience (Menendez et al., 2020).

### Adolescents' Understanding of Death

Adolescents often describe death as an enduring abstract state of nothingness that accompanies the inevitable and irreversible end of a biological processes (Brent et al., 1996). Adolescents' understanding of death reflects the intersection of biological, cognitive, and socioemotional development. As adolescents experience the rapid biological changes of puberty, this process may heighten their awareness of the inevitability of the biological changes of life. Although adolescents are cognitively aware that death is universal and can happen to anyone, at any time, this awareness often is not reflected in their risk-taking behavior. Instead, adolescents are prone to the personal fable (see Chapter 11), viewing themselves as unique and invulnerable to the negative consequences of risky behaviors, including death (Alberts et al., 2007). The risk-taking behavior characteristic of adolescence may be a form of cheating death, an event that is perceived as a distant, but unlikely, possibility.

Adolescents' advances in abstract reasoning are reflected in their interest in considering the meaning of death, as well as whether some psychological functions, such as knowing and feeling, persist in a dying person after biological processes have ceased (Noppe & Noppe, 2004). Adolescents and adults across cultures often share a belief in an afterlife, whether religious or supernatural in origin (Bering & Bjorklund, 2004). This belief often arises in childhood, but it is in adolescence that we are first able to simultaneously hold a mature biological understanding of death as the end of all body functions alongside with cultural and religious beliefs about an afterlife (Busch et al., 2017; Panagiotaki et al., 2018). The two conceptions coexist and can be called upon as needed depending on the situation and what adolescents are trying to explain (Legare et al., 2012). For example, the Vezo people in rural Madagascar believe that dead ancestors are present among the living, watching and guiding (Astuti & Harris, 2008). Vezo children tend to emphasize biological explanations for death, but adolescents and adults hold both biological and spiritual explanations, reflecting their cognitive abilities to hold two differing perspectives at once.

### Adults' Understanding of Death

Conceptions of death change in subtle ways over the course of adulthood. Young adults begin to apply their mature understanding of death to themselves. The personal fable declines and, as they take on adult roles, young adults begin to acknowledge their vulnerability. Risky activity declines and young adults' behavior begins to better align with their understanding of the inevitability of death. Despite their awareness of the inevitability of death, death often seems like a faraway event.

An awareness of death increases as individuals progress through middle adulthood, when they are likely to gain experience through the deaths of parents, friends, siblings and colleagues. As midlife



adults watch their children take on adult roles and as they become aware of their own aging bodies and minds, they develop a more personalized sense of their own mortality and the inevitability of the life cycle (Doka, 2015). The awareness of death can cause midlife adults to reevaluate their priorities, often leading them to pursue a sense of generativity, the need to give back and leave a lasting legacy (McAdams, 2014). Midlife adults who look beyond their own losses to consider the profound meaning of their absence to significant others, such as spouses and children, may be deeply saddened by the thought of their own death.

Older adults are likely to have exposure to death many times over. With the deaths of many friends and family members, older adults may become socialized to the nature and inevitability of death (Cicirelli, 2002). They often talk about aging and death, perhaps helping them to prepare for the inevitability of their own death (Hallberg, 2013). They also spend more time thinking about the process and circumstances of dying than the state of death, as compared with midlife adults (Corr et al., 2019).

Cross-sectional and longitudinal studies suggest that death anxiety declines over the lifespan; older adults tend to report lower levels of death anxiety than young and middle-aged adults (Chopik, 2017; Russac et al., 2007). Advances in psychosocial development, such as an increasing ability to manage negative emotions, influence how older adults approach death and may account for their reduced anxiety compared to younger adults. In addition, religion, specifically a religious sense of hope (e.g., the conviction that their religious beliefs will bring opportunities or make things turn out well), reduces death anxiety among older adults (Krause et al., 2016). The psychosocial task of late adulthood is to consider the meaning of life and death. Engaging in life review and establishing a sense of ego integrity help older adults reduce regrets and construct a sense that their lives have been well lived (Erikson, 1982).

### Thinking in Context: Lifespan Development

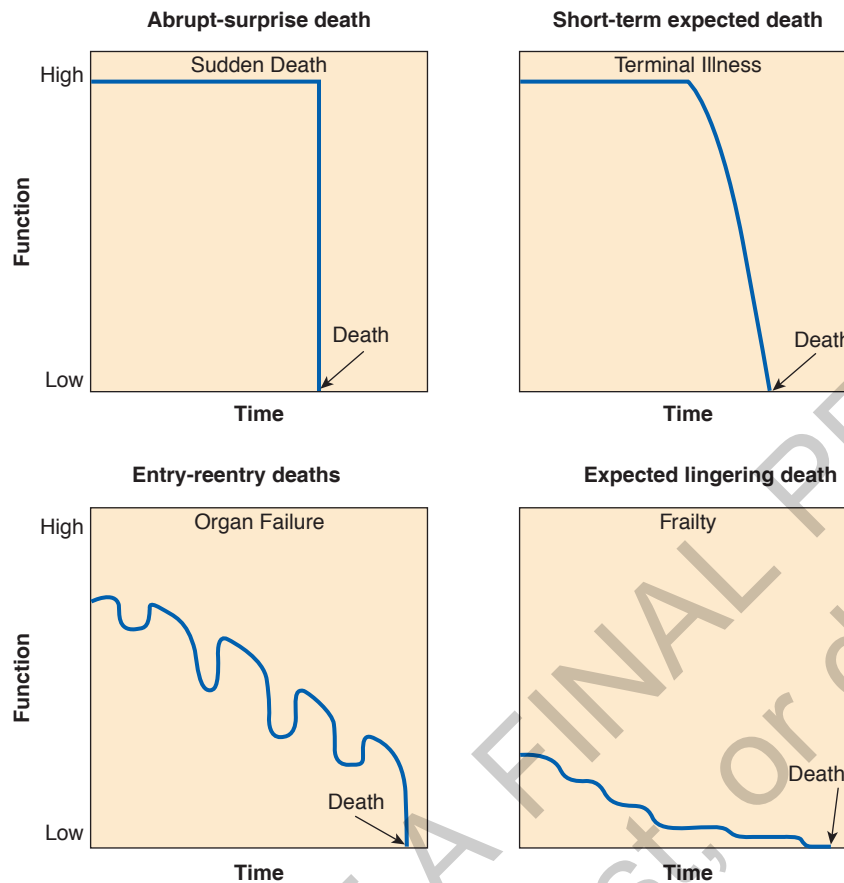
1. How do children's and adolescents' understanding of death reflect their cognitive development? Explain how cognitive advances from Piagetian and information processing perspectives may underlie children's and adolescents' conceptions of death.
2. Recall Erikson's psychosocial stages of development (Chapter 1). How are the developmental tasks of adolescence and adulthood reflected in how people understand death? Provide specific examples of how tasks, such as identity development and the search for intimacy and generativity, might influence people's views of death.
3. In what ways does our sociohistorical context influence our understanding of and attitudes about death? How might views of death vary with culture? Religion? Historical time? To what extent might sociohistorical events, such as the COVID-19 pandemic, influence how people think about death, if at all?

## DYING AND THE EXPERIENCE OF DEATH

### LEARNING OBJECTIVE

**19.4** Discuss the physical and emotional process of dying as it is experienced over the lifespan.

When does dying begin? How does it occur? How is it experienced? These are questions that are challenging to answer. In the following sections, we consider the biological changes that occur with death, as well as the cognitive and socioemotional experience of death, and finally we consider how people experience their own deaths.

