



Jim Craigmyle/Getty Images

1

UNDERSTANDING HUMAN DEVELOPMENT: APPROACHES AND THEORIES

LEARNING OBJECTIVES

- 1.1 Identify five principles of the lifespan developmental perspective.
- 1.2 Discuss three basic issues in developmental science.
- 1.3 Summarize six theoretical perspectives on human development.
- 1.4 Describe the methods and research designs used to study human development.
- 1.5 Examine developmental scientists' obligation to conduct ethical research.
- 1.6 Describe the field of applied developmental science and the role of intersectionality in development.

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

WHAT IS LIFESPAN HUMAN DEVELOPMENT?

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

Table 1.1 illustrates the many phases or stages of life through which we progress from conception to death. The life stages may have different labels and 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 increase over childhood and adolescence, peak in early adulthood, and begin to decline thereafter, declining more rapidly from middle to late adulthood (Gabbard, 2018). There also are ways in which we change little over our lifetimes. Some personality traits are highly stable over the lifespan so that we remain largely the “same person” into old age (Schwaba & Bleidorn, 2018; Wortman et al., 2012).

Lifespan human development can be described by several principles. Development is (a) multidimensional, (b) multidirectional, (c) plastic, (d) influenced by multiple contexts, and (e) 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

TABLE 1.1 ■ Stages in Human Development

Life Stage	Approximate Age Range	Description
Prenatal	Conception to birth	Shortly after conception, a single-celled organism grows and multiplies. This is the period of the most rapid physical development as basic body structures and organs form, grow, and begin to function.
Infancy and toddlerhood	Birth to 2 years	The newborn is equipped with senses that help it to learn about the world. Physical growth occurs and motor, perceptual, and intellectual skills develop. Children show advances in language comprehension and use, problem solving, self-awareness, and emotional control. They become more independent and interested in interacting with other children and form bonds with parents and others.
Early childhood	2 to 6 years	Young children grow steadily, strengthen their muscles, and become better at coordinating their bodies. Memory, language, and imagination improve. They become more independent and better able to regulate their emotions. Family remains children's primary social tie, but interactions with other children begin to influence development.
Middle childhood	6 to 11 years	Growth slows, but strength and athletic ability increase dramatically. School-age children show improvements in their ability to reason, remember, read, and use arithmetic. As children advance cognitively and gain social experience, they understand themselves more complexly than younger children. As friendships develop, peers and group memberships become more central.
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, apart from their parents. Peer groups are vital influences on development.
Early adulthood	18 to 40 years	Physical condition peaks and then shows slight declines with time. Lifestyle choices play a significant role in influencing health. Most young adults join the workforce, marry or establish a long-term bond with a spouse, and become parents. The timing of these transitions varies. Adolescents in Western industrialized societies often experience an extended transition to adulthood (called emerging adulthood), spanning from ages 18 to 25, and as late as age 29.
Middle adulthood	40 to 65 years	In middle adulthood, people notice changes in their vision, hearing, physical stamina, and sexuality. Basic mental abilities, expertise, and practical problem-solving skills peak. Career changes and family transitions prompt adults to continually refine their understandings of themselves. Adults help children to become independent, adapt to an empty nest, and assist older parents with their own health and personal needs.
Late adulthood	65 years and beyond	Most older adults remain healthy and active. Reaction time slows, and most show a decline in some aspects of memory and intelligence, but an increase in expertise and wisdom compensates for losses. Most 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) and search for meaning in their lives. Late adulthood is broken into three ages. Young-old adults, ages 65 to 74, tend to be active, healthy, and financially and physically independent. Old-old adults (75 to 84) typically live independently but often experience some physical and mental impairment. The oldest-old, age 85 and older, are at highest risk for physical and mental health problems and often are unable to live independently. Centenarians, individuals age 100 and older tend, to be healthier than their same-age peers all throughout life, often delaying the onset of mortality-related diseases and disability until well into their 90s.
Death		Death itself is a process entailing the stopping of heartbeat, circulation, breathing, and brain activity. A person's death causes changes in their social context—family members and friends must adjust to and accept the loss.

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. The onset of walking precedes advances in language development in infants in the United States and China (He et al., 2015; Lüke et al., 2019). Brain maturation, a physical development, underlies advances in cognitive development, which might enable adolescents to become better at understanding their best friend's point of view and show more prosocial helpful behavior (Tamnes et al., 2018). In turn, adolescents might become more empathetic and sensitive to their friends' needs and develop a more mature friendship, influencing socioemotional development. Figure 1.1 illustrates how the three areas of development interact.

Development Is Multidirectional

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

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

Development is characterized by **plasticity**: It is malleable, or changeable. Frequently the brain and body can compensate for illness and injury. For instance, in children who

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.



Sources: Images from iStock/Essentials; iStock/Signature; iStock/Jupiter/Pixland.

are injured and experience brain damage, other parts of the brain may take on new functions (Petranovich et al., 2020). The plastic nature of human development allows people to modify their traits, capacities, and behavior throughout life. Older adults who have experienced a decline in balance and muscle strength can regain and improve these capabilities through exercise (McAuley et al., 2013; Sañudo et al., 2019).

Plasticity tends to decline as we age, but it does not disappear entirely. Short instruction, for instance, can enhance the memory capacities of very old adults, but less so than in younger adults (Brehmer et al., 2012; Willis & Belleville, 2016). Plasticity makes it possible for individuals to adjust to change and to demonstrate **resilience**, the capacity to adapt effectively to adverse contexts and circumstances (Masten et al., 2021). The brain naturally adapts to a lifetime of sensory experiences to portray the world around us efficiently and accurately as we age into older adulthood (Moran et al., 2014; Zanto & Gazzaley, 2019).



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

Thomas Barwick/Getty Images

Development Is Influenced by Multiple Interacting Contexts

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

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

Sociohistorical Context

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

Age-Graded Influences. *Age-graded influences* are closely tied to chronological age and are largely predictable. Most individuals walk at about a year of age and reach puberty in early

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

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

Contextual influences tied to specific historical eras explain why a generation of people born at the same time, called a **cohort**, is similar in ways that people born at other times are different. Adults who came of age during the Great Depression and World War II are similar in some ways that make them different from later cohorts; they tend to have particularly strong views on the importance of the family, civic mindedness, and social connection (Rogler, 2002). Yet the same historical event may be experienced differently by successive cohorts relatively close in age, reflecting the fact that they are in different life stages, with different social

roles, levels of maturity, and life experiences (Gerstorff et al., 2020). Illustrating the role of cohort, researchers examined the influence of the Great Depression (1929–1941) and World War II (1939–1945) on two cohorts of California-born Americans. These children were born just 8 years apart in Oakland and Berkeley, and were followed from childhood to older adulthood, over a 70-year period (Elder & George, 2016).

Boys in the older Oakland cohort (born in 1920–1921) were children during the affluent 1920s, a time of economic growth in California, and they experienced a prosperous and relatively stress-free childhood. They entered adolescence during the Great Depression, a period of severe economic stress during which unemployment



Sociohistorical influences, such as the COVID pandemic, contribute to cohort, or generational, differences in development.

Halfpoint Images/Getty Images

skyrocketed and people's savings were depleted. As adolescents during the Great Depression, the Oakland boys tended to behave responsibly and assist their families in coping, such as by working jobs outside the home, which enhanced their independence and sense of responsibility and reduced their exposure to family stress. The Oakland cohort completed high school just prior to the onset of World War II and over time nearly all the young men entered the armed forces.

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

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

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

Take a moment to think about what role larger historical events have played in your development. Consider the COVID-19 pandemic begun in 2020, legalization of same-sex marriage in 2015; the Black Lives Movement, begun in 2013; 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 your cohort may differ from your parents' cohort because of historical events? Your grandparents' cohort?

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

Cultural Context

Like sociohistorical context, we are embedded in a cultural context that influences us 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 (Jones & Mistry, 2019).

Early studies of culture and human development took the form of *cross-cultural research*, comparing individuals and groups from different cultures to examine how these universal processes worked in different contexts (Mistry & Dutta, 2015). Yet research that defines normative development based on Western samples leads to narrow views of human development that do not consider the variety of contexts in which people live. At the extreme, differences in human development within other cultural groups might be viewed as abnormal and harmful (Packer & Cole, 2020).

Most classic theories and research on human development are based on Western samples because researchers once believed that the processes of human development were universal. More recent observations suggest that development varies dramatically with cultural context (Keller, 2017). Consider milestones, such as the average age that infants begin to walk. In Uganda, infants begin to walk at about 10 months of age, in France at about 15 months, and in the United States at about 12 months. These differences are influenced by parenting practices that vary by culture. African parents tend to handle infants in ways that stimulate walking, by playing games that allow infants to practice jumping and walking skills (Hopkins & Westra, 1989; Super, 1981). The cultural context in which individuals live influences the timing and expression of many aspects of development, even physical developments, such as walking, long thought to be a matter of biological maturation (Amir & McAuliffe, 2020). Applying principles of development derived from Western samples to children of other cultures may yield misleading conclusions about children's capacities (Keller, 2017).

There is a growing trend favoring cultural research, which examines how culture itself influences development, over cross-cultural research, which simply examines differences across cultures (Packer & Cole, 2020). Cultural research views development and culture as fused entities that mutually interact, with culture inherent in all domains of development and a contributor to the context in which we are embedded, transmitting values, attitudes, and beliefs that shape our thoughts, beliefs, and behaviors (Amir & McAuliffe, 2020; Jones & Mistry, 2019; J. G. Miller et al., 2020). The shift toward cultural research permits the examination of the multiple subcultures that exist within a society (Oyserman, 2017). North American culture is not homogeneous; many subcultures exist, defined by factors such as ethnicity (e.g., African American, Asian American), religion (e.g., Christian, Muslim), geography (e.g., southern, midwestern), and others, as well as combinations of these factors. Current trends in cultural research document diversity and emphasize understanding how the historical, cultural, and subcultural contexts in which we live influence development throughout our lives.

