TARA L. KUTHER

THE ESSENTIALS OF LIFESPAN DEVELOPMENT

Lives in Context

The Essentials of Lifespan Development

To my parents, Philip & Irene Kuther

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Tara L. Kuther

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PREFACE

The Essentials of 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

The Essentials of 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. *The Essentials of 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 back story 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. In recent years, discussions of culture, diversity, and individual differences have expanded 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 three 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. *The Essentials of 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.

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.

Cutting Edge Research

Our knowledge of human development is rapidly expanding. My aim is 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 Essentials of Lifespan Development: Lives in Context* contains about 2,000 references published since 2018, including more than 700 published since 2020.

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 since 1996). 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 *The Essentials 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 U.S., 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 multifaceted critical thinking feature *Thinking in Context*, which includes 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*

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.

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. The applied feature *Lifespan Development at Work* introduces students to more than 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.

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.

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SAGE thanks the following expert reviewers, who provided detailed recommendations in their areas of expertise with a focus on multicultural and cross-cultural findings and diversity in development:

Dr. Cassendra Bergstrom completed her Ph.D. in educational psychology at the University of Northern Colorado (UNC), where she is now an assistant professor. She held a post-doctoral research position working on a National Science Foundation grant through the Math and Science Teaching Institution, also at UNC. Dr. Bergstrom's research focuses on the intersection of motivation and learning environments, with a recent focus on equity. Her publications and presentations stem from research projects on the topics of transformative experience, goal orientation, and problem-based learning (PBL) environments. Dr. Bergstrom currently teaches undergraduate psychology courses, as well as graduate courses in educational psychology.

Dr. Flora Farago is an assistant professor of Human Development and Family Studies at Stephen F. Austin State University, with a background in developmental psychology and early childhood education. Her teaching and research interests center on children's prejudice and stereotype development and anti-bias curricula surrounding race and gender. Dr. Farago is particularly interested in the link between research and community activism. She collaborates with colleagues and organizations nationally and internationally, including the Indigo Cultural Center, the Jirani Project, and the Girl Child Network, to promote racial and gender equity.

Dr. Jessamy Comer is a lecturer at Rochester Institute of Technology in Rochester, New York. She has been teaching developmental psychology for more than a decade, as well as many other undergraduate and graduate courses. Her area of research interest and specialization is parent-child relationships, particularly during adolescence. She earned her B.A. in psychology from Baylor University in Waco, Texas, and she earned her M.A. and Ph.D. in developmental psychology from the University of Rochester in Rochester, New York. She is also a recipient of the Helen and Vincent Nowlis Award for Excellence in Teaching.

Kathy Erickson is a University of Arizona faculty member teaching in the Human Services and Family Studies departments. Professor Erickson's master's degree is in holistic psychology, with an emphasis on mindfulness and addiction. She has an undergraduate degree in counseling with a minor in holistic education. For two decades Kathy worked with adolescents in education and social services settings. She introduced students to biofeedback and mindfulness techniques to help them develop mechanisms to alleviate and manage stress. She is committed to the value of integrating mindfulness throughout all aspects of one's life as well as in the courses she teaches.

Dr. Merranda Romero Marín is an associate professor in the Department of Family and Consumer Science at New Mexico State University where she teaches courses ranging from lifespan development to multicultural family life education and clinical courses in marriage and family therapy. She is a licensed psychologist and a licensed marriage and family therapist specializing in the treatment of post-traumatic stress disorder (PTSD). Her areas of research include understanding the impact of poverty on children and family systems, the effects of trauma on family and community systems, multicultural counseling, and individual and family resilience.

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1 UNDERSTANDING HUMAN DEVELOPMENT: APPROACHES AND THEORIES

Source: istock/Hispanolistic

Think back over your lifetime. How have you grown and changed over the years? Do your parents describe you as having been a happy baby? Were you fussy? What are some of your most vivid childhood memories? Were your adolescent years a stressful time? What types of changes do you expect to undergo in your adult years? 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:** how 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 who study human development seek to understand these lifetime patterns of change.

We progress through many stages in life (see Table 1.1). 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 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 during 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).

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, 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 adultlike ways. Adolescents are driven to learn about themselves and begin the process of discovering who they are. 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 longterm 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 **emerging adulthood**), spanning from ages 18 to 25 and as late as age 29.
Middle adulthood	40 to 65 years	In middle adulthood, people begin to notice changes in their senses, 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; then they adapt to an empty nest and assist elderly parents with their health and personal needs.
Late adulthood	65 years and beyond	Most older adults remain healthy and active. Reaction time slows, and although most older adults show a decline in some aspects of memory and intelligence, 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 is a process that includes 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.

Lifespan human development can be described by several principles. Development is (1) multidimensional, (2) multidirectional, (3) plastic, (4) influenced by multiple contexts, and (5) developmental science is 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 domains or areas 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. Brain maturation, a physical development, underlies advances in cognitive development, which enable adolescents to become better at understanding their best friend's point of view and to show more prosocial helpful behavior (Tamnes et al., 2018). In turn, adolescents become more empathetic and sensitive to their friends' needs and develop a more mature friendship, influencing socioemotional development (see Figure 1.1; Tamnes et al., 2018).

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). Throughout life, there is a shifting balance between gains, or improvements in performance (common early in life), and losses, or 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 their 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, other parts of the brain may take on new functions (Petranovich et al., 2020). 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. 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).

FIGURE 1.1 ■ Domains of Development

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

Source: iStock/ Essentials; iStock/ Signature; Jupiter/ Pixland/Thinkstock

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

Reuters/Mariana Bazo

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 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 perceived aspects.

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 did spirituality or religion play in your family's life? Did it shape your parents' childrearing practices and your own values? How did your family's economic status affect your development? These questions examine the home context, critical for our development. We are also embedded in other contexts that influence us and that we influence, such as peer group, school, neighborhood or community, and culture. Our development occurs 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 nonnormative influences (Elder & George, 2016; Elder et al., 2016).

Age-graded influences are closely tied to chronological age and are largely predictable. Most individuals walk when about 1 year old and reach puberty in early adolescence. Similarly, most women reach menopause in their 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 from 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.

The term *history-graded influence* refers to how the time in which we live and the unique historical circumstances of that 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). For instance, the COVID-19 pandemic shaped individuals' health behaviors, such as wearing face coverings, standing further away from others, and refraining from 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 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.

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

istock/kali9

Contextual influences tied to specific historical eras explain why generations, such as "Baby Boomers" and "Millennials," differ from each other. A generation is also known as a **cohort** (a group of people born around the same time). Members of a cohort are similar in ways that people born at other times are not. For example, adults who came of age during the Great Depression and World War II tend to have particularly strong views on the importance of the family, civic-mindedness, and social connection (Rogler, 2002).

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 the United States 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?

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. *Nonnormative influences* are experiences or events that happen to a person or a few people. Nonnormative influences include experiencing the death of a parent in childhood, widowhood in early adulthood, winning the lottery, or illness. Nonnormative events are not predictable and are not easily studied, as they are not experienced by most people—and the nature of nonnormative events varies widely. With age, nonnormative 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).

Development varies dramatically with cultural context (Keller, 2017). The cultural context in which individuals live influences the timing and expression of many aspects of their development, even physical developments such as walking, which was long thought to be a matter of biological maturation (Mistry, 2013). 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).

Development and culture are fused and 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 (Mistry & Dutta, 2015). There are many cultures, or subcultures, within each 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.

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, is 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 development?
4. Why might some people say that the U.S. 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.

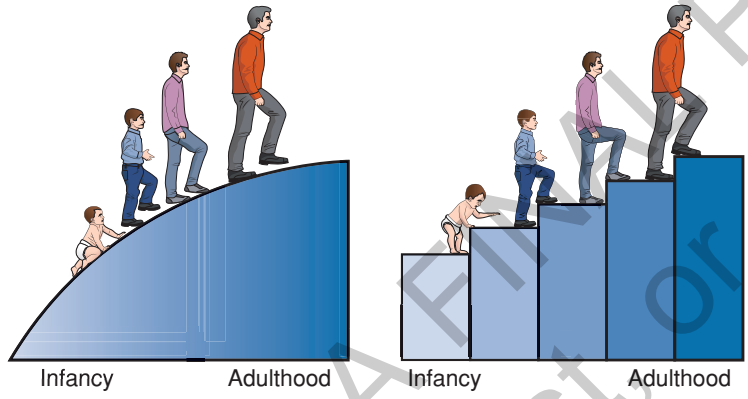
Development Is Characterized by Continuous and Discontinuous Change

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**. For example, 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). Others 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 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

FIGURE 1.2 ■ Continuous and Discontinuous Development

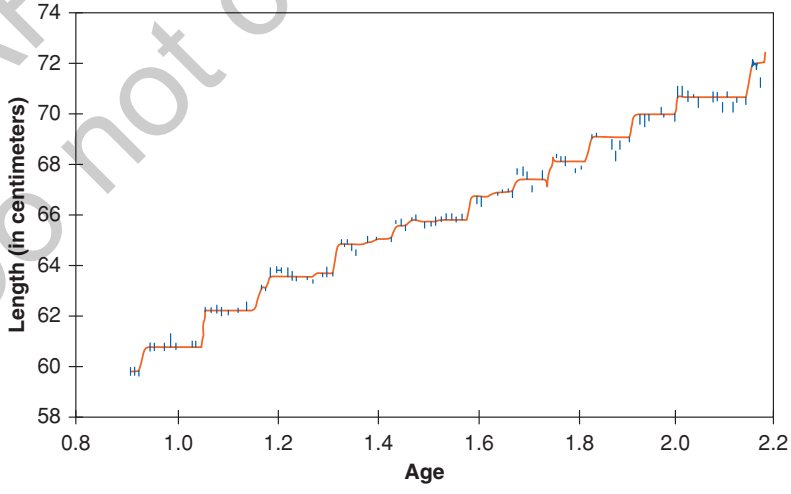


(a) Continuous Development **(b) Discontinuous Development**

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).

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 depends 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 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 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 and objects, 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. Researchers once asked whether development is caused by nature (genetics) or nurture (environment), a question referred to as the **nature-nurture debate**. Explanations that relied on nature pointed to inborn genetic traits and maturational processes as causes of developmental change. For example, 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, 2016). An alternative explanation for developmental change emphasized nurture—the environment. Although most infants begin to walk at about the same time, 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). In other words, infants may walk at about the same time because they experience similar environmental circumstances and parenting practices.

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

Today, the nature-nurture debate is, in fact, not a debate. Instead, most developmental scientists 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). Now developmental scientists are attempting to determine *how* nature and nurture interact and work together to influence how people grow and change throughout life (Bjorklund, 2018b; Lickliter & Witherington, 2017).

Thinking in Context: Lifespan Development

1. Identify ways in which you have changed very gradually over the years. Have there been times when 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. Provide 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 is 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 your 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.

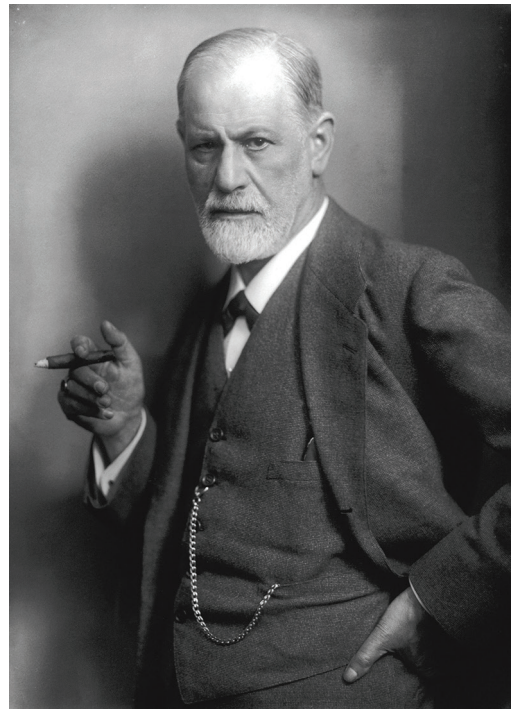
Over the past century, scientists have learned much about how individuals progress from infants, to children, to adolescents, and to adults, as well as how they change throughout adulthood. The great body of research in the field of lifespan human development has been organized into several theoretical perspectives to account for the developmental changes that occur over the lifespan.

Psychoanalytic Theories

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. Freud and Erikson are two key psychoanalytic theorists.

Freud's Psychosexual Theory

Sigmund Freud (1856–1939), a Viennese physician, believed that much of our behavior is driven by unconscious impulses (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). Today Freud's ideas about psychosexual development and emphasis on childhood sexuality are unpopular and not widely accepted (Westen, 1998). In addition, it is not possible to conduct research examining Freud's ideas because unconscious drives and other psychosexual constructs cannot be directly observed and tested (Miller, 2016).



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

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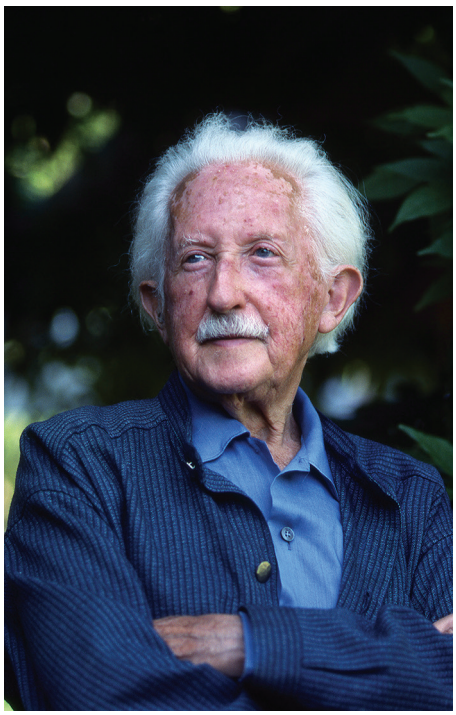


Erik Erikson (1902–1994) posited that, throughout their lives, people progress through eight stages of psychosocial development.

Jon Erikson/Science Source

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 (see 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. For example, 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 the 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.

Erikson's theory includes the role of society and culture, largely ignored by Freud. Erikson based his theory on a broad range of cases, including larger and more diverse samples of people than did Freud. Erikson's theory is criticized as difficult to test because many crises are not easily observed. It has nonetheless sparked research on specific stages, such as the development of identity during adolescence (Crain, 2016). Erikson's lifespan theory of development holds implications for every period of life. We will revisit his theory throughout this book.

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. Failure to meet oral needs influences adult habits centering on the mouth (such as fingernail biting, overeating, smoking, 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 or 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 though 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.

Approximate Age	Freud's Psychosexual Theory		Erikson's Psychosocial Theory	
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 hard working, competent, and productive by mastering new skills in school, friendships, and home life or experience difficulty, leading to feelings of inadequacy and incompetence.
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.

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 **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)

Watson believed that by controlling an infant's physical and social environment, 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.

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.

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

Operant conditioning explains how we learn skills and habits, but 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). 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, consistent with the lifespan concept that individuals are active contributors to their development.

Social Learning Theory

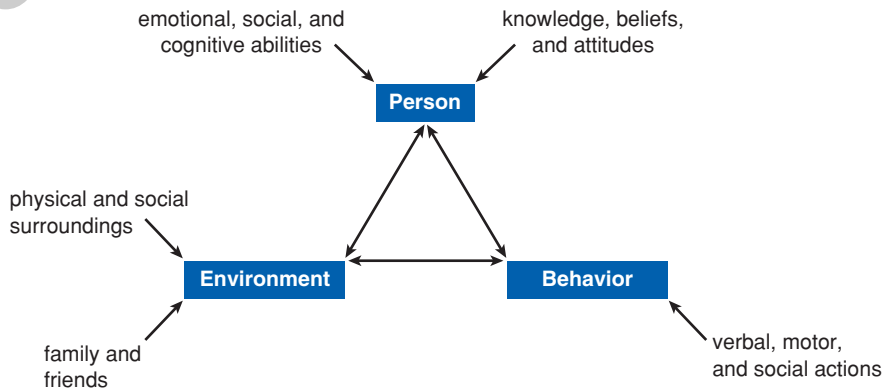
Like behaviorists, Albert Bandura (1925–2021) believed that the physical and social environments are important, but he also advocated for thought and emotion as contributors to development. According to Bandura's **social learning theory**, people actively process information—they think and they feel emotion—and their thoughts and feelings influence their behavior. The physical and social environments influence our behavior through their effect on our thoughts and emotions. We can learn by thinking about the potential consequences of our actions. Teenagers who break their curfew and are met by worried parents may experience remorse, and remorse may make them less likely to come home late in the future. We do not need to experience punishment or reinforcement to change our behavior (Bandura, 2012).

One of Bandura's most enduring ideas about development is that people learn by observing the consequences of others' actions, which he referred to as **observational learning** (Bandura, 2010). 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. 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.

Bandura also contributed to the field of lifespan human development with his concept of **reciprocal determinism**, according to which individuals and the environment interact and influence each other (Bandura, 2011, 2018). Bandura viewed individuals as active in their development because development is a result of interactions between the individual's characteristics, his or her behavior, and the physical and social environment (see Figure 1.4).

People's characteristics influence their behavior and the environments they seek. Their environments also influence their characteristics. Personal characteristics (e.g., inquisitiveness) influence behavior (e.g., asking lots of questions), which influences the environment (e.g., receiving interesting responses from other people). Those responses, in turn, influence behavior (asking questions and further engaging others) and personal characteristics (increasing or decreasing inquisitiveness).

FIGURE 1.4 ■ Bandura's Model of Reciprocal Determinism



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 play 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.

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, thereby contributing to their own cognitive development.

Piaget proposed that children's drive to explore and understand the world propels them through four stages of cognitive development (see Table 1.3). His 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.

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

Information Processing Theory

According to **information processing theory**, 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.

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.

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

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 or gradual. We become more efficient at attending to, storing, and processing information during the childhood years and these processes tend to slow during the adult years (Luna et al., 2015). Brain maturation contributes to changes in our information processing abilities. Experience and interaction with others also contributes by helping us learn new ways of managing and manipulating information.

Contextual Theories

Contextual theories emphasize the role of the sociocultural context in development. Recall that people of all ages are immersed in a system of social contexts and are inseparable from the cultural beliefs and societal, neighborhood, and familial contexts in which they live.

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. Through these formal and informal dialogues, children learn about their culture and 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).

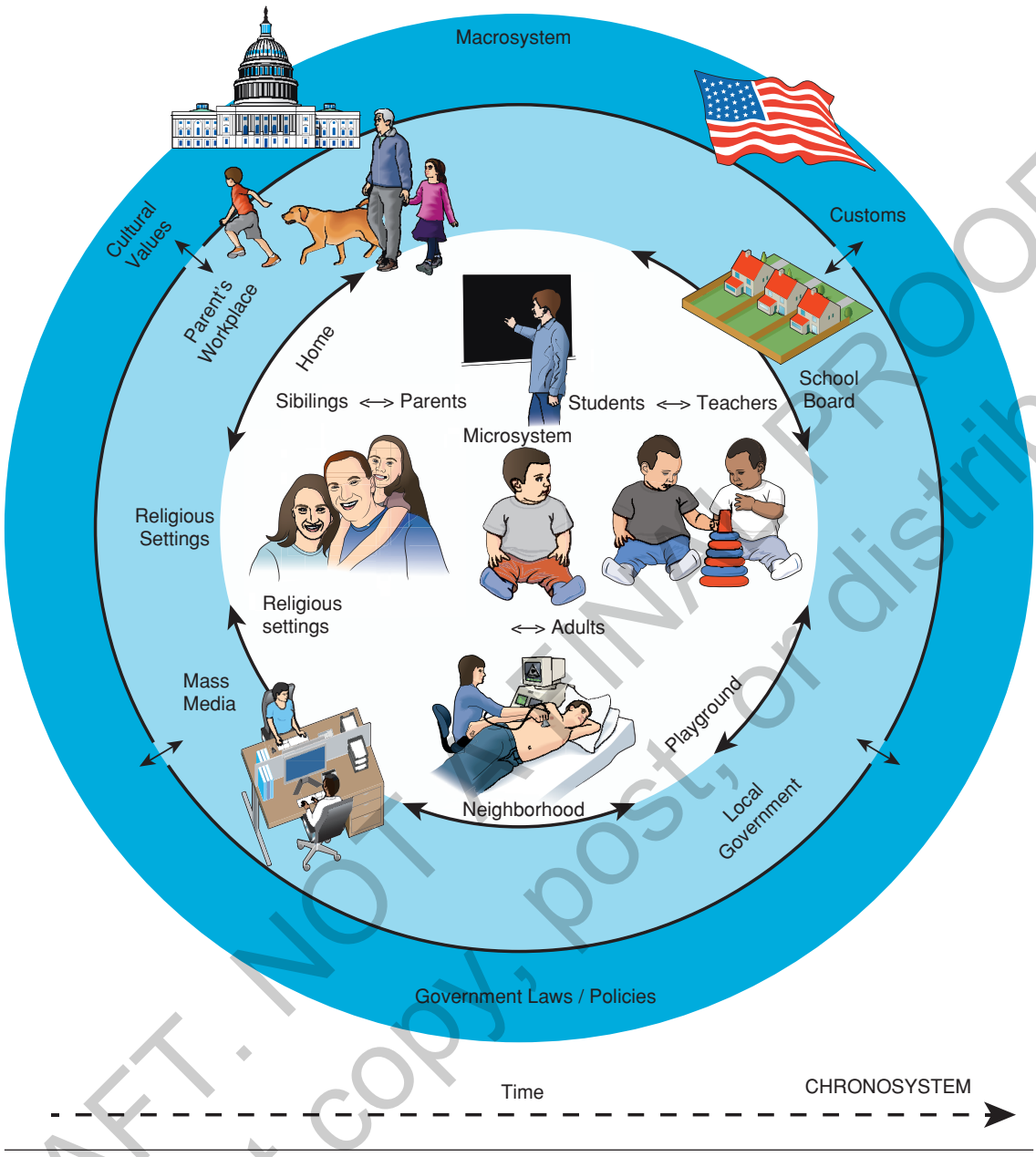
Like Piaget, Vygotsky emphasized that children are actively participate in their development by engaging with the world around them. However, Vygotsky also viewed cognitive development as a social process that relies on interactions with adults, more mature peers, and other members of their culture.

Bronfenbrenner's Bioecological Systems Theory

Similar to Vygotsky, Urie Bronfenbrenner (1917–2005) believed that individuals are active in their own development. Bronfenbrenner's **bioecological systems theory** posits that development is a result of the ongoing interactions among biological, cognitive, and socioemotional changes within individuals and their changing contexts, including home, school, neighborhood, culture, and society (see Figure 1.5) (Bronfenbrenner & Morris, 2006). 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 individuals' interacting biological, cognitive, and socioemotional traits. 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, such as the ability to have more complex and intimate friendships. Social development can then influence cognitive development, as children learn from each other. Ontogenetic development is influenced by, but also influences, the many contexts in which we are embedded (Bronfenbrenner & Morris, 2006).

FIGURE 1.5 ■ Bronfenbrenner's Bioecological Systems Theory



Source: Adapted from Bronfenbrenner and 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). 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. The availability of funding for schools, an exosystem factor, indirectly

affects children by influencing the availability of classroom resources. The exosystem illustrates 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, such as student, employee, parent, and grandparent. These shifts in contexts, called *ecological transitions*, occur throughout life.

Recently, the bioecological model has been criticized for its vague explanation of culture as being part of the macrosystem (Vélez-Agosto et al., 2017). Current views of culture describe it as all the processes used by people in their daily activities as they make meaning or think through interactions with group members (Mistry et al., 2016; Vélez-Agosto et al., 2017; Yoshikawa et al., 2016). Cultural influences operate 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. In any case, bioecological theory remains an important contribution to explaining developmental change across the lifespan and is a theory that we will consider throughout this book.

Ethology and Evolutionary Developmental Theory

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. 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. For example, shortly after birth, goslings imprint to their mother, 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. Mothers instinctively stay close to the nest so that their young can imprint (Lorenz, 1952).

John Bowlby (1969) believed that humans also display biologically preprogrammed behaviors that have survival value and promote development. Crying, smiling, and grasping are inborn ways that infants get attention from caregivers as caregivers naturally respond to these cues, ensuring that infants will be safe and cared for. These 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, 2018a; Witherington & Lickliter,

2016). From an evolutionary development perspective, 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). Although all of our traits and characteristics are influenced by genes, contextual factors influence the expression of genetic instructions, determining whether and how genes are shown. Contextual factors such as gravity, light, temperature, and moisture can influence how genes are expressed and therefore how individuals develop (Meaney, 2017). For instance, in some reptiles, such as crocodiles, sex is determined by the temperature at 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).

Shortly after birth, goslings imprint to their mother, 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

According to evolutionary developmental theory, genetic factors and biological predispositions interact with the physical and social environment to influence development, and natural selection determines which genes and traits are passed on to the next generation (Bjorklund, 2018a; Witherington & Lickliter, 2016). People are viewed 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 changes over the course of the lifetime will be discussed throughout this book. Table 1.4 summarizes the theories of human development discussed.

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	*Greater emphasis on nature*: People are driven by inborn drives, but the extent to which the drives are satisfied influences developmental outcomes.	*Passive*: People are driven by inborn instincts and are not active participants in their development.	*Discontinuous*: Stages
Erikson's psychosocial theory	*Both nature and nurture*: Biological and social forces propel people through the stages and social and psychosocial influences determine the outcome of each stage.	*Active*: People are active in their development because they interact with their social world to resolve psychosocial tasks.	*Discontinuous:* Stages
Behaviorist theory	*Nurture*: Environmental influences shape behavior.	*Passive*: People are shaped and molded by their environment.	*Continuous:* Gradual process of learning new behaviors
Bandura's social learning theory	*Both nature and nurture:* Inborn characteristics and the physical and social environment influence behavior.	*Active*: Individuals are influenced by the environment but also play an active role in their development through reciprocal determinism.	*Continuous:* Gradual process of learning new behaviors

	Is development influenced by nature or nurture?	Are individuals active or passive in their development?	Is development continuous or discontinuous?
Piaget's cognitive-developmental theory	*Both nature and nurture*: 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.	*Active*: Individuals actively interact with the world to create their own schemas.	*Discontinuous:* Stages
Information processing theory	*Both nature and nurture:* People are born with processing capacities that develop through maturation and environmental influences.	*Active*: People attend to, process, and store information.	*Continuous:* Gradual increase of skills and capacities
Vygotsky's sociocultural theory	*Both nature and nurture*: People learn through interactions with more skilled members of their culture; capacities are influenced by genes, brain development, and maturation.	*Active*: Individuals actively interact with members of their culture.	*Continuous:* Continuous interactions with others lead to developing new reasoning capacities and skills.
Bronfenbrenner's bioecological systems theory	*Both nature and nurture:* People's inborn and biological characteristics interact with an ever-changing context to influence behavior.	*Active*: 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.	*Continuous*: People constantly change through their interactions with the contexts in which they are embedded.
Ethology and evolutionary developmental theory	*Both nature and nurture*: Genetic programs and biological predispositions interact with the physical and social environment to influence development, and Darwinian natural selection determines which genes and traits are passed on to the next generation.	*Active:* People interact with their physical and social environment.	*Both continuous and discontinuous:* 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 and the ethical principles that guide developmental science research.

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. By conducting multiple studies over time, developmental scientists refine their theories about lifespan human development and determine new questions to ask.

Methods of Data Collection

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.

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

istock/ sakkmesterke

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 children get used to the observer and return to their normal behavior.

Naturalistic observation permits researchers to observe patterns of behavior in everyday settings, such as whether one particular event or behavior typically precedes another. 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,

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

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 other children or complete a puzzle-solving task. The challenges of identifying and categorizing which behaviors to record are similar to those involved in naturalistic observation. The laboratory environment permits researchers to exert more control over the situation than is possible in natural settings. 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).

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 but this 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 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.

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. For example, 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.

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

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. Sometimes people give socially desirable answers: They respond in ways they would like themselves to be perceived or believe researchers desire. 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 also indicate attention and interest. Researchers who employ physiological measures might use pupil dilation as a measure of interest in infants and physiological arousal in adults (Wetzel et al., 2016; Feurer et al., 2017). 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.

Computerized tomography scan (CT scan): Compiles multiple x-ray images to create a 3-D image of a person's brain, including brain structures, bone, brain vasculature, and tissue.