**FIGURE 19.7** ■ Theoretical Trajectories of Dying

Source: Lunney et al. (2003).

### The Dying Process

There is great variability in the **dying trajectory**, or the rate of decline that people show prior to death (Cohen-Mansfield et al., 2017; Lunney et al., 2003). Dying trajectories vary by duration and descent and can be categorized into four patterns. The first trajectory is the *abrupt-surprise death*, which is sudden, unexpected, and instantaneous, such as an accident, a shooting, or a heart attack. As shown in Figure 19.7, the person shows normal functioning until a steep, catastrophic decline occurs, bringing a sudden death without warning. The dying person and his or her family have no time to prepare or adjust beforehand. A second trajectory, the *short-term expected death* is a steady predictable decline due to a terminal illness such as cancer (Teno et al., 2001). A third dying trajectory is referred to as an *expected lingering death* because it is anticipated but prolonged, such as in the case of frailty and old age. The fourth trajectory is referred to as *entry-reentry deaths*, because slow declines are punctuated by a series of crises and partial recoveries; the dying person may have repeated hospital stays, returning home between stays. The dying trajectory influences adaptation on the part of the dying person and his or her family. Typically, the short-term expected death is most predictable and most likely to be experienced in hospice care as the lifespan is clearly identified as limited. Lingering and entry-reentry deaths are prolonged. They can tax caregivers' coping skills as such deaths are often not afforded hospice care until death is imminent.

There are predictable changes and symptoms that occur in the dying person hours and days before death; but people vary in the number and severity of symptoms (Corr et al., 2019). Toward the end of life, many people lose their appetite, which is often distressing to family as the patient may show dramatic weight loss. People suffering from lengthy illnesses, such as cancer, AIDS, and neurodegenerative disorders, often show extreme weight loss and the loss of muscle mass, known as *cachexia* (Evans

et al., 2008). As death is imminent, the person sleeps most of the time, may be disoriented, less able to see, and may experience visual and auditory hallucinations. Many terminally ill patients experience declines in cognitive function in the weeks prior to death.

The dying person may experience pain, shortness of breath, irregular breathing, nausea, disrupted bladder and bowel function, and lethargy (Kastenbaum & Moreman, 2018). As the person is closer to death, he or she will lose interest in and the ability to eat, drink, and talk, as well as show reduced mobility and drowsiness. Breathing will be difficult and the person may experience dry mouth and difficulty swallowing. Breathing becomes noisy, a gurgling or crackling sound with each breath that is referred to as the *death rattle*. The average time from the onset of the death rattle to death is about 16 hours (Peskin, 2017). Fluids may accumulate in the abdomen and extremities, leading to bloating. Psychological symptoms such as anxiety, depression, confusion, the inability to recognize family members, and delirium are common (Enck, 2003).

### Emotional Reactions to Dying

People tend to show a range of emotional reactions, grief, to the knowledge that they are dying. After conducting more than 200 interviews with terminally ill people, psychiatrist Elisabeth Kübler-Ross categorized people's reactions into five types or ways in which people deal with death: denial, anger, bargaining, depression, and acceptance (Kübler-Ross, 1969). Although Kübler-Ross described these grief reactions as a series of stages, not everyone experiences all of them or proceeds through them at the same pace or in the same order (Corr et al., 2019; Kübler-Ross, 1974).

Upon learning that one has a terminal illness, the first reaction is likely shock. For most people, denial ("It's not possible!") is the first stage of processing death, reflecting the initial reaction to the news. The person may not believe the diagnosis, deny that it is true, and might seek a second or third opinion. Once the dying person realizes that they are terminally ill, anger may set in. Dying people might ask themselves, "Why me?" Feeling cheated and robbed of life, the person may harbor resentment and envy toward family, friends, and caregivers, as it may seem unfair that others live while they must die. Anger is a very difficult stage, but with time and effort most dying people manage and resolve these challenging feelings.

The bargaining stage, like the other stages of dying, is common but not universal. The dying person bargains to find a way out. Perhaps a deal can be struck with God or fate. The dying person might promise to be a better person and help others if only they can survive. A parent might attempt to bargain a timetable, such as, "just let me live to see my daughter give birth." Eventually, when the person realizes that death cannot be escaped, prolonged, or bargained with, depression is common—especially as the illness becomes more evident because of pain, surgery, or a loss of functioning. Knowing it is the end brings profound sadness. During this stage, the dying person feels great loss and sorrow with the knowledge that, for example, they will never return to work or home, that all relationships will end, and that the future is lost. The person may feel guilt over the illness and its consequences for their loved ones. Many dying people will tend to withdraw from emotional attachments to all but the few people with whom they have the most meaningful relationships. Sharing their feelings with others can help dying people come to an acceptance of death, the final stage. In this stage, the dying person no longer fights death. They accept that death is inevitable, seem at peace, and begin to detach themselves from the world.

Although these grief reactions to impending death are often described as stages, a stage view ignores the relevance of context—including relationships, illness, family, and situation (Corr, 2019; Kastenbaum & Moreman, 2018). Dying is an individual experience. The dying person has a myriad of emotions and must be allowed to experience and express them in order to come to terms with their grief, complete unfinished business with loved ones, and to, ultimately, accept death (Corr & Corr, 2013). It is difficult to predict the psychological state and needs of a dying person because they vary with age, development, experience, and the situation. Many dying people experience a sense of calm toward the end, releasing denial, anger, and fear to die in peace (Renz et al., 2018). Grief does not progress through a series of universal and predictable steps, but stage models offer useful descriptions of the range of reactions people experience (Corr, 2019).

## The Experience of One's Death

Children, adolescents, and adults have very different sets of abilities and experiences that lead them to view the world in ways that are unique to their age group. We have seen that conceptions of death grow in complexity over time. How do children, adolescents, and adults experience their own deaths?

### The Dying Child

Physicians and parents often find it difficult to talk to children about their prognosis and death (Bates & Kearney, 2015). As a result, children may be less likely to develop a clear understanding of their condition and imminent death. Yet in a hospital setting it is natural for children to acquire information about their disease during the progression of the illness, though parents and doctors are often unaware that they are doing so. Children's experiences are an important determinant of how they view the concepts of sickness, more so than age or intellectual ability (Corr, 2010a, 2010b). Children with life-threatening diseases tend to show a greater awareness of death than their healthy or chronically ill peers (Jay et al., 1987; O'Halloran & Altmaier, 1996). Dying children who have been ill for a long time have been observed to show a maturity beyond their years (Leming & Dickinson, 2020). It is experience with the disease and its treatment that advances children's awareness of dying (Cotton & Range, 2010; Hunter & Smith, 2008). A 3- or 4-year-old child who is dying might understand more about impending death than an older child who is well,

Anthropologist Myra Bluebond-Langner (1989) observed terminally ill 3- to 9-year-old children and noted that all became aware of the fact that they were dying before death was imminent. They also knew that death was a final and irreversible process, suggesting a mature concept of death. The children she studied showed awareness that they were dying by noting that they were never going back to school or that they would not be around for a birthday or holiday; some frankly said, "I am going to die." observed that not only did children know that they were dying before death was imminent, many kept that knowledge a secret. Just as parents try to protect children, children may keep their knowledge that they are dying from their parents—perhaps in an attempt to protect them from distress.