Developmental Science Is Multidisciplinary

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

Thinking in Context

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 or older family members or friends may have experienced in their youth. What technology was available? What historical events did they experience? What were the popular fads? 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. 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 United States has no culture? What do you think?

BASIC ISSUES IN LIFESPAN HUMAN DEVELOPMENT

Developmental scientists agree that people change from conception to death. Some abilities increase and others decrease. Yet developmental scientists 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 do their surroundings influence them, 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 Continuity and Discontinuity

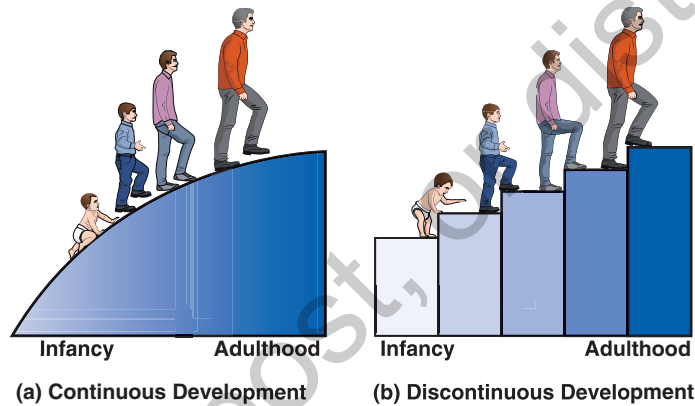
Do children slowly grow into adults, steadily gaining more knowledge and experience and becoming better at reasoning? Or do they grow in spurts, showing sudden, large gains in knowledge and reasoning capacities? Some aspects of development unfold slowly and gradually over time, demonstrating **continuity**. Children gradually gain experience and learn strategies to solve problems more quickly (Siegler, 2016). Similarly, middle-aged adults experience gradual losses of muscle and strength (Wilkinson et al., 2018).

Other developmental changes occur in stages, dramatic transformations, demonstrating **discontinuity**. Puberty transforms children's bodies into more adultlike adolescent bodies (Wolf & Long, 2016). School-age children's language abilities are radically different from infants' (Rudman & Titjen, 2018). 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). Each of these examples illustrates qualitative changes, transformations from one state to another. To sum

up, a discontinuous view of development emphasizes sudden transformation, whereas a continuous view emphasizes gradual and steady changes (Figure 1.2).

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 (Bornstein et al., 2017). 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, when researchers measured infants' height every day, they discovered that infants have growth days and nongrowth days; days in which they show rapid change in height interspersed with days in which there is no change in height, illustrating discontinuous change (Lampl et al., 2001) (Figure 1.3). In this example, monthly measurements of infant height

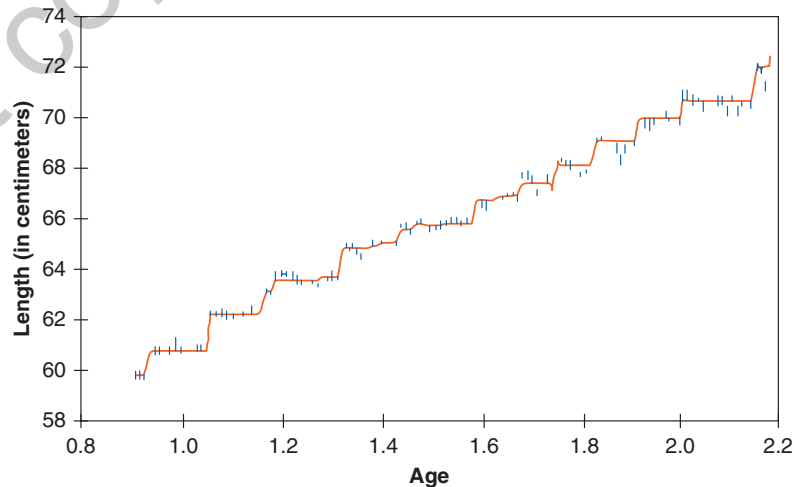
FIGURE 1.2 ■ Continuous and Discontinuous Development



Source: Adapted from End of the Game (2014) Child Development 101 – History and Theory.

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 in 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: Adapted from Lampl, M., Veldhuis, J. D., & Johnson, M. L. (1992). Saltation and stasis: A model of human growth. *Science*, 258, 801–803.

suggest gradual increases, but daily measurements show spurts of growth, each lasting 24 hours or less. Thus, whether a given phenomenon, such as height, is described as continuous or discontinuous can vary depending on perspective. Most developmental scientists agree that some aspects of development are best described as continuous and others as discontinuous (P. H. 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? It was once believed that individuals were shaped by and did not influence their environment. In this sense, people were viewed as passive in their own development, or simply molded by experience. Today most developmental scientists disagree with this view (Lerner et al., 2014; Overton, 2015).

Instead, developmental scientists believe that people are active contributors to their own development. They create experiences that lead to developmental change and thereby influence how they themselves change over the lifespan. 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). We often are unaware of our influence on our physical and social context.

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 learning opportunities. By engaging the world around them, thinking, being curious, and interacting with people, objects, and the world around them, infants and children are “manufacturers of their own development” (Flavell, 1992, p. 998). That is, they play an active role in influencing their own development.

Nature and Nurture Influence Development

Perhaps the oldest question about development concerns its origin. Referred to as the **nature–nurture debate**, researchers once asked whether development is caused by nature (genetics) or nurture (environment). Explanations that rely on nature point to inborn genetic traits and maturational processes as causes of developmental change. Most infants take their first steps at roughly the same age, suggesting a maturational trend supporting nature’s role in development (Payne & Isaacs, 2020).

An alternative explanation for developmental change emphasizes nurture, the environment. Individuals are molded by the physical and social environment in which they are raised. From this perspective 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). Therefore, many infants



Infants naturally influence people and the world around them. What reactions might these two babies elicit?

Ambria Michelle/Getty Images

may walk at about the same time because they experience similar environmental circumstances and parenting practices.

Today developmental scientists generally agree that the nature–nurture debate is, in fact, not a debate. Instead most now agree that *both* nature and nurture are important contributors to development (Rutter, 2014; Sasaki & Kim, 2017). In this example, we now know that walking is heavily influenced by maturation (nature), but experiences and environmental conditions can speed up or slow down the process (nurture). Developmental scientists now work to understand how nature and nurture interact and together influence how people grow and change throughout life (Bjorklund, 2018; Lickliter & Witherington, 2017). We examine the complex interactions between biology and environment in Chapter 2.

Thinking in Context

1. Identify ways in you have changed very gradually over the years. Are there times in which you showed stage-like transformations, 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. Identify examples of how a child might play an active role in his or her development. How do children influence the world around them?
3. 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?

THEORETICAL PERSPECTIVES ON HUMAN DEVELOPMENT

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

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

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

Psychoanalytic Theories

Are there powerful forces within us that make us behave as we do? Do inner drives push us? **Psychoanalytic theories** describe development and behavior as a result of the interplay of inner drives, memories, and conflicts we are unaware of and cannot control. These hidden forces

influence our behavior throughout our lives. Freud and Erikson are two key psychoanalytic theorists.

Freud's Psychosexual Theory

Sigmund Freud (1856–1939), a Viennese physician, is credited as the father of psychoanalytic theory. Freud believed that much of our behavior is driven by unconscious impulses 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 (Table 1.2). Freud explained that the task for parents is to strike a balance between over-gratifying and under-gratifying a child's desires at each stage to help the child develop a healthy personality with the capacity for mature relationships throughout life. Notably, Freud did not study children; his theory grew from his work with female psychotherapy patients (Crain, 2016).

Many of Freud's ideas, such as the notion of unconscious processes of which we are unaware, have permeated popular culture. Notably, Freud's theory was the first to emphasize the importance of early family experience and especially the parent–child relationship for development (Bargh, 2013). However, the psychosexual stage framework's emphasis on childhood sexuality, especially the phallic stage, is unpopular and largely unaccepted by developmental scientists (Westen, 1998). In addition, unconscious drives and other psychosexual constructs cannot be directly observed and tested (P. H. Miller, 2016). They are not falsifiable. How can we study unconscious drives, for instance, when we are not aware of them?



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

Library of Congress/Contributor/Getty Images

TABLE 1.2 ■ Psychoanalytic Theories of Development

Approximate Age	Freud's Psychosexual Theory		Erikson's Psychosocial Theory	
0 to 18 months	Oral	Basic drives focus on the mouth, tongue, and gums. Feeding and weaning influence personality development. Freud believed that failure to meet oral needs influences adult habits centering on the mouth, such as fingernail biting, overeating, smoking, or excessive drinking.	Trust vs. Mistrust	Infants learn to trust that others will fulfill their basic needs (nourishment, warmth, comfort) or to lack confidence that their needs will be met.
18 months to 3 years	Anal	Basic drives are oriented toward the anus, and toilet training is an important influence on personality development. If caregivers are too demanding, pushing children before they are ready, or too lax, children may develop control issues such as a need to impose extreme order and cleanliness on their environment or extreme messiness and disorder.	Autonomy vs. Shame and Doubt	Toddlers learn to be self-sufficient and independent through toilet training, feeding, walking, talking, and exploring or to lack confidence in their own abilities and doubt themselves.

