DISCOVERING THE LIFE SPAN

THIRD EDITION

GLOBAL EDITION

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1 INTRODUCTION

The Ruiz "Happy Birthday Family Reunion" was a big success. Marco Ruiz's grandfather, Geraldo, who would turn 90 tomorrow, was in his glory at the center of the festivities.

Marco's wife, Louise, had hatched the reunion idea while planning next summer's wedding of their youngest daughter Eva. Eva's husband-to-be, Peter, would be the first African American in the family, and Louise's idea was to introduce him early so his ethnicity would be old news by the wedding day.

Louise's brainstorm was apparently working, given the happy din of the huge throng in attendance. Marco took a quiet census: his father, Damiano, and Louise's mom and dad, plus a gaggle of uncles, aunts, siblings, and cousins from his and Louise's families. One generation down, he counted his children and their families, and virtual busloads of nieces and nephews with their families, down to the youngest child, the daughter of Marco's niece Terri and her husband Tony, 4-year-old Alicia Wei-Li Saucedo, Geraldo's great-great-granddaughter, who had been adopted from China.

Marco watched as Grandpa Geraldo hugged and chatted happily with Alicia. There in one small picture frame was the story of the five generations of Grandpa's family, from 4 to 90.

Marco thought to himself: What is Grandpa making of all this? Is he wondering how he spawned all these different personalities? Is he speculating about their careers, their futures? Is he looking for traces of his stubbornness and short temper, his generosity and open-mindedness? Does he find in this gathering the vast ambitions that he had as a boy? Will any of them be—at last—the athlete that he never was, or will they be writers and thinkers like him and his children?

Marco smiled at Louise's idea of "integrating" Peter into the family. Peter's skin color wasn't even an issue. The main stories were that Marco's nephew Ted was here with his fiancé Tom, and his niece Clarissa had her fiancée Rosa on her arm. Marco's smile grew broader. Let Grandpa wonder where this latest family trend came from.

Lifespan development is a diverse and growing field with a broad focus and wide applicability. It covers the entire life span of the individual from birth to death as it examines the ways in which people develop physically, intellectually, and socially. It asks and attempts to answer questions about the ways in which people change and remain the same over their years of life.

Many of the questions that developmentalists ask are, in essence, the scientist's version of the questions that parents ask about their children and themselves: How the genetic legacy of parents plays out in their children; how children learn; why they make the choices they make; whether personality characteristics are inherited and whether they change or are stable over time; how a stimulating environment affects development; and many others. To pursue these answers, of course, developmentalists use the highly structured, formal scientific method, while parents mostly use the informal strategy of waiting, observing, engaging with, and loving their kids.

In this chapter, we will introduce the field of lifespan development. We first discuss the breadth of the field, both in the range of years it covers and in the topics it addresses, and we look at the major theoretical perspectives that have examined those topics. We also describe the key features of the scientific method, the main approach that scientists take to answering questions of interest.

MODULE 1.1

BEGINNINGS

Nature vs. nurture: Which has the greater influence?

MODULE 1.2

THEORETICAL PERSPECTIVES ON LIFESPAN DEVELOPMENT

Is one right and one wrong?
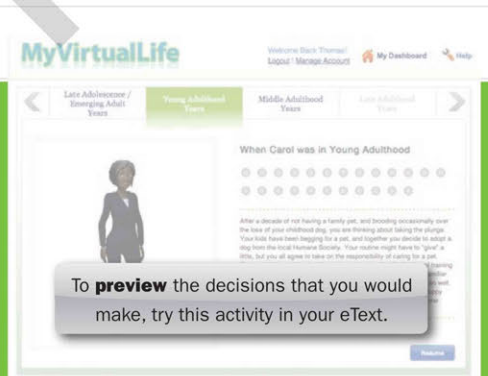
MODULE 1.3

RESEARCH METHODS

What kind of research could you conduct using Marco's five-generation family?

MyVirtualLife

If you are currently using MyVirtualLife, consider how you will navigate your journey through the lifespan. What decisions will you make?

Access **MyVirtualLife** for a chance to live your own virtual life.

MyVirtualLife

Welcome Back Thomas!
Logout | Manage Account   My Dashboard   Help

Late Adolescence / Emerging Adult Years | Young Adulthood Years | Middle Adulthood Years | Late Adulthood Years

When Carol was in Young Adulthood

After a decade of not having a family pet, and bonding occasionally over the loss of your childhood dog, you are thinking about taking the plunge. Your kids have been begging for a pet, and together you decide to adopt a dog from the local Humane Society. Your routine might have to "give" a little, but you all agree to take on the responsibility of caring for a pet.