Pediatricians, social workers, and parents should arrive at a shared understanding of how to approach a terminally ill child's questions and what type of information is appropriate for the child. Because dying children tend to want to know about their illness and treatment, experts advise that discussions about death should use concrete terms (Bates & Kearney, 2015). Open-ended questions can gauge children's knowledge, and children's questions should be answered honestly and directly, in language suited to the child's developmental level (Slaughter & Griffiths, 2007). Part of the process of discussing the child's illness is simply being present for him or her. Children who are dying tend to express sadness and fears of loneliness, separation, and abandonment (Judd, 2014; Theunissen et al., 2007). Parents and loved ones are advised to stay with a dying child, reading, singing, holding, and sleeping with him or her.

### The Dying Adolescent

Adolescents' abilities for abstract reasoning translate into more mature conceptions of death, its finality and permanence (Greydanus & Pratt, 2016). Adolescents' responses to a terminal illness influence and are influenced by the normative developmental tasks they face. Adolescents tend to feel they have a right to know about their illness and prognosis, consistent with their emerging sense of autonomy (Pousset et al., 2009). The sense of invulnerability that is typical of adolescents can lead some to deny their illness or the need for treatment (Balk, 2009). The side effects of treatment, such



Physicians and parents often find it difficult to talk to children about their prognosis and death, but many dying children express desire for the opportunity to seek closure and say goodbye to loved ones.

The Washington Post/Contributor/Getty Images

as hair loss and weight loss or weight gain, can have devastating consequences for adolescents' body image, often causing much distress or even leading them to shun treatment (Bates & Kearney, 2015).

Like patients in other age groups, adolescents who are terminally ill often spend a great deal of time in hospitals or other treatment facilities. Given that peer relationships are critical influences on adolescents' development and well-being, these lengthy absences from home and the normal social milieu can distance adolescents from their friends and make them feel increasingly different from their peers. Adolescents tend to focus on the social implications of their illness, such as their ability to attract a boyfriend or girlfriend, be rejected by peers, or lack independence from parents (Stevens & Dunsmore, 1996). Because of their illness, they may have few opportunities to exercise autonomy or experience independence, leading them to feel anger over what they are missing and their need to be dependent on parents and doctors.

As they begin to become aware of the future and develop a future orientation, dying adolescents may mourn the loss of the future. Many adolescents feel angry and cheated, that life is unjust (Corr & Corr, 2013). Given adolescents' drive for autonomy, it is important that they are informed and involved in planning treatment and decision-making (Decker et al., 2004; Jacobs et al., 2015). Dying adolescents especially need to live in the present, have the freedom to try out different ways of coping with illness-related challenges, and find meaning and purpose in both their lives and their deaths (Greydanus & Pratt, 2016; Stevens & Dunsmore, 1996).

### The Dying Adult

Dying young adults may feel angry and that the world is unfair; they have many developmental tasks that will be unfulfilled. The primary psychosocial task of young adulthood consists of developing relationships, specifically, a sense of intimacy (Erikson, 1959). A terminal illness can pose challenges to satisfying intimacy needs as it is difficult to form close and secure relationships when one is ill and has limited time left to live. Isolation and abandonment are often principal fears of young adults who are dying (Corr & Corr, 2013). Young adults also lose the sense of an unlimited future. Goals, plans, and aspirations are threatened.

Whereas young adults miss out on the future, midlife adults mourn losing the present. They often worry about abandoning family and not having completed their journey. The normative process of taking stock in midlife transitions from planning for the future to putting affairs in order. Midlife adults who are dying have a need to find ways to continue to meet their responsibilities to others, such as children, after they die.

Older adults have a life to look back on. Their developmental task is to come to a sense of integrity after a successful life review (Erikson, 1982). Terminal illness may speed the process, adding stress, so that the adult may find it difficult to do the work involved in life review. Older adults are more likely than their younger counterparts to accept death, feel that it is appropriate, and be free of any sense of unfinished business. Older adults who are dying have a desire to close ties, to make peace with family, and to engage in legacy work, leaving something behind (Leming & Dickinson, 2020).

### Thinking in Context: Applied Developmental Science

Our knowledge of children, adolescent, and adults' experiences of death is limited.

1. What are some of the challenges in studying death, generally? Consider the research questions that can be asked, the ways of obtaining participants, and what kinds of information might be gathered.
2. In what ways is studying people's experiences with death similar to and different from other topics, like cognition or personality?
3. What role does development play in the challenge of studying death? How might research on death experiences vary with age, from childhood to adolescence?

## BEREAVEMENT AND GRIEF

### LEARNING OBJECTIVE

**19.5** Summarize typical grief reactions to the loss of loved ones and influences on the grief process.

The death of a loved one brings on **bereavement**, a state of loss. It triggers an emotional response known as **grief**, which includes an array of emotions such as hurt, anger, guilt, and confusion. **Mourning** refers to culturally patterned ritualistic ways of displaying and expressing bereavement, including special clothing, food, prayers, and gatherings.

One of the first steps in mourning is to organize a funeral or other ritual to mark the occasion of the loved one's death; such customs are different in various cultures around the world. Mourning rituals such as the Jewish custom of sitting *shiva*, ceasing usual activity and instead mourning and receiving visitors at home for a week, provides a sense of structure to help the bereaved manage the first days and weeks of bereavement. The process of coping with the loss of a loved one is personal, complicated, and lengthy.

### Grief Process

There are no rules to grieving. People vary in the intensity of their reactions to loss and in the timing of their reactions. People grieve differently, and the same person may react differently to different losses. Some might feel intense but short-lived grief. Other people may find that grief lingers for many months. Sometimes grief may seem to resolve only to resurface periodically and unexpectedly. Grief is experienced and expressed in many ways: in emotions, physical sensations, and behaviors (Kowalski & Bondmass, 2008; Mallon, 2008). The experience of grief is often described as stifling, a metaphorical weight dulling one's senses and thought. Physical responses such as tightness in the chest, feeling out of breath, stomach pains, and weakness are common manifestations of grief. Grief may affect the immune response and manifest as health problems (O'Connor, 2019). A range of emotions, from anger, anxiety, loneliness, guilt, helplessness, and even relief, occur. Behaviors such as looking for the person in crowds and familiar places, absentmindedness, sleep problems, avoiding reminders of the deceased, and loss of interest are common (Lancel et al., 2020).

Grief is associated with a variety of cognitive changes, such as reductions in attention, memory, processing speed, and verbal fluency (Rosnick et al., 2010). In one study, individuals experiencing symptoms of grief showed attentional biases toward words associated with the deceased as compared with other words and were less able to regulate their attention when presented with reminders of the deceased (Freed et al., 2009). The stress that accompanies grief may influence cognitive and brain function, including neurogenesis, the maintenance of dendrites, neurotransmission, and plasticity (Egeland et al., 2015; Mirescu & Gould, 2006; Schoenfeld & Gould, 2013).

Grief is an active coping process in which the grieving person must confront the loss and come to terms with its effects on their physical world, interpersonal interactions, and sense of self (Buglass, 2010; Trevino et al., 2018). The person in grief must acknowledge their emotions, make sense of them, and learn to manage them. Most important, and most difficult, the grieving person must adjust to life without the deceased (Stroebe et al., 2010). They must adapt to the loss by establishing new patterns of behavior and redefining relationships with family and friends in light of the loss (Leming & Dickinson, 2020). The grieving person must construct a new sense of self that takes into account the loss of the deceased and how that loss has changed everyday life.