[Continued]

TABLE 1.2 ■ Psychoanalytic Theories of Development (Continued)

Approximate Age	Freud's Psychosexual Theory		Erikson's Psychosocial Theory	
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 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 their 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 they experience overwhelming guilt for their curiosity and overstepping boundaries.
6 years to puberty	Latency	This is not a stage but a time of calm between stages when the child develops talents and skills and focuses on school, sports, and friendships.	Industry vs. Inferiority	Children learn to be hard working, competent, and productive by mastering new skills in school, friendships, and home life, or they 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 they 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.

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. According to Erikson, throughout their lives, individuals progress through eight *psychosocial stages* that include changes in how they understand and interact with others, as well as changes in how they understand themselves and their roles as members of society (Erikson, 1950). Each stage presents a unique developmental task, which Erikson referred to as a crisis or conflict that must be resolved. How well individuals address the crisis determines their ability to deal with the demands made by the next stage of development. Children's success in achieving a sense of trust in others influences their progress in developing a sense of autonomy, the ability to be independent and guide their own behavior.

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

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



Erik Erikson (1902–1994), shown with his wife and collaborator, Joan, posited that, throughout their lives, people progress through eight stages of psychosocial development.

Jon Erikson/Science Source

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 emotions, which cannot be seen or objectively verified. Theorists who study **behaviorism** examine only behavior that can be observed and believe that the physical and social environment causes all behavior. 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)



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

Sovfoto/Contributor/Getty Images

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

Pavlov's Classical Conditioning

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

they also salivate in response to various sights and sounds that occur before they taste food, such as their bowl clattering or their owner opening the food cupboard. Pavlov tested his observation by pairing the sound of a tone with the dog's food; the dogs heard the tone, then received their food. Soon the tone itself began to elicit the dogs' salivation. Through classical conditioning, a neutral stimulus (in this example, the sound of the tone), comes to elicit a response originally produced by another stimulus (food).

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

Skinner's 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 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 (1904–1990) 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. One followed by an aversive or unpleasant outcome, called **punishment**, will be less likely to recur.

Operant conditioning explains much about human behavior, including how we learn skills and habits. Behaviorist ideas about operant conditioning and the nature of human behavior are woven into the fabric of North American culture and are often applied to understand parenting and parent–child interactions (Troutman, 2015). Developmental scientists tend to disagree with operant conditioning's emphasis on external events (reinforcing and punishing consequences) over internal events (thoughts and emotions)

FIGURE 1.4 ■ Classical Conditioning in a Newborn

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



Source: Adapted from Lampl, M., Veldhuis, J. D., & Johnson, M. L. (1992). Saltation and stasis: A model of human growth. *Science*, 258, 801–803.

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. This is consistent with the lifespan concept that individuals are active contributors to their development.



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

Bandura's Social Learning Theory

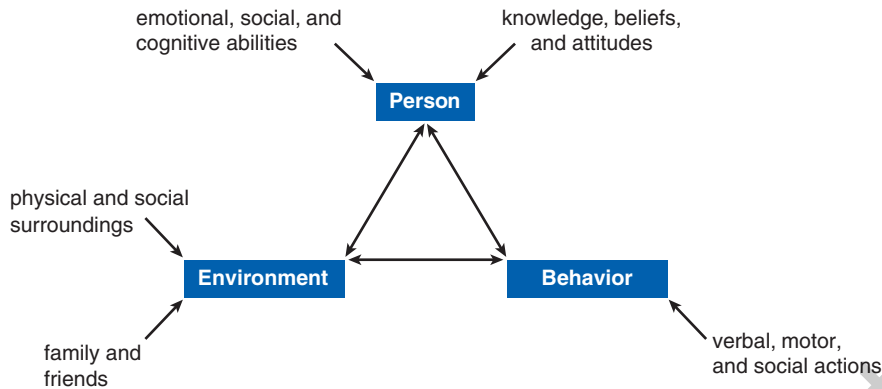
Like behaviorists, Albert Bandura (1925–2021) believed that the physical and social environments are important, but he also advocated for thought and emotion as contributors to development. According to Bandura's **social learning theory**, people actively process information—they think and feel emotion—and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

One of Bandura's most enduring ideas about development is that people learn by observing and imitating others, referred to as **observational learning** (Bandura, 2010). This finding suggests that children who observe

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

In contrast with behaviorist theorists, Bandura viewed individuals as active in their development rather than passively molded by their physical and social environments. Bandura believed that individuals and the environment interact and influence each other, a concept he called **reciprocal determinism** (Bandura, 2011, 2018). People's development is a result of interactions between their characteristics, their behavior, and the physical and social environment (Figure 1.5).

People's characteristics influence their behavior and the environments they seek. Suppose Issac is inquisitive and assertive, personality characteristics that make him quick to challenge others in debate. This behavior (challenging others to debate), in turn, stimulates those around him (environment) to participate in debate. The environment also influences Issac's behavior. People who enjoy debating are more likely to engage Issac and people who avoid debating are less likely to engage him, influencing his behavior accordingly. This is an example of the complex interplay among person, behavior, and physical and social environment that underlies much of what we will discuss throughout this book.

FIGURE 1.5 ■ Bandura's Model of Reciprocal Determinism

Behaviorist theories have made important contributions to understanding lifespan human development. Concepts such as observational learning, reinforcement, and punishment are powerful means of explaining human behavior and have implications for parents, teachers, and anyone working with people of any age. Social learning theory and reciprocal determinism illustrate individuals' role 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 (i.e., thought) as essential to understanding people's functioning across the lifespan. Some view cognition as developing in stages and others as a gradual increase in abilities.

Piaget's Cognitive-Developmental Theory

Swiss scholar Jean Piaget (1896–1980) was the first scientist to examine infants' and children's thinking and reasoning systematically. Piaget believed that to understand children, we must examine their thinking 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 know into **cognitive schemes**, or concepts, ideas, and ways of interacting with the world. Through these interactions, they construct and refine their cognitive schemes, thereby contributing to their own cognitive development.

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

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

Some critics of cognitive-developmental theory argue that Piaget focused too heavily on cognition and ignored emotional and social factors in development (Crain, 2016). Others believe that



Jean Piaget (1896–1980) believed that children are driven to explore and their thinking progresses through four stages of development.

Bill Anderson/Science Source

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

Stage	Approximate Age	Description
Sensorimotor	Birth to 2 years	Infants understand the world and think using only their senses and motor skills, by watching, listening, touching, and tasting.
Preoperations	2 to 6 years	Preschoolers explore the world using their own thoughts as guides and develop the language skills to communicate their thoughts to others. Despite these advances, their thinking is characterized by several errors in logic.
Concrete Operations	7 to 11 years	School-age children become able to solve everyday logical problems. Their thinking is not yet fully mature because they can apply it only to tangible problems 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.

Piaget neglected the influence of contextual factors by assuming that cognitive-developmental stages are universal. All individuals everywhere progress through the stages in a sequence that does not vary. Some cognitive theorists argue that cognitive development is not a discontinuous, stage-like process but instead a continuous process (Birney & Sternberg, 2011), as described in the following section.

Information Processing Theory

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

The problem described in the previous paragraph illustrates the questions studied by developmental scientists who favor **information processing theory**, which posits that the mind works in ways similar to a computer in that information enters and then is manipulated, stored, recalled, and used to solve problems (Halford & Andrews, 2011; Wickens & Carswell, 2021). 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 (Conte & Richards, 2021; Eggen, 2020; Winne, 2021). Some theories focus on how people perceive, focus on, and take in information. Others examine how people store information, create memories, and remember information. Still others examine problem solving—how people approach and solve problems in school, the workplace, and everyday life.

According to information processing theorists, we are born with the ability to process information. Our mental processes of noticing, taking in, manipulating, storing, and retrieving information do not show the radical changes associated with stage theories. Instead, development is continuous and entails changes in the efficiency and speed of thought. Maturation of the brain and nervous system contributes to changes in our cognitive abilities (Gibb, 2020). We tend to

become more efficient at attending to, storing, and processing information over childhood and to slow over adulthood (Salthouse, 2019). Experience and interaction with others also contribute by helping us learn new ways of managing and manipulating information. We naturally engage in information processing throughout our lives. We will discuss these changes and their implications for children, adolescents, and adults in later chapters.

Information processing theory offers a complex and detailed view of how we think, which permits scientists to make specific predictions about behavior and performance that can be tested in research studies. Indeed, information processing theory has generated a great many research studies and has garnered much empirical support (Halford & Andrews, 2011; Wickens & Carswell, 2021). Critics of information processing theory argue that a computer model cannot capture the complexity of the human mind and people's unique cognitive abilities. In addition, findings from laboratory research may not extend to everyday contexts in which people must adapt to changing circumstances and challenges to attention (P. H. Miller, 2016).

Vygotsky's Sociocultural Theory

Writing at the same time as Piaget, Russian scholar Lev Vygotsky (1896–1934) emphasized the importance of culture in cognition. 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 & Hamedani, 2020; 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 social contacts, children learn about their culture and what it means to belong to it. By participating in cooperative dialogues and receiving guidance from adults and more expert peers, children adopt their culture's perspectives and practices, learning to think and behave as members of their society (Rogoff, 2016). Over time, they become able to apply these ways of thinking to guide their own actions, thus requiring less assistance from adults and peers (Daniels, 2017; Rogoff et al., 2014).

Vygotsky's sociocultural theory holds important implications for understanding cognitive development. Like Piaget, Vygotsky emphasized that children actively participate in their development by engaging with the world around them. He viewed cognitive development as a social process that relies on interactions with adults, more mature peers, and other members of their culture. Vygotsky believed that acquiring language is a critical milestone for children because it enables them to think in new ways (Daniels, 2017). Language enables children to participate in culturally valued activities, have more sophisticated dialogues with others, and adopt attitudes and perspectives valued by their community. We will revisit Vygotsky's ideas about the roles of culture, language, and thought in Chapter 7.