Positron emission tomography scan (PET scan): Involves injecting a small dose of radioactive material into the participant's blood stream to monitor the flow of blood. Blood flows more readily to active areas of the brain, illustrating which parts of the brain are active as participants view stimuli and solve problems.

Functional magnetic resonance imaging (fMRI): Measures brain activity using a powerful magnet combined with radio waves to measure blood oxygen level. Active areas of the brain require more oxygen-rich blood, so an increased flow of oxygenated blood shows which parts of the brain are active as individuals complete cognitive tasks.

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, measuring the thickness and density of the brain's neural connections.

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. For instance, excitement and anger may both cause an increase in heart rate. Data collection methods are summarized in Table 1.5.

Research Designs

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.

TABLE 1.5 ■ Data Collection Methods

	Advantage	Disadvantage
Observational Measures		
Naturalistic observation	Gathers data on everyday behavior in a natural environment as behaviors occur	The observer's presence may influence the children's behavior. No control over the observational environment.
Structured observation	Observation in a controlled setting	May not reflect real-life reactions and behavior
Self-Report Measures		
Open-ended interview	Gathers a large amount of information quickly and inexpensively	Nonstandardized questions. Characteristics of the interviewer may influence participant responses.
Structured interview	Gathers a large amount of information quickly and inexpensively	Characteristics of the interviewer may influence children's responses.
Questionnaire	Gathers data from a large sample more quickly and inexpensively than by interview methods	Some participants may respond in socially desirable or inaccurate ways.
Physiological Measures	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.

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 **independent 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 **dependent variable**, the behavior under study. If the behavior changes as the variable changes, this suggests that the variable caused the change in the behavior. That is, a cause and effect relationship has been demonstrated.

Gentile et al. (2017) examined the effect of playing violent videogames on children's physiological stress and aggressive thoughts. Children were assigned to play a violent videogame (*Superman*) or a nonviolent videogame (*Finding Nemo*) for 25 minutes in the researchers' lab (independent variable). The researchers measured physiological stress as indicated by heart rate and cortisol levels before and after the children played the videogame (dependent variable). The researchers found that children

who played violent videogames showed higher levels of physiological stress than did the children who played nonviolent videogames. They concluded that the type of videogame changed children's stress reactions.

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.

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 and administer a survey about alcohol use to students aged 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. In developmental science, 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. Research designs and developmental research designs are summarized in Table 1.6.

TABLE 1.6 ■ Comparing Research Designs

Design	Strengths	Limitations
Research Designs		
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.
Developmental Research Designs		
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.

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?
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.

In addition to conducting research that is scientifically sound, developmental scientists must adhere to standards of ethical conduct in research.

Ethical Principles for Research

Several basic ethical principles guide developmental scientists' work: (1) to 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 with which they work 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.

Second, developmental scientists must act responsibly by adhering to professional standards of conduct, clarifying their obligations and roles to others, and avoiding conflicts of interest. Developmental psychologists who conduct research with children and parents must clarify their role as scientists and not counselors or therapists. 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, 2007)

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. 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 with 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 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).

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 indicated that they would not participate if guardian permission were required, citing negative parental attitudes or not being "out" about their LBGT identity (Macapagal et al., 2017).

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 risky 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).

Adults also 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 improves (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 because she is 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 dependence in an adult who is also taking many medications? Or a sexual relationship of 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 (Hiriscau 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 schoolchildren? 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?

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, 2007.

Thinking in Context: Intersectionality

Some ethical concerns are more pressing for some participants and in some studies 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, race, 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 timeframes. 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 myriad 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 influences 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**, which describes 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 their 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 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 how Black boys are perceived and treated in classroom settings; their experience is unique from that of boys of other races and ethnicities and that 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 (rural, suburban, or urban) and geographic location (North, South, Midwest, or coastal United States).

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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Until recently, people of color have either been largely excluded from research studies or grouped with participants of all ethnicities and races, masking differences and contributing to a sense of invisibility (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.

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?

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 emphasizes psychosexual stages. 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 theories emphasize environmental influences on behavior, specifically operant conditioning, as well as observational learning. Piaget's cognitive-developmental theory describes cognitive development as an active process that proceeds 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. 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 and ethical principles that guide developmental science research.

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 and longitudinal research. Researchers must maximize the benefits to research participants, minimize the harms, be accurate and honest in their work, and respect participants' autonomy, including seeking informed consent and child assent.

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.

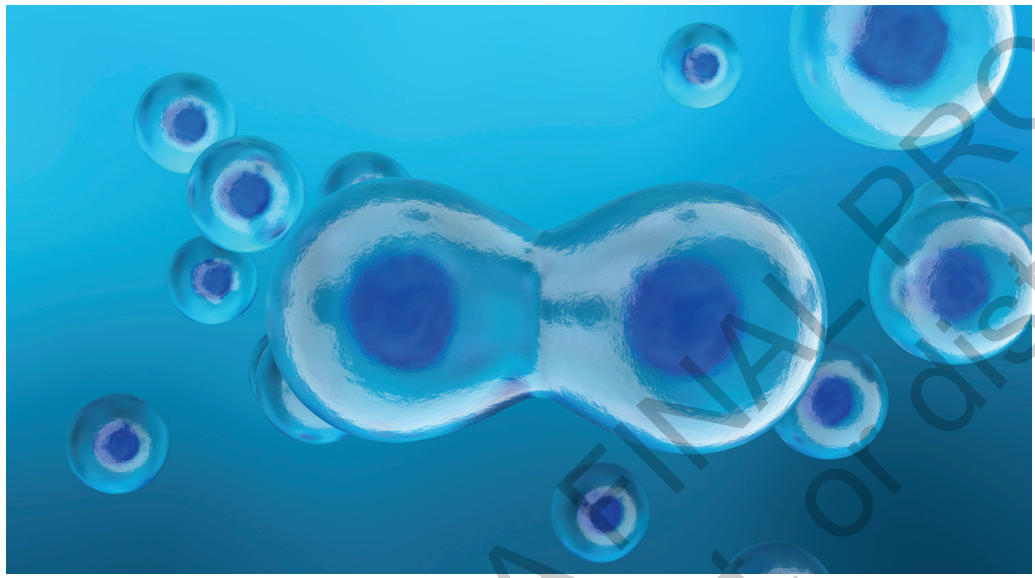
Applied developmental science examines the lifelong interactions among individuals and their contexts and applies these findings to prevent and intervene in problems and promote positive development in people of all ages. Our unique experiences and perspectives are influenced by intersectionality, the 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. 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 (p. 28)
behaviorism (p. 11)
bioecological systems theory (p. 14)
case study (p. 21)
child assent (p. 25)
cognitive-developmental theory (p. 13)
cognitive development (p. 3)
cohort (p. 5)
context (p. 4)
continuous change (p. 6)
correlational research (p. 22)
cross-sectional research study (p. 23)
culture (p. 5)
dependent variable (p. 22)
development (p. 1)
developmental science (p. 29)
discontinuous change (p. 6)
domains of development (p. 5)
emerging adulthood (p. 2)
ethology (p. 16)
evolutionary developmental theory (p. 16)
experimental research (p. 22)
hypotheses (p. 19)
independent variable (p. 22)
information processing theory (p. 13)
Informed consent (p. 25)
lifespan human development (p. 1)
longitudinal research study (p. 23)
naturalistic observation (p. 19)
observational learning (p. 12)
open-ended interview (p. 20)
passive consent (p. 26)
physical development (p. 3)
plasticity (p. 3)
psychoanalytic theories (p. 9)
punishment (p. 11)
questionnaire (p. 20)
reciprocal determinism (p. 12)
reinforcement (p. 11)
resilience (p. 3)
respect for autonomy (p. 24)
responsibility (p. 24)
social learning theory (p. 12)
sociocultural theory (p. 14)
socioemotional development (p. 3)
structured interview (p. 20)
structured observation (p. 20)
theory (p. 9)

2 BIOLOGICAL AND ENVIRONMENTAL FOUNDATIONS AND PRENATAL DEVELOPMENT



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"Rico and Remmy couldn't be more different," marveled their mother. "People are surprised to find out they are brothers." Rico is tall and athletic, with blond hair and striking blue eyes. His older brother, Remmy, has a smaller frame and wears thick glasses over his dark brown eyes. She wondered, "Where did Rico get such blue eyes and blond hair? He looks different from everyone in our family. Maybe I did something different when I was pregnant with him? Eat or do something unusual?" In this chapter, we examine processes of genetic inheritance that can help us understand how members of a family can share a great many similarities and also many differences. We also explore the process of **prenatal development**, or how a single cell develops into a newborn.

GENETIC FOUNDATIONS OF DEVELOPMENT

LEARNING OBJECTIVE

2.1 Discuss patterns of genetic inheritance and examples of genetic disorders and chromosomal abnormalities.

We are born with a hereditary "blueprint" that influences our development and determines our traits, such as appearance, physical characteristics, health, and even personality.

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). 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 him or her genetically distinct from other humans.

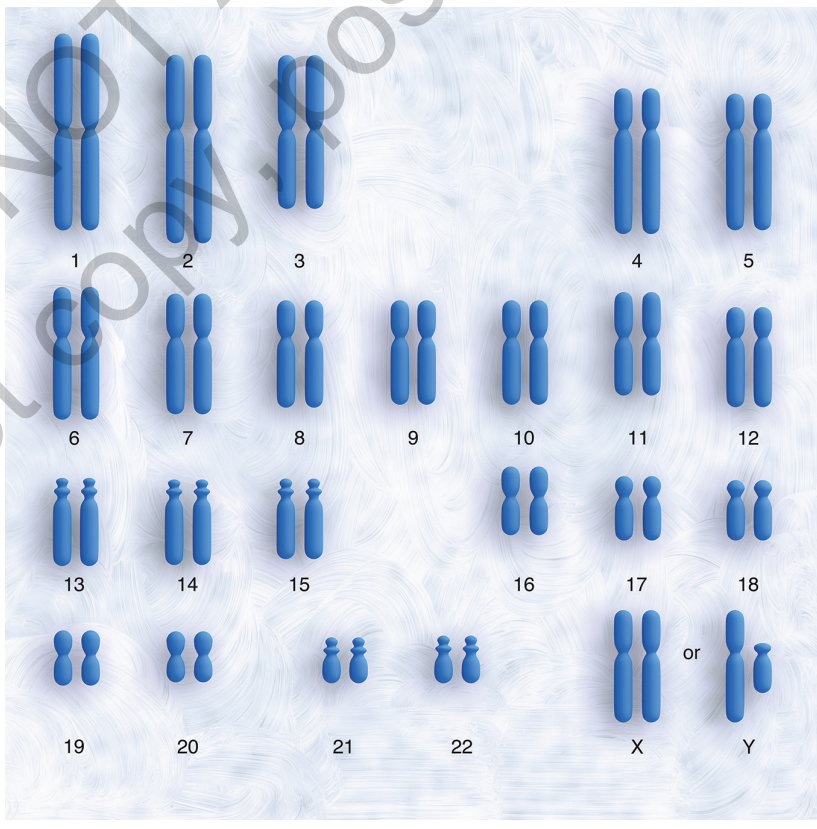
Cell Reproduction

Most cells in the human body reproduce through a process known as **mitosis,** in which DNA replicates itself, duplicating the 46 chromosome pairs, resulting in new cells with identical genetic material (Sadler, 2018). **Gametes**, or sex cells that are specialized for reproduction (such as the ova and sperm), 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, the DNA segments cross over, moving from one member of the pair to the other, essentially "mixing up" the DNA and creating unique combinations of genes (Finegold, 2019). The resulting gametes, ova and sperm, consist of only 23 single, unpaired sex chromosomes. At fertilization ova and sperm join to produce a fertilized egg, or **zygote,** with 46 chromosomes forming 23 pairs, 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

Twenty-two of the 23 pairs of chromosomes are matched pairs (see 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

FIGURE 2.1 ■ Chromosomes



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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 (see Figure 2.2).

Patterns of Genetic Inheritance

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

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. Examples of dominant genes include those for dark (brown or black) hair color and brown eyes. Other genes, such as for blond or red hair and blue eyes, are *recessive* and will be expressed only if paired with another recessive gene (see Figure 2.3 and Table 2.1).

Incomplete Dominance

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 nor B dominate each other. A person with the alleles for blood types A and B will express both A and B alleles and have blood type AB.

Polygenic Inheritance

Most characteristics result from the interaction of many genes, known as **polygenic inheritance**. 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. Table 2.2 summarizes the three patterns of inheritance.

FIGURE 2.2 Sex Determination

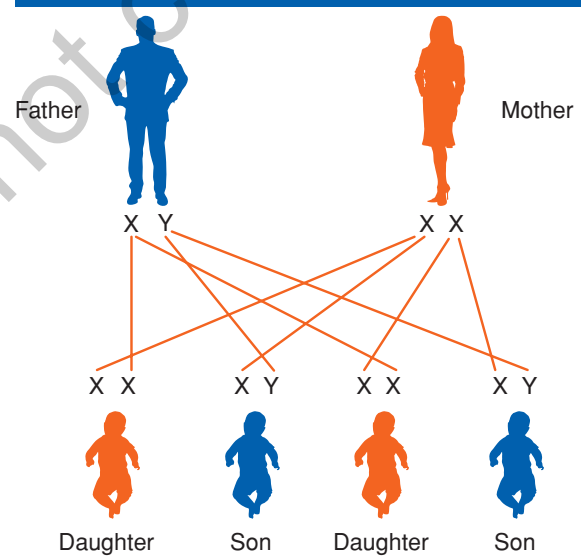


FIGURE 2.3 ■ Dominant-Recessive Inheritance

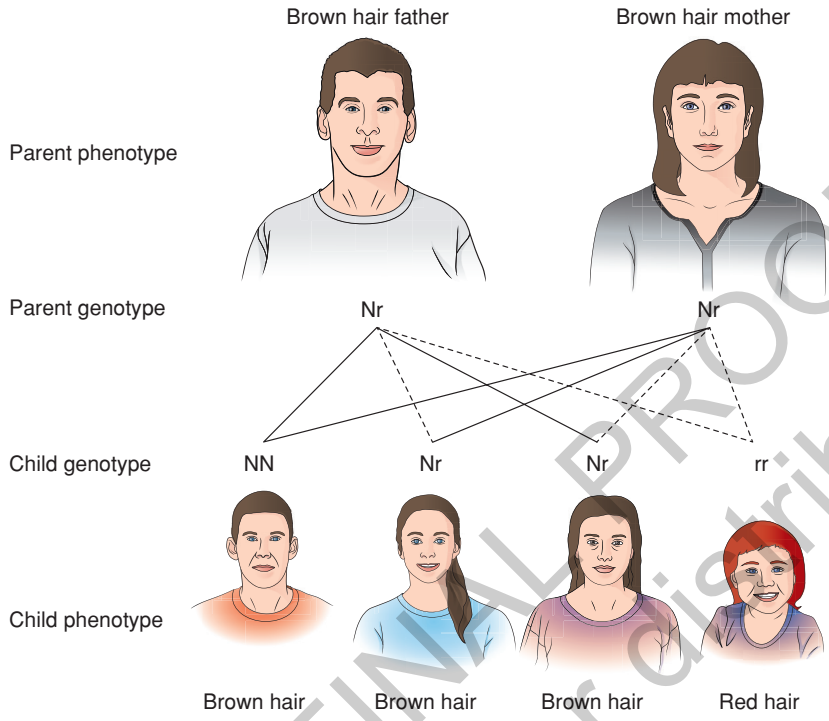


TABLE 2.1 ■ Dominant and Recessive Characteristics

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.

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.

Chromosomal and Genetic Problems

Many disorders are the result of chromosomal abnormalities passed through genetic inheritance. Many hereditary and chromosomal abnormalities can 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.

Disorders and abnormalities that are inherited through the parents' genes are passed through the inheritance processes that we have discussed. Some are highly visible and some may go unnoticed throughout an individual's life.

Dominant-Recessive Genetic 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 (see Table 2.3). Few severe disorders are 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.

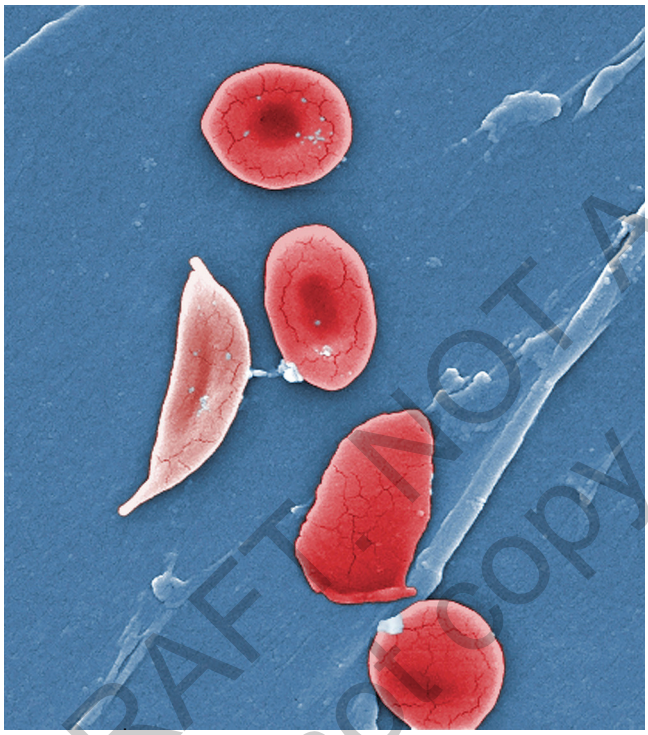
TABLE 2.3 ■ Diseases Inherited Through Dominant-Recessive Inheritance

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, which, 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 3,600–4,000 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.

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.

Marmaduke St. John / Alamy Stock Photo



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.

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Phenylketonuria (PKU) is a common recessive disorder that prevents the body from producing an enzyme that breaks down phenylalanine, an amino acid in 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 (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).

The **sickle cell trait**, carried by about 5% of African American newborns (and relatively few Caucasians or Asian Americans) causes another recessive disorder, sickle cell anemia (Ojodu et al., 2014). In sickle cell anemia, red blood cells 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). Unlike other recessive disorders, the genes for normal blood cells do not mask all of the characteristics of recessive sickle cell genes. This is known as incomplete dominance. People who carry a single recessive sickle cell gene do not develop full-blown sickle cell anemia but may show some symptoms, such as reduced oxygen distribution throughout the body and exhaustion after exercise (Xu & Thein, 2019; Chakravorty & Williams, 2015).

X-Linked Genetic 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 (see 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 therefore 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.

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.

Fragile X syndrome is a dominant-recessive disorder carried on the X chromosome (Hagerman et al., 2017; Salcedo-Arellano et al., 2020). Because the gene is dominant, it need appear on only one X chromosome to be displayed, so it occurs in both males and females. Fragile X syndrome (FXS) is the most common inherited form of intellectual disability (Doherty & Scerif, 2017), and children with Fragile X syndrome tend to show moderate to severe intellectual disability and problems with executive function (Schmitt, Shaffer, Hessl, & Erickson, 2019; Raspa et al., 2017). Several behavioral mannerisms are also common, including poor eye contact and repetitive behaviors such as hand flapping, hand biting, and mimicking others, behaviors also common in individuals with autistic spectrum disorders (Hagerman et al., 2017; Salcedo-Arellano et al., 2020). Fragile X syndrome is often codiagnosed with autism; it's estimated about 40%–60% of boys and 16%–20% of girls with Fragile X syndrome meet the diagnostic criteria for autism (Bagni & Zukin, 2019; Kaufmann et al., 2017).

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 dominant gene on their second X chromosome promotes normal blood clotting (d'Oiron, 2019). Sons who inherit the gene will display the disorder because the Y chromosome does not have the corresponding genetic information to counter the hemophilia gene.

Chromosomal Abnormalities

Chromosomal abnormalities are the result of errors during cell reproduction 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; a round face; almond-shaped eyes; and a flattened nose

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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(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 genetic cause of intellectual developmental disability (Vissers et al., 2016), but children's abilities vary. 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).

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 (see Table 2.5).

Klinefelter syndrome, in which males are born with an extra X chromosome (XXY), occurs in 1 in 1,000 males (McKusick-Nathans Institute of Genetic Medicine, 2020; Wistuba et al., 2017). Many males are unaware they have the disorder until they are tested for infertility in adulthood (Bird & Hurren, 2016; Gravholt et al., 2018). Severe characteristics of Klinfelter syndrome include a high-pitched voice, short stature, feminine body shape, breast enlargement, and infertility (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 (Juul et al., 2011).

Jacob's syndrome, also known as XYY syndrome, causes men to produce high levels of testosterone (McKusick-Nathans Institute of Genetic Medicine, 2017; Pappas et al., 2017). 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 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

TABLE 2.5 ■ Sex Chromosome Abnormalities

Male Genotype	Syndrome	Description	Prevalence
XO	Turner	Abnormal growth patterns, delayed puberty, lack of prominent female secondary sex characteristics, and infertility. Short adult stature, webbing around the 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.
Female Genotype	**Syndrome**		
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.

develop normally, they do not ovulate and 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). Its prevalence is estimated to be 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**, which are 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. 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 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. For example, 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.

Thinking in Context: Biological Influences

1. Consider your own physical characteristics, such as hair and eye color. Are they indicative of recessive traits, or dominant ones? Do you think that you might be a carrier of recessive traits? Why or why not?
2. Recall from Chapter 1 that most developmental scientists agree that nature and nature 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?

Thinking in Context: Applied Developmental Science

Your friend, a "study buddy," is confused about the differences between disorders that are passed through genetic inheritance and chromosomal abnormalities. Explain how genetic disorders are transmitted, including examples. What are some examples of chromosomal disorders?

HEREDITY AND ENVIRONMENT

LEARNING OBJECTIVE

2.2 Describe behavior genetics and interactions among genes and environment, such as gene-environment correlations, gene-environment interactions, and the epigenetic framework.

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 personality that we display. Phenotypes result from the interaction of genotypes and our experiences.

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 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 by mating highly active mice only with other highly active mice or to be sedentary by breeding mice with very low levels of activity with each other (Schwartz et al., 2018). Selective breeding in rats, mice, and chickens has revealed genetic contributions to many traits and characteristics, such as aggressiveness, emotionality, sex drive, and maze learning (Bubac et al., 2020).

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. Identical twins are genetically identical; they share 100% of their genes. Fraternal twins share 50% of their genes; they are genetically similar to non-twin siblings. If genes affect a given attribute, identical twins should be more similar than fraternal twins because identical twins share identical genes whereas fraternal twins share about half of their genes.

Adoption studies compare the degree of similarity between adopted children, 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 traits with their biological parents even though they were not raised by them (and do not share an environment), it suggests that the traits are genetic. If the children share traits with their adoptive parents, it indicates the traits are influenced by the environment.

Genes contribute to many traits, such as sociability, temperament, emotionality, and susceptibility to various illnesses including 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 with a strong genetic component, such as growth, body weight, and height, are modified by environmental circumstances and opportunities that 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 because of the influence of environmental factors, which interact with genes in a variety of ways.

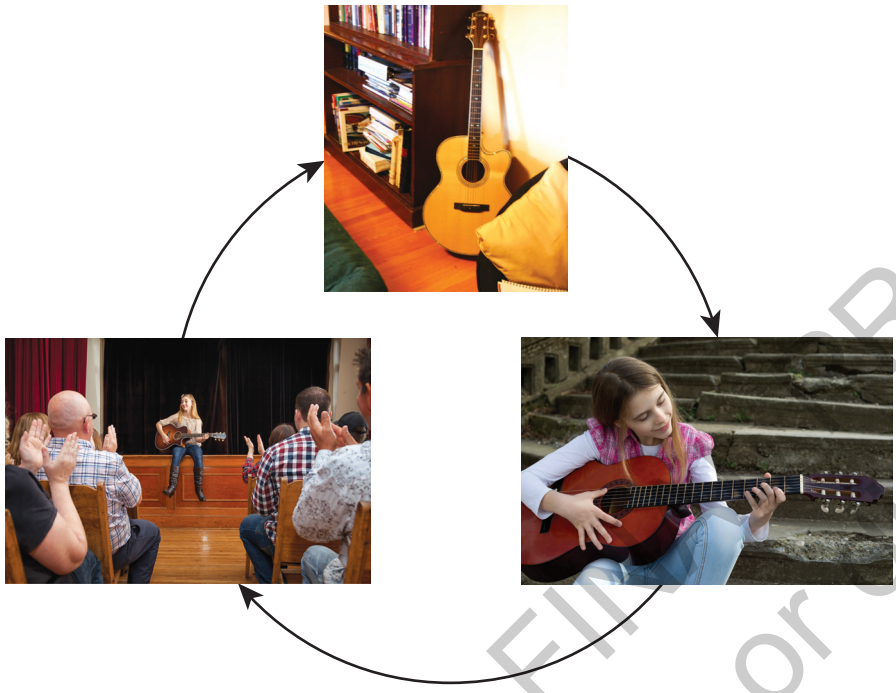
Gene-Environment Correlations

Genes and environment influence development and behavior independently, but they also are correlated. 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 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. For example, parents might provide genes that predispose a child to develop musical ability and then create a home environment that supports the development of musical ability, such as by playing music in the home and owning musical instruments (Corrigall & Schellenberg, 2015; see Figure 2.4). This type of

FIGURE 2.4 ■ Gene-Environment 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).



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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 such as 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). A child with a genetic trait for music talent will evoke pleasurable responses (e.g., parental approval) when she 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 to choose 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 or her genetic predisposition. For example, 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 (Corrigall & 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).

Gene-Environment (G x E) Interactions

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). Consider a classic study that followed a sample of boys from birth to adulthood and found that

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

FatCamera/ Getty Images

the effects of experiencing childhood maltreatment varied with boys' genotypes. The boys who experienced maltreatment were twice as likely to develop problems with aggression, violence, and to even be convicted of a violent crime—but only if they carried a specific form of the gene that controls monoamine oxidase A (MAOA), an enzyme that regulates chemicals in the brain. 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).

MAOA gene-environment interactions influence 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). Gene-environment interactions determine the effects of many genes. For example, 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). 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).

Epigenetic Framework

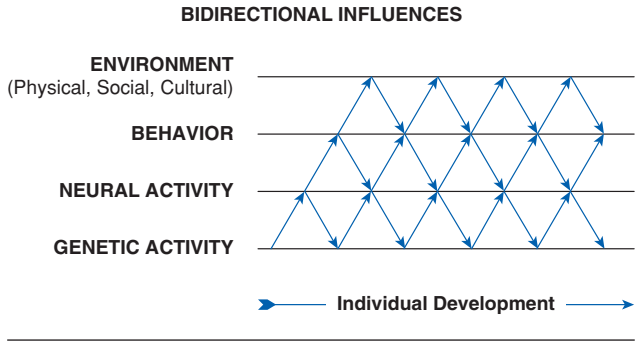
As we have seen, development is influenced by the dynamic interaction of biological and contextual forces. Genes provide a blueprint for development, but phenotypic outcomes—individuals' characteristics—are not predetermined; they vary with environmental factors. Recently scientists have determined that environmental factors do not simply interact with genes to determine people's traits Instead, they *determine how* genes are expressed through a process known as **epigenetics** (Carlberg & Molnar, 2019; Moore, 2017). The epigenome is a molecule that stretches along the length of DNA and provides instructions to genes, determining how they are expressed, that is, whether they are turned on or 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 which genes are turned on and off (O'Donnell & Meaney, 2020).

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, brain development is influenced by epigenetic interactions among genes and contextual factors that determine infants' phenotypes (Lerner & Overton, 2017). These complex interactions are illustrated in Figure 2.5 (Dodge & Rutter, 2011). 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 the epigenome 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).

FIGURE 2.5 ■ Epigenetic Framework



Source: Gottlieb, 2007.

Thinking in Context: Lifespan Development

1. Describe a skill or ability at which you excel. How might your ability be influenced by your genes and your context?
   - **a.** Identify 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 correlation 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?

Thinking in Context: Applied Developmental Science

Imagine that you are a researcher planning to conduct a twin study and an adoption study on intelligence, personality, academic achievement, or another topic. What are the advantages and disadvantages of each method? What are some challenges in obtaining participants for these studies? Using the twin approach, how might you determine the genetic and environmental influences on your topic of interest? How does this differ in adoptive studies?

What conclusions do you draw about these types of studies? Which do you prefer and why?