It was once believed that effective grieving required loosening emotional ties to the deceased, permitting the grieving person to “work through” the death (Buglass, 2010; Wright & Hogan, 2008). During a period of mourning, the survivor would sever attachments to the deceased and become ready for new relationships and attachments. Instead, in recent decades, theorists have come to view the

bereaved person's continued attachment to the deceased as normative and adaptive in providing a sense of continuity despite loss (Sirrinc et al., 2018; Stroebe et al., 2010). Attachment is illustrated in several behaviors common among the bereaved, such as feeling that the deceased is watching over them, keeping the deceased's possessions, and talking about the deceased to keep their memory alive. Successful adaptation entails moving toward abstract manifestations of attachment, such as thoughts and memories, and away from concrete manifestations such as possessions (Field et al., 2003). The deceased remains in mind. Grieving appears to involve learning to live with loss rather than getting over loss.

More serious and persisting grief is known as *complicated grief*, which includes a set of symptoms such as persistent intense yearning, and longing for and disruptive preoccupation with thoughts of the deceased (De Stefano et al., 2020; Nakajima, 2018; Shear et al., 2005). These symptoms are prominent and elevated at 6 months and beyond after the loss. In one study, compared with either normal-grief or no-grief groups, participants with complicated grief showed poor executive function and processing speed and a lower total brain volume as measured by structural brain imaging (Saavedra Pérez et al., 2015). Neurological research suggests that complicated grief is experienced as pain. When presented with reminders of the deceased, bereaved individuals show increased activity in brain regions activated in response to physical and social pain (such as rejection) (O'Connor, 2012). Complicated grief may occur in 10% to 15% of bereaved people (Center for Complicated Grief, 2021). Individual and group therapy and the use of bereavement support groups can help people with complicated grief learn to live with their loss (Crunk et al., 2017; Mason et al., 2020).

### Models of Grieving

Although people vary in how they experience loss, some theorists suggest phases or stages, such as the stages of emotional adjustment to death posited by Kübler-Ross (1969). People may traverse through several phases of mourning, from shock, to intense grieving, to establishing a sense of balance, accommodating the loss into one's sense of being (Buglass, 2010; Wright & Hogan, 2008). The initial reaction to loss is most often shock, a feeling of being dazed, detached, or stunned by the loss. As the person realizes the magnitude of loss, intense feelings of despair arise. The bereaved person may question their sense of self in light of the loss. With persistence, the person begins to find a way of living without the loved one. Life will never be the same, but a "new normal" is created.

Phases of mourning are useful in describing common reactions to loss; but they represent a generalization and perhaps oversimplification of the process (Stroebe et al., 2017b). The expectation that bereaved persons will progress through predictable stages can be harmful to those who do not. The progression through grief is not linear. Steps do not always occur in sequence, and there is no universal timeframe for processing grief (Maciejewski et al., 2007).

Some theorists view mourning as a set of tasks to accomplish. The bereaved person must accept the reality of the loss, experience the pain of grief, adjust to a life without the deceased, and develop a new life while maintaining an enduring connection to the deceased (Howarth, 2011; Stroebe et al., 2010). Completing the first task, overcoming the initial sense of denial of the reality of the loss, may be especially difficult if the death was sudden or if the deceased lived far away. As the individual accepts the reality, the pain of grief can become overwhelming. Successfully managing this task requires finding ways of experiencing the pain that are not paralyzing and realizing that grief is to be expected. Adjusting to life without the deceased means that the individual must manage the practical details of life, identify the roles that the deceased filled in the relationship and household, and come to terms with the fact that he or she will no longer fill those roles. Children require care even after a parent has died; the surviving spouse must adjust to this reality and determine how to fulfill the roles of the deceased partner. Fulfilling these roles can help many bereaved adapt productively by developing new skills and growing (Jozefowski, 1999).

The final task of mourning is to establish a new life that recognizes the enduring connection to the deceased, who will not be forgotten. This is often experienced as particularly challenging because the bereaved may not want to "move on," and may even feel it is disloyal to do so, but successful grieving entails learning how to live life without the physical presence of the deceased (Leming & Dickinson, 2020).

An alternative view of adaptation to loss emphasizes the stresses that accompany grief. According to the **dual-process model of grief**, bereavement is accompanied by two types of stressors (Stroebe et al., 2017b; Stroebe & Schut, 2016). The first is loss-oriented and comprises the emotional aspects of grief that accompany the loss of an attachment figure, such as managing emotions and breaking ties to the deceased. Restoration-oriented stressors represent secondary losses; these are the life changes that accompany the death, such as moving to a different residence, social isolation, establishing new roles, and managing practical details, such as paperwork. At any given time, the grieving person may focus on the loss-oriented stressors or the life changes that comprise the restoration-oriented stressors. Healthy adjustment is promoted by alternating focus between the two types. When the person is able, he or she confronts the losses, yet at other times the person may set that task aside to instead consider restoration (Stroebe et al., 2017a; Stroebe & Schut, 2010). In this way, the grieving person adaptively copes as he or she is able, gradually moving forward. Some bereaved individuals experience *overload*, the feeling that he or she has too much to deal with—whether too many losses, too many stimuli, too many stressors—and this can interfere with the grieving process (Stroebe & Schut, 2016).

### Contextual Influences on the Grief Process

No two deaths are experienced in the same way. Deaths are interpreted and grieved differently based on a variety of factors, such as the age of the deceased, the nature of the death, and age of the bereaved. The death of a child or young adult is grieved more intensely and is viewed as more catastrophic than that of an older adult (Jecker, 2011). Younger and older adults judge a 19-year-old victim of a fatal car accident as a more tragic and unjust death than that of a 79-year-old victim (Chasteen & Madey, 2003). The young are grieved more intensely as they are viewed as robbed of the chance to experience significant life events such as falling in love or becoming a parent. They are not able to set and fulfill dreams. Generally, off time deaths, especially those that occur much before our expectations, are particularly difficult (Moos, 1994).

When death is the result of a prolonged illness, it is no surprise, yet it is still a source of grief. Some theorists have posited the existence of anticipatory grief, feelings of loss that begin before a death occurs but are not fully realized (Coelho et al., 2018; Siegel & Weinstein, 2008). People grieve losses as they happen. A spouse of a terminally ill patient might grieve the parenting help or physical intimacy that they have already lost and anticipate losing the relationship itself. Each loss generates its own grief reaction and mourning process. Knowing that death is to come permits the dying to make decisions, tie loose ends, and strengthen relationships. Although many people believe that having the time and opportunity to prepare for loss will make it less distressing, research suggests that this is not true (Coelho et al., 2018; Siegel & Weinstein, 2008). All deaths are stressful, just in different ways.

The nature of the death influences how it is experienced and the grief process. Sudden, unexpected deaths are particularly challenging. Mourners are unprepared, with no support group in place. Many feel intense guilt and the need to assign blame and responsibility for accidental deaths. There often is no chance to say goodbye or mend relationships. Anger is a common reaction, especially if the deceased contributed to his or her demise through poor decisions. Sudden and traumatic deaths, such as from natural or man-made disasters, can leave losses that are difficult to make sense of. Feeling that a death is traumatic is associated with increased grief, depression, loneliness, and risk for mental health problems (Keyes et al., 2014; Kristensen et al., 2015; Tang & Chow, 2017).