Vygotsky's sociocultural theory is the first theory to emphasize the role of the cultural context in influencing people's development. Critics of Vygotsky's sociocultural theory argue that it overemphasizes context and undervalues the roles of biological factors and children's own influence on their development (Crain, 2016).



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

Heritage Image Partnership Ltd/Alamy Stock Photo

Systems Theories

Many theories examine a specific aspect of development, such as cognition, the sense of self, and environmental determinants of behavior. Systems theories take a broader approach, considering all parts of the individual and the many contexts in which they are embedded, such as home, school, peer group, and so on. A system is a set of interacting parts that are interconnected and work together as a network. We are composed of multiple interacting systems that make up the physical, cognitive, and socioemotional developments that we have discussed so far. We are also embedded in systems, contexts. People take an active role in their development by interacting with people, objects, and settings, and they are also influenced by these factors. These interactions take place all throughout our lives, changing over time. The two predominant systems theories are the bioecological systems theory and dynamic systems theory.

Bronfenbrenner's Bioecological Systems Theory

Similar to Vygotsky, Urie Bronfenbrenner (1917–2005) emphasized the role of context in development. He also believed that individuals are active in their own development. Specifically, Bronfenbrenner's **bioecological systems theory** poses that development is a result of the ongoing interactions among biological, cognitive, and socioemotional changes within individuals and their changing contexts, including home, school, neighborhood, culture, and society (Figure 1.6) (Bronfenbrenner & Morris, 2006). Bronfenbrenner proposed that all individuals are embedded in, or surrounded by, a series of nested contexts: home, school, neighborhood, culture, and society. These contexts interact with one another and the person to determine development.

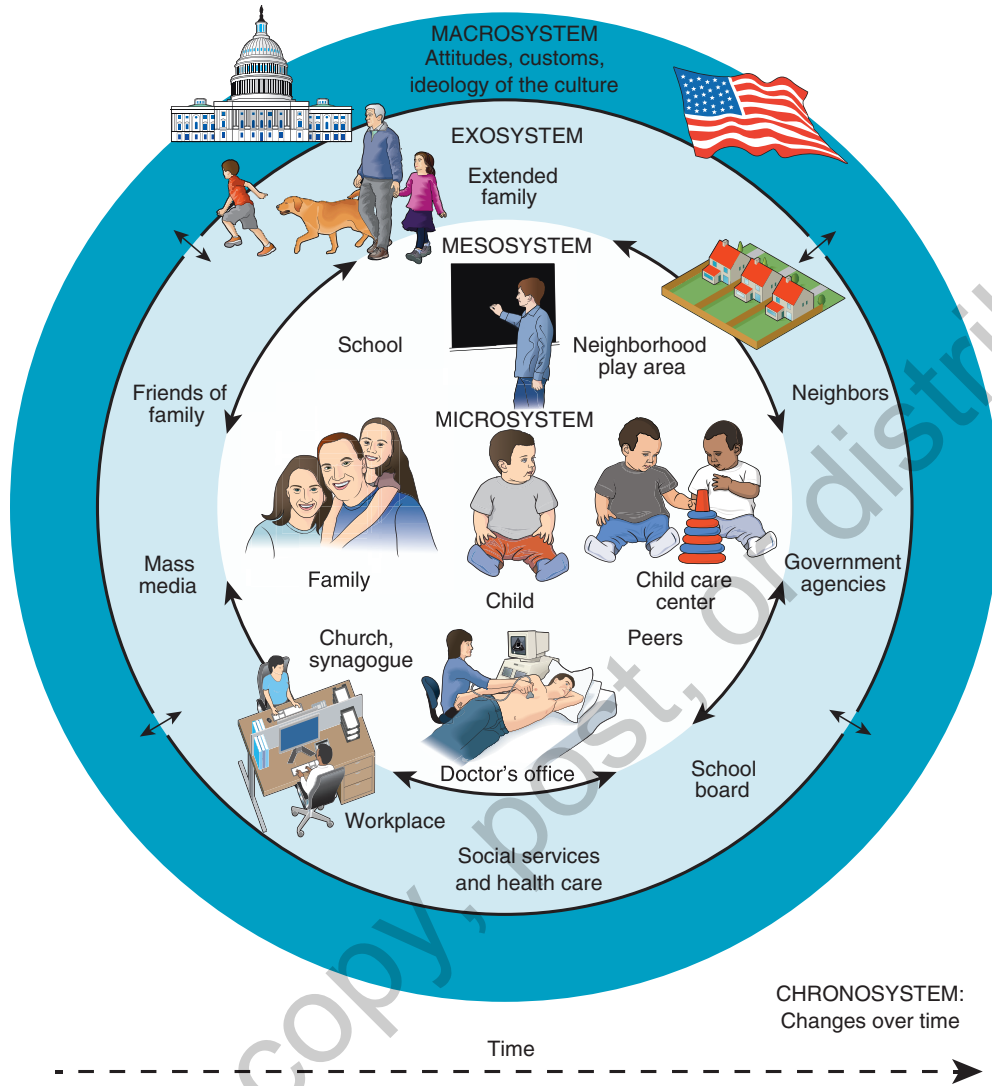
Ontogenetic development. At the center of the bioecological system is the individual. **Ontogenetic development** refers to the changes that take place within the person over their lifetime, including biological, cognitive, and socioemotional changes, which influence each other. Physical development,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

Microsystem. Perhaps the most visible context is the **microsystem**, the innermost layer 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 includes the person, it has an immediate and direct influence on the person's development. Interactions with friends, family, and teachers (all part of the microsystem) can influence a child's sense of self-esteem, social skills, and emotional development (ontogenetic development).

Mesosystem. Microsystems naturally interact. Experiences in the home (one microsystem) influence those at school (another microsystem). Encouragement and support for reading at home can influence the child's experiences in the classroom. These interactions comprise the **mesosystem**, which refers to the relations among microsystems, connections among contexts, such as home, peer group, school, work, and neighborhood. Like the microsystem, the mesosystem has a direct influence on people because they participate within it.

Exosystem. The **exosystem** consists of settings in which individuals do not participate yet are affected. A parent's experiences at work can influence children's home environment. Promotions,

FIGURE 1.6 ■ Bronfenbrenner's Bioecological Systems Theory



Source: Adapted from Bronfenbrenner, U., & Morris, P. A. (2006). The bioecological model of human development. In R. M. Lerner & W. Damon (Eds.), *Handbook of child psychology: Theoretical models of human development* (pp. 793–828). John Wiley & Sons.

raises, long work hours, stressful interactions, and lengthy commutes can influence parents' interactions with family members and the emotional climate at home. The availability of funding for schools, another exosystem factor, indirectly affects children by influencing the availability of classroom resources. Exosystem factors trickle down to influence our interactions in the meso-system and microsystem.

Macrosystem. 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).

Chronosystem. By its very nature, the bioecological system 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 passing of time. The bioecological system changes over time. The historical time in which we live also influences our development. Large-scale social changes, such as those that accompany war, natural disasters, and epidemics, can influence each level of the bioecological system. Neighborhood resources may change over time with changes in local policies and funding. Our relationships with parents, friends, and teachers change over time. As people grow and change, they take on and let go of various roles. Graduating from college, getting married, and becoming a parent involve changes in roles and shifts in microsystems. These shifts in contexts, called *ecological transitions*, occur throughout life.

Evaluating Bronfenbrenner's bioecological systems theory. Recently, bioecological systems theory has been criticized for its vague explanation of development, especially the role of culture (Vélez-Agosto et al., 2017). Situated in the macrosystem, culture is said to influence development through the interdependence of the systems. Yet developmental scientists today believe that culture refers to all the processes used by people as they make meaning or think through interactions with group members (Mistry et al., 2016; Yoshikawa et al., 2016). Critics therefore argue that since culture is manifested in our daily interactions and activities, it is inherent in each bioecological level, not just the macrosystem as Bronfenbrenner believed (Varnum & Grossmann, 2017; Vélez-Agosto et al., 2017).

A second criticism arises from the sheer complexity of the bioecological system 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. Yet proponents argue that, rather than conducting large studies to test all of the model's components at once, smaller studies can examine each component over time (Jaeger, 2016; Tudge et al., 2016). In any case, bioecological systems theory remains an important contribution toward explaining developmental change across the lifespan and is a theory that we will consider throughout this book.

Dynamic Systems Theory

Some of the major concepts that we have discussed throughout this chapter include the interaction of genetics and environment and the active role of children in their own development. Esther Thelen's **dynamic systems theory** emphasizes interactions between biological maturation, environmental circumstances and constraints, and individuals' drive to engage the world (Thelen, 1995, 2000). Collectively these are an integrated system that is constantly changing, resulting in developmental change and the emergence of new abilities.

Dynamic systems theory places children at the center of their development. Children advance their own development because they are motivated to obtain objects, interact with others, understand their experience, and control their environment. Each child's physical characteristics are unique. Environmental circumstances are also unique, affording specific opportunities and constraints. Children's behavior and development are the result of their motivation to master their unique environment, capitalizing on opportunities, and adapting to constraints. For example, infants' desire to obtain objects and master their environment drives them to crawl, but how they crawl and the time frame in which crawling unfolds

varies with their physical abilities and their specific environment, such as whether they live in a home with carpeting (which might make crawling easier) or slippery floors (which might make it more difficult). Although Esther Thelen described developmental systems theory with motor development in mind, theorists are now applying it to understand children's cognitive and emotional development as well as the nature of development itself (Perone et al., 2021; Sosnowska et al., 2020).