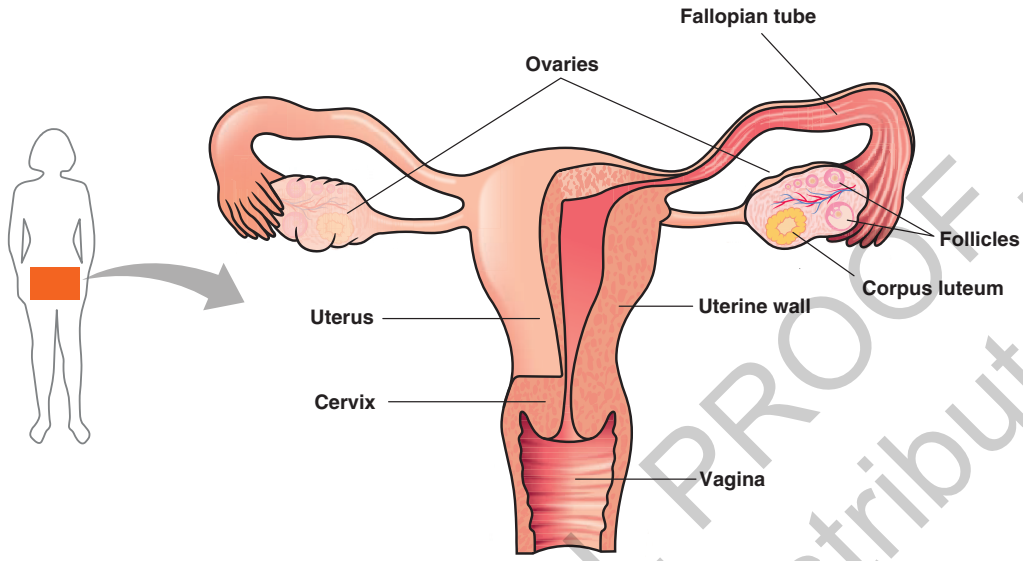
PRENATAL DEVELOPMENT

LEARNING OBJECTIVE

2.3 Describe the three periods of prenatal development.

Prenatal development is a dramatic process in which a single cell transforms and grows into a **neonate**, or newborn. Conception, the union of ovum and sperm, marks the beginning of prenatal development. Over the next 38 weeks, the human progresses through several periods of development from fertilization to birth.

FIGURE 2.6 ■ Female Reproductive System



Conception

A woman can conceive only during a short window of time each month. About every 28 days, an ovum bursts from one of the ovaries into the long, thin fallopian tube that leads to the uterus; this event is known as ovulation (see Figure 2.6). Over several days, the ovum travels down the fallopian tube, which connects the ovaries to the uterus, while the woman's hormones cause the lining of the uterus to thicken in preparation for the fertilized ovum (Sadler, 2018). If fertilization does not occur, the lining of the uterus is shed through menstruation about 2 weeks after ovulation.

Conception, of course, also involves the male. Each day a man's testes produce millions of sperm, which are composed of a pointed head packed with 23 chromosomes' worth of genetic material and a long tail. During ejaculation, about 360 million, and as many as 500 million, sperm are released, bathed in a protective fluid called semen (Moore et al., 2019). On average, only about 300 sperm reach the ovum within the fallopian tubes, if an ovum is present (Webster et al., 2018). As soon as one sperm penetrates the ovum the sperm's tail falls off, and the sperm's genetic contents merge with that of the ovum. After fertilization, the zygote rapidly transforms into a multicelled organism. Prenatal development takes place over three developmental periods: (1) the germinal period, (2) the **embryonic period**, and (3) the fetal period.

This ball of cells, known as a morula, is formed at about three days after conception. Each of these cells is identical. Differentiation has not yet begun.

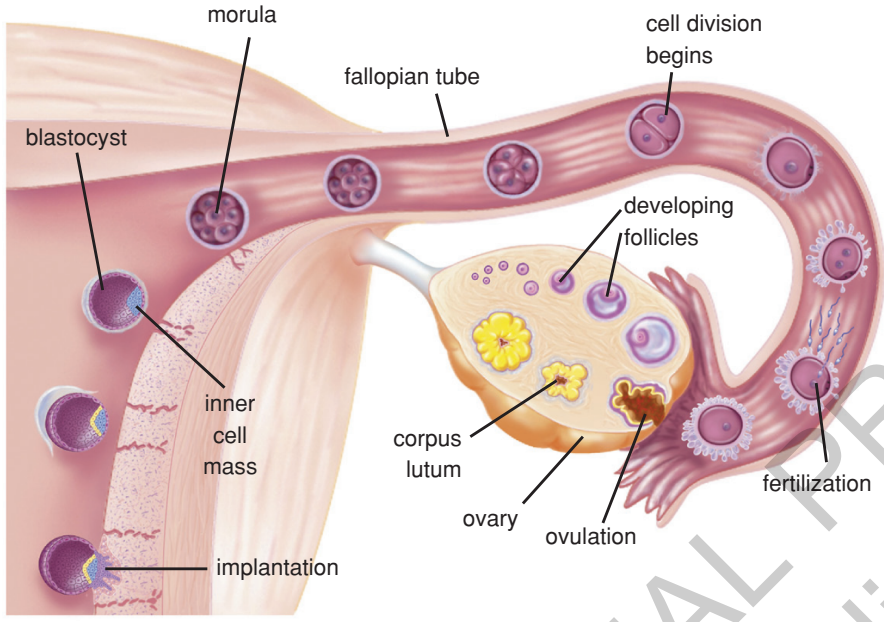
Pascal Goetgheluck/Science Source

Germinal Period (0 to 2 Weeks)

During the **germinal period**, also known as the period of the zygote, the newly created zygote begins cell division as it travels down the fallopian tube, where fertilization took place, toward the uterus. About 30 hours after conception, the zygote then splits down the middle, forming two identical cells (Webster et al., 2018). This process is called cleavage, and it continues at a rapid pace. The two cells each split to form four cells, then eight, and so on (see Figure 2.7).

After four days, the organism consists of about 60 to 70 cells formed into a **blastocyst**, a fluid-filled ball of cells surrounding an inner cluster of cells from which the embryo will develop. **Implantation**, in which the blastocyst burrows into the wall of the uterus, begins at about day 6 and is complete by about day 11 (Moore et al., 2019).

FIGURE 2.7 ■ Germinal Period



Embryonic Period (3 to 8 Weeks)

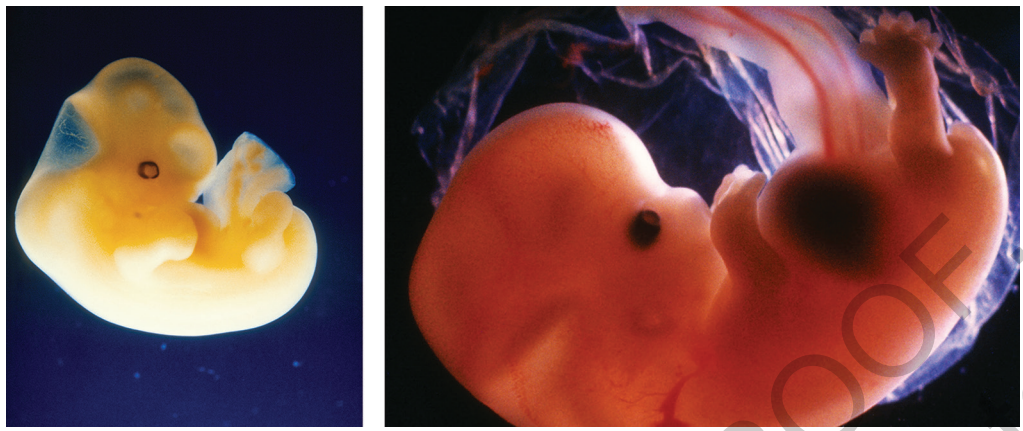
After implantation, during the third week after conception, the developing organism, now called an **embryo,** begins the most rapid period of structural development in the lifespan. The mass of cells composing the *embryonic disk* forms layers, which will develop into all the major organs of the body. The *ectoderm*, the upper layer, will become skin, nails, hair, teeth, sensory organs, and the nervous system. The *endoderm*, the lower layer, will become the digestive system, liver, lungs, pancreas, salivary glands, and respiratory system. The middle layer, the *mesoderm*, forms later and will become muscles, skeleton, circulatory system, and internal organs.

As the embryo develops, support structures form to protect it, provide nourishment, and remove wastes. The **amnion**, a membrane that holds amniotic fluid, surrounds the embryo providing temperature regulation, cushioning, and protection from shocks. The **placenta**, a principal organ of exchange between the mother and developing organism, begins to form. It will act as a filter, enabling the exchange of nutrients, oxygen, and wastes to occur through the umbilical cord, and as a protective barrier, preventing some toxins from entering the embryo's bloodstream.

About 22 days after conception marks a particularly important change: The ectoderm folds to form the **neural tube**, which will develop into the central nervous system (brain and spinal cord; Webster et al., 2018). The head can be distinguished and a blood vessel that will become the heart begins to pulse and blood begins to circulate throughout the body. During days 26 and 27, arm buds appear, followed by leg buds on days 28 through 30 (Sadler, 2018). The brain develops rapidly and the head grows faster than the other parts of the body during the fifth week of development. The eyes, ears, nose, and mouth begin to form during the sixth week. Upper arms, forearms, palms, legs, and feet appear.

During the seventh week a ridge called the **indifferent gonad** appears that can develop into the male or female genitals, depending on the fetus's sex chromosomes (XY for males and XX for females; Moore et al., 2019). The sex organs take several weeks to develop. The external genital organs are not apparent until about 12 weeks.

At the end of the embryonic period, 8 weeks after conception, the embryo weighs about one-seventh of an ounce and is 1 inch long. All of the basic organs and body parts have formed in a very rudimentary way. The embryo displays spontaneous reflexive movements, but it is still too small for the movements to be felt by the mother (Hepper, 2015). Serious defects that emerge during the embryonic period most often occur before the pregnancy is detected, are the result of chromosomal abnormalities, and often cause a miscarriage (loss of the embryo; Chou et al., 2020).



Development proceeds very quickly during the embryonic period. Note the dramatic changes from the fifth week (left) to the seventh week (right) of prenatal development.

Petit Format/Science Source; Professor Pietro M. Motta/Science Source

Fetal Period (9 Weeks to Birth)

During the **fetal period**, from the ninth week to birth, the organism, called a **fetus**, grows rapidly, and its organs become more complex and begin to function. Now all parts of the fetus's body can move spontaneously, the legs kick, and the fetus can suck its thumb (an involuntary reflex; Sadler, 2018).

By the 14th week, limb movements are coordinated, but they will be too slight to be felt by the mother until about 17 to 20 weeks. The heartbeat gets stronger. Eyelids, eyebrows, fingernails, toenails, and tooth buds form. During the last 3 months of pregnancy, the fetal body grows substantially in weight and length; specifically, it typically gains more than 5 pounds and grows 7 inches (Moore et al., 2019). At about 28 weeks after conception, the cerebral cortex develops convolutions and furrows, taking on the brain's characteristic wrinkly appearance (Andescavage et al., 2016). The fetal brain wave pattern shifts to include occasional bursts of activity, similar to the sleep-wake cycles of newborns.

Prenatal Diagnosis

Prenatal development is monitored through several methods. 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 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 to four screenings over the duration of pregnancy are common to evaluate fetal development. Repeated ultrasound of the fetus does not appear to affect growth and development (Abramowicz, 2019; Stephenson, 2005).

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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Fetal MRI applies MRI technology (see Chapter 1) to image the fetus's body and diagnose malformations (Aertsen et al., 2020). It is often used as a follow-up to ultrasound imaging to provide more detailed views of suspected abnormalities (Milani et al., 2015). Unlike ultrasound, fetal MRI can detect abnormalities throughout the body, including in the central nervous system (Griffiths et al., 2017; Masselli et al., 2020). Fetal MRI is safe for mother and fetus in the second and third trimesters but is expensive and has limited availability in some areas (Patenaude et al., 2014).

Amniocentesis involves sampling the amniotic fluid surrounding the fetus by extracting it 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 to create enough cells for genetic analysis. Genetic analysis is then performed to detect 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 obtaining a small amount of tissue from the chorion, part of the membrane surrounding the fetus, by using 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). However, 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 in the fetus. Cell-free fetal DNA (chromosome fragments that result in the breakdown of fetal cells) circulates in maternal blood in small concentrations (Hartwig et al., 2017; Warsof et al., 2015). Testing can be done after 10 weeks; it's typically done 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 U.S. and other countries (Hui et al., 2017). NIPT can provide accurate sex determination but cannot detect as many chromosomal abnormalities as amniocentesis or CVS and with less accuracy (Hartwig et al., 2017; Villela et al., 2019). 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 (see Table 2.6).

TABLE 2.6 ■ Methods of Prenatal Diagnosis

	Explanation	Advantages	Disadvantages
Ultrasound	High-frequency sound waves directed at the mother's abdomen provide clear images of the womb projected on to a video monitor.	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.
Amniocentesis	A small sample of the amniotic fluid containing fetal cells is extracted from the mother's uterus. The fetal cells are grown in a laboratory dish and analyzed.	Permits a thorough analysis of the fetus's genotype. There is 100% diagnostic success rate.	Safe, but poses a greater risk to the fetus than ultrasound, especially if conducted before the 15th week of pregnancy.
Chorionic villus sampling (CVS)	A small amount of tissue is sampled from the chorion, grown in a laboratory dish, and studied to detect chromosomal abnormalities.	Permits a thorough analysis of the fetus's genotype. There is 100% diagnostic success rate. CVS can be conducted earlier than amniocentesis, between 10 and 12 weeks.	It is safe but may pose a risk of spontaneous abortion and limb defects when conducted prior to 10 weeks' gestation.
Fetal MRI	Uses a magnetic resonance imaging scanner to record detailed images of fetal organs and structures.	Provides the most detailed and accurate images available	It is expensive, but safe.
Noninvasive prenatal testing (NIPT)	Cell-free fetal DNA is examined by drawing blood from the mother.	There is no risk to the fetus. It can diagnose several chromosomal abnormalities.	It cannot detect the full range of abnormalities and may be less accurate than other methods.

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)

Thinking in Context: Lifespan Development

What might be some of the implications of the timing of prenatal development—that is, when the major body systems develop—for the behavior of pregnant women and those who are considering becoming pregnant?

Thinking in Context: Applied Developmental Science

1. Petra noticed that her abdomen has not grown much since she became pregnant three months ago. She concluded that the fetus must not undergo significant development early in pregnancy. How would you respond to Petra?
2. 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?

ENVIRONMENTAL INFLUENCES ON PRENATAL DEVELOPMENT

LEARNING OBJECTIVE

2.4 Explain how exposure to environmental factors can influence the prenatal environment and provide examples.

Prenatal development unfolds along a programmed path, a predictable pattern of change, but it can be disrupted by environmental factors called **teratogens**. A teratogen is an agent, such as a disease, drug, or other environmental factor, that can cause prenatal abnormalities, defects, and even death.

Principles of Teratology

Several principles can account for the varied effects of exposure to teratogens on prenatal development (Moore et al., 2019; Sadler, 2018).

Critical Periods

The developing organism is more susceptible to the harmful effects of teratogens during certain stages of development(Nelson & Gabard-Durnam, 2020). The embryonic period is the most sensitive stage of development (Webster et al., 2018). In addition, each organ of the body has a sensitive period during which it is most susceptible to damage from teratogens such as drugs, alcohol, and environmental contaminants (see Figure 2.8). Once a body part is fully formed, it is less likely to be harmed by exposure to teratogens, but some body parts, like the brain, remain vulnerable throughout prenatal development.

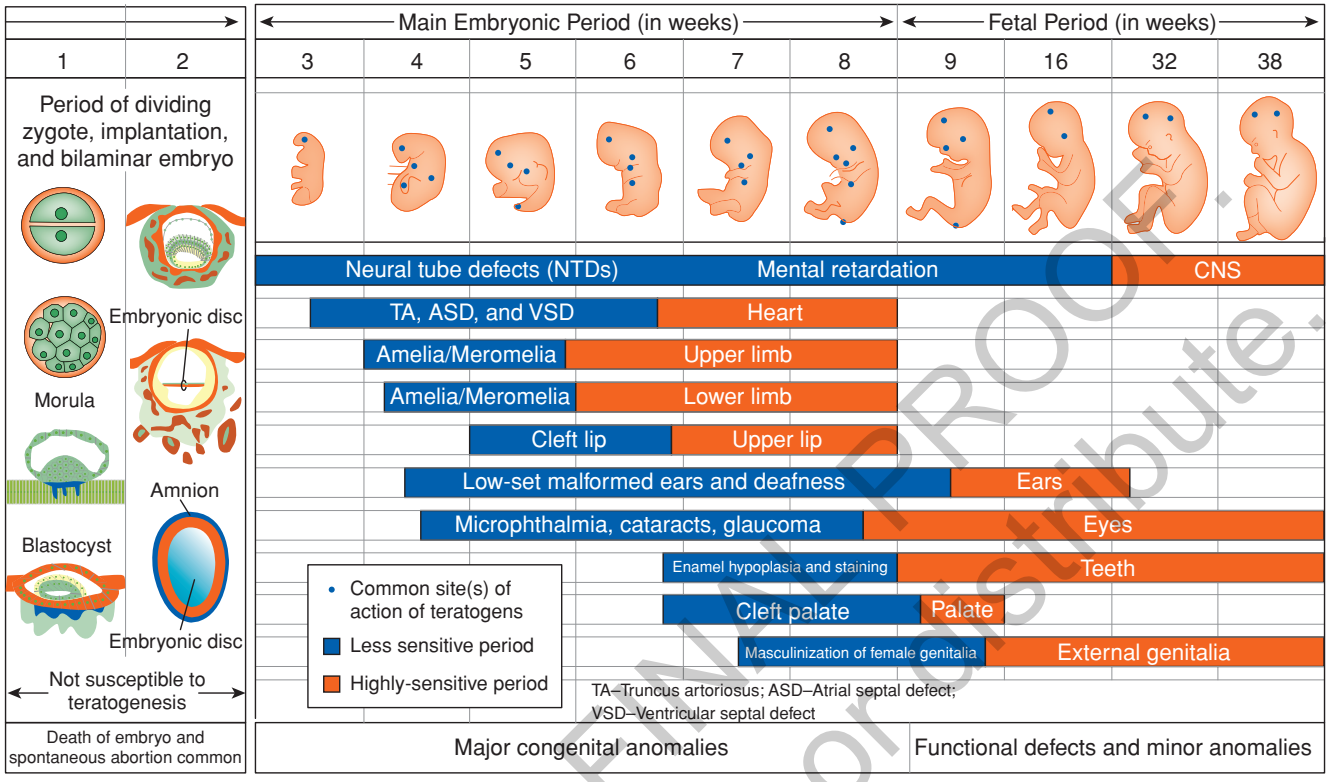
Dose

The amount of exposure (i.e., dosage) to a teratogen influences its effects. Generally, the greater the dose and the longer the period of exposure, the more damage to development, but teratogens also differ in their strength. Some, like alcohol, display a powerful dose-response relationship so that larger doses, or heavier and more frequent drinking, predictably result in greater damage (Bandoli et al., 2019).

Individual Differences

Individuals vary in their susceptibility to particular teratogens based on the genetic makeup of both the organism and mother, as well as the quality of the prenatal environment. Organisms might show a range of responses to a given teratogen, such that some show severe defects, others more mild defects, and some may display normal development (Kaminen-Ahola, 2020).

FIGURE 2.8 ■ Critical Periods in Prenatal Development



Adapted from Moore et al, 2019

Types of Teratogens

Prenatal development can be influenced by many contextual factors: maternal consumption of over-the-counter (OTC), prescription, and recreational drugs; illness; environmental factors; and more.

Prescription and Nonprescription Drugs

More than 90% of pregnant women take prescription or OTC medications (Servey & Chang, 2014; Stanley et al., 2019). Prescription drugs that can act as teratogens include antibiotics, certain hormones, antidepressants, anticonvulsants, and some acne drugs (Tsamantioti & Hashmi, 2020).

Nonprescription drugs, such as diet pills and cold medicine, can also act as teratogens, but research on OTC drugs lags far behind research on prescription drugs, and we know little about the teratogenic effect of many OTC drugs (Tsamantioti & Hashmi, 2020). Caffeine, found in coffee, tea, cola drinks, and chocolate, is the most common OTC drug consumed during pregnancy. Prenatal caffeine exposure is associated with smaller size for gestational age (Modzelewska et al., 2019) and large doses are associated with an increased risk for miscarriage and low birthweight (Chen et al., 2014; Chen et al., 2016; Qian et al., 2020).

Some drugs show complicated effects on development. High doses of aspirin early in pregnancy are associated with increased risk of miscarriage and poor fetal

More than 90% of pregnant women take prescription or over-the-counter (OTC) medications. The findings regarding the teratogenic effects of drugs are mixed, with some studies suggesting potential harm and others suggesting no ill effects of a given drug. In addition, low doses of aspirin may have benefits in treating preeclampsia and high blood pressure during pregnancy.

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Fetal alcohol syndrome is associated with distinct facial characteristics, growth deficiencies, and deficits in intellectual development, language, motor coordination, and the combined abilities to plan, focus attention, and problem solve that persist throughout childhood and into adulthood.

Susan Astley PhD/University of Washington

growth (Antonucci et al., 2012). Yet later in pregnancy, low doses of aspirin are often prescribed to prevent and treat preeclampsia (dangerously high blood pressure in pregnancy that can cause organ damage; Loussert et al., 2020; Roberge et al., 2017).

Alcohol

An estimated 10% to 20% of Canadian and U.S. women report consuming alcohol during pregnancy (Alshaarawy et al., 2016; Popova et al., 2017). Alcohol abuse during pregnancy is the leading cause of developmental disabilities (Webster et al., 2018). **Fetal alcohol spectrum disorders** refer to the continuum of effects of exposure to alcohol, which vary with the timing and amount of exposure (Hoyme et al., 2016). Fetal alcohol spectrum disorders are estimated to affect as many as 2% to 5% of younger schoolchildren in the United States and Western Europe (May et al., 2014, 2018).

Fetal alcohol syndrome (FAS) is a cluster of defects that occur with heavy prenatal exposure to alcohol. FAS is associated with physical characteristics (often small head circumference, short nose, and small midface), growth deficiencies, and deficits in motor coordination and in a range of cognitive abilities that affect attention, planning, and problem solving (Gupta et al., 2016; Loock et al., 2020; Wozniak et al., 2019). Cognitive and behavioral problems can persist from childhood and adolescence through adulthood (Dejong et al., 2019; Mamluk et al., 2017; Mattson et al., 2019). Children exposed to smaller amounts of alcohol prenatally may display *fetal alcohol effects*, which are some but not all of the problems of FAS (Hoyme et al., 2016).

There appears to be no safe level of drinking (Sarman, 2018; Shuffrey et al., 2020). Even less than one drink per day has been associated with poor fetal growth, preterm delivery, and abnormal brain activity in newborns (Mamluk et al., 2017; Shuffrey et al., 2020).

Smoking cigarettes during pregnancy can have adverse consequences.

iStock/Jan-Otto

Cigarette Smoking and E-Cigarette Use

About 7% to 10%, and in some studies as many as 17%, of women report smoking cigarettes during pregnancy (Agrawal et al., 2019; Kondracki, 2019). Fetal deaths, premature births, and low birthweight are nearly twice as frequent in mothers who are smokers than in those who do not smoke (Juárez & Merlo, 2013; Soneji & Beltrán-Sánchez, 2019). Infants exposed to smoke while in the womb are prone to congenital heart defects, respiratory problems, and sudden infant death syndrome and, as children, show more behavior problems, attention difficulties, and lower scores on intelligence and achievement tests (Froggatt et al., 2020; He et al., 2017; Sutin et al., 2017). Even babies born to light smokers (one to five

cigarettes per day) show poorer fetal growth and higher rates of low birthweight than do babies born to nonsmokers (Berlin et al., 2017; Brand et al., 2019; Tong et al., 2017). Maternal smoking during pregnancy shows epigenetic effects on offspring, influencing predispositions to illness and disease in childhood, adolescence, and even middle adulthood (Joubert et al., 2016; Kaur et al., 2019; Nguyen et al., 2018).

About 10% to 15% of women report using e-cigarettes during pregnancy and the prevalence is rising (Wagner et al., 2017; Whittington et al., 2018). E-cigarettes are commonly believed to be "safer" than cigarettes, but exposure to e-cigarette vapor prenatally has similar toxic effects on prenatal development as traditional cigarettes, including increased risk for asthma and cognitive and neurological problems (Church et al., 2020; Greene & Pisano, 2019; Nguyen et al., 2018)

Marijuana

About 4% to 7% of pregnant women report using marijuana (Brown et al., 2017; Young-Wolff et al., 2019). The main active ingredient of marijuana, THC, readily crosses the placenta to affect the fetus (Alvarez et al., 2018). Marijuana use during early pregnancy negatively affects fetal growth, birthweight, and preterm birth, and is associated with a thinner cortex in late childhood (El Marroun et al., 2018). There are long-term neurological effects including impairments in attention, memory, and executive function as well as impulsivity in children, adolescents, and young adults (Grant et al., 2018; Sharapova et al., 2018; Smith et al., 2016).

Cocaine

Prenatal exposure to cocaine is associated with low birthweight, impaired motor skills and reflexes, and reduced brain volume at birth and in infancy (dos Santos et al., 2018; Grewen et al., 2014). Exposure has long-term effects on children through its effect on brain development, particularly the regions associated with attention, arousal, regulation, and executive function (Bazinet et al., 2016). It has a small but lasting effect on attention, emotional control, and behavioral problems through early adolescence and even emerging adulthood (Buckingham-Howes et al., 2013; Min et al., 2014; Richardson et al., 2015, 2019; Singer et al., 2015)

Opioids

Opioids are a class of drugs that include the illegal drugs heroin and synthetic opioids such as fentanyl, as well as prescription pain relievers, such as oxycodone and morphine. Prenatal exposure to opioids is associated with low birthweight, smaller head circumference, and altered brain development (Azuine et al., 2019; Monnelly et al., 2018; Towers et al., 2019). Newborns exposed to opioids prenatally may show signs of addiction and withdrawal symptoms, including tremors, irritability, abnormal crying, disturbed sleep, and impaired motor control (Conradt et al., 2019; Raffaeli et al., 2017). As children and adolescents they tend to show difficulty with attention, learning, managing arousal, and behavioral control; show more emotional and behavior problems than peers; and have reduced brain volume and smaller cortical surface area (Levine & Woodward, 2018; Nygaard et al., 2018; Sirnes et al., 2017; Yeoh et al., 2019).

Maternal Illness

Not all teratogens are drugs. Depending on the type and when it occurs, an illness experienced by the mother during pregnancy can have grave consequences for the developing fetus. Rubella (German measles) prior to the 11th week of pregnancy can cause a variety of defects, including blindness, deafness, heart defects, and brain damage, but after the first trimester, adverse consequences are less common (Bouthry et al., 2014; Singh, 2020). Chicken pox can produce birth defects affecting the arms, legs, eyes, and brain; mumps can increase the risk of miscarriage (Mehta, 2016; Webster et al., 2018). Some sexually transmitted infections (STIs), such as syphilis, can be transmitted to the fetus during pregnancy (Tsimis & Sheffield, 2017). HIV, the virus that causes acquired immune deficiency syndrome (AIDS), a disease affecting the immune system, can be transmitted during birth and through bodily fluids, including by breastfeeding.

Prenatal exposure to radiation increases genetic mutation, leading to impaired development. After the nuclear power accident at Chernobyl, a significant rise in congenital conditions, or birth defects, were reported.

Sean Gallup / Staff/ Getty Images

Environmental Hazards

Prenatal exposure to chemicals, radiation, air pollution, and extremes of heat and humidity can impair development. Exposure to heavy metals, such as lead and mercury, is associated with lower scores on tests of cognitive ability and higher rates of childhood illness (Sadler, 2018; Vigeh et al., 2014; Xie et al., 2013). Prenatal exposure to radiation can cause genetic mutations and is associated with Down syndrome, reduced head circumference, intellectual disability, reduced cognitive and school performance, and heightened risk for cancer from childhood through adulthood (Black et al., 2019; Chang et al., 2014).