Students embrace at a makeshift memorial for two peers killed in a car accident. Grieving the loss of a young person involves grieving for their lost future.

Jessica Rinaldi/The Boston Globe via Getty Images



The incidence of complicated grief is thought to have increased during the COVID-19 pandemic (Mortazavi et al., 2020; Wallace et al., 2020). Fear, lockdown orders, and social distancing disrupted social connections at the same time as the deadly virus caused widespread illness and death. Sudden loss without the opportunity to say goodbye coupled with a lack of social support can disrupt the grief process (Nakajima, 2018; Otani et al., 2017). The unexpected nature of pandemic-related death and lack of contact with the dying person and other mourners can intensify feelings of guilt, helplessness, and anger—and is associated with heightened grief reactions (Eisma et al., 2021; Mortazavi et al., 2020). Social disconnection is associated with heightened psychological distress (Smith et al., 2020). Adjusting to the death is difficult in the absence of rituals, connections, and a return to daily routines.

### Thinking in Context: Lifespan Development

1. How might the grief process be influenced by a person's prior socioemotional development, such as attachment experiences, emotional regulation, and psychosocial development? What role does development play in influencing how a person experiences and understands grief?
2. Grief itself is a developmental process. Agree or disagree? Why?

### Thinking in Context: Biological Influences

Considering what you know about stress and health over the lifespan, why is grief associated with health problems? How might grieving individuals minimize the negative health effects of grief? What do you suggest?

## ADJUSTING TO THE DEATH OF A LOVED ONE

### LEARNING OBJECTIVE

**19.6** Describe patterns of adjustment after bereavement.

Grieving is influenced by the relationship between the person and the deceased. Much of the literature on bereavement comes from studying those who have lost a spouse.

### Losing a Spouse

The term **widowhood** refers to the status of a person who has lost a spouse through death and has not remarried. About one-third of U.S. adults over the age of 65 are widowed. Women who have lost a spouse live longer than men and are less likely to remarry. Thirty-five percent of women over the age of 65 are widowed, as compared with 11% of men (Administration on Aging, 2014). Among adults 75 years or older, over one-half of women and one in five men are widowed (Gurrentz & Mayol-Garcia, 2021).

Losing a spouse begins one of the most stressful transitions in life. Widows have lost the person closest to them, a source of companionship, support, status, and often income. Widowhood poses a challenge of renegotiating a sense of identity in light of the loss of the role of spouse, often the most long-lasting intimate role held in life. The identity development task posed by the loss of a spouse is to construct a sense of self that is separate from the spouse (Cheek, 2010; Naef et al., 2013). As in earlier periods of life, adults who have a myriad of roles apart from their spouse tend to fare better in adjusting to the death of a spouse than do those with few roles, predominantly centered around their spouses. Most widowed older adults live alone, often in the same home. Those who relocate often do so for financial reasons, and they tend to move closer to children and grandchildren.

Perhaps the most striking effect of widowhood is on adults' physical health. The increased likelihood for a recently widowed person to die, often called the **widowhood effect**, is one of the best documented examples of the relationship between social relations and health (Elwert & Christakis, 2008; Ennis & Majid, 2020). Widowed adults show maladaptive immune and hormone responses and poor health behaviors (Fagundes & Wu, 2020). The widowhood effect has been found among men and women of all ages throughout the world. Widowhood increases survivors' risk of dying from almost all causes but is especially linked with cardiovascular problems (Ennis & Majid, 2021; Fagundes et al., 2018; Subramanian et al., 2008). One study of Norwegian adults found that the rate of mortality was highest for adults in late midlife (55–64); generally the risk for death declined over time after the spousal loss, but it remained high 7 years later (Brenn & Ytterstad, 2016). Interestingly, the widowhood effect persists into old age, stopping at about age 90 in women and 95 in men (Blanner et al., 2020).

Compared with their functioning prior to the loss of a spouse, bereaved adults show increased levels of depression, anxiety, and stress, as well as more poor performance on cognitive tests measuring attention, processing speed, and memory (King et al., 2019; Rosnick et al., 2010; Schmitz, 2021; Shin et al., 2018). The prevalence of depression may be especially elevated in the first year after the loss of a spouse, with about 20% of adults meeting the diagnostic criteria for major depression (Blanner Kristiansen et al., 2019).

Social interaction, and especially helping others, aids in reducing depressive symptoms. Specifically, widowed adults who help others by providing instrumental support show an associated decline in depressive symptoms for 6 months to 18 months following spousal loss (Brown et al., 2008). Depression declines with time (Powers et al., 2014), and men and women typically return to pre-widowhood levels of depression within 24 months of being widowed (Sasson & Umberson, 2014).

Losing a spouse poses risks to mental and physical health for both men and women, but men tend to show more health problems, including an increased risk for dementia, and higher rates of mortality (Bennett et al., 2005; Gerritsen et al., 2017; King et al., 2019). Men tend to sustain a high level of depression 6 to 10 years after losing a spouse and are at higher risk of suicide (Conejero et al., 2018; Jadhav & Weir, 2017). Men often rely on their spouses for maintaining relationships with friends and family, managing household tasks, and assistance in coping with stress and managing emotions (Lund & Caserta, 2001). Men are more likely to remarry after losing a spouse than are women, partly because there are far more single older women than men, but also because men have fewer social outlets and sources of support than women (Carr, 2004).

Perhaps the greatest challenge to adjustment that widowed adults face is loneliness (Kowalski & Bondmass, 2008; Schmitz, 2021). Although widowhood marks the loss of a confidant, older adults often maintain and even increase their social participation following spousal loss (Donnelly & Hinterlong, 2010; Isherwood et al., 2012). Older adults tend to increase contact and support with others, especially their children and siblings, over the first 2 years of widowhood, then support may decline (Guiaux et al., 2007; Powers et al., 2014). A longitudinal study of German older adults showed that widowhood resulted in an increased network size, increasing over 4 years, then decreasing reaching pre-widowed levels at about 7 years after widowhood (Klaus, in press). This effect was most pronounced for widowed spouses with university degree and for widowed women.

A prospective study followed widowed adults over an 18-month period and found that the quality and continuity of support provided by children influences adaptation to spousal loss (Ha, 2010). Specifically, adults who perceived positive support (such as feeling loved, cared for, and heard) from their children 6 months after the death of their spouse showed few depressive symptoms 18 months later. In contrast, negative support (e.g., feeling that children are too demanding or critical) that remains steady, increases, or is accompanied by declines in positive support over time is associated with



Losing a spouse begins one of the most stressful transitions in life.

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anger and symptoms of depression and anxiety (Ha, 2010). Maintaining close relationships with family and friends gives widows a sense of continuity, which aids in adjusting to their loss. Contact with others also reduces feelings of loneliness. When widowed adults volunteered two or more hours each week, their loneliness is reduced to levels similar to married adult volunteers at the same intensity (Carr et al., 2018).

The degree to which a spouse adapts to widowhood is influenced by a variety of factors, such as the circumstances surrounding the spouse's death and his or her age (McNamara & Rosenwax, 2010). Death of a spouse following a long illness such as cancer or Alzheimer's disease can evoke complex emotional responses because such illnesses involve drastic physical and mental deterioration and intense demands for caregiving (Rossi Ferrario et al., 2004). In such cases, in addition to loss, the spouse may feel relief from watching a partner slip away and from the pressures of caregiving (Bonanno et al., 2004). The complex intermingling of sorrow and relief may be confusing, and the widowed spouse may feel guilty.