To **preview** the decisions that you would make, try this activity in your eText.

MODULE
1.1

BEGINNINGS

New Conceptions

In July 1978, Louise Brown became the world's first "test tube baby"—the first baby conceived through in vitro fertilization (IVF), a medical procedure in which fertilization of the mother's egg with the father's sperm occurs outside the mother's body.

Louise's parents told her the story of her conception when she was in preschool, explaining exactly what had happened and answering all her questions. Even so, she was ill-prepared for the years of questions from curious schoolmates about her supposed birth in a bottle in a science lab.

She did her best to minimize differences between herself and her schoolmates, but in those early years, she often felt alone. Gradually her sense of isolation diminished as she was joined by literally millions of other children conceived the same way. Today, IVF is essentially a routine procedure practiced all over the world.

And there's a happy ending: At age 28, Louise gave birth to a son, Cameron, conceived—she is pleased to say—the old-fashioned way (Falco, 2012; ICMRT, 2012).

Louise Brown's conception may have been novel, but her development since then has followed a predictable pattern. While the specifics of our development vary, the broad strokes set in motion in that test tube more than three decades ago are remarkably similar for all of us. Shaquille O'Neal, Donald Trump, the Queen of England—all are traversing the territory known as lifespan development.

Louise Brown's conception is just one of the brave new worlds of the day. Issues that affect human development range from cloning to poverty to the prevention of AIDS. Underlying these are even more fundamental issues: How do we develop physically? How does our understanding of the world change throughout our lives? And how do our personalities and social relationships develop as we move through the life span?

These questions and many others are central to lifespan development. The field encompasses a broad span of time and a wide range of areas. Consider the range of interests that different specialists might focus on when considering Louise Brown:

- Lifespan development researchers who investigate behavior at the biological level might ask if Louise's functioning before birth was affected by her conception outside the womb.
- Specialists in lifespan development who study genetics might examine how the genetic endowment from Louise's parents affects her later behavior.
- Lifespan development specialists who investigate thinking processes might examine how Louise's understanding of the circumstances of her conception changed as she grew older.
- Other researchers in lifespan development, who focus on physical growth, might consider whether her growth rate differed from children conceived more traditionally.
- Lifespan development experts who specialize in the social world and social relationships might look at the ways that Louise interacted with others and the kinds of friendships she developed.

Although their interests take many forms, these specialists share one concern: understanding the growth and change that occur during life. Taking many different approaches, developmentalists study how both our biological inheritance from our parents and the environment in which we live jointly affect our future behavior, personality, and potential as human beings.

Whether they focus on heredity or environment, all developmental specialists acknowledge that neither one alone can account for the full range of human development. Instead, we must look at the interaction of heredity and environment, attempting to grasp how both underlie human behavior.

In this module, we orient ourselves to the field of lifespan development. We begin with a discussion of the scope of the discipline, illustrating the wide array of topics it covers and the full range of ages it examines. We also survey the key issues and controversies of the field and consider the broad perspectives that developmentalists take. Finally, we discuss the ways developmentalists use research to ask and answer questions.

AN ORIENTATION TO LIFESPAN DEVELOPMENT

L01	What is the scope of the field of lifespan development?
L02	What are cohorts, and how do they influence development?

Have you ever wondered at the way an infant tightly grips your finger with tiny, perfectly formed hands? Or marveled at how a preschooler methodically draws a picture? Or at the way an adolescent can make involved decisions about whom to invite to a party or the ethics of downloading music files? Or the way a middle-aged politician can deliver a long, flawless speech from memory? Or what makes a grandfather at 80 so similar to the father he was at 40?

If you've ever wondered about such things, you are asking the kinds of questions that scientists in the field of lifespan development pose. **Lifespan development** is the field of study that examines patterns of growth, change, and stability in behavior that occur throughout the life span.

In its study of growth, change, and stability, lifespan development takes a *scientific* approach. Like members of other scientific disciplines, researchers in lifespan development test their assumptions by applying scientific methods. They develop theories about development and use methodical, scientific techniques to validate the accuracy of their assumptions systematically.

Lifespan development focuses on *human* development. Although there are developmentalists who study nonhuman species, the vast majority study people. Some seek to understand universal principles of development, while others focus on how cultural, racial, and ethnic differences affect development. Still others aim to understand the traits and characteristics that differentiate one person from another. Regardless of approach, however, all developmentalists view development as a continuing process throughout the life span.

As developmental specialists focus on change during the life span, they also consider stability. They ask in which areas, and in what periods, people show change and growth, and when and how their behavior reveals consistency and continuity with prior behavior.