Contextual Factors and Teratogens

Our discussion of teratogens thus far has examined the effects of each teratogen independently, which is misleading because infants are often exposed to multiple teratogens. Most infants exposed to opioids or cocaine were also exposed to other substances, including tobacco, alcohol, and marijuana, making it difficult to isolate the effect of each drug on prenatal development. The effects of prenatal exposure to drugs are also influenced by parenting and other postnatal factors (Lee et al., 2020). Once contextual factors in the home and neighborhood, such as parenting, the caregiving environment, socioeconomic status, and exposure to violence are controlled, child and adolescent behavior problems are reduced and often eliminated (Brodie et al., 2019; Buckingham-Howes et al., 2013; Calhoun et al., 2015). Disentangling the long-term effects of prenatal exposure to substances, subsequent parenting, and contextual factors is challenging.

In addition, we must be cautious in interpreting findings about illicit drug use and the effects on prenatal development because race and ethnicity, maternal age, socioeconomic status, and region combine to influence the immediate and long-term outcomes of prenatal substance use for women and their infants. Many U.S. states treat maternal substance use as fetal abuse and construct laws that threaten women who use substances with involuntary treatment or protective custody during pregnancy (Atkins & Durrance, 2020; Seiler, 2016). About one-half of U.S. states classify controlled substance use during pregnancy as child abuse and require that substance use by pregnant mothers be reported to child protective services, which may lead to removing the newborn from parental custody or even terminating parental rights altogether (Guttmacher Institute, 2020).

Policies criminalizing maternal substance use discriminate against women of color and those in low socioeconomic brackets; low-income African American and Hispanic women are disproportionately tested and reported to child protective services for substance use (Paltrow & Flavin, 2013) (Hoerr et al., 2018; Rebbe et al., 2019). Criminal sanctions for maternal drug use can discourage women from seeking prenatal and postnatal care and undermine the physician-patient relationship (American College of Obstetricians and Gynecologists, 2011; American Medical Association, 2014). In contrast, women who live in states that adopt multiple policies, including those that reward abstention, invest in family and community supports, and promote contact with health care and social support services, hold the most promise for encouraging women to seek treatment and for promoting health outcomes (Bada et al., 2012; Hui et al., 2017; Kozhimannil et al., 2019)

Maternal and Paternal Influences on Prenatal Development

A pregnant woman's characteristics, such as her nutritional status, emotional well-being, and age, may also influence prenatal outcomes.

Nutrition

Most women need to consume 2,200 to 2,900 calories per day (and gain about 25 to 30 pounds in total) to sustain a healthy pregnancy (Kaiser et al., 2008). Yet about 14.3 million United States households (about 11%) reported food insecurity in 2018 (United States Department of Agriculture, 2019).

Fetal malnutrition is associated with poor growth before and after birth as well as effects that can last into adulthood (Han & Hong, 2019; Kim et al., 2017).

In addition to calories, specific nutrients are also needed for healthy prenatal development. Folic acid (a B vitamin) is essential in preventing neural tube defects. **Spina bifida** occurs when the lower part of the neural tube fails to close and spinal nerves begin to grow outside of the vertebrae, often resulting in paralysis and malformations in brain development and impaired cognitive development (Avagliano et al., 2019; Donnan et al., 2017). Another neural tube defect, **anencephaly,** occurs when the top part of the neural tube fails to close and all or part of the brain fails to develop, resulting in death shortly after birth (Avagliano et al., 2019). Neural tube defects can be prevented by consuming 0.4 to 0.8mg of folic acid daily. Many foods are fortified with folic acid, but a dietary supplement is safe and ensures that prenatal needs are met (Bibbins-Domingo et al., 2017).

Emotional Well-Being

Exposure to chronic and severe stress during pregnancy, such as from living in unsafe environments, experiencing traumatic life events, or exposure to racism and discrimination, poses risks for prenatal development, including low birthweight, premature birth, and a longer postpartum hospital stay (Lima et al., 2018; Schetter & Tanner, 2012). Long-term exposure to stress hormones in utero is associated with higher levels of stress hormones at birth and in infancy (Kapoor et al., 2016; McGowan & Matthews, 2018; Nazzari et al., 2019).

Infants prenatally exposed to high levels of maternal stress experience higher rates of emotional and behavior problems in infancy, childhood, and adolescence and increased risk for neurodevelopmental disorders such as autism and attention deficit disorder (Hentges et al., 2019; MacKinnon et al., 2018; Madigan et al., 2018; Manzari et al., 2019). Prenatal stress may also have epigenetic effects on development, influencing stress responses throughout the lifespan and perhaps transmitting them across generations (DeSocio, 2018).

Children who experience prenatal stress also tend to experience postnatal stress, making it difficult to separate their effects on children (Hartman et al., 2020; Lin et al., 2017). Children who are exposed to prenatal stress show greater emotional problems when they are also exposed to postnatal maternal depression and anxiety, as compared with those who are exposed to less maternal postnatal depression (Hartman et al., 2020). Contextual factors that influence pre- and postnatal maternal depression, such as exposure to poverty, racism and discrimination, and environmental stressors, are also experienced by children and influence their development and reactions to stress.

Maternal Age

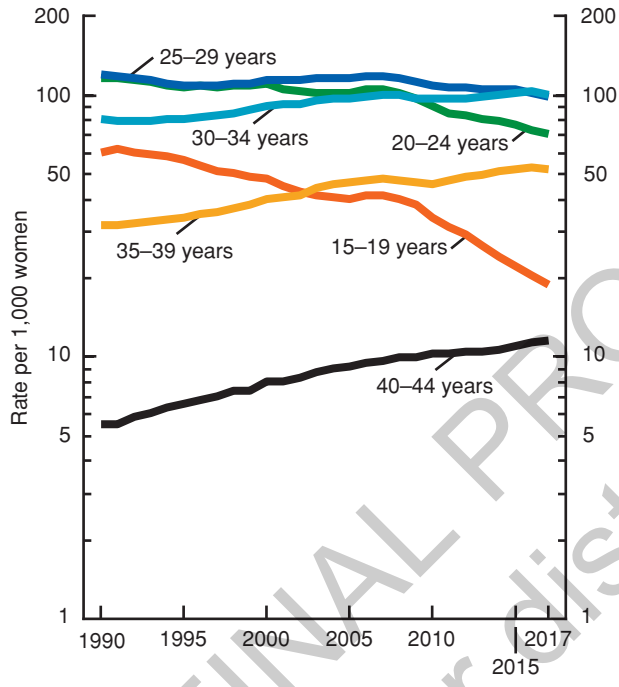
Since 1990, the birth rate has increased for women ages 35 to 39 and 40 to 44 (Hamilton et al., 2017; see Figure 2.9). The risk of birth complications increases in the late 30s and especially after age 40. Women who give birth after the age of 40 are at greater risk for pregnancy and birth complications, including hypertension, gestational diabetes, and miscarriage, than are younger women (Londero et al., 2019; Magnus et al., 2019; Marozio et al., 2019).

Their newborns are at increased risk for low birthweight, preterm birth, respiratory problems, and other conditions requiring intensive neonatal care (Frederiksen et al., 2018; Grotegut et al., 2014; Kenny et al., 2013; Khalil et al., 2013). The risk of having a child with Down syndrome also increases sharply with maternal age, especially after age 40 (Diamandopoulos & Green, 2018; Hazlett et al., 2011; see Figure 2.10). Although risks for complications rise linearly with each year (Yaniv et al., 2011), it is important to know that the majority of women over age 35 give birth to healthy infants.

Paternal Characteristics

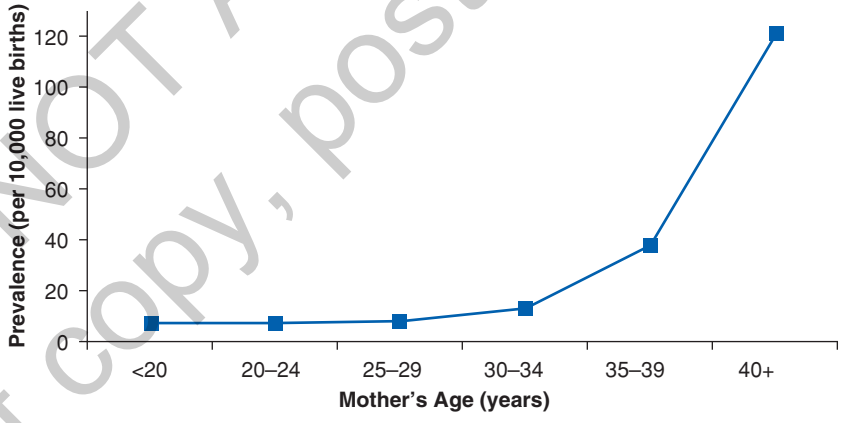
Fathers influence prenatal development indirectly, such as through secondhand smoke and their interactions with pregnant mothers (Braun et al., 2020; Glover & Capron, 2017). Biological fathers also influence prenatal development directly. Advanced paternal age (over 40) is associated with damage to sperm and DNA and an increased risk for birth defects, chromosomal abnormalities, and developmental disorders (Brandt et al., 2019; Herati et al., 2017; Rosiak-Gill et al., 2019). Alcohol use, substance use, smoking, and exposure to toxins can impair sperm production and quality, including increasing

FIGURE 2.9 ■ Birth Rates by Age of Mother, United States, 2017



Source: Martin et al, 2018.

FIGURE 2.10 ■ Maternal Age and Down Syndrome



Source: Centers for Disease Control and Prevention, 2019.

the risk of DNA damage and mutations (Beal et al., 2017; Borges et al., 2018). In addition to DNA, fathers (and mothers) pass on epigenetic markers that can influence their offspring's health throughout life and may even be passed to their offspring's children (Estill & Krawetz, 2016).

Prenatal Care

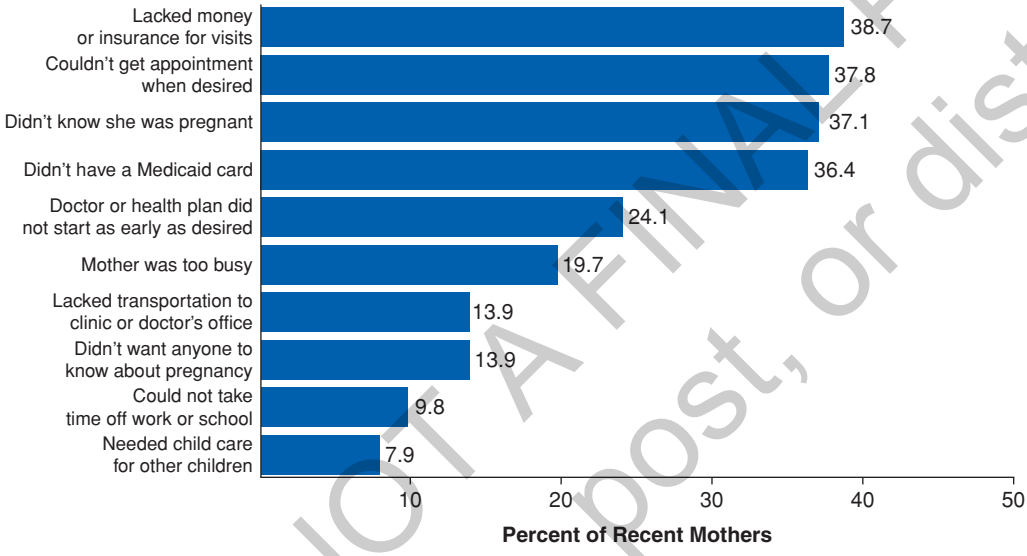
Prenatal care, a set of services provided to improve pregnancy outcomes and engage the expectant mother, family members, and friends in health care decisions, is critical for the health of both mother and infant. Prenatal care visits typically include a physical exam, weight check, and diagnostic procedures, such as ultrasound, to assess the fetus's health. These visits also provide women the opportunity to ask questions and obtain health care information and advice about nutrition, prenatal care, and preparing for birth.

About one-quarter of pregnant women in the United States do not obtain prenatal care until after the first trimester; 6% obtain prenatal care at the end of pregnancy or not at all (U.S. Department of Health and Human Services, 2014). Inadequate prenatal care is a risk factor for low birthweight and preterm births as well as infant mortality during the first year (Partridge et al., 2012; Xaverius et al., 2016). The use of prenatal care predicts pediatric care, and thereby health and development, throughout childhood (Deaton et al., 2017).

Common reasons for insufficient prenatal care include lacking health insurance (Baer et al., 2018), difficulty in finding a doctor, lack of transportation, demands of caring for young children, poor prior experiences in the health care system, and family crises (see Figure 2.11; Daniels et al., 2006; Heaman et al., 2015; Mazul et al., 2017). Black and Latina women report nearly twice as many barriers to accessing care as white women (Fryer et al., 2021).

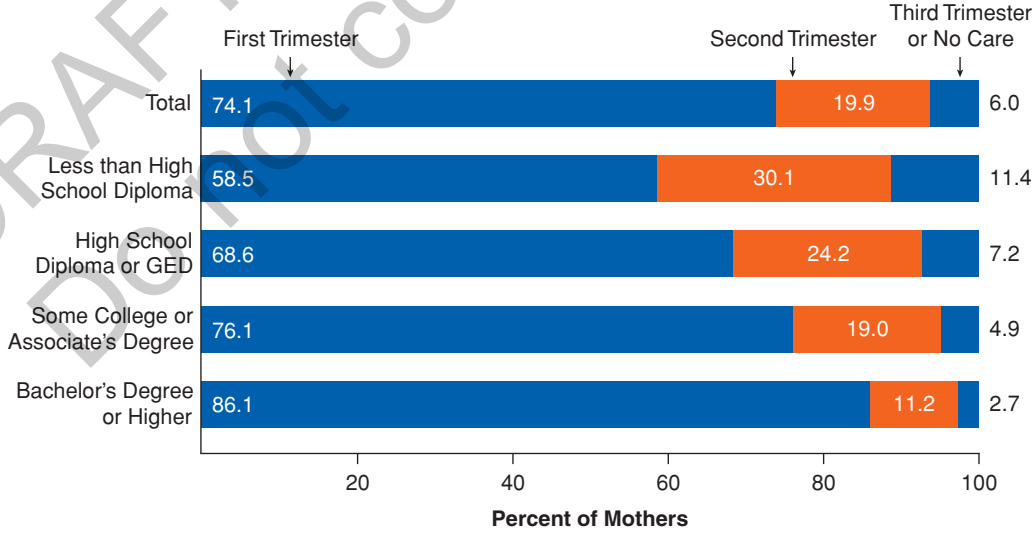
There are significant ethnic and socioeconomic disparities in prenatal care. Prenatal care is closely linked with maternal education (see Figure 2.12; Blakeney et al., 2019).

FIGURE 2.11 ■ Reasons for Delayed Prenatal Care Among Women, 2009–2010



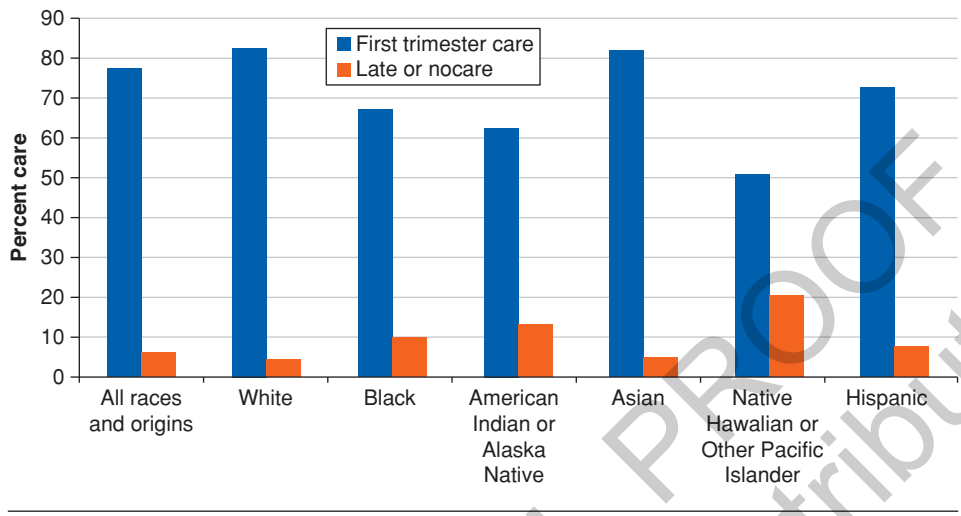
Source: U.S. Department of Health and Human Services, 2013.

FIGURE 2.12 ■ Timing of Prenatal Care Initiation, by Maternal Education, 2012



Source: U.S. Department of Health and Human Services, 2015

FIGURE 2.13 First Trimester and Late Prenatal Care by Race and Ethnicity, 2018



Source: Hamilton et al, 2018.

Women of color are disproportionately less likely to receive prenatal care during the first trimester and are more likely to receive care beginning in the third trimester or receive no care (Blakeney et al., 2019; see Figure 2.13). Native Hawaiian and Native American women are least likely to obtain prenatal care during the first trimester, followed by Black, Hispanic, Asian American, and white American women (Hamilton et al., 2018). Ethnic differences are influenced by socioeconomic factors, as the ethnic groups least likely to seek early prenatal care are also the most economically disadvantaged members of society and are most likely to live in communities with fewer health resources, such as access to physicians and hospitals, sources of health information, and nutrition and other resources.

Cultural factors may also protect some women and infants from the negative consequences of inadequate prenatal care. For example, Latina mothers in the United States face multiple barriers to prenatal care, yet their rates of low birthweight and infant mortality are below national averages. This is known as the *Latina paradox*. These favorable birth outcomes are striking because Latinos as a group are among the most socioeconomically disadvantaged ethnic populations in the United States (McGlade et al., 2004; Ruiz et al., 2016). Protective cultural factors, such as strong social support, support for maternity, the norm of selfless devotion to the maternal role (known as *marianismo*), and informal systems of health care among Latina women—in which women tend to take responsibility for the health needs of those beyond their nuclear households—account for the Latina paradox (Fracasso & Busch-Rossnagel, 1992; McGlade et al., 2004).

However, the Latina birth advantage may decline in subsequent American-born generations, perhaps because the negative effects of socioeconomic disadvantage cannot be easily ameliorated by cultural supports (Hoggatt et al., 2012; Sanchez-Vaznaugh et al., 2016). Yet Latina women who express a bicultural identity, identifying with both Latin and continental U.S. cultures, experience lower stress levels than those with low acculturation (Chasan-Taber et al., 2020), suggesting that the Latina paradox is complex, influenced by many intersecting social factors.

Thinking in Context: Lifespan Development

Consider the influence of teratogens from the perspective of Bronfenbrenner's model (Chapter 1). Identify examples of teratogens, such as the factors we have discussed, at each bioecological level: microsystem, mesosystem, exosystem, and macrosystem. How might this model be used to help promote healthy prenatal development?

Thinking in Context: Intersectionality

1. The issue of substance use in pregnant women is complicated. Consider the effects of teratogens on fetuses and the rights of pregnant women. How might they conflict? How do issues of justice and equity influence whether women are likely to be discovered, receive treatment, and/or be charged with maltreatment? Are all women, regardless of age, ethnicity and race, and SES, equally likely to be discovered and charged? Why or why not?
2. What are some examples of barriers to receiving prenatal care? In what ways do factors such as race, ethnicity, socioeconomic status, and culture influence whether women receive prenatal care? Would you expect all women—white, Asian American, Black, Hispanic, Pacific Islander, and Native American—to experience and perceive similar barriers? Why or why not? What environmental factors might contribute to these differences?

Thinking in Context: Applied Developmental Science

Suppose that you plan to study the presence and effects of teratogens on prenatal development. Choose a teratogen that you believe is most relevant to prenatal health.

1. How might you measure the fetus's or embryo's exposure to the teratogen? What effects would you study?
2. To what degree are other teratogens likely to be present? How might this complicate your results?
3. How will you obtain participants (pregnant women)? How might you ensure that your participants are diverse in terms of race, ethnicity, and SES? Are there other relevant variables on which women might differ?
4. In what ways might interactions among race, ethnicity, and SES influence your results? Why or why not?

CHILDBIRTH

LEARNING OBJECTIVE

2.5 Summarize the process of childbirth and the risks for, and characteristics of, low birthweight infants.

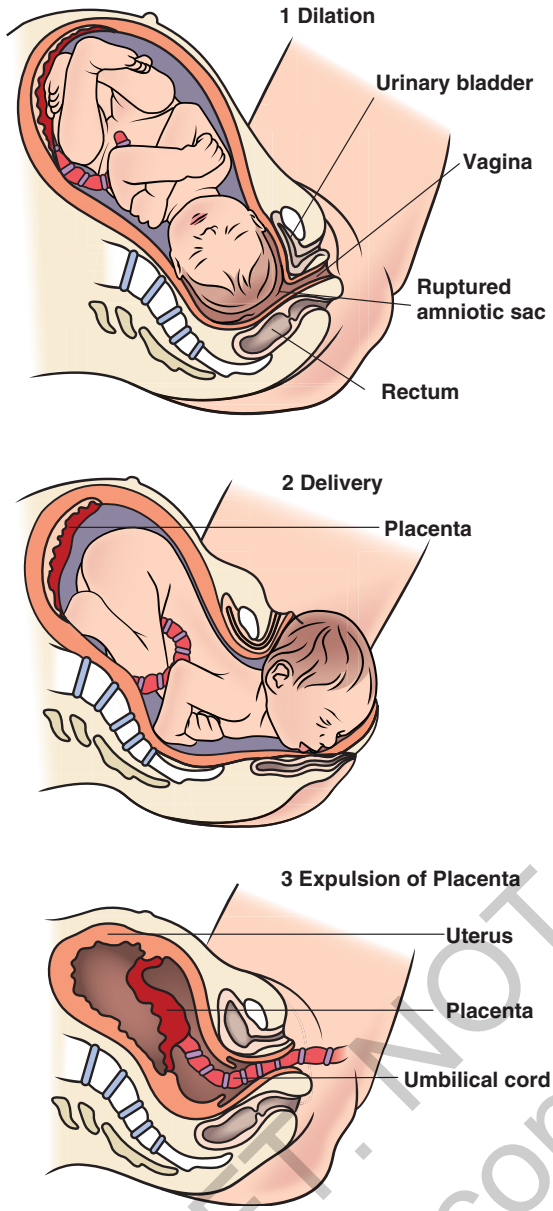
At about 40 weeks of pregnancy, or 38 weeks after conception, childbirth, also known as **labor**, begins.

Labor

Labor progresses in three stages. The first stage of labor, dilation, is the longest. It typically lasts 8 to 14 hours for a woman having her first child; for later-born children, the average is 3 to 8 hours. Labor begins when the mother experiences regular uterine contractions spaced at 10- to 15-minute intervals. Initial contractions may feel like a backache or menstrual cramps or may be extremely sharp. The amniotic sac, a membrane containing the fetus surrounded by fluid, may rupture at any time during this stage, often referred to as the "water breaking." The contractions, which gradually become stronger and closer together, cause the cervix to dilate so that the fetus's head can pass through, as shown in Figure 2.14.

The second stage of labor, delivery, begins when the cervix is fully dilated to 10 cm and the fetus's head is positioned at the opening of the cervix—known as "crowning." It ends when the baby emerges

FIGURE 2.14 ■ Stages of Labor



completely from the mother's body. It is during this stage that the mother typically feels an urge to push or bear down with each contraction to assist the birth process.

In the third stage of labor, shortly after birth, the placenta separates from the uterine wall and is expelled by uterine contractions.

Medication During Delivery

Medication is administered in more than 80% of births in the United States (Declercq et al., 2014). There are two main types of medications administered during labor. *Analgesics*, such as tranquilizers, reduce the perception of pain and can help the mother relax. But these drugs pass through the placenta to the fetus and are associated with decreases in heart rate and respiration (Hacker et al., 2016). Newborns exposed to some medications show signs of sedation and difficulty regulating their temperature (Gabbe et al., 2016).

Anesthetics are painkillers that block overall sensations or feelings. General anesthesia (getting "knocked out") blocks consciousness entirely; it is no longer used because it is transmitted to the fetus and can slow labor and harm the fetus. Today, the most common anesthetic is an **epidural**, in which a pain-relieving drug is administered to a small space between the vertebrae of the lower spine, numbing the woman's lower body. Epidurals are associated with a longer delivery as they weaken uterine contractions and may increase the need for a **cesarean section**, as discussed next (Gabbe et al., 2016; Herrera-Gómez et al., 2017). Epidurals do not appear to affect newborns (Wang et al., 2018). The American College of Obstetricians and Gynecologists (2017) has concluded that the proper administration of medication poses few risks to the newborn and pain medication should be available to all women.

Cesarean Delivery

Sometimes a vaginal birth is not possible because of concerns for the health or safety of the mother or fetus. A cesarean section is a surgical procedure that removes the fetus from the uterus through the abdomen. About 32% of U.S. births were by cesarean section in 2018 (Hamilton et al., 2018; Martin et al., 2018). Cesarean sections are performed when labor progresses too slowly, the fetus is in breech position (legs first) or transverse position (crosswise in the uterus), the head is too large to pass through the pelvis, or the fetus or mother is in danger (Jha et al., 2015; Visscher & Narendran, 2014). Babies delivered by cesarean are exposed to more maternal medication and secrete less of the stress hormones that occur with vaginal birth, which are needed to facilitate respiration, enhance circulation of blood to the brain, and help the infant adapt to the world outside of the womb.

Natural Childbirth

Natural childbirth is an approach to birth that emphasizes preparation by educating mothers and their partners about childbirth, helping them to reduce their fear, and teaching them pain management techniques that do not rely on medication. The most widely known natural childbirth method, the Lamaze method, entails teaching pregnant women (and partners) about their bodies, including detailed anatomical information, as well as breathing techniques, with the intent of reducing anxiety and fear. Many women seek the help of a **doula**, a caregiver who provides support to an expectant mother and her partner throughout the birth process (Kang, 2014). The doula is present during birth, whether at

a hospital or other setting, and helps the woman carry out her birth plans. The presence of a doula is associated with less pain medication, fewer cesarean deliveries, and higher rates of satisfaction in new mothers (Gabbe et al., 2016; Kozhimannil et al., 2016). Many women combine medication with natural childbirth methods, such as breathing techniques.

A midwife prepares a mother to give birth in her home. Birth practices vary by culture.

Viviane Moos / Getty Images

Home Birth

Although common in nonindustrialized nations, home birth is rare in the U.S., comprising 1.5% of all births in 2016 in the United States (MacDorman & Declercq, 2016). Most home births are managed by a **midwife**—a health care professional, usually a nurse, who specializes in childbirth. Midwives provide health care throughout pregnancy and supervise home births. A healthy woman who has received prenatal care and is not carrying twins is unlikely to encounter problems and may be a good candidate for a home birth (Wilbur et al., 2015). Although unpredictable events can occur and immediate access to medical facilities can improve outcomes, studies from Europe indicate that home birth is not associated with greater risk of perinatal mortality. However, home birth is far more common in many European countries than in the United States (20% in the Netherlands, 8% in the United Kingdom, and about 1% in the United States; Brocklehurst et al., 2011; de Jonge et al., 2015). The few U.S. studies that have examined planned home birth compared with hospital birth have found no difference in neonatal deaths, and women who have a planned home birth report high rates of satisfaction (Jouhki et al., 2017; Zielinski et al., 2015).

Apgar Score

Immediately after birth, newborns are evaluated to determine their **Apgar score**, which provides a quick overall assessment of the baby's health. The Apgar score is composed of five subtests: appearance (color), pulse (heart rate), grimace (reflex irritability), activity (muscle tone), and respiration (breathing). The newborn is rated 0, 1, or 2 on each subtest for a maximum total score of 10 (see Table 2.7). A score of 4 or lower means that the newborn is in serious condition and requires immediate medical attention. The rating is conducted twice, 1 minute after delivery and again 5 minutes after birth; this timing ensures that hospital staff will monitor the newborn over several minutes. A low Apgar score is associated with an increased risk of neonatal death, but an increase in score after 10 minutes lowers the risk of problems (Chen et al., 2014). More than 98% of all newborns in the United States achieve a 5-minute score of 7 to 10, indicating good health (Martin et al., 2013).