Ethology and Evolutionary Developmental Theory

What motivates parents of most species to care for their young? Some researchers argue that caregiving behaviors have an evolutionary basis. **Ethology** is the scientific study of the evolutionary basis of behavior (Bateson, 2015). In 1859, Charles Darwin proposed his theory of evolution, explaining that all species adapt and evolve over time. Specifically, traits that enable members of a species to adapt, thrive, and mate tend to be passed to succeeding generations. The traits that helped individuals survive to adulthood successfully are passed to their offspring, aiding their survival and that of the species.

Several early theorists applied the concepts of evolution to behavior. Konrad Lorenz and Kiko Tinbergen, two European zoologists, observed animal species in their natural environments and noticed patterns of behavior that appeared to be inborn, emerged early in life, and ensured the animals' survival. Shortly after birth, goslings imprint to their mothers, meaning that they bond to her and follow her. Imprinting aids the goslings' survival because it ensures that they stay close to their mother, get fed, and remain protected. For imprinting to occur, the mother goose must be present immediately after the goslings hatch; mothers instinctively stay close to the nest so that their young can imprint (Lorenz, 1952).

According to John Bowlby (1969), humans also display biologically preprogrammed behaviors that have survival value and promote development. Caregivers naturally respond to infants' cues. Crying, smiling, and grasping are inborn ways that infants get attention from caregivers, bring caregivers into physical contact, and ensure that they will be safe and cared for. Such behaviors have adaptive significance because they meet infants' needs and promote the formation of bonds with caregivers who then 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.

Similar to ethology, **evolutionary developmental theory**, applies principles of evolution to understand development; however, this approach emphasizes the interactive influence of genetic and environmental mechanisms in development (Bjorklund & Hart, 2022; Blasi, 2020). Genetic factors and biological predispositions interact with the physical and social environment to influence development, and Darwinian natural selection determines what genes and traits are passed on to the next generation (Witherington & Lickliter, 2016).

You may have wondered whether you—your abilities, personality, and competencies—result from your genes or from the physical and social environment in which you were raised. Evolutionary developmental scientists explain that this is the wrong question to ask because genes and context interact in an ever-changing way so that it is impossible to isolate the contributions of each to development (Blasi, 2020). Genes influence our traits and characteristics, but contextual factors influence the expression of genetic instructions, determining whether and how genes are shown. For example, gravity, light, temperature, and moisture can influence how genes are expressed and therefore how individuals develop (Meaney, 2017). In some reptiles, such as crocodiles, sex is determined by the temperature in which the organism develops. Eggs incubated at one range of temperatures produce male crocodiles and at another temperature

produces female crocodiles (Pezaro et al., 2017). In this way a contextual factor, temperature, determines how genes are expressed, sex.

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

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

TABLE 1.4 ■ Comparing Theories of Human Development

	Is development influenced by nature or nurture?	Are individuals active or passive in their development?	Is development continuous or discontinuous?
Freud's psychosexual theory	<i>Greater emphasis on nature:</i> People are driven by inborn drives, but the extent to which the drives are satisfied influences developmental outcomes.	<i>Passive:</i> People are driven by inborn instincts and are not active participants in their development.	<i>Discontinuous:</i> Stages
Erikson's psychosocial theory	<i>Both nature and nurture:</i> Biological and social forces propel people through the stages, and social and psychosocial influences determine the outcome of each stage.	<i>Active:</i> People are active in their development because they interact with their social world to resolve psychosocial tasks.	<i>Discontinuous:</i> Stages
Behaviorist theory	<i>Nurture:</i> Environmental influences shape behavior.	<i>Passive:</i> People are shaped and molded by their environment.	<i>Continuous:</i> Gradual process of learning new behaviors
Bandura's social learning theory	<i>Both nature and nurture:</i> Inborn characteristics and the physical and social environment influence behavior.	<i>Active:</i> Individuals are influenced by the environment but also play an active role in their development through reciprocal determinism.	<i>Continuous:</i> Gradual process of learning new behaviors
Piaget's cognitive-developmental theory	<i>Both nature and nurture:</i> An inborn ability to learn, coupled with brain development, leads people to interact with the world. Opportunities provided by the physical and social environment influence development.	<i>Active:</i> Individuals actively interact with the world to create their own schemes.	<i>Discontinuous:</i> Stages
Information processing theory	<i>Both nature and nurture:</i> People are born with processing capacities that develop through maturation and environmental influences.	<i>Active:</i> People attend to, process, and store information.	<i>Continuous:</i> Gradual increase of skills and capacities

	Is development influenced by nature or nurture?	Are individuals active or passive in their development?	Is development continuous or discontinuous?
Vygotsky's sociocultural theory	<i>Both nature and nurture:</i> People learn through interactions with more skilled members of their culture; capacities are influenced by genes, brain development, and maturation.	<i>Active:</i> Individuals actively interact with members of their culture.	<i>Continuous:</i> Continuous interactions with others lead to developing new reasoning capacities and skills.
Bronfenbrenner's bioecological systems theory	<i>Both nature and nurture:</i> People's inborn and biological characteristics interact with an ever-changing context to influence behavior.	<i>Active:</i> People interact with their contexts, being influenced by their contexts but also determining what kinds of physical and social environments are created and how they change.	<i>Continuous:</i> People constantly change through their interactions with the contexts in which they are embedded.
Dynamic systems theory	<i>Both nature and nurture:</i> Developmental domains, maturation, and environment form an integrated system.	<i>Active:</i> Development reflects goal-oriented behavior by the desire to accomplish goals.	<i>Continuous:</i> New developmental achievements are the result of systematic skill-building.
Ethology and evolutionary developmental theory	<i>Both nature and nurture:</i> Genetic programs and biological predispositions interact with the physical and social environment to influence development, and Darwinian natural selection determines what genes and traits are passed on to the next generation.	<i>Active:</i> People interact with their physical and social environment.	<i>Both continuous and discontinuous:</i> People gradually grow and change throughout life, but there are sensitive periods in which specific experiences and developments must occur.

Thinking in Context

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, identify microsystem and mesosystem factors that might influence the parent-child bond. What role might exosystem and macrosystem factors take?

RESEARCH IN HUMAN DEVELOPMENT

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

The Scientific Method

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

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

In practice, the scientific method usually does not proceed in such a straightforward, linear fashion. Frequently research studies raise as many questions as they answer—and sometimes more. Unexpected findings can prompt new studies. Researchers may repeat an experiment (called a *replication*) to see whether the results are the same as previous ones. Sometimes analyses reveal data collection methods or research design flaws, prompting a revised study. Experts may also disagree on the interpretation of a study. Researchers may then conduct new studies to test new hypotheses and shed more light on a given topic. For all of these reasons, scientists often say the scientific method is “messy.”

Methods of Data Collection

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

Observational Measures

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

Scientists who use **naturalistic observation** observe and record behavior in natural, real-world settings. Vanden Abeele and colleagues (2020) observed caregivers and young children on playgrounds. They recorded caregivers' use of mobile phone and caregiver–child interactions. When using a mobile phone, caregivers were 5 times less likely to respond to a child's bid for attention (such as waving, speaking, crying out). In addition, caregivers who used mobile phones responded more slowly and with less engagement and warmth. Naturalistic observation permitted the researchers to examine authentic caregiver–child interactions in a real-world setting.

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. Another promising method of minimizing participant reactivity is to use an *electronically activated voice recorder* (EAR) (Mehl, 2017). Participants carry the EAR as they go about their daily lives. The EAR captures segments of information over time: hours, days, or even weeks. It yields a log of people's activities as they naturally unfold. The EAR minimizes participant reactivity because the participant is unaware of exactly when the EAR is recording. Researchers who study child trauma use EAR to sample conversations between parents and children to understand how parent–child interactions influence children's adjustment and how the family environment can aid children's recovery from trauma (Alisic et al., 2016).

Naturalistic observation permits researchers to observe patterns of behavior in everyday settings, such as whether a particular event or behavior typically precedes another. Such observations can help researchers determine which behaviors are important to study. A scientist who studies bullying by observing children's play may notice that some victims act aggressively *before* a bullying encounter (Kamper-DeMarco & Ostrov, 2017). The scientist may then decide to examine aggression in victims not only after a bullying incident but also beforehand.

Naturalistic observation is a useful way of studying events and behaviors that are common. Some behaviors and events are uncommon or are difficult to observe, such as physical aggression among adults, requiring a researcher to observe for very long periods of time to obtain data on the behavior of interest. For this reason, many researchers make structured observations.

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



Researchers use video cameras to observe and record the facial expressions a newborn baby makes while it sleeps.

Thierry Berrod, Mona Lisa Production/Science Source

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 better understand the person's reasoning (Ginsburg, 1997). An example of this is the Piagetian Clinical Interview, which requires specialized training to administer. Consider this dialogue between Piaget and a 6-year-old child:

You know what a dream is?

When you are asleep and you see something

Where does it come from?

The sky

Can you see it?

No! Yes, when you're asleep

Could I see it if I was there?

No.

Why not?

Because it is in front of us. . . . When you are asleep you dream and you see them, but when you aren't asleep you don't see them. (Piaget, 1929, p. 93)

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

In contrast, a **structured interview** poses the same set of questions to each participant in the same way. Although structured interviews are less flexible than open-ended interviews, 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. D. W. Evans et al. (2002) used a structured interview to examine North American children's beliefs about magic. Children between the ages of 3 and 8 were asked the following set of questions:

What is magic? Who can do magic?

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

Does someone have to learn to do magic? Where have you seen magic? (D. W. Evans et al., 2002, p. 49).