Losing a spouse in young or middle adulthood is likely experienced very differently than in old age; but there is little research on off-time widowhood. Unfulfilled roles, unfinished business, and an un-lived life can make adjusting to an early widowhood especially difficult. Younger widowed adults likely have been married fewer years than older widowed adults, and they probably have greater responsibilities for dependent children and jobs. These responsibilities can be stressful, but on the positive side, children and coworkers may provide comfort and emotional support to young widowed adults.

Adults vary in the degree to which they show resilience in the face of a partner's death. Personal characteristics influence how people manage the transition to widowhood. Those who are outgoing, have high self-esteem, and a high sense of perceived self-efficacy in managing tasks of daily living tend to fare best (Corr, 2021; Leming & Dickinson, 2020). One study of Australian adults who experienced spousal loss found that although about two-thirds showed increased life satisfaction over time, only 19% and 26% of individuals showed resilience with regard to negative affect (e.g., feeling down, worn out, tired, or unable to be cheered) and positive affect (feeling full of life, energetic, peaceful, or happy), respectively (Infurna & Luthar, 2017b). About one-third appeared to be resilient in terms of self-reported health and physical functioning. Very few adults showed resilience across all domains and about 20% were not resilient in any domain, suggesting that losing a spouse may pose lifelong challenges to physical and emotional health (Infurna & Luthar, 2017b).

### Losing a Child

The most difficult of deaths to grieve is the loss of a child. It violates the perceived order of natural life and compromises the continuity of the family life cycle. Parenthood is a developmental achievement that provides a sense of purpose and engenders a sense of identity in people (Cao et al., 2016). For parents, the loss of a child entails the loss of self and the loss of hopes and dreams for the child and the future (Wijngaards-de Meij et al., 2008). Parents grieve what could have been and what did not occur, the life their child did not have. In this way, they lack a sense of closure (Woodgate, 2006).

Research suggests that the age of the child has little effect on the severity of the grief. Parents, especially mothers, often experience severe grief after miscarriages, still births, or the loss of a young infant (Adolfsson, 2011; Avelin et al., 2013; Robinson, 2014). Parents of neonates and young infants grieve for the infant and the lost attachment, but also the lack of memories and being robbed of the opportunity to become a parent (Avelin et al., 2013; Cacciatore, 2010). Parents of children of all ages mourn unfulfilled dreams, unfinished tasks, and the resulting void in the family.

Guilt is a common response to losing a child (Leming & Dickinson, 2020). Parents may question their adequacy in providing care. This is especially true if the death resulted from a preventable accident, or when the causes of death are not understood, as in cases of SIDS. Loss of a child is associated with short- and long-term problems in physical health, mental health, and even mortality (Dias et al., 2017; Rogers et al., 2008; Song et al., 2010).

Bereaved parents tend to experience grief without an endpoint, with complicated grief symptoms often lasting throughout the remainder of the parent's life (Denhup, 2017; Morris et al., 2019; Rogers et al., 2008). Parents often have difficulty finding meaning in their loss, as the loss of a child is often

perceived as “senseless” (Keesee et al., 2008; Wheeler, 2001). Transforming their identity as parent represents a crisis as adults must reshape their sense of purpose, identity, and legacy (De Vries et al., 1994). Parents typically struggle with this task for years, if not a lifetime. One study of 156 bereaved parents (on average about 6 years after the child’s death) found that only about half found a sense of meaning in the death (Lichtenthal et al., 2010). While about half of bereaved parents might show a reduction in negative affect over time, less than half report high levels of life satisfaction, about one-third report good health, and a fifth or less report positive affect and physical functioning (Infurna & Luthar, 2017a). Mourning a child appears to be a lifelong event for most parents (Keesee et al., 2008). Older adults who have lost a child many years ago report the loss as their most negative life experience (Bratt et al., 2018).

### Losing a Parent

Most adults expect their parents to precede them in death, yet even the expected death of a parent is difficult (Marks et al., 2007). It is the loss of a lifelong relationship, attachment, and shared experiences. Adult children who acted as caregivers for their parents have devoted much time and energy to care for their parent, often reorganizing their lives in order to provide care (Weitzner et al., 2000). The loss of a parent may cause further household upheaval, and the adult child may be unprepared to redirect his or her attention, efforts, and time (Hebert et al., 2006). Feelings of guilt and fear that one has not provided adequate care may be combined and heightened if the adult child felt overburdened by the level of care. Adult children may mourn lost opportunities to improve relationships and make amends for unfinished business.

The loss of a parent influences adults’ sense of self. It often enhances adults’ feelings of mortality as the loss of parents marks adult children as the oldest generation. The parents are no longer the buffer or generational protection against old age and death. The death of a parent often sparks a shift in development, causing adult children to alter their sense of selves and realize their responsibilities to others. In this way, it can impart a sense of generativity to the next generation (Umberson, 2003). Some adults experience tension between grieving their parents’ death and facing one’s own death and their own grief over perceived lost opportunities.

Death of a parent influences sibling relationships. They must reevaluate the meaning of family and their roles without the grounding role of their parents. The pattern of sibling relationships over the lifespan tends to intensify, such that good relationships often get better and, without the parent, poor relationships may worsen or disrupt. A parents’ death changes the fabric of family relations.

### Bereavement in Childhood and Adolescence

Losing a loved one in childhood or adolescence brings special challenges to the process of mourning. Cognitive and socioemotional development influence how children and adolescents understand, make sense of, and adjust to loss.

#### Bereavement in Childhood

Like adults, children’s experience of grief is influenced by the deceased’s role in their life. Children’s grief is uniquely affected by their developmental level, including cognitive and socioemotional development, as well as their understanding of the nature of death (Corr, 2010b; Corr et al., 2019). Children’s first experience with death is often that of a grandparent. How this affects the child depends on their proximity and contact with the grandparent. Children with close relationships to grandparents, who experience their grandparents as caregivers and sources of unconditional love, are more likely to find death traumatic than are children whose grandparents live far away and with whom they have less contact. Many children find seeing parents and other adults upset distressing, perhaps increasing their sense of loss. There are no rules for children’s grief (Leming & Dickinson, 2020).

Bereaved children often experience guilt. Many wonder if they caused the death to happen or if the loved one “went away” because of them. The degree to which children feel and express the fear that the death is somehow their fault varies with development (Wolfelt, 2013). This fear is most commonly and openly expressed by young children who are least able to understand the nature of death, but even older

children worry. This is especially true in the case of sudden and accidental deaths. In cases of natural disasters and terror attacks, children may feel worry about threats to themselves and their family. Many children who lost loved ones during the COVID-19 pandemic expressed fear of becoming sick (Albuquerque & Santos, 2021). The replay of disasters and coverage of the pandemic on television and in the media may intensify children's anxiety. Children also worry about who will take care of them.

Younger bereaved children often talk freely about the deceased parent and may also shift from play to grief and back (Leming & Dickinson, 2020). Children tend to experience grief for their parent for a longer period of time than do adults as they must grow up with the loss; their developmental milestones are affected and the death robs them of emotional support from caregivers (Wolfelt, 2013). Many children strive to maintain a connection to the deceased parent by talking to them, feeling that the parent is watching them, dreaming of the parent, and holding on to symbolic objects—particular dolls, pictures, or the parent's possessions.