Finally, developmentalists assume that the process of development persists from the moment of conception to the day of death, with people changing in some ways right up to the end of their lives and in other ways exhibiting remarkable stability. They believe that no single period governs all development, but instead that people maintain the capacity for substantial growth and change throughout their lives.

Characterizing Lifespan Development: The Scope of the Field

Clearly, the definition of lifespan development is broad and the scope of the field is extensive. Typically, lifespan development specialists cover several diverse areas, choosing to specialize in both a topical area and an age range.

Topical Areas in Lifespan Development. Some developmentalists focus on **physical development**, examining the ways in which the body's makeup—the brain, nervous system, muscles, and senses, and the need for food, drink, and sleep—helps determine behavior. For example, one specialist in physical development might examine the effects of malnutrition on the pace of growth in children, while another might look at how athletes' physical performance declines during adulthood (Fell & Williams, 2008).

Other developmental specialists examine **cognitive development**, seeking to understand how growth and change in intellectual capabilities influence a person's behavior. Cognitive developmentalists examine learning, memory, problem solving, and intelligence. For example, specialists in cognitive development might want to see how problem-solving skills change over the course of life, or if cultural differences exist in the way people explain their academic successes and failures, or how traumatic events experienced early in life are remembered later in life (Penido et al., 2012; Feldman, 2013).

lifespan development the field of study that examines patterns of growth, change, and stability in behavior that occur throughout the entire life span

physical development development involving the body's physical makeup, including the brain, nervous system, muscles, and senses, and the need for food, drink, and sleep

cognitive development development involving the ways that growth and change in intellectual capabilities influence a person's behavior

TABLE 1-1 APPROACHES TO LIFESPAN DEVELOPMENT

Orientation	Defining Characteristics	Examples of Questions Asked*
Physical development	Emphasizes how brain, nervous system, muscles, sensory capabilities, and needs for food, drink, and sleep affect behavior	• What determines the sex of a child? (2.1) • What are the long-term results of premature birth? (2.3) • What are the benefits of breast milk? (3.1) • What are the consequences of early or late sexual maturation? (6.1) • What leads to obesity in adulthood? (7.1) • How do adults cope with stress? (8.1) • What are the outward and internal signs of aging? (9.1) • How do we define death? (10.1)?
Cognitive development	Emphasizes intellectual abilities, including learning, memory, problem solving, and intelligence	• What are the earliest memories that can be recalled from infancy? (3.2) • What are the intellectual consequences of watching television? (4.2) • Do spatial reasoning skills relate to music practice? (4.2) • Are there benefits to bilingualism? (5.2) • How does an adolescent's egocentrism affect his or her view of the world? (6.2) • Are there ethnic and racial differences in intelligence? (5.2) • How does creativity relate to intelligence? (7.2) • Does intelligence decline in late adulthood? (9.2)?
Personality and social development	Emphasizes enduring characteristics that differentiate one person from another, and how interactions with others and social relationships grow and change over the lifetime	• Do newborns respond differently to their mothers than to others? (2.3) • What is the best procedure for disciplining children? (4.3) • When does a sense of gender identity develop? (4.3) • How can we promote cross-race friendships? (5.3) • What are the causes of adolescent suicide? (6.3) • How do we choose a romantic partner? (7.3) • Do the effects of parental divorce last into old age? (9.3) • Do people withdraw from others in late adulthood? (9.3) • What are the emotions involved in confronting death? (10.1)?

*Numbers in parentheses indicate in which chapter and module the question is addressed.

Finally, some developmental specialists focus on personality and social development. **Personality development** is the study of stability and change in the characteristics that differentiate one person from another over the life span. **Social development** is the way in which individuals' interactions and relationships with others grow, change, and remain stable over the course of life. A developmentalist interested in personality development might ask whether there are stable, enduring personality traits throughout the life span, while a specialist in social development might examine the effects of racism or poverty or divorce on development. These four major topic areas—physical, cognitive, social, and personality development—are summarized in Table 1-1.

Age Ranges and Individual Differences. In addition to choosing a particular topical area, developmentalists also typically look at a particular age range. The life span is usually divided into broad age ranges: the prenatal period (from conception to birth); infancy and toddlerhood (birth to 3); the preschool period (3 to 6); middle childhood (6 to 12); adolescence (12 to 20); young adulthood (20 to 40); middle adulthood (40 to 60); and late adulthood (60 to death).