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

To collect data from large samples of people, scientists may compile and use **questionnaires**, also called surveys, made up of sets of questions, typically multiple choice. Questionnaires can be administered in person, online, or by telephone, e-mail, or postal mail. Questionnaires are popular data collection methods because they are easy to use and enable scientists to collect information from many people quickly and inexpensively. Scientists who conduct research on sensitive topics, such as sexual interest and experience, often use questionnaires because they can easily be administered anonymously, protecting participants' privacy. The Monitoring the Future study is an annual survey of 50,000 8th-, 10th-, and 12th-grade students that collects information about their behaviors, attitudes, and values concerning drug and alcohol use (Miech et al., 2021). The survey permits scientists to gather an enormous amount of data, yet its anonymity protects the adolescents from the consequences of sharing personal information that they might not otherwise reveal.

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

Physiological Measures

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

Eye movements and pupil dilation can indicate attention and interest. Researchers who tracked participants' eye movements as they viewed Facebook feeds learned that people are naturally attracted to social and news posts that are rich with pictures and links, yet most people are unable to report what they have viewed, even immediately after viewing it (Vraga et al., 2016). Researchers who employ physiological measures might use pupil dilation as a measure of interest in infants and physiological arousal in adults (Aktar et al., 2021).

Physiological measures of brain activity are a particularly promising source of data. Several tools are used to study the brain. **Electroencephalography (EEG)** measures electrical activity patterns produced by the brain via electrodes placed on the scalp. Researchers study fluctuations in activity that occur when participants are presented with stimuli or when they sleep. EEG recordings measure electrical activity in the brain, but they do not provide information about the location of activity or the brain structures that are the source of brain activity.

Computerized tomography (CT scan) compiles multiple x-ray images to create a 3-D picture of a person's brain, providing images of brain structures, bone, brain vasculature, and tissue (Withers et al., 2021). CT scans can provide researchers with information about the density of brain structures to illustrate how the thickness of the cortex changes with development. Recording multiple x-ray images, however, exposes research participants to higher levels of radiation than a single x-ray (Rehani & Nacouzi, 2020).

Positron emission tomography (PET) involves injecting a small dose of radioactive material into the participant's bloodstream to monitor the flow of blood (Gellman, 2020). Blood flows more readily to active areas of the brain, and the resulting images can illustrate what parts of the brain are active as participants view stimuli and solve problems.

Functional magnetic resonance imaging (fMRI) measures brain activity with a powerful magnet that uses radio waves and to measure blood oxygen level (Bandettini, 2012; Bielczyk et al., 2019). Active areas of the brain require more oxygen-rich blood. fMRI enables researchers to determine what parts of the brain are active as individuals complete cognitive tasks. fMRI images are much more detailed than PET scans and do not rely on radioactive molecules, which can only be administered a few times before becoming unsafe.

Diffusion tensor imaging (DTI) uses an MRI machine to track how water molecules move in and around the fibers connecting different parts of the brain (Lope-Piedrafita, 2018). DTI gauges the thickness and density of the brain's connections, permitting researchers to measure the brain's white matter and determine changes that occur with development.

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

Research Designs

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

Case Study

A **case study** is an in-depth examination of a single person (or small group of individuals). It is conducted by gathering information from many sources, including 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 their 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.

Correlational Research

Are children with high self-esteem more likely to excel at school? Are older adults with many 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 activity and academic performance in college

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	Gather a large amount of information quickly and inexpensively.	Nonstandardized questions. Characteristics of the interviewer may influence participant responses.
Structured interview	Gather a large amount of information quickly and inexpensively.	Characteristics of the interviewer may influence children's responses.
Questionnaire	Gather 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		
Electroencephalography (EEG)	Measures electrical activity patterns produced by the brain	Does not provide information about the brain structures that are the source of brain activity.
Computerized tomography (CT scan)	Provides images of brain structures, bone, brain vasculature, and tissue.	Exposes participants to low levels of radiation.
Positron emission tomography (PET)	Illustrates activity in specific parts of the brain as participants complete cognitive tasks.	Exposes participants to low levels of radiation.
Functional magnetic resonance imaging (fMRI)	Illustrates activity in specific parts of the brain as participants complete cognitive tasks. More detailed images than PET scans and does not rely on radiation.	Expensive and requires participants to be completely still during the scan.
Diffusion tensor imaging (DTI)	Measures the thickness and density of brain connections. Less expensive than fMRI.	Requires participants to be completely still during the scan.

students. Students who were more active and fit, as measured by daily step counts and a timed run, showed higher scores on academic achievement than their less active and fit peers (Broadus et al., 2021). Note that this correlation does not tell us *why* physical activity 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 the college students' physical activity and achievement, such as general health. Correlational studies do 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, conduct an **experiment**. An experiment is a procedure that uses control to determine causal relationships among variables. Specifically, one or more variables thought to influence a behavior of interest are changed, or manipulated, while other variables are held constant. Researchers can then examine how the changing variable influences the behavior under study. If the behavior changes as the variable changes, this suggests that the variable caused the change in the behavior.

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

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

on how the independent variable is manipulated (e.g., physiological stress and aggressive thoughts vary in response to the type of video game).

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

In an experiment, the independent variable is administered to one or more experimental groups, or test groups. The control group is treated just like the experimental group except that it is not exposed to the independent variable. In an experiment investigating whether particular types of



By experimentally manipulating which infants receive massage therapy, researchers determined that massage can help preterm infants gain weight, an important correlate of health.

istock/Andrey Zhuravlev

music influence mood, the experimental group would experience a change in music (e.g., from “easy listening” to rock), whereas the control group would hear only one type of music (e.g., “easy listening”). **Random assignment**, whereby each participant has an equal chance of being assigned to the experimental or control group, is essential for ensuring that the groups are as equal as possible in all preexisting characteristics (e.g., age, ethnicity, and gender). Random assignment makes it less likely that any observed differences in the outcomes of the experimental and control groups are due to preexisting differences between the groups. After the independent variable is manipulated, if the experimental and control groups differ on the dependent variable, it is concluded that the independent variable *caused* the change in the dependent variable. That is, a cause-and-effect relationship has been demonstrated.

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

Developmental Research Designs

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

Cross-Sectional Research

Cross-sectional research compares groups of people of different ages at a single point in time. Suppose a researcher wanted to know how alcohol use changes from middle school (6th grade) through high school (12th grade). To study this question the researcher might visit a school system in 2024 and administer a survey about alcohol use to 6th-, 8th-, 10th-, and 12th-grade students. The survey tells us about *age differences* in alcohol use or how 6th graders differ from 12th graders, for example. 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 6th graders in this sample will show the same patterns of alcohol use as the current 12th graders when they are in 12th grade, 6 years from now.

Cross-sectional research enables researchers to compare participants of different ages, but in these studies participants differ not only in age but in cohort. A **cohort** is a group of people of the same age who are exposed to similar historical events and cultural and societal influences. Cohorts refer to generations; however, we can also speak of smaller cohorts based on factors such as the year of entry to school. In this example, the 6th graders and 12th graders 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 6th graders received a new early prevention program at school that was not available to the 12th graders when they were in 6th grade. The difference in alcohol use between the 6th and 12th graders 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

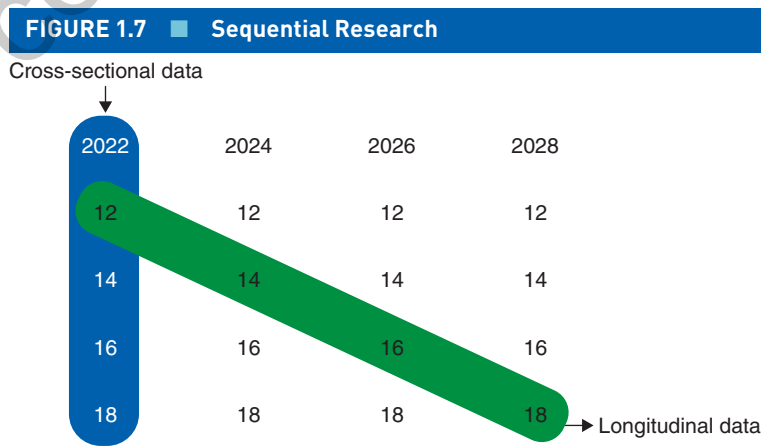
Longitudinal research follows the same group of participants over many points in time. Returning to the previous example, to examine how alcohol use changes from 6th to 12th grade, a developmental scientist using longitudinal research might administer a survey on alcohol use to 6th graders and then follow up 2 years later when they are in 8th grade, again when they are in 10th grade, and finally when they are in 12th grade. If a researcher began this study in 2024, the last round of data collection would not occur until 2030.

Longitudinal research provides information about age-related change because it follows individuals over time, enabling scientists to describe how the 6th graders' alcohol use changed as they progressed through adolescence. Yet 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 6th graders that the scientist chose to follow for 6 years somehow different from the cohorts or groups of students who came before or after? Because only one cohort is assessed, it is not possible to determine whether the observed changes are age-related changes or changes that are unique to the cohort examined.

Sequential Research

Sequential research combines the best features of cross-sectional and longitudinal research by assessing multiple cohorts over time, enabling scientists to make comparisons that disentangle the effects of cohort and age (Figure 1.7). Consider the alcohol use study once more. A sequential design would begin in 2024 with a survey to students in 6th, 8th, 10th, and 12th grades. Two years later, in 2026, the initial sample is surveyed again. The participants are 2 years older: The 6th graders are now in 8th grade, the 8th graders in 10th grade, the 10th graders in 12th grade, and the 12th graders have graduated and can no longer be surveyed. Now a new group of 6th graders are surveyed. Two years later, in 2028, the participants are surveyed again, and so on.