Bereavement poses serious risks to development. By one estimate, over 40% of youth offenders have experienced child bereavement. One-quarter of adults over age 20 who commit suicide have experienced childhood bereavement (Weinstock et al., 2021). Bereaved children need support, nurturance, and continuity in their lives. They need accurate information about the death and to have their fears addressed. Children want to know that they will be cared for. Adults should reassure children that they are not to blame, as well as provide support and listen (Corr & Corr, 2013). Children, especially younger children, will often require help in understanding and managing their conflicting emotions. Engaging in routine activities can help children gain a sense of normalcy despite all of the changes (Stokes, 2009). Adults should attempt to model healthy mourning by sharing their own grief and providing an example of how to experience grief in constructive ways (Saldinger et al., 2014).

### **Bereavement in Adolescence**

Adolescents' advancing cognitive abilities and their emerging sense of self influence how they grieve (Christ et al., 2002). Adolescents who lose a parent tend to feel intense loss, isolation, and the sense that the parent is irreplaceable and that loss cannot be overcome (Tyson-Rawson, 1996). Adolescents may be plagued by a strong sense that life is unfair. They are at risk to suffer social and interpersonal difficulties in adjustment, including internalizing symptoms such as anxiety and depression yet often show a strong desire for others to include them and take interest in them (Stikkelbroek et al., 2016). Many feel a strong presence of the deceased in dreams and in daily life, which can offer a sense of comfort and support (Meshot & Leitner, 1992).

Adolescents tend to have mature conceptions about death, but their experience of grief is often influenced by their ability to understand and manage their emotions as well as their experience of egocentric thought (Corr et al., 2019). The existence of the personal fable may lead them to view their grief as unique and incomprehensible—that others could not understand and certainly do not feel the way they do. Mourning adolescents commonly display intense emotional outbursts that are brief, but cyclical, punctuated by periods during which they resume normal activity (Christ et al., 2002; Noppe & Noppe, 2004). Alternatively, some adolescents may suppress their emotions altogether, out of fear of a loss of control (Robin & Omar, 2014). Adolescents may retreat into themselves, reading and listening to music, or they may act out, engaging in risky behaviors. With each developmental shift, adolescents must reinterpret the death in light of their new cognitive and emotional understanding (D. A. Brent et al., 2012).

The tasks of grieving intertwine and potentially interfere with the normative developmental tasks of adolescence, such as developing a sense of emotional autonomy as well as intimate relationships with friends (Robin & Omar, 2014). Adolescents who were concerned with establishing a sense of emotional autonomy prior to the parent's death may feel intense guilt. The grieving adolescent may find it challenging to develop a sense of autonomy while maintaining connection to the deceased parent, resulting in distress and often guilt. Grieving adolescents may feel that they are different from peers, and this "different" perception may impair their feelings of peer acceptance. They may also worry about how to act while grieving. Young adolescents who are concerned with peer acceptance may be reluctant to share their grief with friends, whereas middle and older adolescents who have formed intimate relationships with peers may find that support from friends can help them work through their pain (Dopp & Cain,

2012). Yet if their friends do not understand their pain or are rejecting, the adolescent may be devastated and grieve not only the loss of the parent but of his or her friends too (Gray, 1989).

Bereaved adolescents need adults who are open to discussing whatever they would like to explore and who are careful listeners. Grieving adolescents commonly worry that they will forget the person they have lost (Robin & Omar, 2014). Adults should attend to the feelings that underlie what the adolescent is saying and help the adolescent to understand that their feelings are important, real, and normal. Adults can help them to find ways to remember the deceased and make meaningful connections that retain their attachment with the deceased loved one. The COVID-19 pandemic increased many of the risks for complicated grief for adolescents, including loneliness, social isolation, sudden unexpected losses, and the collapse of collective means of mourning, such as funerals, rituals, and gatherings (Weinstock et al., 2021). They may experience heightened risk for physical and mental health problems.

Death and loss are not easy topics to consider. We have seen that, regardless of age, both dying and grieving people have some common needs. All need to move past denial and accept the death, whether upcoming or past. Both the dying and grieving require help managing their emotional reactions to loss, including common physical reactions, such as stomach aches, headaches, and lethargy. People of all ages have a need to express their reactions to the loss and may need help identifying and articulating their reactions that may feel very strange and unfamiliar to them. Finally, the dying and the bereaved need to make some sense of the loss. The dying must connect to their loved ones and accept the loss. The bereaved, in turn, must find a way to maintain the connection to the deceased while moving on in their life, recognizing that in some ways they will never be the same.

### Thinking in Context: Lifespan Development

1. From your perspective, is the process of adjusting to the death of a loved one continuous or discontinuous one? (Review these terms in Chapter 1.) Why?
2. Much of what we know about bereavement comes from studying people who have lost a spouse. What are some of the challenges in extending conclusions regarding widowhood to other forms of loss?
3. Compare grief experiences in childhood and adolescence. Consider children's and adolescents' cognitive development, sense of self and identity, emotion regulation, and relationships with parents and peers. What aspects of the grief experience may be unique to children? Adolescents? What challenges does each age face, and what strengths may aid in their adaptation?



Adolescents tend to have mature conceptions about death, but their experience of grief is often influenced by their ability to understand and manage their own emotions.

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### APPLY YOUR KNOWLEDGE

Lying in bed, 88-year-old Margaret wakes and takes in her surroundings. Her daughter and granddaughter are in the room, one reading a magazine and the other reading her phone. Margaret is fortunate to have a private room in her nursing home, where she has been living since she suffered a stroke.

Life here is better than she expected. The nurses are responsive, especially the kind night nurse who tells Margaret's daughter that she will check in often and does. The only thing Margaret doesn't like is that the nurses pressure her to socialize in the lounge each day. She'd rather sleep than be pushed out in her wheelchair to play games and watch television with the other older adults. Her daughter urges her to eat, but she finds that she isn't very hungry anymore. Margaret feels lucky to have family who live nearby and visit very often. Margaret's children notice a change in their mother. She seems less sharp and each day seems a little bit more confused. She's often too tired to talk and drifts in and out of sleep.

With time, Margaret sleeps nearly all of the time. In addition to her stroke-related impairments, she has congestive heart failure that is not responding to treatment. A few days before her 89th birthday, the doctors tell Margaret's daughter that the time is near. Margaret's children and grandchildren gather in her room, waiting. They talk about old times and everyday life. Margaret is largely unconscious but now and then she calls out, moans, or talks to herself, reaching her arms out in front of her. As time goes on her breathing becomes more labored and heavy, with occasional gasps. Margaret's children watch carefully and wait, attempting to talk with one another and retain a sense of normalcy. Finally, the room is quiet. Margaret's children know that she is gone. After 88 years and surrounded by family, Margaret has died.

1. What type of death trajectory does Margaret show? Explain your reasoning.
2. How might Margaret's 6-year-old grandchild understand her death? What might a child's grieving look like?
3. What would you expect from a 16-year-old grandchild?
4. How might children's and adolescents' responses differ when considering a parent's death?
5. How might the adult child grieve for a parent?