TABLE 2.7 ■ Apgar Scoring System

	Rating (Absence–Presence)		
Indicator	**0**	**1**	**2**
Appearance (color)	Blue	Pink body, blue extremities	Pink
Pulse (heart rate)	Absent	Slow (below 100)	Rapid (over 100)
Grimace (reflex irritability)	No response	Grimace	Coughing, crying
Activity (muscle tone)	Limp	Weak and inactive	Active and strong
Respiration (breathing)	Absent	Irregular and slow	Crying, good

Source: Adapted from Apgar, 1953.

Low-Birthweight Infants: Preterm and Small-for-Date Babies

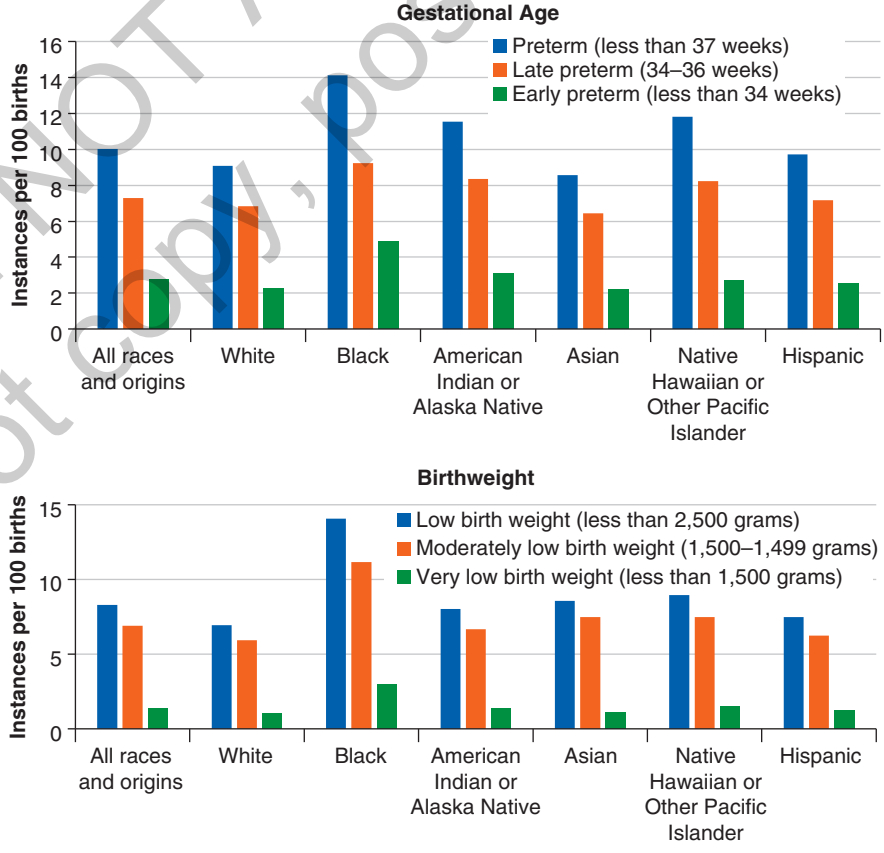
About 8% of infants born in the United States each year are low birthweight (Martin et al., 2018). Infants are classified as **low birthweight** when they weigh less than 2,500 grams (5.5 pounds) at birth; **very low birthweight** refers to a weight less than 1,500 grams (3.5 pounds); and **extremely low birthweight** refers to a weight less than 750 grams (1 lb. 10 oz.). Low-birthweight (LBW) infants may be **preterm** (premature, i.e., born before their due date) or **small for date** (full term but have experienced slow growth and are smaller than expected for their gestational age). Low birthweight is the second leading cause of infant mortality (Murphy et al., 2018; Mathews & MacDorman, 2013).

Contextual Risks for LBW

Socioeconomic status is associated with LBW. In the United States, socioeconomic status is associated not simply with income, but with access to social services, such as health care, that determine birth outcomes. In one international comparison of U.S. births with those in the UK, Canada, and Australia—countries with health care and social services available to all individuals—the most disadvantaged women in all four countries were more likely to give birth to LBW infants, but SES was most strongly linked with LBW in the United States, where health care is privatized (Martinson & Reichman, 2016).

Socioeconomic disadvantage interacts with race and ethnicity in complex ways to influence LBW in the U.S. (see Figure 2.15). In 2016, non-Hispanic Black infants were more than twice as likely to be born low birthweight (11%) than non-Hispanic white and Hispanic infants (5% and 6%, respectively; Womack et al., 2018). SES plays a role in these differences, but it is not the whole story. In one study, LBW rates were higher for non-Hispanic Black mothers than non-Hispanic white mothers, but the racial difference declined (but did not disappear) when the researchers took into account

FIGURE 2.15 ■ Gestational Age and Birthweight, by Race and Ethnicity: United States, 2018



Source: Centers for Disease Control and Prevention; National Center for Health Statistics.

financial and relationship stresses, suggesting a role for SES in racial differences, but also the presence of other factors (Almeida et al., 2018). In another study of more than 10,000 Californian women, the most economically disadvantaged Black and white women showed similar LBW rates, but increase in income was more strongly associated with improvement in LBW rates among white than Black women (Braveman et al., 2015). As SES advantage increased for both white and Black women, the racial disparity in LBW outcomes grew. Racial differences in LBW are not only a function of income, but also of other factors such as racism and discrimination (Ncube et al., 2016; Ramraj et al., 2020).

Low birthweight infants require extensive care. They are at risk for poor developmental outcomes and even death.

AFP Contributor / Contributor/ Getty

Characteristics of LBW Infants

At birth, LBW infants often experience difficulty breathing and have difficulty maintaining homeostasis, a balance in their biological functioning. (Charles et al., 2018). The deficits that LBW infants experience correspond closely to the infant's birthweight (Hutchinson et al., 2013). LBW infants are at higher risk for poor growth, cerebral palsy, seizure disorders, neurological difficulties, respiratory problems, and illness (Adams-Chapman et al., 2013; Charles et al., 2018; Durkin et al., 2016; Miller et al., 2016). They often experience difficulty in self-regulation and cognitive problems that may persist into adulthood (Eryigit Madzwamuse et al., 2015; Hutchinson et al., 2013; MacKay et al., 2010).

As children and adolescents, they are more likely to show problems with inattention, hyperactivity, and experience emotional and behavioral problems (Jaekel et al., 2018; Mathewson et al., 2017; Franz et al., 2018). They tend to show poor social competence and poor peer relationships, including peer rejection and victimization in adolescence (Georgsdottir et al., 2013; Ritchie et al., 2015; Yau et al., 2013). As adults, LBW individuals may experience social difficulties and may score high on measures of anxiety (Eryigit Madzwamuse et al., 2015; Mathewson et al., 2017).

Parenting a LBW infant is stressful because such infants tend to be easily overwhelmed by stimulation and difficult to soothe (Howe et al., 2014; Gardon et al., 2019). LBW infants are slow to initiate social interactions and do not attend to caregivers, looking away or otherwise resisting attempts to attract their attention (Eckerman et al., 1999; Provasi, 2019). Because LBW infants often do not respond to attempts to solicit interaction, they can be frustrating to interact with and are at risk for less secure attachment to their parents (Jean & Stack, 2012; Wolke et al., 2014). Research also indicates that they may experience higher rates of child abuse, partly because of their special needs but also because the risk factors for LBW, such as prenatal exposure to substances or maternal illness, also pose challenges for postnatal survival and are themselves are associated with abuse (Cicchetti & Toth, 2015; Puls et al., 2019)

Promoting Positive Outcomes for LBW Infants

The parenting context is an important influence on LBW infant health (Pierrehumbert et al., 2003; Provasi, 2019). When mothers have knowledge about child development and how to foster healthy development, are involved with their children, and create a stimulating home environment, LBW infants tend to have good long-term outcomes (Benasich & Brooks-Gunn, 1996; Jones et al., 2009; Lynch & Gibbs, 2017). A study of LBW children showed that those who experienced sensitive parenting showed faster improvements in executive function and were indistinguishable from their normal-weight peers by age 5; however, those who experienced below-average levels of sensitive parenting showed lasting deficits (Camerota et al., 2015). In contrast, longitudinal research has found that LBW children raised in unstable, economically disadvantaged families tend to remain smaller in stature, experience more emotional problems, and show more long-term deficits in intelligence and academic performance than do those raised in more advantaged homes (Taylor et al., 2001).

Interventions to promote the development of LBW children often emphasize helping parents learn coping strategies for interacting with their infants and managing parenting stress (Chang et al., 2015; Lau & Morse, 2003). One intervention common in developing countries where mothers may not have access to hospitals is **kangaroo care,** in which the infant is placed vertically against the parent's chest, under the shirt, providing skin-to-skin contact (Charpak et al., 2005). As the parent goes about daily activities, the infant remains warm and close, hears the voice and heartbeat, smells the body, and feels constant skin-to-skin contact. Kangaroo care is so effective that the majority of hospitals in the United States offer kangaroo care to preterm infants. Babies who receive early and consistent kangaroo care grow more quickly, sleep better, score higher on measures of health, and show more cognitive gains throughout the first year of life (Boundy et al., 2015; Jefferies, 2012; Sharma et al., 2019).

Thinking in Context: Lifespan Development

1. Ask adults of different generations, perhaps a parent or an aunt and a grandparent or family friend, about their birth experiences. How do these recollections compare with current birthing practices?
2. A basic tenet of development is that individuals are active in their development, influencing the world around them (see Chapter 1). Consider LBW infants: How might their characteristics and abilities influence their caregivers? Why is caring for LBW infants challenging?
3. Parental responses to having a LBW infant influence the child's long-term health outcomes. How might contextual factors influence parents' responses? What supports from the family, community, and broader society can aid parents in helping their LBW infants adapt and develop healthily?

Thinking in Context: Applied Developmental Science

Create a birth plan for a healthy woman in her 20s. What type of birth will you choose? Why? How might you address pain relief? Consider a healthy 39-year old woman; in what ways might your birth plan change (or not)? Why?

CHAPTER SUMMARY

2.1 Discuss patterns of genetic inheritance and examples of genetic disorders and chromosomal abnormalities.

Some genes are passed through dominant-recessive inheritance, in which some genes are dominant and will always be expressed and others are recessive, only expressed if paired with another recessive gene. Incomplete dominance is a genetic inheritance pattern in which both genes influence the characteristic. Polygenic traits are the result of interactions among many genes. Genetic disorders carried through dominant-recessive inheritance include PKU (recessive allele) and Huntington disease (dominant allele). Some recessive genetic disorders are carried on the X chromosome. Males are more likely to be affected by X-linked genetic disorders. Examples of X-linked disorders include hemophilia, Fragile X, and color blindness. Some disorders, such as trisomy 21, known as Down syndrome, are the result of chromosomal abnormalities. Abnormalities resulting from additional or missing sex chromosomes include Klinefelter syndrome, Jacob's syndrome, triple X syndrome, and Turner syndrome. Other disorders result from mutations—genetic abnormalites that may occur randomly or as the result of exposure to toxins.

2.2 Describe behavior genetics and interactions among genes and environment, such as gene-environment correlations, gene-environment interactions, and the epigenetic framework.

Behavior genetics is the field of study that examines how genes and experience combine to influence the diversity of human traits, abilities, and behaviors. Behavior genetic research includes three types of studies: selective breeding studies, family studies, and adoption studies. Genetics contributes to many traits. Passive, evocative, and active gene–environment correlations illustrate how traits often are supported by both our genes and environment. 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.

2.3 Describe the three periods of prenatal development.

Conception occurs in the fallopian tube. During the germinal period, the zygote begins cell division and travels down the fallopian tube toward the uterus. During the embryonic period, from weeks 2 to 8, the most rapid developments of the prenatal period take place. From 9 weeks until birth, the fetus grows rapidly, and the organs become more complex and begin to function. There are several diagnostic methods used to examine the developing organism: ultrasound, amniocentesis, chorionic villus sampling, fetal MRI, and noninvasive prenatal testing (NIPT) screens.

2.4 Explain how exposure to environmental factors can influence the prenatal environment and provide examples.

Teratogens include diseases, drugs, and other agents that influence the prenatal environment to disrupt development. Generally, the effects of exposure to teratogens on prenatal development vary depending on the stage of prenatal development and dose. There are individual differences in effects, different teratogens can cause the same birth defect, a variety of birth defects can result from the same teratogen, and some teratogens have subtle effects that result in developmental delays that are not obvious at birth or not visible until many years later. Prescription and nonprescription drugs, maternal illnesses, and smoking and alcohol use can harm the developing fetus. Prenatal development can also be harmed by factors in the environment as well as by maternal and paternal characteristics and behaviors.

2.5 Summarize the process of childbirth and the risks for, and characeritics of, low birthweight infants.

Childbirth progresses through three stages. The first stage of labor begins when the mother experiences regular uterine contractions that cause the cervix to dilate. During the second stage, the fetus passes through the birth canal. The placenta is passed during the third stage. Medication is used in most births, often in combination with breathing and relaxation techniques characteristic of natural births. About one third of U.S. births are by cesarean section. There are two types of low-birthweight infants: those who are preterm and those who are small for date. Low-birthweight infants struggle to survive and experience higher rates of sensory, motor, and language problems; learning disabilities; behavior problems; and deficits in social skills into adolescence. The long-term outcomes for low birthweight infants vary considerably and depend on the environment in which the children are raised.

KEY TERMS

amniocentesis (p. 49)
amnion (p. 47)
anencephaly (p. 55)
Apgar score (p. 61)
behavior genetics (p. 42)
blastocyst (p. 46)
cesarean section (p. 60)
chorionic villus sampling (CVS) (p. 49)
chromosomes (p. 33)
deoxyribonucleic acid (DNA) (p. 34)
dominant-recessive inheritance (p. 35)
doula (p. 60)
Down syndrome (p. 39)
embryo (p. 47)
embryonic period (p. 46)
epidural (p. 60)

epigenetics (p. 44)
extremely low birthweight (p. 62)
fetal alcohol spectrum disorders (p. 52)
fetal alcohol syndrome (FAS) (p. 52)
fetal MRI (p. 48)
fetal period (p. 48)
fetus (p. 48)
Fragile X syndrome (p. 39)
gametes (p. 34)
gene-environment correlation (p. 42)
gene-environment interactions (p. 44)
genes (p. 34)
genotype (p. 42)
germinal period (p. 46)
hemophilia (p. 39)
implantation (p. 46)
incomplete dominance (p. 35)
indifferent gonad (p. 47)
Jacob's syndrome (p. 40)
kangaroo care (p. 64)
Klinefelter syndrome (p. 40)
labor (p. 59)
low birthweight (p. 62)
meiosis (p. 34)
midwife (p. 61)
mitosis (p. 34)
mutations (p. 41)
natural childbirth (p. 60)
neonate (p. 45)
neural tube (p. 47)
niche picking (p. 43)
noninvasive prenatal testing (NPT) (p. 49)
phenotype (p. 42)
phenylketonuria (PKU) (p. 38)
placenta (p. 47)
polygenic inheritance (p. 35)
prenatal care (p. 56)
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preterm (p. 62)
sickle cell trait (p. 38)
small for date (p. 62)
spina bifida (p. 55)
teratogens (p. 50)
triple X syndrome (p. 40)
Turner syndrome (p. 40)
ultrasound (p. 48)
very low birthweight (p. 62)
zygote (p. 34)

PART 1 LIFESPAN DEVELOPMENT AT WORK: FOUNDATIONS OF LIFESPAN HUMAN DEVELOPMENT

One of the tenets of lifespan development is that it is a multidisciplinary field, integrating findings from many settings. In this feature that appears at the end of each major part of this book, we explore some of the career choices for students interested in lifespan development.

Students with interests in human development select many different college majors, such as human development and family studies, psychology, social work, education, nursing, and more. What these diverse fields hold in common, beside a grounding in human development, is training in transferable skills that are valuable in a variety of employment settings.

Transferable Skills

Just as it sounds, a *transferable skill* is one that can *transfer* or be applied in multiple settings. Employers value transferable skills. Consider the top five attributes that employers seek in potential employees, shown in Table 1.

It might be quickly apparent that none of these attributes refers directly to any specific college major. Instead, these are skills that students of all disciplines who study human development have the opportunity to hone. Let's take a closer look at some of these transferable skills.

Perhaps not surprising, the skill employers view as most valuable is *problem solving.* Individuals who are successful at problem solving can gather and synthesize information from a variety of sources. They learn to weigh multiple sources of information, determine the degree of support for each position, and generate solutions based on the information at hand. Effective problem solving relies on *analytical skills*. Exposure to diverse perspectives and ideas about human development trains students to think flexibly and to accept some ambiguity because solutions to complex problems are often not clear cut.

Students in human development fields learn *teamwork skills* to work with others in coursework and placements. For example, nursing, psychology, and human development and family studies students

TABLE 1 ■ Top 5 Attributes Employers Prefer in Applicants

Desired Attribute	Percentage of Employers Endorsing
Problem-solving skills	91
Ability to work in a team	86
Strong work ethic	80
Analytical/quantitative skills	79
Communication skills (written)	78

Source: (NACE, 2020)

may work together as lab members. Education students may collaborate on group projects, such as designing curricula, and social work students may get hands-on experience working with others in field placements. These valuable experiences foster the ability to effectively work with teams, a skill coveted by employers in all fields.

Students in human development and family studies, psychology, social work, education, and nursing take coursework relevant to their discipline, but success in each of these fields requires a *strong work ethic* and good *communication skills*. Succeeding in challenging courses like anatomy and physiology, research methods, and statistics requires dedication and consistent work. Oral and written communication skills are developed in coursework, but also in field and practicum experiences when students learn to communicate with children, adolescents, adults, and supervisors.

Lifespan Development Fields

As we consider career opportunities in lifespan development, we break them into several areas: education; health care and nursing; social work, counseling, and psychology ; and research and advocacy.

Education

Perhaps the most obvious career for students interested in human development is educator, or teacher. Educators who work with young children include *early childhood educators* and *preschool teachers*. Educators who work with older children and adolescents include *elementary school teachers* and *high school teachers*. Some educators specialize in working with children with specific developmental needs (*special education teachers*). Other teachers specialize in teaching English as a Second Language (*ESL teachers*) and work with children, adolescents, and adults. Becoming a teacher requires a bachelor's degree and certification.

Career and technical education teachers provide vocational training to adolescents and adults in subjects such as auto repair, cosmetology, and culinary arts. *Adult literacy teachers* instruct adults in literacy skills such as reading and writing. *GED teachers or instructors* help students earn their GED certificate, a high school equivalency diploma.

The education field also includes careers in administration, overseeing educational programs and educators. *Preschool and childcare center directors* work with early childhood educators to design educational plans for young children, oversee staff, and prepare budgets and are responsible for all aspects of the program. *Elementary school principals, middle school principals,* and *high school principals* oversee all school operations, including the work of teachers and other personnel, curricula, and daily school activities, and they promote a safe and productive learning environment.

Perhaps the most visible career at the college level is *college professor*. Becoming a professor requires education beyond the bachelor's degree, sometimes a master's degree but more typically a doctoral degree. However, there are many opportunities to work on a college campus with a bachelor's degree. For example, every college and university sponsors student activities, such as clubs, student government, and fraternities and sororities. S*tudent activities directors*, or *directors of student services*, oversee the development and organization of the college or university's extracurricular programs, including approving funding for student activities and overseeing students and staff who organize and supervise

student activities. *Resident directors* oversee the residence halls, ensuring that they are safe, supportive environments for students living on campus.

Health Care and Nursing

An understanding of human development is helpful to all who work in health care settings. There are many kinds of nurses, and nurses of any specialty can benefit from understanding development. Examples of nurses who specialize in human development include *geriatric nurses*, who provide care for elderly patients. *Pediatric nurses* work with infants, children, and adolescents. *Neonatal nurses* provide care to infants who are born preterm, low birthweight, or suffer health problems, from birth until they are discharged from the hospital. A *nurse midwife* provides gynecological care, especially concerning pregnancy, labor, and delivery.

All physicians must learn about human development as part of their medical education, but only some specialize in working with people of particular ages. *Obstetrician-gynecologists* are physicians who specialize in female reproductive health, pregnancy, and childbirth. *Pediatricians* treat infants, children, and adolescents and *geriatricians* treat older adults. *Psychiatrists* are medical doctors who treat patients, conduct therapy, and prescribe medication to patients. To specialize, physicians must complete additional training, often a fellowship after earning their medical degree and obtaining licensure.

Allied health is a field of health care whose functions include assisting, facilitating, or complementing the work of nurses, physicians, and other health care specialists. *Recreational therapists* assess clients and provide recreational activities to individuals with physical or emotional disabilities in a variety of medical and community settings. *Physical therapists* design and provide treatments and interventions for individuals suffering pain, loss of mobility, or other physical disabilities. *Occupational therapists* help patients with physical, developmental, or psychological impairments, helping patients develop, recover, and maintain skills needed for independent daily living and working. Physical therapists and occupational therapists must earn graduate degrees, but *assistant physical therapists* and *assistant occupational therapists* may be hired with specialized associate degrees and certification.

Other allied health care specialists include s*peech-language pathologists,* who assess, diagnose, and treat speech, language, and social communication disorders in children, adolescents, and adults. A speech-language pathologist must earn a graduate degree and *assistant speech-language pathologists* may be hired with associate or bachelor's degrees with specialized coursework and certification, depending on U.S. state. *Child life specialists* typically work in hospital settings, helping children and families adjust to a child's hospitalization by educating and supporting families in the physically and emotionally demanding process of caring for hospitalized or disabled children. An entry-level position as child life specialist requires a bachelor's degree and certification.

Knowledge about health and development is also needed to become a health educator. *Health educators* design and implement educational programs (classes, promotional pamphlets, community activities) to educate individuals and communities about healthy lifestyles and wellness.

Social Work, Counseling, and Psychology

Children and adolescents have different needs and abilities to communicate than adults and older adults. Professionals who work closely with individuals must understand how they change over their lives.

Social workers help people improve their lives by identifying needed resources (such as housing or food stamps) and providing guidance. *Clinical social workers* also conduct therapy and implement counseling treatments with individuals and families. Entry-level social workers earn a bachelor's degree whereas clinical social workers must earn a graduate degree and seek licensure.

There are many different types of counselor positions, which generally require master's degrees. *Mental health counselors* help people manage and overcome mental and emotional disorders. *School counselors* help elementary, middle, and high school students develop skills to enhance personal, social, and academic growth. *Marriage and family therapists* focus on the family system and treat individuals, couples, and families to help people overcome problems with family and relationships. *Substance use counselors* help people who suffer from addictions, helping them to recover and modify behaviors through individual and group therapy sessions.

Applied behavior analysts apply scientific principles of learning to modify people's behavior to improve social, communication, academic, and adaptive skills in children, adolescents, and adults. They teach parents, teachers, and support professionals how to implement behavioral procedures, skills, and interventions. A position as an applied behavior analyst requires a graduate degree. *Assistant behavior analysts* support the work of applied behavior analysts. They assist in gathering data or information about clients, monitoring client progress and maintaining records, and administering assessments and treatment under the supervision of the applied behavior analysts.

Psychologists are doctoral-level mental health professionals. *Clinical psychologists* and *counseling psychologists* conduct therapy with children, adolescents, adults, and families. Clinical psychologists specialize in treating mental disorders and counseling psychologists emphasize helping people adjust to life changes. *School psychologists* work within school settings, assessing individuals' learning and mental health needs; collaborating with parents, teachers, and school administrators; designing interventions to improve students' well-being; and counseling students. *Applied developmental psychologists* may, depending on their training, assess and treat children, adolescents, and adults and design and evaluate intervention programs to address problems and enhance the development of people of all ages.

Research and Advocacy

Developmental scientists design and conduct research on social problems and apply their findings to advocate on behalf of individuals and families. They are employed at social service agencies, nonprofits, and think tanks conducting research to gather information about social problems and policies; assess and improve programs for children, youth, and families; and write reports and other documents to inform policymakers and the public. Some work as program directors and administrators for these programs. Others assess programs.

Some developmental scientists head nonprofit organizations as *foundation directors*. They develop goals and strategies in line with the foundation's mission statement and oversee all activities within an organization, including program delivery, program evaluation, finance, and staffing. Other developmental scientists work as *grant writers*, submitting proposals to fund programs. Organizations that award grants to others have *grant directors* who oversee the funding process by analyzing grant proposals, communicating with applicants, and determining which proposals are suitable for funding.

Developmental scientists conduct research in a variety of settings. Some work at universities and apply their research findings to help people. For example, a *researcher* might conduct experiments in a lab to identify influences of electronic cigarette use on children, adolescents, and adults and then apply the findings to develop prevention programs tailored to each age group. Developmental scientists who work for the government might evaluate government-supported social media health initiatives (such as those targeting distracted driving) or educational initiatives, such as the effects of providing free kindergarten to children.

Developmental scientists working in business and industry help companies design materials such as toys, products, and media that fit people's needs and abilities. They might determine the developmental appropriateness of toys and provide insight into children's abilities or examine children's and parents' reactions to particular toys, advertising, and promotional techniques. Others might provide developmental and educational advice to creators of children's media, such as by interpreting research on children's attention spans to inform creative guidelines for television programs such as *Sesame Street*.

Developmental scientists also assist companies in developing and marketing products that are appropriate for older adults. A consultant might suggest modifying the design of product packaging by using contrasting colors and larger print easier for older adults to read. A developmental scientist might research ways of modifying a car's dashboard to include displays and knobs that can be easily viewed and used by older adult drivers.

CAREERS IN GENETICS AND PRENATAL DEVELOPMENT

Genetic Counselor

As we have seen in Chapter 2, many chromosomal abnormalities are passed through genetic inheritance. Genetic counselors help assess the risk of an individual or couple passing a genetic disorder to their offspring.

Genetic counselors interview individuals and couples to gather information about their family history, educate them about the risks for particular genetic conditions in their offspring, and inform them about the different genetic tests available to them. Genetic counselors also help individuals and couples understand that results of DNA and other laboratory tests and the potential implications for offspring. Genetic counselors typically work in a hospital or clinic setting but may work in private practice.

Genetic counselors typically have a master's degree in genetics or genetic counseling from a program certified by the Accreditation Council for Genetic Counseling and pass a national certification exam. Some genetics counselors specialize in particular area, such as cancer, psychiatric, or genomic health. The median annual wage for genetic counselors was $85,700 in May 2020 (U.S. Bureau of Labor Statistics, 2021).

Midwife

A midwife is a health care professional who supports and cares for women throughout their pregnancy, including delivering babies during childbirth. They collaborate with other health care professionals, including obstetricians, nurses, and hospital staff.

There are two main paths to becoming a midwife, with different levels of expertise, certification, and autonomy. Some midwives are referred to as direct-entry midwives because, after earning a bachelor's degree, they are trained and certified (through the North American Registry of Midwives) but do not have a nursing degree. The legal status and requirements to become a direct-entry midwife vary by state, but many states do not permit midwives without nursing degrees. Carefully research state requirements before choosing this option.

The second path to becoming a midwife is to earn a nursing degree and complete a master's program in nurse-midwifery education. A certified nurse-midwife can practice independently in every state. Most people are familiar with the labor and delivery activities of nurse-midwives. Nurse-midwives may focus on all or part of pregnancy and birth, from preconception to postpartum. The nurse-midwife practice includes a variety of services: reproductive health visits, preventative care, and postmenopausal care. They can prescribe medication and admit or discharge patients if needed.

Nurse-midwives can work in a variety of settings, including hospitals, birth centers, health centers, and in private practice. The median annual wage for nurse-midwives was about $111,000 in 2020 (U.S. Bureau of Labor Statistics, 2021).

Doula

Doulas provide physical, emotional, and educational support to expectant mothers prior to birth, during labor, and immediately after birth through the first few weeks. Doulas provide education about labor, medication, and comfort during the birth process. Doulas also support the partner and family to aid their participation in the birth process.

The educational requirements to become a doula include a high school degree and completion of a doula education program. Some employers prefer college credits or a degree. Doulas work in hospitals, private practices, birth centers, or community organizations. Doulas' earnings vary with work setting, experience, and location. A common national hourly rate is about $45 per hour, as high as $70 in large urban cities and as low as $25 per hour in small towns.

4 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"). 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

4.1 Analyze 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, rock 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 infants' needs, they 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.

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

iStock/dszc

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 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? What would you advise new parents to do 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

4.2 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

TABLE 4.1 ■ 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

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 (see Table 4.1). 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. In adults, smiling indicates happiness. 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, 1997). 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).