The sequential design provides information about age, cohort, and age-related change. The cross-sectional data (comparisons of 6th, 8th, 10th, and 12th graders from a given year) provide information about age differences, how the age groups differ from one another. The longitudinal data capture age-related change because participants are followed up annually. The sequential component helps scientists separate cohort effects from age-related change. Because



Source: Kim, J.-S., & Böckenholt, U. (2000). Modeling stage-sequential change in ordered categorical responses. *Psychological Methods*, 5(3), 380–400.

several cohorts are examined at once, the effect of cohort can be studied. The sequential design is complex, but it permits human development researchers to disentangle the effects of age and cohort and to answer questions about developmental change. Table 1.6 summarizes the research designs discussed thus far.

Thinking in Context

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?

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 from 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.
Sequential	Permits thorough analyses of developmental change. Simultaneous longitudinal and cross-sectional comparisons reveal age differences and age change, as well as cohort effects.	Time consuming, expensive, and complicated data collection and analysis.

RESEARCH ETHICS

Designing a study that effectively tests a research hypothesis is challenging. Conducting research, however, involves more than simply choosing a research design and method. Developmental scientists are obligated to consider their participants' rights and welfare.

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

Conducting Ethical Research

In addition to conducting scientifically sound research, developmental scientists must adhere to standards of ethical conduct in research. The ethical guidelines emphasize scientists' obligations to their participants (American Psychological Association, 2010; Society for Research in Child Development, 2021). Developmental psychologists must (a) help and not harm, (b) take responsibility, (c) be honest and fair, and (d) respect participants' autonomy.

Let's take a closer look at each of these principles.

Developmental Scientists Must Help and Not Harm

Researchers are obligated to protect and help the individuals, families, and communities they work with by maximizing the benefits and minimizing the potential harms of their work. They also must not harm participants. Participating in research must never pose threats to individuals beyond those they might encounter in everyday life. Researchers also have the responsibility to aid individuals by, for example, directing a distressed adolescent toward help-seeking resources.

Developmental Scientists Must Take Responsibility

Responsible scientists adhere to professional standards of conduct, clarify their obligations and roles to others, and avoid conflicts of interest. Psychologists who conduct research with children and parents must clarify their role as scientists, not counselors, and help participants understand they are simply gathering information from them rather than conducting therapy.

Researchers' responsibility extends beyond their participants to society at large. Research findings often gain media attention. Scientists must work to ensure that their findings are accurately portrayed. This is admittedly difficult but scientists must attempt to foresee ways in which their results may be misinterpreted and correct any misinterpretations that occur (Lilienfeld, 2002; Society for Research in Child Development, 2021).

Sometimes researchers' findings have social and political implications that they may not expect. For example, one highly publicized study compiled the results of many research studies examining college students who had become sexually involved with an adult before reaching the legal age of consent (Rind et al., 1998). After examining the body of research, the scientists determined that young people's coping and development varied depending on a number of factors within the individual, situation, and broader context. Younger participants were predictably harmed by the abuse. Participants who were older when the relationship began, such as in late adolescence, just before reaching the age of consent, showed fewer negative effects and often appeared well-adjusted. Some organizations, media outlets, and politicians misinterpreted these findings as suggesting that sexual involvement with minors was acceptable or even beneficial—clearly not the researchers' conclusions (Garrison & Kobor, 2002). Ethical researchers attempt

to consider how to help others understand their work, prevent misunderstandings, and correct inaccurate representation and conclusions.

Developmental Scientists Must Be Honest and Fair

Developmental scientists must be honest with participants. They must be mindful of the promises they make to participants and make every effort to keep their promises to the people and communities with which they work. Honesty can take the form of **debriefing** or informing participants about the purpose and results of their research after the study is completed. Researchers are also obligated to treat their participants fairly. **Justice** involves ensuring that the risks and benefits of research participation are spread equitably across individuals and groups. 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 allowed to benefit from it.

Developmental Scientists Must Respect Participant Autonomy

Perhaps the most important principle of research ethics is respect for autonomy. Scientists have a special obligation to respect participants' **autonomy**, their ability to make and implement decisions. Ethical codes of conduct require that researchers protect participants' autonomy by obtaining **informed consent**—participants' informed, rational, and voluntary agreement to participate. Soliciting informed consent requires providing the individuals under study information about the research study, answering questions, and ensuring that they understand that they are free to decide not to participate in the research study. 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 (McCabe & Pao, 2021).

Informed Consent

Respecting people's autonomy involves protecting those who are not capable of making judgments and asserting themselves. Parents provide parental permission for their minor children to participate because researchers (and lawmakers) assume that minors cannot meet the rational criteria of informed consent (Remien & Kanchan, 2022). Although children cannot provide informed consent, researchers respect their growing capacities for decision making in ways appropriate to their age by seeking child assent, children's agreement to participate (Tait & Geisser, 2017; Weisleder, 2020). For toddlers or young children, obtaining assent may involve simply asking if they want to play with the researcher (H. R. Brown et al., 2017). With increasing cognitive and social



The decision to participate in research must be reasoned, with an understanding of what is involved and that participation is voluntary.

istock/SDI Productions

development, children can better 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 (Gaches, 2021). Moreover, seeking assent has the benefit of helping children learn how to make decisions and participate in decision making within safe contexts (Weisleder, 2020).

Studying adolescents often raises unique ethical questions because they are able to reason and make choices, yet they are minors, generally requiring parental consent. Adolescent research participants are often very concerned about how their information and samples will be used, particularly whether the information will 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 LGBT identity (Macapagal et al., 2017). As one 15 year-old bisexual participant explained:

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

Generally, LGBTQIA+ adolescents are often less willing to participate in research studies when parental consent is required due to concerns about potential victimization and discrimination (A. U. Smith & Schwartz, 2019). In response to these ethical challenges, researchers frequently obtain **passive consent** for researching sensitive topics with adolescents. Passive consent procedures typically involve notifying parents about the research and requiring them to reply if they do *not* want their child to participate. Studies that examine sensitive topics, such as risk behaviors, may benefit from the use of passive consent procedures because they are associated with more diverse samples of adolescents that better represent the population (Liu et al., 2017). Parental consent is sometimes waived in research on sensitive topics, such as sexuality and HIV prevention (Bauman et al., 2020; Chenneville et al., 2020).

In addition to minors, adults sometimes require accommodations for providing informed consent. Traumatic brain injury, dementia, mental illness, some physical illnesses, and advanced age can impair adults' capacities to provide informed consent (C. J. Evans et al., 2020; Poppe et al., 2020). 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 may sometimes improve, such as in the case of people with traumatic brain injury (Triebel et al., 2014). Researchers must be prepared to tailor their explanations to the participant's fluctuating competence.

Confidentiality

Ethical issues may arise when researchers' desire to learn about development and solve problems conflicts with their need to protect research participants. Researchers generally promise participants **confidentiality**, that their responses will remain confidential and will not be disclosed to others. Suppose a researcher studying adolescents learns that a participant is in jeopardy, whether engaging in health-compromising behaviors (e.g., cigarette smoking, unsafe driving, or unhealthy behavior), contemplating suicide, or engaging in illegal or harmful activities (e.g., drug addiction, stealing, or violence). Is the researcher responsible for helping the adolescent? Does the researcher have a duty to disclose the risk to an outside party that 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 engage in potentially dangerous activities. Helping the adolescent might involve removing him or her from the study and potentially compromising the study. Adolescents generally expect researchers to 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 in an adult who experiences bouts of dementia? Or suicidal thoughts in a middle-aged parent?

Ethical guidelines published by research and medical associations address researchers' obligations to help and not harm and to protect participants' confidentiality, but they generally fail to offer specific recommendations about how researchers can manage the conflicting duties to maintain confidentiality and disclose participant problems (McCabe & Pao, 2021). Instead, researchers must decide for themselves how to balance their sometimes conflicting obligations to their participants.

Thinking in Context

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

1. What concerns might adolescents have when agreeing to participate? Compare these with the concerns an adult might have. Would you expect older adults to have similar concerns? Why or why not?
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 religion or ethnicity relate to concerns about confidentiality in sexuality research? Why or why not?

APPLIED DEVELOPMENTAL SCIENCE AND INTERSECTIONALITY

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

Applied Developmental Science

Our discussions of lifespan development throughout this book exemplify **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 (Barbot et al., 2020; Fisher et al., 2013; Lerner, 2012). Applied developmental scientists study pressing social issues, such as promoting the development of preterm infants, understanding children's and adolescents' use of screens and social media, advocating for juvenile justice, and helping adults manage the anxiety and stress that accompanied the COVID-19 pandemic (Hassinger-Das et al., 2020; Odgers et al., 2020; Simmons et al., 2019; Wilson et al., 2021; Wolke et al., 2019). Working to enhance the life chances of diverse groups of individuals, families, and communities requires a multidisciplinary approach. Real-world problems are complex and require the expertise of scientists from many fields, such as human development, psychology, medicine, biology, anthropology, and more.

Through applied research, 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 study and address the systemic disparities in opportunities that people experience over the lifespan (Elenbaas et al., 2020; Killen et al., 2021). 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 (C. S. Brown et al., 2019; C. D. Smith & Smith Lee, 2019). Individuals' access to support and opportunity varies dramatically with race, sex, and other factors. Equity and social justice involve recognizing and addressing these disparities and the complex factors that contribute to them.