## CHAPTER SUMMARY

### 19.1 Identify the leading causes of death and patterns of mortality and life expectancy.

Infants born in the United States today can expect to live to about age 80. There are large racial disparities in mortality, with life expectancy lowest for Black men. Racial differences in mortality are related to longstanding differences in access to resources, health care, education and wealth, and the accumulation of experiences with adversity throughout the lifetime, including racism and discrimination, exposure to segregated schools and communities, and other forms of injustice. The leading causes of death vary by age. Infants under a year of age are most likely to die from genetic, prenatal, and birth complications. Childhood deaths are most often due to accidents, illnesses, and homicide. Adolescents and adults through age 44 are most likely to die from unintentional injuries, most often from drug overdose. Illnesses become more common causes of death over adulthood. The most common causes of accidents and deaths tend to change over time, with shifts in sociohistorical context.

### 19.2 Examine definitions of death and end-of-life considerations.

Clinical death occurs when the heart stops beating. Advances in medicine have led to a definition of death as entailing whole brain death. Cortical death, but survival of the brainstem, is known as a persistent vegetative state. Advance directives, including a living will and durable power of attorney, permit individuals to make their wishes regarding end-of-life care known. Euthanasia refers to the practice of assisting terminally ill people in dying naturally. Physician-assisted suicide occurs when the terminally ill patient makes the conscious decision that they want their life to end and seeks assistance from a physician. Hospice emphasizes prolonging quality of life by meeting dying patients' needs for pain management; psychological, spiritual, and social support; and desire to die with dignity.

### 19.3 Contrast views of death, including children's, adolescents', and adults' understanding of death.

There is great variability in cultural views of the meaning of death and the rituals or other behaviors that express grief. Young children tend to view death as temporary and reversible. Children's understanding of death gradually emerges alongside cognitive development. Most adolescents evidence a mature conception of death, as the inevitable and irreversible end of biological processes, yet they often have difficulty appreciating it as an inevitability for themselves. Adolescents and adults across cultures often share a belief in an afterlife, whether religious or supernatural in origin. Conceptions of death change in subtle ways over the course of adulthood. Young adults begin to apply their mature understanding of death to themselves, acknowledging their own vulnerability. The awareness of death can cause midlife adults to reevaluate their priorities, often leading them to pursue a sense of generativity. Older adults experience less anxiety about death than younger adults.

### 19.4 Discuss the physical and emotional process of dying as it is experienced over the lifespan.

People tend to show a range of emotional reactions to the knowledge that they are dying, including denial, anger, bargaining, depression, and acceptance. Although described as stages, not everyone experiences all of them or proceeds through them at the same pace or in the same order. Children who are dying tend to express fears of loneliness, separation, and abandonment. Adolescents' sense of invulnerability can lead some to deny their illness or the need for treatment. Dying adolescents mourn the future and have a need to live in the present and to be involved in planning treatment and decision-making. Young adults often feel angry and that the world is unfair. Midlife adults tend to mourn losing the present, abandoning family. Dying midlife adults have a need to find ways to continue to meet their responsibilities to others after death. Older adults talk more about death, think about it more, have more experience with it, and are more likely to accept death.

### 19.5 Summarize typical grief reactions to the loss of loved ones and influences on the grief process.

Grief is associated with physical and cognitive changes and health problems. Complicated grief is serious and long-lasting. Some theorists suggest phases or stages in grieving that are similar to the stages of emotional adjustment to death. Other theorists view mourning as a set of tasks to accomplish. According to the dual-process model, bereavement is accompanied by loss-oriented stressors and restoration-oriented stressors. Healthy adjustment is promoted by alternating focus between the two types of stressors. Deaths are interpreted and grieved differently based on a variety of factors, such as the age of the deceased, the nature of the death, and age of the bereaved.

### 19.6 Describe patterns of adjustment after bereavement.

Bereavement is associated with increased levels of depression, anxiety, stress, poor performance on cognitive tests, and poor health. Bereaved parents often experience grief symptoms throughout their lives and often have difficulty finding meaning in their loss. Children's grief is uniquely affected by their cognitive and socioemotional development, as well as their understanding of the nature of death. Adolescents tend to have mature conceptions about death, but their experience of grief is often influenced by their ability to understand and manage their emotions, their experience of egocentric thought, and their emerging sense of self.

## KEY TERMS

Active euthanasia	Dying trajectory
Bereavement	Death with dignity
Clinical death	Euthanasia
Dual-process model of grief	Grief
Durable power of attorney	Hospice



Living will	Persistent vegetative state (PVS)
Mourning	Physician-assisted suicide
Noncorporeal continuation	Whole brain death
Palliative care	Widowhood
Passive euthanasia	Widowhood effect

## PART 9: LIFESPAN DEVELOPMENT AT WORK: DEATH

Many people avoid thinking about death, but death is part of life—and preparing for a good death can improve the quality of life. Death and its aftermath poses challenges to adjustment. Grief counselors and hospice workers help people manage these transitions.

### Grief Counselor

Also known as bereavement counselors, grief counselors specialize in working with the bereaved. They help individuals who are grieving the death of a loved one as well as those who are grieving personal losses or transitions, such as a pet, miscarriage, or a career. Grief counselors provide support and therapy to help individuals process their grief, accept their loss, and find a way to continue their lives.

Like other counselors, grief counselors consult and interview clients, record observations, determine clients' intervention needs and develop treatment plans, and monitor clients' progress and adjust treatment plans if necessary. They facilitate individual and group therapy sessions and collaborate with other health professionals as needed. They work with individuals, couples, families, and groups in hospitals, mental health clinics, community centers, funeral homes, and private practice.

Becoming a grief counselor requires a master's degree in counseling. Grief counselors must seek state licensure or certification, usually as a licensed professional counselor (LPC), to practice. Licensure requirements include post-graduate supervised experience (3,000 hours in many states) and a passing grade on the National Counselor Examination. Some grief counselors are licensed clinical social workers (LCSW), who have obtained master's degrees, supervised experience (often 3,000 hours), and licensure. Grief counseling is a specialty field. Additional certification is desirable, which typically includes additional coursework, and perhaps supervised experience and/or exams in grief counseling. Counselors earned a median salary of about \$48,000 per year in 2020 (U.S. Bureau of Labor Statistics, 2021).

### Hospice Services

Hospice services are designed to help terminally ill people retain their quality of life by providing physical, emotional, and spiritual support to dying people and their families. Similar to a medical team in a hospital, hospice services are provided by a team of health care professionals. Hospice services are provided in residential settings and at home.

Hospice services include providing palliative care designed to ease pain and prolong quality of life, as well as helping dying people and their loved ones have meaningful interactions, prepare for the time before and after death, and manage their grief. These difficult tasks are eased with the assistance of many of the health and mental health professionals we have discussed, including nurses, nurse practitioners, physicians, social workers, counselors, occupational therapists, and physical therapists.

Nursing assistants, hospice aides, and home health aides are tasked with providing basic care and helping patients with activities of daily living. They help patients with bathing, grooming, and assist with movement. They monitor patients' condition and report information to nurses and other health care professionals. Typically, becoming a home health aide does not require a college degree, but some states or employers may require training or completing an exam. Nursing assistants must be certified by the state (certified nursing assistant), which requires completing about 8 weeks of coursework at a community college, vocational school, or hospital, and completing an exam. Nursing assistants earned a median salary of about \$31,000 and home health aides earned \$27,000 in 2021 (U.S. Bureau of Labor Statistics, 2021).

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