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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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, or intense happiness, as early as 2 ½ 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, 2019). Initially, physical restrictions, such as being restrained in a high chair or being dressed, can elicit anger. The inability to carry out a desired act, 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. 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).

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, for example, 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 two to three months of life, infants manage negative emotions by sucking vigorously on their hands or objects. At about three 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 the 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 helps 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 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 over time. 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 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. 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, although 2-day-old infants initially did not show a preference for a happy or disgusted face, 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 such as happiness as opposed to anger, surprise, and sadness (Bornstein et al., 2013). At 6 ½ months, infants can identify and match happy, angry, and sad emotions portrayed on faces and 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 infants' 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.

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.

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 (Juruena 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, controlling 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).

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 influences 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). These dulled 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 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 parenting, including how much responsiveness is appropriate when babies cry and fuss, and 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 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, suggesting cultural differences that may influence 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, Arterberry, & Lamb, 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 the stimuli that elicit emotions, what emotions to show, 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. 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 had recently immigrated to the U.S. (Liu et al., 2013). Mothers' interactions and emotional expressivity varied with their cultural orientation. Second-generation Chinese immigrant mothers or those who had immigrated to the U.S. 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, differs by culture and context (Yang & Wang, 2019). Whereas North 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

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

VW Pics / Contributor/ Getty Images

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.

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. 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) 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).

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.

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

4.3 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; Rothbart, 2011). 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, 2011; 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 was shown to be 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 child-rearing 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 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 warmer 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, for example, 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., 1993b; 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., 1993a). 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 influences 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.

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

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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 does temperament—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 U.S.? Are some infant temperaments a better fit for some contexts than others? Why or why not?

ATTACHMENT IN INFANCY AND TODDLERHOOD

LEARNING OBJECTIVE

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

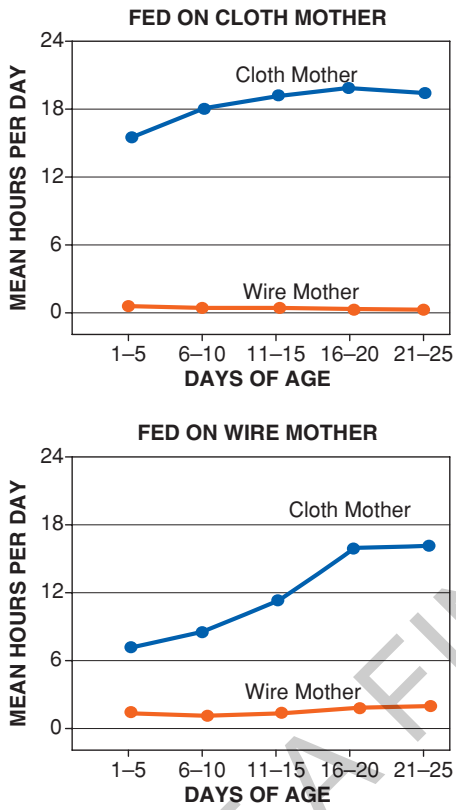
Raj gurgles and cries out while lying in his crib. As his mother enters the room he squeals excitedly. Raj's mother smiles as she reaches into the crib, and Raj giggles with delight as she picks him up. Raj and his mother have formed an important emotional bond, called attachment. **Attachment** refers 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.

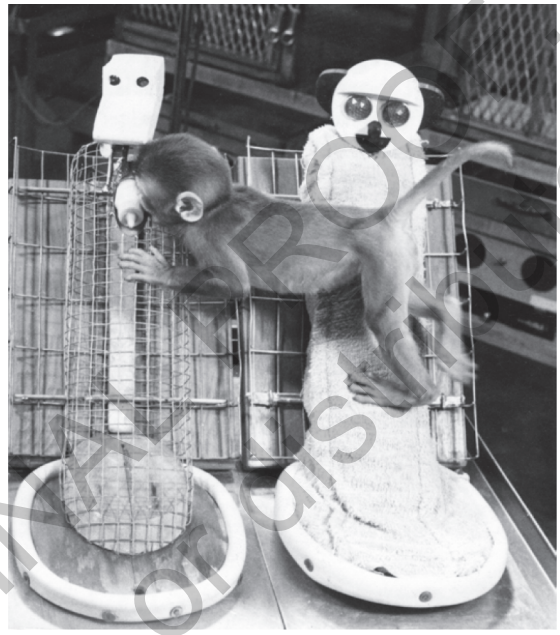
Attachment relationships serve as an important backdrop for emotional and social development. Our earliest attachments are with our primary caregivers, most often our mothers. It was once thought that feeding determined patterns of attachment. Freud, for example, emphasized the role of feeding and successful 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 (see Figure 4.1). The baby monkeys clung

FIGURE 4.1 ■ 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

to 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, proposed 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 (see Chapter 1) and by observations of interactions between 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).

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 separation 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 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 4.2, 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.

TABLE 4.2 ■ 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.

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).
- **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 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, Kochanska, Yoon, & & Koenig Nordling,2014; Sroufe, 2016; Stern & Cassidy, 2018).

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

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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 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 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

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

Attachment is complex and influenced by contextual factors outside 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 distress faces, mothers with depression showed blunted brain activity in response to their own infants' joy and distress 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 but meet their basic needs, and they maintain a calm, regulated state (Cassidy et al., 2005). A study of 4.5-month-old infants from predominantly Black, white, and Hispanic 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).

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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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 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, House, Barnard, & Spicker, 1994; Hossain et al., 1997; Roopnarine et al., 1992). Interaction styles differ more in some cultures than in others. 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,

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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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 continue 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 (Dagan & Sagi-Schwartz, 2018; Kochanska & Kim, 2013; Boldt et al., 2014).

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). However, 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.

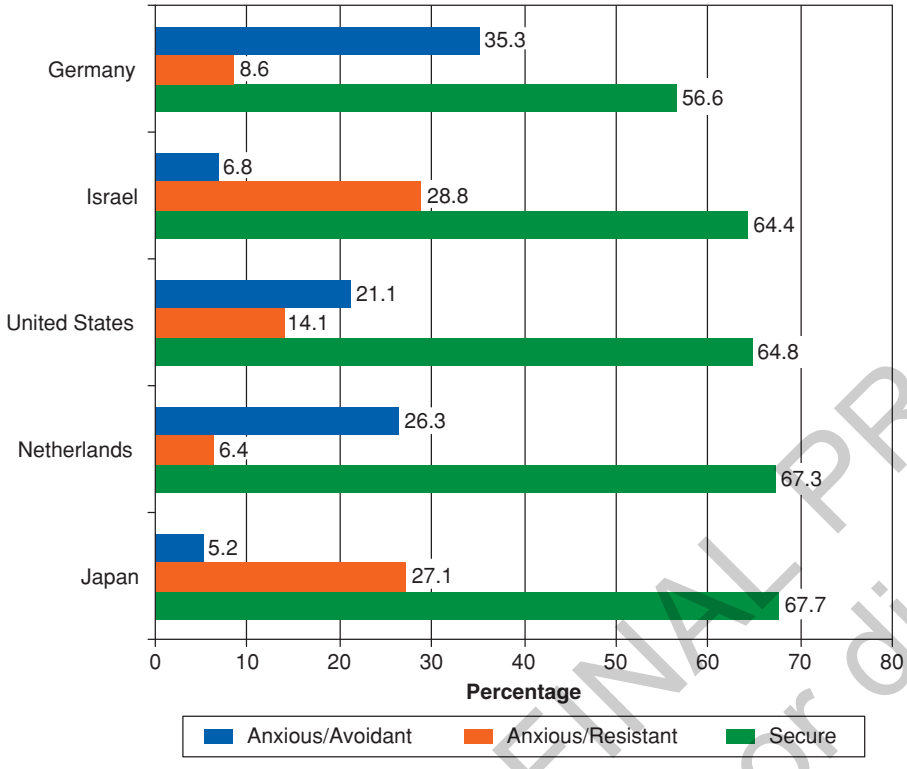
Cultural Variations in Attachment Classifications

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). (see Figure 4.2) This pattern may result from the fact that Western cultures tend to emphasize individuality and independence, whereas Eastern cultures are more likely 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). 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).

FIGURE 4.2 ■ Cross-Cultural Variations in Attachment



Adapted from Van Ijzendoorn & Kroonenberg, 1988.

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 leaves 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 they 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).

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

Consider the Efe foragers of the Democratic Republic of Congo: In their culture, infants are cared for by many people because 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 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. 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?
2. There are many children in the U.S. 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 parent-infant 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

4.5 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 3), 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, 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).

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

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-recognition 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.

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' demands. In order to engage in self-control, the infant must be able to attend to a caregiver's instructions, shift

TABLE 4.3 ■ 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.

his or her attention from an attractive stimulus or task, and inhibit a behaviour. Cortical development, specifically 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 with, 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 with parental instructions in toddlerhood through early childhood (Laurin & Joussemet, 2017). Secure attachment relationships and warm parenting are associated with effortful control, likely because 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 suggest 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 (Białecka-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 4.3. 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 US?
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?

CHAPTER SUMMARY

4.1 Analyze 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.

4.2 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.

4.3 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 child-rearing methods.

4.4 Examinethe 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 classified as securely attached or insecurely attached (insecure-avoidant, insecure-resistant, or insecure-disorganized). 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.

4.5 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 (p. 121)
autonomy versus shame and doubt (p. 108)
basic emotions (p. 109)
categorical self (p. 132)
difficult temperament (p. 118)
easy temperament (p. 118)
emotion regulation (p. 111)
emotional display rules (p. 115)
goodness of fit (p. 119)
insecure-avoidant attachment (p. 125)
insecure-disorganized attachment (p. 124)
insecure-resistant attachment (p. 126)
internal working model (p. 123)
secure attachment (p. 124)
self-conscious emotions (p. 111)
self-recognition (p. 131)
separation anxiety (p. 123)
slow-to-warm-up temperament (p. 118)
social referencing (p. 113)
social smile (p. 110)
Strange Situation (p. 123)
stranger wariness (p. 116)
temperament (p. 117)
trust versus mistrust (p. 108)
secure base (p. 123)
security of attachment (p. 123)

PART 2 LIFESPAN DEVELOPMENT AT WORK: INFANCY AND TODDLERHOOD

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

Childcare Director

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

Childcare directors are responsible for operating and leading the work of a childcare center. They play a lead role in constructing the center's mission statement, the philosophy that guides the center's work. Childcare 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 childcare 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 childcare staff member before becoming a director. Most require directors of childcare centers to have certification, such as the National Administration Credential (NAC), which requires completion of a 45-hour course. The 2020 median salary for childcare 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 to 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 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 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. Licensed clinical social workers (LCSW) must have a master's degree and pass a certification exam. 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 pays a higher salary). Certification as a registered nurse requires two years of experience and passing an exam.

Pediatric nurses are RNs 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 the 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 for four years after obtaining a 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 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).

16 SOCIOEMOTIONAL DEVELOPMENT IN LATE ADULTHOOD AND DEATH

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"Hold the end, and swing it gently in time with your sister," 72-year-old Jennifer instructed her grandson as he grasped the end of the jump rope. She watched as he and his sister swung the rope and a third grandchild hopped in between them, beginning a game of jump rope. "When I was little I could jump double Dutch. Do you know what that is?" Jennifer asks her grandchildren. Jennifer thinks back in time, closes her eyes, and smiles before she begins her explanation.

In this chapter, we examine the socioemotional transitions of older adulthood, including changes in how adults view themselves, changes in the contexts in which they live, their evolving relationships, and changes in work habits. Again, it will be apparent that the reality of life in late adulthood does not conform to many of the stereotypes or commonly held views about older adults.

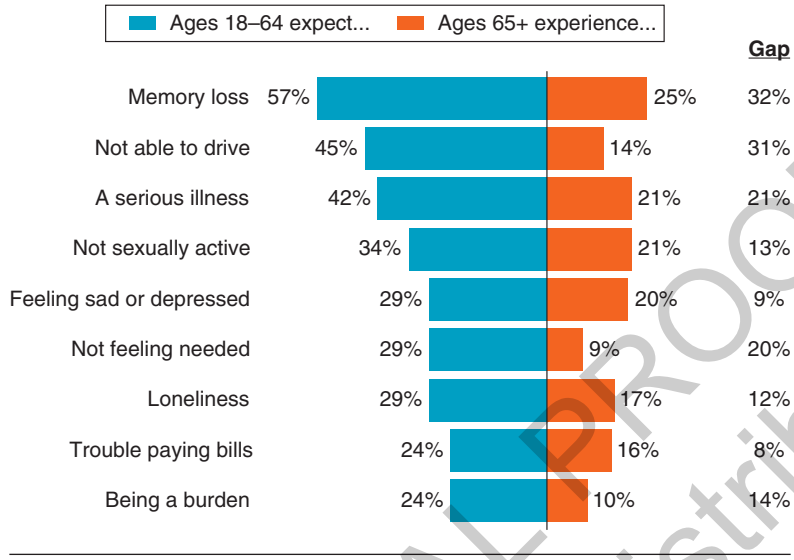
PSYCHOSOCIAL DEVELOPMENT

LEARNING OBJECTIVE

16.1 Summarize patterns of psychosocial development in late adulthood.

The "terrible twos" of toddlerhood, adolescent angst, and the midlife crisis are periods of development that are accompanied by stereotypes—beliefs about commonalities shared by members of a given age group. Older adulthood is no different. Ageist attitudes abound in popular culture. Stereotypes of older adults include the belief that they are lonely; lack close friends and family; have a higher rate of mood disorders; and are rigid, unable to cope with age-related declines, one-dimensional, dependent, and cognitively impaired. These stereotypes are misguided. Older adults experience fewer challenges of aging than young and middle-aged adults expect (see Figure 16.1). However, stereotypes can influence how adults see themselves and other aspects of their psychosocial development.

FIGURE 16.1 ■ Challenges of Aging as Expected and Experienced by Older Adults



Source: Pew Research Center (2009)

Self-Concept and Self-Esteem

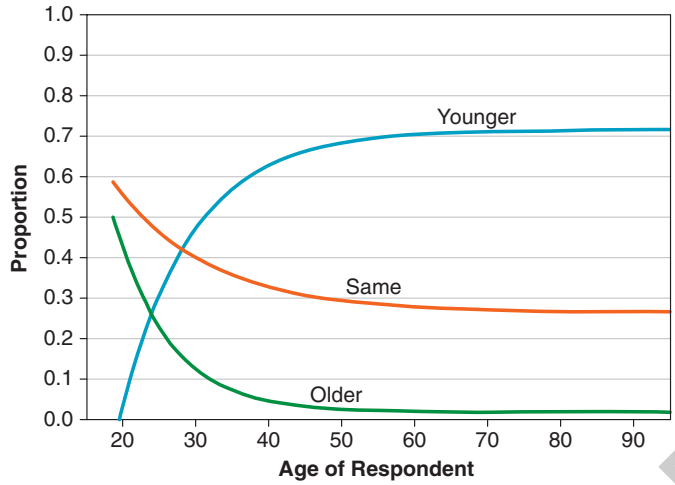
Self-conceptions are more multifaceted, complex, and stable in old age than at other periods of life. Although global self-esteem tends to decline in late life, most adults maintain a positive view of themselves, expressing more positive than negative self-evaluations well into old age (Orth & Robins, 2019). Old (70 to 84) and very old (85 to 103) adults rate themselves more positively than negatively in a variety of areas including hobbies, interests, family, health, and personality, and these positive self-evaluations predicted psychological well-being (Freund & Smith, 1999). Older adults tend to compartmentalize their self-concept more so than younger and middle-aged adults by categorizing the positive and negative aspects of self as separate roles, whereas younger and middle-aged adults tend to integrate them into one (Ready et al., 2012). Life experience and advances in cognitive affective complexity (see Chapter 15) underlie older adults' multifaceted self-conceptions and evaluations. The developmental task for older adults is to accept their weaknesses and compensate by focusing on their strengths. Over time, adults reframe their sense of self by revising their possible selves in light of experience and emphasizing goals related to the sense of self, relationships, and health (Smith & Freund, 2002). Adults' reports of life satisfaction and well-being typically increase into old age, along with corresponding decreases in negative affect (Darbonne et al., 2012; Jeste & Oswald, 2014).

Subjective Age

Throughout life, perceived age is an important part of our self-concept. Most older adults feel that they are younger than their years and this tendency increases with age (see Figure 16.2; Bergland et al., 2014; Shinan-Altman & Werner, 2019). On average, adults over age 60 feel up to 18%, or about 20 years, younger than their age (Pinquart & Wahl, 2021). Research with U.S., German, and Chinese adults suggests that this pattern occurs cross-culturally (O'Brien et al., 2017).

Why do older adults feel younger than their years? One reason may have to do with avoiding the self-categorization of being old (Kornadt & Rothermund, 2012). Categorizing oneself as a member of one's age group influences how individuals think about themselves, their competencies, and their future (Weiss & Lang, 2012). Given the negative stereotypes associated with aging, adults may employ strategies to avoid the negative consequences of identification with their age group, such as denying or hiding their age by excluding themselves from the "old age" category (Heckhausen & Brim, 1997). Adults with more negative self-views are more likely to feel older than their years over time (Kornadt

FIGURE 16.2 ■ Subjective Age Across the Lifespan



Source: Rubin & Berntsen, 2006.

et al., 2018). In addition, individuals experiencing challenging contexts and situations, such as those experiencing financial distress, tend to report older subjective ages (Agrigoroaei et al., 2017).

Subjective age is associated with health and well-being, including the risk for cardiovascular disease, engagement in health behaviors, life satisfaction, and mortality (Stephan et al., 2018; Stephan, Sutin, Wurm, et al., 2021). Individuals who feel younger than their years are less likely to internalize negative stereotypes about aging and they remain active, which promotes good heath (Kotter-Grühn et al., 2016). Younger subjective ages are associated with physical functioning, such as grip strength (Stephan et al., 2013). Cognitive performance is also related to subjective age. Older adults who reported feeling younger relative to their peers tended to show better performance and slower declines in recall tasks over a 10-year period (Stephan et al., 2014). In contrast, an older subjective age is associated with accelerated aging; adults who feel older are biologically older than their peers (Stephan, Sutin, Luchetti, et al., 2021). Even more striking, older adults who perceived themselves as younger than their real ages showed larger gray matter volume and younger predicted brain age, as assessed by MRI scans (Kwak et al., 2018).

Subjective age is malleable in response to contextual conditions (Hughes & Touron, 2021). In one study, older adults reported feeling older after taking a working memory test but not after a vocabulary test (Hughes et al., 2013). Recall from Chapter 13 and 15 that age-related declines are seen in tasks tapping fluid intelligence, such as working memory, but not tasks tapping crystallized intelligence, such as vocabulary. More important, simply expecting to take a memory test was associated with feeling subjectively older, suggesting that perception of abilities in various domains can influence perceived age (Hughes et al., 2013). Similarly, reminders of one's aging body, such as body pain, can temporarily increase subjective age (Barrett & Gumber, 2020). Collectively, these findings suggest that the old adage, "You're only as old as you feel," is partially true as one's perception of one's own age is dynamically associated with health, well-being, and cognitive performance.

Ego Integrity

Older adults naturally engage in **life review**, reflecting on past experiences and contemplating the meaning of those experiences and their role in shaping one's life (Butler, 1963). They are tasked with processing and accepting the triumphs and disappointments of their lives and tend to become more tolerant and accepting of others, and they experience a rise in life satisfaction and well-being. Life review is integral to developing a sense of **ego integrity vs. despair,** the last stage in Erikson's (1959) psychosocial theory, in which older adults find a sense of coherence in life experiences and ultimately conclude that that their lives are meaningful and valuable (Whiting & Bradley, 2007). Adults who achieve ego

Social support from family and friends protects against the negative effects of stress, promotes longevity and life satisfaction, and enhances well-being.

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integrity can see their lives within a larger global and historical context and recognize that their own experiences, while important, are only a very small part of the big picture. Viewing one's life within the context of humanity can make death less fearsome, more a part of life, and simply the next step in one's path (Vaillant, 1994, 2004).

According to Erikson, the alternative to developing a sense of integrity is despair, the tragedy experienced if the retrospective looks at one's life are evaluated as meaningless and disappointing, emphasizing faults, mistakes, and what could have been (Whiting & Bradley, 2007). The despairing older adult may ruminate over lost chances and feel overwhelmed with bitterness and defeat, becoming contemptuous toward others to mask self-contempt. As might be expected, adults who do not develop a sense of ego integrity are more likely to experience a poor sense of well-being and depression (Dezutter et al., 2014).

How does one attain ego integrity? A sense of ego integrity relies on cognitive development, such as complexity and maturity in moral judgment and thinking style, tolerance for ambiguity, and dialectical reasoning (Hearn et al., 2011). The ability to realize that there are multiple solutions to problems and recognize that one's life path may have taken many different courses is integral to developing a sense of ego integrity. Ego integrity is also predicted by social factors, including social support, generativity, and good family relationships (James & Zarrett, 2006; Sheldon & Kasser, 2001). Similar to the development of identity and generativity, ego integrity is influenced by interactions with others. When older adults relay their experiences, tell family stories from their lives, and provide advice, they have opportunities to engage in the self-evaluation that can lead to ego integrity.

Personality

As in other life periods, personality traits remain stable into late adulthood. Adults who scored high in extroversion relative to their peers at age 30 tend to continue to score high relative to their peers in old age (Graham & Lachman, 2012). Research examining the Big 5 personality traits (see Chapter 14) suggests that the stereotype of older adults becoming rigid and set in their ways is untrue. Personality traits shift subtly over the life course in response to individuals' interactions with their contexts (Mroczek, 2020). Most people experience a mellowing of personality characteristics with age. A longitudinal study that examined adults aged 60 through their 80s found that more than one-third of the sample scored highest on agreeableness in their 80s (Weiss et al., 2005). Extroversion and openness to experience decline with age from 30 to 90, with the most pronounced drops after the mid-50s (Lucas & Donnellan, 2011; Wortman et al., 2012). Conscientiousness increases from emerging to mid-adulthood, peaks between 50 and 70, and then declines. These findings are also supported by cross-cultural research with adults from 50 countries (McCrae et al., 2005).

Individuals' patterns of Big 5 personality traits predict physical and cognitive functioning (Mroczek et al., 2020). Conscientiousness is associated with health and longevity, as well as better performance on cognitive tasks (Bogg & Roberts, 2013; Graham et al., 2021; Möttus et al., 2013). Neuroticism, on the other hand, is associated with worse average cognitive functioning, poor executive function, and a steeper rate of decline (Bell et al., 2020; Luchetti et al., 2015). Neuroticism also predicts increasing frailty (Stephan et al., 2017).

Big 5 personality traits show complex associations with well-being. Specifically, well-being correlates with higher levels of extroversion, agreeableness, and conscientiousness, and with lower levels of neuroticism (Cox et al., 2010). Moreover, this relationship is bidirectional. A study of 16,000 Australian adults revealed that their personality traits predicted changes in well-being, yet changes in well-being, in

turn, influenced their traits (Soto, 2015). Individuals who were initially extroverted, agreeable, conscientious, and emotionally stable subsequently increased in well-being and in turn became even more agreeable, conscientious, emotionally stable, and extroverted. We have seen that well-being tends to increase over the adult years. Research from the Big 5 trait approach to personality supports this, as people in their later years tend to become happier (more agreeable and less neurotic), more self-contented and self-centered (less extroverted and open), more laid back and satisfied with what they have, and less preoccupied with productivity (less conscientious; Kandler et al., 2015; Marsh et al., 2012). This mellowing of personality aids older adults in adjusting to change, contributing to well-being (Reitz & Staudinger, 2017).

The nature of sexual expression often changes in older adulthood, but most older adults remain interested in, and satisfied by, sexual activity.

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Sexuality

Despite common beliefs and stereotypes, five decades of research has consistently shown that older people tend to maintain sexual interest and remain sexually capable and active well into their 80s and often 90s (DeLamater & Koepsel, 2015; Lee et al., 2016). Research conducted in Europe, the United States, Australia, and Asia confirms that many older people continue to view sexual interest and activity as important (Bauer et al., 2016; Hyde et al., 2010; Palacios-Ceña et al., 2012).

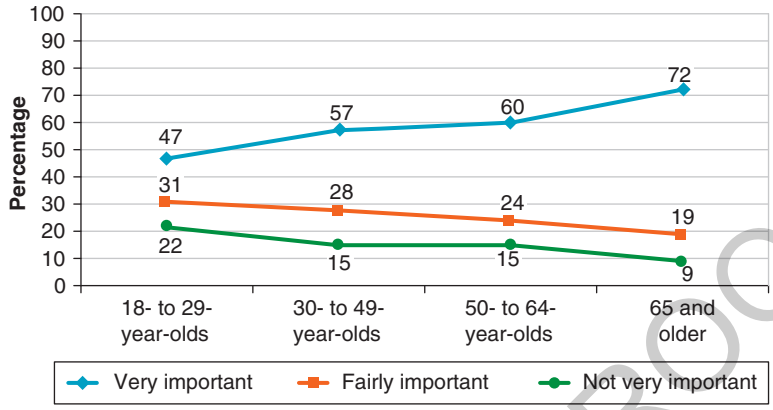
The frequency of sexual activity declines with age, but sexual satisfaction often remains unchanged (Lee et al., 2016; Thompson et al., 2011). Studies of older adults age 70 to 85 have suggested that at least one-third to one-half report having intercourse within the past year (Doskoch, 2011; Hyde et al., 2010). However, the nature of sexual expression shifts with age, encompassing an array of behaviors (e.g., self-stimulation, noncoital activity with partners) as well as sexual activity in both long-term and new relationships (McAuliffe et al., 2007; Skałacka & Gerymski, 2019). Similar to other periods of life, research on gay, lesbian, and bisexual older adults is scant. A small sample of older adults suggests similar levels of activity and satisfaction in LGB and heterosexual older adults (Brennan-Ing et al., 2021). Common reasons for lack of sexual activity include physical problems, lack of interest, partner's lack of interest, partner's physical problems, and the loss of a partner (Palacios-Ceña et al., 2012). Although challenges and sexual impairments increase with age, few older adults report distress (Srinivasan et al., 2019). Just as in middle age, good sex in the past predicts good sex in the future (Bell et al., 2017).

Many factors may diminish sexual response and satisfaction: cigarette smoking, heavy drinking, obesity, poor health, some medications, and negative attitudes toward sexuality and aging, among others (DeLamater, 2012). Many illnesses encountered in advancing age (e.g., arthritis, heart disease, diabetes, Parkinson's disease, stroke, and cancer) can have a negative impact on an individual's interest or participation in sexual activity (Syme et al., 2013; Taylor & Gosney, 2011). Sexual activity is a correlate of health, as those who report good health are more likely to be sexually active (DeLamater & Koepsel, 2015; Holden et al., 2014). However, just as during other phases of life, there is a bidirectional relationship: Sexual activity is likely to enhance health by reducing stress and improving positive affect and well-being (Debrot et al., 2017; Freak-Poli et al., 2017).

Religiosity

Older adults tend to be more active participants in religion than younger people and view prayer and personal religious activity as more important (Kaplan & Berkman, 2021). With age, U.S. adults experience an increase in religious intensity and strength of beliefs (Atchley, 2016; Bengtson et al., 2015; see Figure 16.3). Religious attendance declines in late adulthood, likely due to changes in health, mobility, and transportation (Hayward & Krause, 2013).

FIGURE 16.3 ■ Importance of Religion by Age Groups



Source: Newport (2006).

In North America, marginalized groups tend to show the highest rates of religious participation. Black older adults tend to report higher levels of private religious practice and daily spiritual experiences than white older adults, as well as the belief that God controls much of the world, than do white older adults (Krause, 2005). Black older adults tended to report turning to God as both a primary source of social support and their personal consultant for health-related matters, whereas white older adults tended to report seeking assistance from family, friends, professional and community sources of support (Lee & Sharpe, 2007). Religion and religious involvement are embedded in the culture, community, and identity for Black, Latinx, and other people of color (Nguyen, 2020). In these communities, the church often provides tangible support in the form of social connections, informal health interventions, and activities that improve welfare (Cosby, 2020).