Intersectionality and Development

We are all members of multiple intertwined social categories, such as gender, race, age, and sexual orientation. Our understanding and experience of each category is influenced by our membership in other categories. Adolescents' understanding and experience of gender may be filtered through the lens of their membership in another social category, such as ethnicity. Latina girls' views of themselves and their worlds may be quite different from those of Latino boys as well as girls of other ethnicities, such as Black and white girls. In this example the intersection of ethnicity and gender combine to influence girls' self-understanding and experience. Power and opportunity are enmeshed with social categories, such as ethnicity and gender. Latina girls' views of themselves reflect not simply their sex and ethnicity but the relative power ascribed girls and persons of color in U.S. society.

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

Central to intersectionality are the assumptions that (a) all individuals have multiple identities that converge, (b) within each identity is a dimension of power or oppression, and (c) identities are influenced by the sociocultural context (Abrams et al., 2020; Else-Quest & Hyde, 2016). Identities overlap and systems of oppression, such as racism and sexism, may interlock.

Individuals therefore experience multiple overlapping identities and may struggle against intertwined systems of oppression and bias (Rosenthal, 2016).

The effects of social category membership are not experienced universally but 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 that have implications for development (Crenshaw, 1989; Syed & Ajayi, 2018). For instance, intersecting expectations about race and gender may uniquely shape the experience of Black boys in classroom settings, how they are perceived and treated, which is different from those experienced by boys of other races and ethnicities and the experiences of Black girls, with implications for their academic performance, development, and long-term outcomes (Roy, 2018). Likewise, Black boys' classroom experiences might vary with context, whether rural, suburban, or urban, and part of the United States, such as the North, South, Midwest, and coasts.

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

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. Revisiting our discussion of research methods, what are some of the challenges of the studying the real-world problems addressed by applied developmental science? Do any special considerations arise when studying development through an intersectional lens?

APPLY YOUR KNOWLEDGE

Steven enters the school psychologist's office with a frown, grumbling to himself. His teacher, Ms. Marta, has suggested that he visit the school psychologist for help understanding and treating his academic problems. Steven is a bright fifth grader, but he has great difficulties reading and his mathematics skills lag far behind his peers. Ms. Marta contacts Steven's mother, reassuring her that the school has excellent resources for diagnosing children's learning problems and special education professionals who can intervene and help children overcome learning difficulties.

The school psychologist interviews Steven's mother to compile a history of Steven's development. Through this interview, he learns that Steven suffered a great deal of trauma early in life; as an infant, he was physically abused by his biological mother, then taken away and placed in foster care. At age 3, he was adopted into a middle-class, suburban family with two older, non-adopted children.

As we have seen, each developmental theory has a unique emphasis. How might various theories address Steven's academic difficulties?

- (a) What might psychoanalytic theorists (Freud or Erikson) point to in explaining Steven's functioning?
- (b) How would cognitive theorists, such as Piaget, Vygotsky, or information processing researchers, account for and intervene with Steven's difficulties?
- (c) From Bronfenbrenner's ecological theory, identify a microsystem, mesosystem, exosystem, and macrosystem factor or variable that might influence Steven's functioning.

Suppose you wanted to conduct research on academic achievement during elementary and middle school.

- (a) How might you measure academic achievement?
- (b) Identify another variable that might be associated with students' academic achievement. How might you measure it?
- (c) How would you conduct a correlational study looking at these two variables?
- (d) What would a cross-sectional study look like? How would a longitudinal study differ? Sequential?
- (e) From your perspective, considering the research you have just described; what are the advantages and disadvantages of each type of study?

SUMMARY

1.1 Identify 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 Discuss three basic issues in developmental science.

Developmental scientists are concerned with three basic questions about development. First, in what ways is developmental change characterized by continuity (slow and gradual change) or discontinuity (stage-like)? 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 six theoretical perspectives on human development.

Psychoanalytic theories emphasize inner drives. Freud's theory focuses on childhood psychosexual stages. Erikson's psychosocial theory proposes eight stages of psychosocial development across the lifespan, with each stage presenting a unique crisis. Behaviorist theories and social learning theory emphasize environmental influences on behavior, specifically, classical conditioning and operant conditioning, as well as observational learning. Bandura's social learning theory suggests that individuals and the environment interact and influence each other through reciprocal determinism. Piaget's cognitive-developmental theory describes cognitive development as an active process proceeding through four stages. Information processing theorists study the processes involved in cognition. Vygotsky's sociocultural theory emphasizes cultural interactions in influencing cognitive development. Bronfenbrenner's bioecological systems theory examines ongoing reciprocal interactions within people and their changing contexts. Dynamic systems theory views people's developmental capacities, goals, and context as an integrated system that influences the development of new abilities. Evolutionary developmental psychology integrates Darwinian principles of evolution and scientific knowledge about the interactive influence of genetic and environmental mechanisms.

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

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

1.5 Examine developmental scientists' obligation to conduct ethical research.

Developmental scientists must adhere to standards of ethical conduct in research. They must help and not harm their participants and take responsibility to ensure that others understand their role and the scope of their research findings. Developmental scientists must be honest and fair to their participants, debriefing them and ensuring that risks and benefits are justly distributed. They must respect participants' autonomy by seeking informed consent and child assent.

Specific ethical concerns about informed consent, the use of passive consent, and how to protect participant confidentiality arise in conducting research in lifespan development.

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

Applied developmental science examines the lifelong interactions among individuals and their contexts and applies these findings to prevent and intervene in problems and promote positive development in people of all ages. Individuals' access to support and

opportunity varies dramatically with race, sex, and other factors. Our unique experiences and perspectives are influenced by intersectionality, the dynamic interrelations of social categories, including gender, race and ethnicity, sexual orientation, socioeconomic status, immigration status, and disabilities. Central to intersectionality are the assumptions that all individuals have multiple identities that converge, within each identity is a dimension of power or oppression, and identities are influenced by the sociocultural context. 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. 42)
autonomy (p. 39)
behaviorism (p. 15)
bioecological systems theory (p. 22)
case study (p. 32)
chronosystem (p. 24)
classical conditioning (p. 16)
cognitive development (p. 19)
cognitive scheme (p. 19)
cognitive-developmental theory (p. 19)
cohort (p. 6)
computerized tomography (CT scan) (p. 32)
confidentiality (p. 40)
context (p. 5)
continuity (p. 9)
correlational research (p. 32)
cross-sectional research (p. 35)
culture (p. 7)
debriefing (p. 39)
dependent variable (p. 34)
diffusion tensor imaging (DTI) (p. 32)
discontinuity (p. 9)
dynamic systems theory (p. 24)
electroencephalography (EEG) (p. 31)
ethology (p. 25)
evolutionary developmental theory (p. 25)
exosystem (p. 22)
experiment (p. 34)
functional magnetic resonance imaging (fMRI) (p. 32)
hypothesis (p. 12)
independent variable (p. 34)
information processing theory (p. 20)
informed consent (p. 39)
intersectionality (p. 42)
justice (p. 39)
lifespan human development (p. 2)
longitudinal research (p. 36)
macrosystem (p. 23)
mesosystem (p. 22)
microsystem (p. 22)
naturalistic observation (p. 29)
nature–nurture debate (p. 11)
observational learning (p. 18)
ontogenetic development (p. 22)
open-ended interview (p. 30)
operant conditioning (p. 16)
passive consent (p. 40)
physical development (p. 4)
plasticity (p. 5)
positron emission tomography (PET) (p. 32)
psychoanalytic theory (p. 12)
punishment (p. 16)
questionnaire (p. 31)
random assignment (p. 35)
reciprocal determinism (p. 18)
reinforcement (p. 16)
resilience (p. 5)
scientific method (p. 28)
sequential research (p. 36)
social learning theory (p. 18)
sociocultural theory (p. 21)
socioemotional development (p. 4)
structured interview (p. 30)
structured observation (p. 29)
theory (p. 12)

LIFESPAN DEVELOPMENT AT WORK PART 1: FOUNDATIONS OF 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.

Careers 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, besides a grounding in human development, is training in transferrable skills that are valuable in a variety of employment settings.

Transferrable Skills

Just as it sounds, a *transferrable skill* is one that can *transfer* or be applied in multiple settings. Employers value transferrable skills. Consider the top five attributes that employers seek in potential employees (Table 1.7).

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 transferrable skills.

The skill employers view as more valuable is, perhaps not surprising, *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.

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

TABLE 1.7 ■ Top Five Key Attributes Employers Prefer in Applicants

Desired Attribute	Percentage of Employers Endorsing
Problem-solving skills	86%
Analytical/quantitative skills	78%
Ability to work in a team	76%
Communication skills (written)	73%
Strong work ethic	71%

Source: National Association of College and Employers. (2022). www.nacweb.org

experience working with others in field placements. These valuable experiences foster the ability to effectively work with teams, a skill coveted by employers of 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 not only 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, psychology, and counseling; 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 *pre-school 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 child care center directors* work with early childhood educators to design educational plans for young children, oversee staff, 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 that of *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. *Student activities directors, or directors of student services*, oversee the development and organization of the college or university's extra-curricular 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 older adult patients. *Pediatric nurses* work with infants, children, and adolescents. *Neonatal nurses* provide care to infants who are born preterm, low birth-weight, 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 *speech-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 the 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, PSYCHOLOGY, AND COUNSELING

Children and adolescents have needs and abilities to communicate that differ from those of 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 counselors, 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 who work for the government might evaluate government-supported social media-based 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*. Others assist companies in developing and marketing products that are appropriate for older adults.

Although developmental scientists generally have doctoral degrees in human development, psychology, or a related field, many individuals with bachelor's and master's degrees work alongside them and under their supervision.

We will discuss many of the previously discussed job titles in upcoming Lifespan Development at Work profiles. For additional information on careers, consult the *Occupational Outlook Handbook*, published by the U.S. Bureau of the Census.

Do not copy, post, or distribute

Do not copy, post, or distribute