In late adulthood, religiosity is positively associated with physical activity and health, including increased telomere length (a marker of biological age) and longevity (Homan & Boyatzis, 2010; Kim et al., 2015; Wang et al., 2020). Religiosity and spirituality are also associated with well-being in older adulthood (Abu-Raiya et al., 2015; Galek et al., 2015). A strong sense of religiosity can buffer stress in the face of disadvantage and stressful life events, promote resilience, and help older adults to find meaning in life (Manning & Miles, 2018; Zimmer et al., 2016). Religiosity is also associated with optimism, a sense of self-worth, life satisfaction, and low rates of depression (Reed & Neville, 2014; Ronneberg et al., 2016; Ysseldyk et al., 2013).

Most older adults report religious or spiritual beliefs. Religiosity in older adulthood is positively associated with physical health, well-being, life satisfaction, and longevity.

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Religiosity has a powerful protective effect on mental health for Black and Latinx older adults (Nguyen, 2020). Religious attendance may facilitate mental health through social means by increasing an older adult's connections with other people in the community, both in giving and in receiving support (Zimmer et al., 2016). Church attendance is positively associated with social network size, frequency of social contact, and perceived support, which in turn are associated with life satisfaction (Fernández Lorca & Valenzuela, 2020;Keyes & Reitzes, 2007; Lee & Sharpe, 2007). One study of nearly 1,200 older adults who attended church regularly found that most—and especially African Americans—perceived increases in the amount of emotional support they gave and received over a 7-year period and were more satisfied with the support they received (Hayward & Krause,

2013). Social engagement and feeling part of a community are important benefits of religious service attendance.

Thinking in Context: Lifespan Development

1. Compare changes in subjective age and personality in late adulthood. To what extent do they change and stay the same? How is each associated with health and well-being? In what ways do contextual factors influence subjective age and personality?
2. What are some common or popular views about sexuality in late life? Evaluate these views in light of current evidence. To what degree do popular views reflect stereotypes versus reality? How might popular views influence older adults' experience of sexuality? Explain.

Thinking in Context: Intersectionality

With advancing age religion tends to become more important to most adults, but there are racial and ethnic differences. Discuss these differences. What role might religious participation play for older adults from marginalized groups? Why?

Thinking in Context: Applied Developmental Science

As a recreation coordinator at a local senior center, you are asked to design activities to help older adults foster a sense of ego integrity.

1. What is ego integrity and how is it achieved?
2. What kinds of activities or tasks might help older adults reflect on their lives?
3. How will you know if the activities are successful?

RELATIONSHIPS

LEARNING OBJECTIVE

16.2 Discuss features of older adults' relationships with others, including friends, spouses, children, and grandchildren.

Social and emotional connections with family and friends are essential for well-being and are important influences on adaptation and happiness. Aging places new constraints on social relationships, but most older adults find that social relationships continue to be a source of support, social interaction, and fun.

Friendships

In late adulthood, friendships become more important and more fulfilling, partly due to declines in family and work responsibilities (Adams, 2017). With more time to devote to leisure activities, friendships become more centered on activities, such as playing card games and walking, and older adults report having more fun with their friends than do younger adults (Blieszner & Ogletree, 2017). Although friends become fewer in number, older adults form new friendships throughout their lives (Robles et al., 2015). Older adults tend to report more meaningful relationships than younger adults (Fingerman & Charles, 2010; Sander et al., 2017).

Older adults have more time to spend with friends than middle-aged adults and their friendships become more fulfilling.

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Similar to younger people, older adults describe close friendships as entailing mutual interests, a sense of belonging, and opportunities to share feelings (Adams et al., 2000). Adults tend to choose friends who share similarities in age, race, ethnicity, and values. With increasing age older adults are more likely to report having friends of different ages (Elliott O'dare et al., 2019; Gillespie et al., 2015). We know little about intergenerational friendships, but they likely have similar benefits as same-age friendships.

Friendships, giving and receiving support from friends, are as important to psychological health and well-being in older adulthood as family relationships (Blieszner et al., 2019; Dunbar, 2018;Santini et al., 2015). Friendship also plays a role in physical health (Adams, 2017; Kent de Grey & Uchino, 2020). Specifically, social isolation is associated with frailty and increased risk of mortality after suffering a fractured bone (Mortimore et al., 2008; Uno et al., 2021). Friendships help adults manage age-related losses in health, are associated with improved well-being and happiness, and can help older adults cope with major life events, such as bereavement at the death of a loved one (Adams & Taylor, 2015).

Marriage, Divorce, and Cohabitation

Most older adults are very satisfied in their marriages. A lifetime of shared experiences, such as raising families, navigating crises, and building memories together, brings couples closer.

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As parenting and employment roles are retired, older adults have more time to spend with their spouse. Marital satisfaction tends to increase from middle adulthood through late adulthood (Ko et al., 2007). Marriages in older adulthood are characterized by greater satisfaction, less negativity, and more positive interactions than in other developmental periods (Story et al., 2007). Older couples show fewer disagreements and tend to discuss disagreements with more respect and humor, resolve arguments more quickly and constructively with less resulting anger and resentment, and show more positive affect in their marital interactions than younger couples (Hatch & Bulcroft, 2004; Waldinger & Schulz, 2010).

Compared with middle-aged adults, older adults perceive more positive characteristics and fewer negative characteristics in their partners (Henry et al., 2007). They also show greater positive sentiment override; that is, they appraise their spouse's behavior as more positive than do outside observers (Story et al., 2007). Viewing one's spouse positively predicts marital satisfaction (McCoy et al., 2017). To date, research on marital satisfaction in older adulthood nearly exclusively focuses on heterosexual couples. The limited research discussed in prior chapters suggests that romantic partners share similar relationship and family processes regardless of sexual orientation; therefore, it is reasonable to assume that these patterns of increasing marital satisfaction likely apply to same-sex couples as well. For example, one recent study of gay and lesbian older adult couples found that legally married adults reported better quality of life and more economic and social resources than unmarried couples (Goldsen et al., 2017). Marital satisfaction is associated with health and lower mortality risk (Manvelian & Sbarra, 2020).

Just as marital satisfaction generally tends to increase with age, couples over the age of 65 are less likely to divorce than are younger couples. Yet the "gray divorce" rate has doubled since 1990 (Brown & Wright, 2017). Similar to younger people, older adults report divorcing

because of poor communication, emotional detachment, and few shared interests (Wu & Schimmele, 2007). Contrary to popular belief, the empty nest, retirement, and chronic illnesses are not related to divorce (Lin et al., 2018). Adults in long-term marriages may find it more difficult to adjust to divorce than younger adults. Divorce poses financial challenges for couples because accumulated assets must be divided and financial security in retirement is at risk. Women face greater financial and emotional difficulties than men as they are more likely to remain single throughout the remainder of their lives (McDonald & Robb, 2004).

Rates of remarriage decline in older adulthood. Still, a substantial number of adults, particularly older men, remarry after divorce (Huyck & Gutmann, 2006). Single women, whether by divorce or widowhood, are less likely to marry than men. When older adults remarry, their unions tend to be more stable than those of younger people. The gains in maturity and perspective may contribute to a more realistic concept of marriage and support the longevity of late-life marriages (Kemp & Kemp, 2002).

Cohabitation is increasingly common among all adults. Older adults view cohabitation positively and adults over the age of 50 represent about a quarter of all cohabiting adults (Brown & Wright, 2016). Although the prevalence of cohabitation among adults over age 65 is unknown, cohabitation has nearly quadrupled among adults over age 50, from 1.2 million in 2000 to 4 million adults in 2016 (Brown et al., 2012; Stepler, 2017). Many older adults enter cohabiting relationships as an alternative to marriage (Brown & Wright, 2017)

Cohabitation is more consistently associated with positive outcomes in late adulthood as compared with early adulthood. Older adult cohabitors tend to report higher-quality relationships, perceive more fairness, more time spent alone with their partner, fewer disagreements, and a lower likelihood of heated arguments than their younger peers (Brown & Kawamura, 2010; King & Scott, 2005). Compared with younger couples, older adults who cohabit tend to be in relationships of longer duration; are more likely to have experienced the dissolution of a marriage; and tend to report fewer marriage plans, viewing the relationship as an alternative to marriage (Brown et al., 2012). Older adults may be less interested in marriage because they are past the age of childbearing. They also may be more interested in protecting the wealth they have accrued over their lifetime than they are in pooling economic resources. In late adulthood, cohabitating unions are similar to marriages in terms of adults' reports of emotional satisfaction, pleasure, openness, time spent together, perceived criticism and demands, and overall health and well-being (Brown & Kawamura, 2010; Wright & Brown, 2017).

Relationships With Adult Children and Grandchildren

Most North American older adults are parents, usually of middle-aged adults. The nature of the relationship and exchange of help changes over time, from predominantly parent-to-child assistance in childhood through early adulthood, to increasing assistance provided by adult children to their elderly parents. Adult child-to-parent assistance most often takes the form of emotional support and companionship, which helps adults cope with and compensate for losses such as disabilities and widowhood. Most older adults and their adult children keep in touch even when they are separated by great distance. Overall, adult daughters tend to be closer and more involved with parents than sons, speaking with and visiting more often than sons. In contrast with emotional support, fewer older adults receive instrumental assistance from adult children. Instead, many older adults, especially those of high socioeconomic status, continue to assist their adult children, primarily with financial assistance (Grundy & Henretta, 2006).

Family relations may take many forms. Some parents and adult children live nearby, engage in frequent contact, and endorse family obligation norms. Support is provided either primarily from parent to adult child or adult to parent. Some older adults are part of multigenerational families that include their children and grandchildren (Gilligan et al., 2018). Other families provide support at a distance when they do not live nearby, haveregular contact, endorse fewer family obligation norms, and provide mainly financial support—often from parents to children. Other family relationships are autonomous: not living nearby, engaging in little contact, little endorsement of family obligation norms, and few support exchanges. Each of these types of family relations is found in most European nations and North America (Dykstra & Fokkema, 2010).

Most older adults have grandchildren and most will see them grow into adults (AARP, 2002). Grandchildren and great-grandchildren increase older adults' opportunities for emotional support. The quality of the grandparent relationship is influenced by the degree of involvement in the grandchild's life. A history of close and frequent contact, positive experiences, and affectionate ties predicts good adult child–grandparent relationships (Geurts et al., 2012; Sheehan & Petrovic, 2008) Adults who share close emotional ties with their grandchildren spend more time listening and providing emotional support and companionship to them as adults (Huo et al., 2018). Over time, contact with grandchildren tends to decline as young and middle-aged grandchildren take on time-consuming family and work roles, but affection between grandchildren and grandparents tends to remain strong (Thiele & Whelan, 2008).

Thinking in Context: Lifespan Development

1. To what extent are relationships continuous over adulthood (from early through late adulthood)? Consider friendship and relationships with spouses, children, and grandchildren.
   - What are some ways in which these relationships show continuity or stability?
   - Are there ways in which these relationships change? Explain.
   - How might these patterns of continuity and change influence older adults' health and well-being?
2. Why is cohabitation increasingly common among older adults? Compare older adults' experiences of cohabitation with that of younger adults. What are some similarities and differences?

SOCIAL CONTEXTS

LEARNING OBJECTIVE

16.3 Describe the social contexts in which older adults live and their influence on development.

We have seen that relationships are important sources of support and well-being in late adulthood. As in all periods in life, our interactions with others take place within a range of social contexts that influence our physical functioning, thoughts and relationships. Social contexts are important influences on development, such as changes in physical, cognitive, and social functioning, as well as adaptive functioning. The immediate contexts that influence older adults are neighborhoods and their living environments, including their homes, residential communities, or nursing homes.

Changing Social World

Social support is important for well-being. Yet social interaction tends to decline in older adulthood as social networks become smaller, focused more on family and less on peripheral relationships (Sander et al., 2017). Scientists have examined several explanations for these changes.

An early view, **disengagement theory**, is commonly held but incorrect. According to this theory, older adults are thought to disengage from society, relinquishing valued social roles and reducing interaction, as they anticipate death. At the same time, society disengages from them and this is beneficial to all (DeLiema & Bengtson, 2017). Research has shown that the central tenet of disengagement theory is not true. Rather than disengage, most older individuals prefer to remain active and engaged with others and they benefit from social engagement (Bengtson & DeLiema, 2016; Johnson & Mutchler, 2014). Disengagement does not reflect healthy development but rather a lack of opportunities for social engagement (Lang et al., 1997).

In contrast, **activity theory** says that declines in social interaction are not a result of adults' desires, but are instead a function of social barriers to engagement (DeLiema & Bengtson, 2017). When older adults lose social roles due to retirement or disability, they attempt to replace them to stay active and busy. Volunteer work and civic activity may replace career roles and protect against decline in health, psychological well-being, and mortality (Glass et al., 2006; Hao, 2008). Yet it is not simply the quantity of activity and social relationships that influences health and well-being, but the quality, and individuals differ in their needs and desires (Bengtson & DeLiema, 2016; Pushkar et al., 2010). The more active adults are in roles they value—such as spouse, parent, friend, and volunteer—the more likely they are to report high levels of well-being and life satisfaction and to live longer, healthier lives (Adams et al., 2011; Cherry et al., 2013).

Successful aging entails remaining active and maintaining a sense of continuity in self, in habits, personalities, and lifestyles.

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Relatedly, successful aging entails not simply remaining active but maintaining a sense of consistency in self across one's past into the future, a tenet of **continuity theory** (DeLiema & Bengtson, 2017). Despite changing roles, people are motivated to maintain their habits, personalities, and lifestyles, adapting as needed to maintain a sense of continuity, that they are the same person they have always been (Breheny & Griffiths, 2017). The task is to acknowledge and minimize losses, integrate them with their sense of self, and optimize their strengths to maintain their sense of remaining the same person over time despite physical, cognitive, emotional, and social changes (Bengtson & DeLiema, 2016). Older adults therefore tend to seek routine: familiar people, familiar activities, and familiar settings. Most of older adults' friends are old friends. Engaging in familiar activities with familiar people preserves a sense of self and offers comfort, social support, self-esteem, mastery, and identity (Pushkar et al., 2010).

Another explanation for older adults' narrowing social circles rests on the uniquely human ability to monitor time. With advancing age, people become increasingly aware of their shrinking time horizon: that they have little time left to live (Zacher & Kirby, 2015). This awareness causes them to shift their goals and priorities and accounts for continuity and change in social relationships. According to **socioemotional selectivity theory**, the functions of social interactions change with age (English & Carstensen, 2016). Young adults accumulate many friends because they emphasize the information-sharing function of friendship as they are developing a sense of identity and entering social roles (Wrzus et al., 2013). With age the information-sharing aspects of social interaction become less important because older adults often have accumulated decades of knowledge. Instead it is the emotion-regulating function of social relationships—feeling good—that becomes more important during older adulthood (Carstensen & Mikels, 2005).

As perceived time left diminishes, people tend to discard peripheral relationships and focus on important ones, such as those with close family members and friends (English & Carstensen, 2014). Older adults become increasingly motivated to derive emotional meaning from life and thereby cultivate emotionally close supportive relationships and disengage from more peripheral social ties (Carstensen et al., 2011; English & Carstensen, 2016). Despite an overall decline in the number of relationships in late adulthood, this process of strengthening and pruning relationships is associated with positive well-being. It allows older adults to focus their limited time and energy on relationships that are most beneficial while avoiding those that are inconsequential or detrimental, thereby maximizing their emotional well-being. In this sense, social selectivity is an emotional regulation strategy (Sims et al., 2015).

Neighborhoods

The neighborhoods and communities in which older adults reside influence their adaptation through the provision of physical and social resources. City, suburban, and rural communities offer different opportunities and challenges. Older adults who live in the suburbs tend to be healthier and wealthier and show higher rates of life satisfaction than those who live in cities (Dandy & Bollman, 2008; DeNavas-Walt & Proctor, 2014). Yet because their neighborhoods are less compact, suburban older adults tend to walk less and show greater declines in walking with age, both of which influence health and ability to live independently (King et al., 2017). Generally, urban older adults have better access to transportation and health and social services than do those in suburban and rural settings, enhancing their opportunities for social participation (Andonian & MacRae, 2011).

One-fourth of U.S. and one-third of Canadian older adults live in rural areas where they tend to be more disadvantaged in terms of health, wealth, and availability of services, and they are less likely to live near their children than other adults (DeNavas-Walt & Proctor, 2014). But older adults who live in rural areas tend to interact with their neighbors more than their urban and suburban counterparts (Shaw, 2005). Close relationships with community members, friends, and neighbors, including frequent interaction and high levels of social support, are important emotional and material resources for rural older adults.

In urban and suburban communities, neighborhood SES is associated with older adults' physical and mental health. Canadian older adults who live in poor neighborhoods are more likely than those in affluent neighborhoods to experience arthritis, diabetes, hypertension, heart disease, depression, and stroke (Menec et al., 2010). Disordered neighborhoods are associated with poor health, including frailty, poor mental health, and increased depressive symptoms (Caldwell et al., 2018;Joshi et al., 2017; Wu et al., 2015). Neighborhood characteristics are thought to have a biological effect on health. Specifically, neighborhood SES deprivation is associated with shortened telomere length, a marker of health and longevity (Powell-Wiley et al., 2020).

Neighborhood factors, such as walkability and access to transportation, health services, and social opportunities, influence health and ability to live independently.

istock/ U.Ozel.Images

Perception of neighborhood safety influences activity and health. Australian older adults who reported a sense of trust in their neighborhood and social cohesion were more likely to report recreational walking in nearby parks than were those who perceived the neighborhood as less safe (Van Cauwenberg et al., 2017). One study found that Mexican American older adults who viewed their neighborhoods positively and as safe were less likely to report poor self-rated health, controlling for both socioeconomic status and health status (Stroope et al., 2017). Older adults in more accessible and safe neighborhood contexts, including walking-friendly sidewalks, access to parks, the availability of public transportation, and low crime, are more likely to retain a higher degree mobility, health, and social activity and lower levels of depressive symptoms than those in less accessible contexts (Choi & Matz-Costa, 2017; Joshi et al., 2017; Mathis et al., 2017).

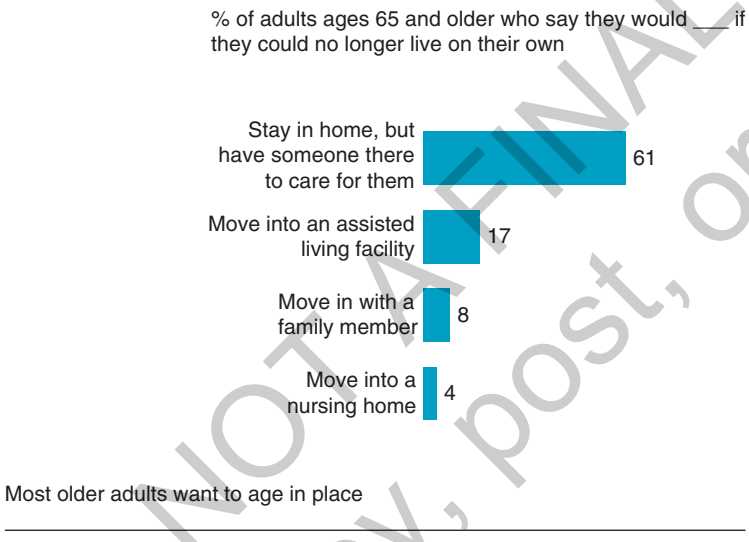
It is worth noting that Black older adults may perceive the same neighborhoods differently than white older adults, with ramifications for health. For example, Black older adults are more likely than white older adults to describe a given neighborhood as lacking features such as accessible parks (Esposito et al., 2020). At all ages, adults' experience of a neighborhood is filtered through lenses of race, ethnicity, and gender. Racial differences in views of a given neighborhood are influenced by a lifetime of exposure to inequality, discrimination, and racism, such as segregated housing within a community. Adults who live in neighborhoods with a higher density of Black residents and more residential instability and disorder show higher rates of frailty (Caldwell et al., 2018). Moreover, the effects of neighborhood poverty and disadvantage accumulate over a lifetime, with significant implications for functional decline and mortality (Clarke et al., 2014).

Aging in Place

Most older adults prefer to age in their homes, referred to as "aging in place" (see Figure 16.4; Fields & Dabelko-Schoeny, 2016). Most older adults live in or near the home they have lived in most of their lives. As health declines, living alone poses physical and psychological risks, including social isolation and loneliness. Declines in health and widowhood often prompt older adults to relocate, but most North Americans remain in their old neighborhoods (Chappell et al., 2003). Despite the challenges, remaining in a lifelong home strengthens adults' feelings of continuity with the past, aids their sense of identity, as well as maintains connections with the community, an important source of support.

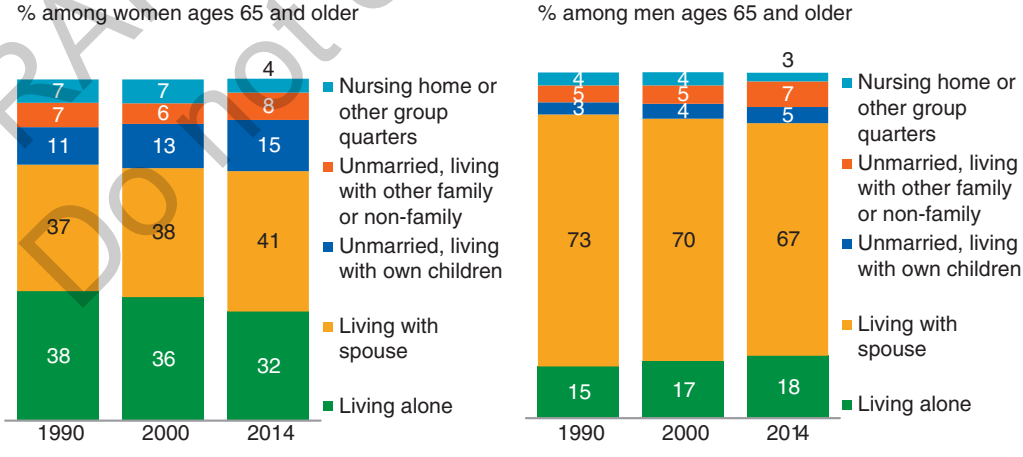
When older adults are healthy and not physically impaired, living in their own home permits them the greatest degree of control over their lives, such as choosing what and when to eat. Because of divorce, widowing, or never marrying, about one-third of North American older adults live alone, and more than one-third of women over 65 live alone (see Figure 16.5; Stepler, 2016). Older adults who live alone are more likely to worry about finances and to live in poverty. Elderly women are about 50% more likely to be poor than elderly men, and the risk of poverty increases as women age.

FIGURE 16.4 ■ Living Preferences Among Older Adults



Source: Stepler (2016)

FIGURE 16.5 ■ Living Arrangements of Older Adults, by Sex



Source: Stepler (2016)

Most adults prefer to age in place and retain their independence. As health declines, living alone poses physical and psychological risks, such as social isolation and loneliness. Despite the challenges, remaining in a lifelong home strengthens elders' feelings of continuity with the past, aids their sense of identity, as well as maintains connections with the community, an important source of support.

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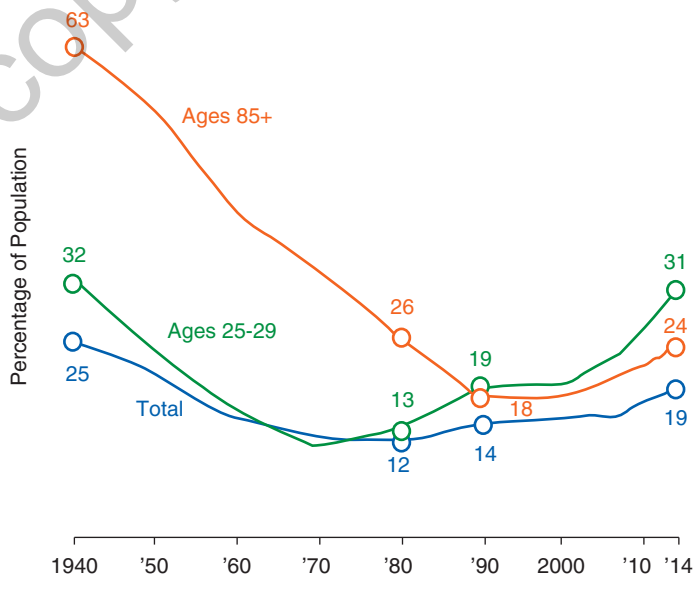
African American older adults are especially likely to remain in their lifelong neighborhoods and to live in poverty, but they also tend to rely on informal support systems for care, a helper network that includes spouses, children, siblings, friends, neighbors, and church members (Rasheed & Rasheed, 2003). This helper network is the basis for informal caregiving for those older persons who find themselves unable to maintain complete self-care due to illness or physical infirmities. It provides older adults with instrumental assistance, such as help in grocery shopping, transportation, and meal preparation, and expressive assistance, including emotional support, giving advice, encouragement, companionship, and prayer.

Many older adults live with kin, in intergenerational families. As discussed in Chapter 15, adult children often feel a strong responsibility to care for aging parents and grandparents, especially when the older adults have serious economic and housing needs (Postigo & Honrubia, 2010). As members of an intergenerational household, older members of a family may provide childcare and share their experience with grandchildren, adult children, and other family members (see Figure 16.6). Grandparents, particularly African American grandmothers, are important agents of socialization, maintaining the role of matriarch and kinkeeper (Barer, 2001). However, the transition to coresidence (an older family member giving up their own home and moving in with younger family members) may be challenging. The older person may have concerns about not wanting to be a burden, losing autonomy, or losing privacy; younger family members may have similar concerns about an older family member disrupting the household. The new extended family consisting of grandparents, parents, and grandchildren must find a new balance (Hagestad, 2018). Attitudes about coresidence are based on family obligation norms, beliefs about repaying older adults for past help, perceived relationship quality, other demands

FIGURE 16.6 ■ Adults Residing in Multigenerational Households in the United States, by Age, 1940–2014



Source: Cohn and Passel (2018)

on the younger adults' resources, the older person's resources, and family members' sense of moral responsibility to assist (Coleman & Ganong, 2008).

Other Housing

Some older adults live in residential communities for older adults, ranging from single houses, to small collections of condominiums, to large apartment complexes (Freedman & Spillman, 2014). Homes in residential communities are designed to meet older adults' physical and social needs and may include such features as grab bars in bathrooms, single-level homes, and intercoms for emergency assistance. Some homes are designed for low-income elderly and are subsidized by the government. Most communities are private businesses. Older adults rent or purchase a home and entry to a community complete with recreational facilities for socializing with other adults and obtaining assistance. Others live in congregate housing, which permits them to live independently but provides more comprehensive support, including common areas such as a dining room, recreational facilities, meals, and additional supervision and assistance with disabilities. Some older adults opt for "continuing care" communities that are designed to meet their changing needs, wherein they begin with independent housing, and when needed, transfer to congregate housing, and finally nursing home care.

There are many types of residential communities and many offer several options for care. Living in a community of older adults provides opportunities for social activities, forming friendships, and offering help to peers.

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Living in a community of older adults supports social activities, the formation of friendships, and provision of assistance to others, which increases a sense of competence and leadership (Ball et al., 2000; Lawrence & Schigelone, 2002). Older adults show better adaptation to living in residential communities when they share similar backgrounds and values, have frequent contact and communication with others, and feel socially integrated into the community. Supportive environments can match their changing physical abilities and offset declines in mobility and aid older adults' attempts to remain active (Fonda et al., 2002; Jenkins et al., 2002). Overall, older adults who reside in residential communities tend to show higher levels of perceived autonomy, sense of security, and quality of life as compared with those living independently in the neighborhood (van Bilsen et al., 2008). Although adults in residential settings did not differ from those in regular homes with regard to their sense of well-being or feelings of loneliness, those in residential communities participate more frequently in social activities. The main drawback to residential communities is their cost, which may entail purchasing an apartment or renting for $2,000 or more per month in the United States.

A small and declining number of older adults live in nursing homes (Toth et al., 2021). A nursing home is a facility that provides care to older adults who require assistance with daily care and health issues (Sanford et al., 2015). Nursing homes offer the greatest amount of care, 24 hours a day and 7 days a week, but also are most restrictive of adults' autonomy. Nursing homes tend to be hospital-like settings in which adults often have limited opportunities to control their schedule or interact with others, and their contact with peers generally is determined by staff. Constraints on autonomy can lead to loneliness, feelings of helplessness, and depression (Anderberg & Berglund, 2010). Most older people prefer to avoid living in nursing homes, if possible. Family members often experience guilt when they see no other choice but nursing home placement for their loved one (Seiger Cronfalk et al., 2017).

Several factors are thought to be most influential in determining the quality of life of older adults: freedom of choice and involvement in decision making, recognition of individuality, right to privacy, continuation of normal social roles, a stimulating environment, and a sense of connectedness between home, neighborhood, and community. Well-being is enhanced in nursing homes that are designed to foster a sense of control over day-to-day experiences and social life. Encouraging social interaction in communal spaces, allowing residents to furnish and deinstitutionalize their spaces with some

belongings, and modifying their environments to meet their changing needs while retaining as much autonomy as possible can help residents adapt to nursing home living.

Thinking in Context: Lifespan Development

1. Individuals' social circles tend to narrow over adulthood. Why? What are some of the implications of socioemotional selectivity theory for older adults' daily interactions, relationships, and well-being?
2. Considering the full span of adulthood, from early through late adulthood, compare socioemotional selectivity theory with the positivity effect, the tendency to switch focus from negative to positive information from early adulthood through late adulthood (see Chapter 15). How are these concepts similar and different? How might they interrelate?
3. Compare aging in place with living in residential communities and nursing homes.
   a. What are the advantages and disadvantages of each environment?
   b. What factors, such as activities, safety, autonomy, and others, do you deem important in choosing a housing situation?
   c. To what degree does an adult's age, mobility, or health influence housing decisions? How might housing decisions change over late adulthood?

Thinking in Context: Intersectionality

Contrast rural, urban, and suburban contexts.

1. What opportunities and challenges do rural, urban, and suburban contexts offer older adults?
2. What is the role of neighborhood SES in health and well-being?
3. In what ways might adults' experiences vary with race, ethnicity, and membership in a marginalized group? Why?

RETIREMENT

LEARNING OBJECTIVE

16.4 Examine influences on the timing of retirement and adaptation to retirement.

Today's adults, members of the Baby Boom generation (born 1946–1964), tend to remain working full time longer than ever before. About 28% of adults age 65 to 74 and 9% adults age 75 and older are in the workforce (U.S. Bureau of Labor Statistics, 2020). In contrast, only about 20% of adults in the generations born between 1901 and 1945 worked between ages 65 and 72 (Fry, 2019). Improved health and longevity enable adults to work many more years. However, working in late life, or retiring for that matter, are decisions that are often out of older adults' control because of finances, health, or circumstances.

Deciding to Retire

Ideally retirement is a process that begins long before the last day of employment. Under the best of circumstances, the retirement process begins with imagining the possibility of retirement and what it might be like. Adults then assess their abilities and their resources, determine when is the best time to let go of the work role, and put plans into action (Feldman & Beehr, 2011). The reality of retirement planning is that plans may change quickly and unexpectedly.

Health is a critical influence on the timing of retirement. Adults with poor health and visual and hearing impairments tend to retire earlier than their peers (Gopinath et al., 2017). The large racial and ethnic differences that we see in health over the lifespan influence retirement rates. Among U.S. retirees, 40% of Black and 50% of Hispanic retirees indicate that poor health was at least somewhat important to their decision, as compared with 26% of white retirees (U.S. Federal Reserve, 2018).

Retirement ages tend to vary with job conditions. Workers tend to retire early from jobs that are stressful or hazardous. Many of these job have mandatory retirement ages (such as air traffic controllers, pilots, firefighters, and police officers). Older adults tend to delay retirement from jobs that are highly stimulating, take place in pleasant environments, and are a source of identity and self-esteem (American Association of Retired Persons, 2008). Some adults cite the desire to maintain a routine and enjoyment as reasons to work (Sewdas et al., 2017). Workers in professional occupations and those who are self-employed tend to stay in their jobs longer as compared with those in blue-collar or clerical positions.

A sense of control and perceived working conditions, such as feeling respected by coworkers and leaders, is associated with delaying retirement in German and Finnish older adults (Böckerman et al., 2017;Wöhrmann et al., 2017). In contrast, workers who feel devalued may feel forced from the workplace. For Black workers, experiences with discrimination over their lifetime and at work are associated with retiring early relative to peers (Gonzales et al., 2018).

Financial resources have a large influence on whether and when an older adult retires.There are large racial disparities in the amount of retirement savings, with Black and Hispanic adults having saved about one-third as much as white non-Hispanic adults (a median of $29,000, $23,000, and $80,000, respectively; Morrissey, 2019). Black older adults are disproportionately at risk to live in poverty during retirement.

Changing economics also influence older adults' abilities to retire, as personal retirement investments such as IRAs and 401(k) plans may lose value unexpectedly. The availability of Social Security influences retirement timing for women (Morrill & Westall, 2019). Social Security, enacted as part of the Social Security Act signed by President Franklin D. Roosevelt in 1935, is funded by taxes paid by workers. Social Security provides older Americans with a dependable monthly income, with automatic increases tied to increases in the cost of living. Social Security has reduced poverty rates for older Americans by more than two-thirds, from 35% in 1959 to about 9% in 2016 (Bureau of the Census, 2017; Shelton, 2013). More than 90% of U.S. retirees receive monthly Social Security benefit payments (Social Security Administration, 2018). Yet Social Security was never intended as a sole form of income, but as a supplement to income from a retirement plan, pension, and savings. Unfortunately, many older adults rely on Social Security as their primary source of income. In 2017, one-half of married older adult couples and nearly three-quarters of single adults were getting at least half of their income from Social Security; and for about one-quarter and nearly one-half, respectively, Social Security was virtually their only income (Social Security Administration, 2018). Moreover, Social Security provides critical income to older women and people of color, who are more likely than married and white older adults to rely on Social Security for 90% or more of their income (Social Security Administration, 2016).

Transition to Retirement and Adjustment

Theorists propose that the transition to retirement is a process that follows a predictable set of steps. Adults generally seek to preserve continuity in their sense of self, and this tendency influences their transition to retirement (Atchley, 1989). Adults who are more satisfied at work may see work as central to their sense of self, may experience retirement as a disruption to their sense of self, and may thereby delay retirement. As workers approach retirement they may adjust their attitudes toward work, revising their views on its importance. Work is central to many people's sense of identity, posing transitory adjustment issues for new retirees (Bordia et al., 2020).

After the retirement event, retirees may experience a short honeymoon phase marked by new interests and rest without the obligations of work. As retirees become accustomed to the reality of everyday life in retirement, these positive feelings may change to disenchantment. Over time, the adult develops a realistic view of the social and economic opportunities and constraints of retirement, and a period of

reorientation occurs in which the person attempts to replace the lost work role with new activities or becomes stressed if they cannot (Richardson & Kilty, 1991). Finally, stability occurs once the retiree accommodates and adjusts to retirement.

Gains in one domain, such as increased family time, might compensate for losses in another, such as job-related status. Attitudes toward retirement may be based on adults' evaluation of the expected balance between the gains and losses associated with leaving working and being retired and the expected disruption to their lifestyle (Davies et al., 2017). The net balance of perceived gains and losses will vary between individuals, with some older adults expecting greater gains or losses than others (Pinquart & Schindler, 2007b). Given the scale and scope of potential changes across multiple life domains, attitude toward retirement is likely to be characterized by ambivalence in which individuals will hold both favorable and unfavorable attitudes (Muratore & Earl, 2015; Newman et al., 2012).

Research on retirement adjustment suggests that the majority of adults show high levels of well-being and life satisfaction and adjust well to their post-retirement life, but some adults show poor adjustment (Henning et al., 2017; Howe et al., 2010; Pinquart & Schindler, 2007a). One study of Australian retirees found several patterns of adjustment. Some retirees maintained high life satisfaction across the retirement transition (40%), others experienced declining levels of life satisfaction from a high level prior to retirement (28%), some experienced low levels of life satisfaction that declined further (18%), and some reported increasing life satisfaction from a low level prior to retirement (14%). Overall, retirees who experienced significant declines in life satisfaction tended to have worse health and less access to a range of social and economic resources prior to retirement, suggesting that preretirement experiences influence adjustment (Heybroek et al., 2015).

For individuals who find their job stressful or burdensome, retiring could be a very positive experience, a relief from ongoing strains and conflicts, energizing and fulfilling (Fehr, 2012). Also, for individuals who would like to participate more heavily in the roles of family member and community member, retirement is an opportunity for them to enjoy the rewards and responsibilities tied to those roles. Continuity in other social roles and the ability to adapt to role changes leads to few changes in life satisfaction after retirement (Reitzes & Mutran, 2004). In addition, retirement satisfaction tends to increase for most older adults over the first half dozen years after retirement (Gall, Evans, & Howard, 1997; Wang, 2007).

Many older adults report being more socially and intellectually active after retirement (Henning et al., 2021). Retirement has health benefits such as lower cardiovascular risk for both men and women, which is associated with improved cognitive functioning (Oi, 2021). Many adults show improvements in mental health, especially when they retire from jobs with poor working conditions, such as high demands, low authority, and low support (Fleischmann et al., 2020).

Influences on Retirement Adjustment

Adjustment to retirement is influenced by a complex web of factors, including characteristics of the individual, his or her social relationships, and the job (Wang et al., 2011). Some positive predictors of successful adjustment include physical health, finances, leisure, voluntary retirement, social integration, psychological health, and personality-related attributes (Barbosa et al., 2016). Positive adjustment to retirement is also associated with engagement in satisfying relationships and leisure activities—and planning ahead for the financial and social changes that come with retirement (Grotz et al., 2017; Siguaw et al., 2018;Yeung & Zhou, 2017). Workers in high-stress, demanding jobs, or those that provide little satisfaction, tend to show positive adaptation to retirement (Adams et al., 2002; Fehr, 2012). For them, retirement often comes as a relief. Those who are in highly satisfying, low-stress, pleasant jobs tend to experience more challenges in adaptation. Generally speaking, the greater the intrinsic value of the older worker's job, the lower the levels of retirement satisfaction (van Solinge & Henkens, 2008).

The characteristics of the retirement transition also matter. Many adults are taking the route of a gradual retirement, slowly decreasing their involvement and working part time, rather than an abrupt retirement (Calvo et al., 2009). Frequently this is out of financial necessity. One study of Australian

retirees found that those who had retired abruptly were more likely to rate their health as having deteriorated, whereas those who had retired gradually tended to report better adjustment to retirement life (De Vaus et al., 2007). The length of the transition, whether abrupt or gradual, matters less in determining happiness after retirement than the worker's sense of control over the transition—whether the retirement is chosen or forced (Calvo et al., 2009; De Vaus et al., 2007; Quine et al., 2007). Having a sense of control over the decision to retire, as well as the timing and manner of leaving work, has an important positive impact on psychological and social well-being that lasts throughout the retirement transition (Siguaw et al., 2018).

Social support also influences adjustment. Among married retirees, relationship satisfaction aids the transition to retirement and, in turn, the increased time together that retirement brings can serve to enhance marital satisfaction. In contrast, adults who are lonely or recently divorced are more likely to experience difficulty (Damman et al., 2015; Segel-Karpas et al., 2018). Maintaining multiple roles after retirement promotes well-being (Butler & Eckart, 2007). For example, volunteer work offers older adults opportunities to share their experience, mentor others, and develop and sustain social relationships, all of which may enhance their well-being (Tang, 2008; Windsor et al., 2008).

Thinking in Context: Lifespan Development

1. Discuss individual and contextual factors that influence whether and when an older adult retires.
2. In what ways might the characteristics of jobs; individuals' education and experience; and other microsystem, macrosystem, and exosystem factors influence adjustment to retirement?

Thinking in Context: Biological Influences

How might the typical physical changes that older adults experience influence retirement decisions?

1. Consider physical changes in older adulthood, such as strength, sensory and motor abilities, and brain development (see Chapter 15). How might these changes influence adults' performance at work?
2. What kinds of jobs are most likely to be influenced by the sensory, motor, and body changes of older adulthood? By the neurological changes?
3. How might contextual factors influence the connection between physical aging and retirement decisions?

DEATH AND END-OF-LIFE ISSUES

LEARNING OBJECTIVE

16.5 Consider definitions of death and end-of-life considerations.

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 section, 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.

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**. 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. Today ventilators permit patients' hearts to continue to beat even though they cannot eat, think, or breathe on their own.

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, **whole brain death**, may be pronounced dead before the heart stops beating (Harvard Medical School ad Hoc Committee, 1968). Whole brain death refers to the irreversible loss of functioning in the entire brain, higher and lower brain regions, the cortex and brainstem, without possibility of resuscitation (McMahan True et al., 2001). Indicators include no spontaneous movement or respiration, no motor reflexes, no pupilar response, and a flat EEG. This definition was reaffirmed by the 2008 report of the President's Council on Bioethics. 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 to include instances in which inadequate blood supply to the brain irreparably damages the cortex while leaving the brainstem intact and functional, such as after heart attack, drowning, or traumatic brain injury. 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 and maintains heart rate and respiration but is not aware, due to the permanent loss of all activity in the cortex (Laureys et al., 2010). PVS patients are neither clinically dead nor meet the criteria for whole brain death, but remain biologically alive despite lacking the capacity to regain awareness and cognitive capacities (Bender et al., 2015). Because PVS does not meet the criteria for whole brain death, it 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. Yet U.S. 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.

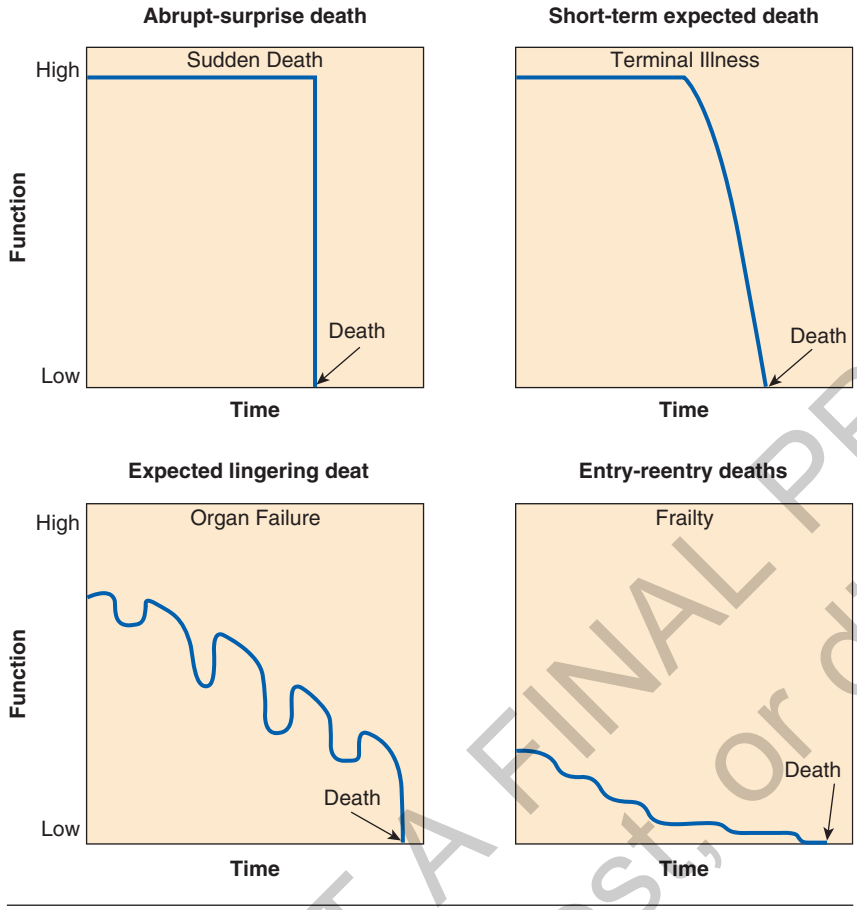
Nieves Melendez tends to her son, former professional boxer Prichard Colon, while he lies in a vegetative state after suffering a traumatic brain injury during his bout against Terrel Williams.

The Washington Post / Contributor/ Getty Images

The Dying Trajectory

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 16.7, 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

FIGURE 16.7 ■ Theoretical Trajectories of Dying



Source: Lunney et al., 2003.

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.

Emotional Reactions to Dying

People tend to show a range of emotional reactions 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 & Corr, 2013;Kastenbaum & Moreman, 2018). Dying is an individual experience. The dying person has myriad 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).

Death With Dignity

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). Given that death is not easily defined, end-of-life issues are particularly important to consider.

Advance Directives

Planning and communication are key to helping people die with dignity. Without prior communication, dying patients are often unable to express their wishes and often cannot participate in decisions about their own end-of-life care, such as pain management, life-prolonging treatment, and memorial services. 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 important ways 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 what medical intervention should and should not be used to prolong their lives if they are incapacitated by an illness or accident and are unable to speak for themselves. 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.

Advance directives permit patients to take control over their health care, their deaths, and what happens to their bodies and possessions after death. Caregivers benefit from advance directives because

an understanding of the patients' wishes can help in decision making and reduce stress, emotional strain, and, potentially, guilt (Radwany et al., 2009). Overall, about one in three U.S. adults, including 40% to 50% of older adults, have written some form of advance directive (Gamertsfelder et al., 2016; Rao et al., 2014; Yadav et al., 2017). 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 because they 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 (Khan, 2014).

Euthanasia

Through a living will individuals indicate 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). **Passive euthanasia** occurs when life-sustaining treatment, such as a ventilator, is withheld or withdrawn, allowing a person to die naturally. 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, but about a third of adults 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).

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.

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. There are strict requirements: Oregon residents must be diagnosed with a terminal illness that will kill them within 6 months. Their written request for a lethal dose of medication for ending their life must be confirmed by two witnesses unrelated to the patient or their care. After a second physician confirms the patient's diagnosis, they must wait an additional two weeks 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. More than 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).

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 those needs. Rather

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

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 to support the patient in facing his or her impending death and help the patient's loved ones cope with the loss.

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?

Thinking in Context: Applied Developmental Science

Our knowledge of 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?

BEREAVEMENT AND GRIEF

LEARNING OBJECTIVE

16.6 Analyze typical grief reactions to the loss of loved ones and influences on the grief process.

One's impending death or the death of the loved one triggers an emotional response known as **grief**, which includes an array of emotions such as hurt, anger, guilt, and confusion. Most discussions of the losses that accompany death focus on the family and friends of the deceased, those left behind.

Knowledge of one's impending death also brings about a grief response centered on the losses that they and their loved ones will experience.

Cultural Rituals Surrounding Death

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.

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 in 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 best-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 also been found in other parts of the world such as the Andes mountains of Peru (Whitbourne, 2007).

The Bornu of Nigeria enlistfamily 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).

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 symbolic 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 therefore is an event to be welcomed or feared.

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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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).

Grief Process

Grief is sometimes described as progressing through phases or stages similar to 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). Phases of mourning are useful in describing common reactions to loss, but they represent a generalization and perhaps oversimplification of the process (Stroebe, Schut, et al., 2017). 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).

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. Common physical responses to grief include tightness in the chest, feeling out of breath, stomach pains, and weakness. Grief may affect the immune response and manifest as health problems (O'Connor, 2019). Cognitive responses include reductions in attention, memory, processing speed, and verbal fluency (Rosnick et al., 2010). The stress that accompanies grief may influence function, including neurogenesis, the maintenance of dendrites, neurotransmission, and plasticity (Egeland et al., 2015; Schoenfeld & Gould, 2013). Behavioral responses including 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 accompanied by many stressors that pose challenges to adaptation. According to the **dual-process model of grief**, bereavement is accompanied by two types of stressors (Stroebe, Schut, et al., 2017; 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, Boerner, et al., 2017; 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).

Ultimately 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). 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

(Sirrine 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). Most important, and most difficult, the grieving person must establish new patterns of behavior and redefine 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. Yet an enduring connection to the deceased remains. Grieving appears to involve learning to live with loss, rather than getting over loss.

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

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).

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. older adults over the age of 65 are widowed. Women who have lost a spouse live longer than men and are less likely to remarry. Among adults 75 years or older, more than one-half of women and one in five men are widowed (Gurrentz & Mayol-Garcia, 2021). Compared with their functioning prior to the loss of a spouse, bereaved adults show increased levels of depression, anxiety, stress, as well as poorer 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).

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). Interestingly, the widowhood effect persists into old age, stopping at about age 90 in women and 95 in men (Blanner et al., 2020).

The nature of the death influences how it is experienced and the grief process. 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). 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. 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).

The incidence of complicated grief, including long-lasting symptoms such as persistent intense yearning and disruptive preoccupation with thoughts of the deceased (De Stefano et al., 2020;Nakajima, 2018), 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, coupled with the 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.

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. 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?
3. From your perspective, is the process of adjusting to the death of a loved one a continuous or discontinuous one? (Review these terms in Chapter 1.) 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?

CHAPTER SUMMARY

16.1 Summarize patterns of psychosocial development in late adulthood.

Most older adults feel that they are younger than their years and this tendency is associated with health and well-being. Self-conceptions are more multifaceted, complex, and stable in old age than at other periods of life. Most older adults maintain a positive view of themselves by

accepting their weaknesses and compensating by focusing on their strengths. Life review help adults find continuity in their lives, come to terms with choices, and develop ego integrity. Big 5 personality traits largely remain stable into late adulthood, but most adults experience subtle shifts with age. Sexual interest and activity persists into late life. Most adults become more religious as they age, which often provides support and a buffer against stress.

16.2 Discuss features of older adults' relationships with others, including friends, spouses, children, and grandchildren.

In older adulthood, friendships become more important and more fulfilling. Marital satisfaction increases in older adulthood. Older adult cohabiters do not differ from marrieds in their reports of emotional satisfaction, pleasure, openness, time spent together, criticism, and demands. The nature of the relationship and the exchange of help between elderly parents and their adult children increasingly emphasizes children-to-parent assistance, most often taking the form of emotional support. Regardless of distance and contact, affection between grandchildren and grandparents tends to remain strong.

16.3 Describe the social contexts in which older adults live and their influence on development.

Social networks tend to become smaller in older adulthood, focused more on family and less on peripheral relationships. Adults strive to remain active and sustain continuity in their relationships and sense of self. Socioemotional selectivity theory explains that a shrinking time horizon causes adults to change their priorities to emphasize the emotional aspects of relationships. Most older adults prefer to age in place. There are a variety of different types of residential communities for older adults, but only a small number live in nursing homes, which offer the greatest amount of care but also the greatest restriction of adults' autonomy. Factors that influence the quality of living environments for older adults include freedom of choice, involvement in decision making, right to privacy, stimulating environment, and sense of connectedness.

16.4 Examine influences on the timing of retirement and adaptation to retirement.

The period of retirement has lengthened in all Western nations. The decision of when to retire is influenced by job conditions, health, finances, and personal preferences. Health status and financial resources are often determining factors on whether and when an older adult retires. Workers in high stress, demanding jobs, or those that provide little satisfaction, tend to show positive adaptation to retirement. Research suggests the worker's sense of control influences the transition to retirement. Continuity in other social roles and the ability to adapt to role changes leads to few changes in life satisfaction after retirement. Engagement in leisure activities and volunteer work increases retirement satisfaction.

16.5 Consider 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 brain stem, is known as a persistent vegetative state. 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. 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 to die with dignity.

16.6 Analyze 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. 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. Bereavement is associated with increased levels of depression, anxiety, stress, and poor performance on cognitive tests and poor health.

KEYWORDS

active euthanasia (p. 505)
activity theory (p. 493)
bereavement (p. 507)
clinical death (p. 502)
continuity theory (p. 493)
disengagement theory (p. 492)
dual-process model of grief (p. 508)
durable power of attorney (p. 504)
dying trajectory (p. 502)
dying with dignity (p. 490)
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whole brain death (p. 502)
widowhood (p. 509)
widowhood effect (p. 509)

PART 8 LIFESPAN DEVELOPMENT AT WORK: LATE ADULTHOOD

Over the course of late adulthood, older adults develop specialized physical and mental health care needs. Many of the professions we have described thus far, such as social workers, counselors, psychologists, and physical and occupational therapists, work with older adults. Here we examine several professions that specialize in aging.

Audiologist

Audiologists are health professionals who diagnose and treat hearing and balance disorders for people of all ages. They screen and test older adults' hearing and evaluate and treat dizziness, tinnitus (ringing in the ears), and balance problems. They help older adults select hearing aids and customize them to the adults' needs. Hearing aids are not one size fits all, so customization and helping the adult adjust to a hearing aid can take time and multiple visits. Audiologists also counsel and educate patients and their families on how to manage hearing impairments and balance problems. Audiologists work in hospitals, schools, physicians' offices, rehabilitation centers, residential health care facilities, and private practice.

Becoming an audiologist requires a doctorate in audiology, a 4-year program. About 375 hours of supervised experience and a passing grade on a state licensure exam is needed to practice. The median annual wage for audiologists was $81,030 in May 2020 (U.S. Bureau of Labor Statistics, 2021).

Geriatric Nurse

A geriatric nurse specializes in working with older adults. In addition to the nurse duties that we have discussed in previous chapters, geriatric nurses assist patients who are experiencing terminal illnesses, other illnesses, and neurocognitive disorders (such as Alzheimer's). They help monitor and assess the cognitive skills and mental status of their patients. Geriatric nurses assist patients who are bedridden and may help feed, clothe, administer drugs, and offer moral support and therapy to older adult patients. Understanding patients' medications and how medications interact is important because many older adults take several medications that may conflict.

In addition to the qualifications required to become a nurse, becoming a geriatric nurse entails specializing in working with older adults. Although nurses often gain experience with geriatric patients, Gerontological Nursing Certification documents experience and certifies competence. It requires 30 hours of continuing education in geriatrics, 2000 hours of experience, and completing an exam. The median salary for a registered nurse was $75,330 in May 2020, but geriatric nursing is a specialized field and likely earns a higher salary (U.S. Bureau of Labor Statistics, 2021).

Geriatrician

A geriatrician is a physician who specializes in the care of older adults. They are trained to manage the unique health care needs of older people and diagnose and treat illnesses, injuries, and conditions that commonly occur with age. Like other physicians, geriatricians provide medical and lifestyle advice. Geriatricians must be keenly aware of the risks of various medications and their interactions because older adults are often prescribed multiple medications and medications may have different effects with age. Geriatricians collaborate with many other health care professionals.

Becoming a geriatrician requires completing medical school and residency, then specializing in a geriatrics fellowship program to get experience. In 2020, physicians earned a median wage of about $208,000 (U.S. Bureau of Labor Statistics, 2021).

Geropsychologist

A geropsychologist is a psychologist who specializes in older adults. Geropsychologists must understand normative adult development and aging, behavioral and mental health issues that may arise in late life, and how to assess older adults. They treat problems including mental disorders such depression and anxiety (which sometimes manifest differently in older adults), dementia, changes in decision making and living abilities, coping with chronic illness, grief and loss, family caregiving, and end-of-life care.

Becoming a geropsychologist requires a doctoral degree in clinical or counseling psychology, supervised experience, and state licensure. The American Board of Professional Psychology certifies geropsychologists with a year of full-time supervised training in geropsychology or 2000 hours equivalent experience and the completion of a certification exam. In 2020, psychologists earned a median salary of about $80,000 (U.S. Bureau of Labor Statistics, 2021).

User Design and Usability

Products that are designed for older adults often have special features, such as large buttons, easy to read font, and a simple layout. A variety of professionals work to create products that older adults perceive as accessible, functional, and attractive. Positions in user design carry many titles, such as usability specialist, user experience strategist, and user interface designer. What all of these "user-oriented" titles have in common is an emphasis on understanding how people use and interact with a product and improving their experience.

User experience designers work with all kinds of products, such as toys, computer hardware and software, electronic equipment, and cars. Some work on teams to create product prototypes and test and modify them based on input from potential users. Knowledge about human development can help in creating websites, apps, and video games with users' development in mind. For example, an understanding of how attention, perception, and cognition changes with age can help user experience designers create software that is easily understood, meaningful, and engaging for older adults. This might include creating software layouts and backgrounds that are sensitive to older adults' needs by including larger text and icons, contrasting colors that are easily distinguished, and slower movements. They might record and analyze users' behaviors when they try to accomplish a task using a software product. They interview users about their experience with the product: Was it easy to use? What confused them about the interface? The resulting knowledge is used to improve the design.

Preparation for user experience careers emphasizes experience over a specific major or degree. Web design, graphic design, computer programming, and an understanding of human behavior are helpful. Some colleges offer bachelor's and master's degrees in user design, as well as one- or two-semester programs and certifications in user design. Generally, median salaries in these fields range from $65,000–$75,000 depending on data source (Payscale, 2021).

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 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).