It's important to keep in mind that these periods are social constructions. A *social construction* is a shared notion of reality that is widely accepted but is a function of society and culture at a given time. Thus, the age ranges within a period—and even the periods themselves—are in many ways arbitrary and culturally derived. For example, we'll see how the concept of

personality development development involving the ways that the enduring characteristics that differentiate one person from another change over the lifespan

social development the way in which individuals' interactions with others and their social relationships grow, change, and remain stable over the course of life

childhood as a special period did not even exist during the seventeenth century—children were seen then simply as miniature adults. Furthermore, while some periods have a clear-cut boundary (infancy begins with birth, the preschool period ends with entry into public school, and adolescence starts with sexual maturity), others don't.

For instance, consider the period of young adulthood, which at least in Western cultures is typically assumed to begin at age 20. That age, however, is notable only because it marks the end of the teenage period. In fact, for many people, such as those enrolled in higher education, the age change from 19 to 20 has little special significance, coming as it does in the middle of college. For them, more substantial changes are likely to occur when they leave college around age 22. Furthermore, in some cultures adulthood starts much earlier, as soon as a child can begin full-time work.

In fact, some developmentalists have proposed entirely new developmental periods. For instance, psychologist Jeffrey Arnett argues that adolescence extends into *emerging adulthood*, a period beginning in the late teenage years and continuing into the mid-20s. During emerging adulthood, people are no longer adolescents, but they haven't fully taken on the responsibilities of adulthood. Instead, they are still trying out different identities and engaging in self-focused exploration (Arnett, 2010, 2011; de Dios, 2012; Syed & Seiffge-Krenke, 2013).

In short, there are substantial *individual differences* in the timing of events in people's lives. In part, this is a biological fact of life: People mature at different rates and reach developmental milestones at different points. However, environmental factors also play a significant role; for example, the typical age of marriage varies from one culture to another, depending in part on the functions that marriage plays.

The Links Between Topics and Ages. Each of the broad topical areas of lifespan development—physical, cognitive, social, and personality development—plays a role throughout
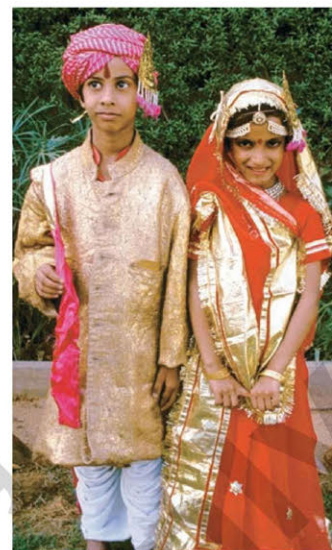
This wedding of two children in India is an example of how environmental factors can play a significant role in determining the age when a particular event is likely to occur.

Cultural Dimensions

How Culture, Ethnicity, and Race Influence Development

Mayan mothers in Central America are certain that almost constant contact between themselves and their infant children is necessary for good parenting, and they are physically upset if contact is not possible. They are shocked when they see a North American mother lay her infant down, and they attribute the baby's crying to the poor parenting of the North American (Morelli et al., 1992).

What are we to make of the two views of parenting depicted in this passage? Is one right and the other wrong? Probably not, if we take cultural context into consideration. Different cultures and subcultures have their own views of appropriate and inappropriate childrearing, just as they have different developmental goals for children (Feldman & Masalha, 2007; Huijbregts et al., 2009; Chen, Chen, & Zheng, 2012).

Clearly, to understand development, developmentalists must take into consideration broad cultural factors, such as an orientation toward individualism or collectivism, as well as finer ethnic, racial, socioeconomic, and gender differences. If they succeed in doing this, not only can they achieve a better understanding of human development, but they may be able to derive more precise applications for improving the human social condition.

To complicate the study of diverse populations, the terms *race* and *ethnic group* are often used inappropriately. *Race* is a biological concept, which should refer to classifications based on physical and structural characteristics of species. In contrast, *ethnic group* and *ethnicity* are broader, referring to cultural background, nationality, religion, and language.

The concept of race has proven particularly problematic. It has inappropriately taken on nonbiological meanings ranging from skin color to religion to culture. Moreover, as a concept it is exceedingly imprecise; depending on how it is defined, there are between 3 and 300 races, and no race is genetically distinct. The fact that 99.9 percent of humans' genetic makeup is identical in all humans makes the question of race seem insignificant (Helms, Jernigan, & Mascher, 2005; Smedley & Smedley, 2005; Alfred & Chlup, 2010).

In addition, there is little agreement about which names best reflect different races and ethnic groups. Should the term *African American*—which has geographical and cultural implications—be preferred over *black*, which focuses primarily on race and skin color? Is *Native American* preferable to *Indian*? Is *Hispanic* more appropriate than *Latino*? And how can researchers accurately categorize people with multiracial backgrounds?

In order to fully understand development, then, we need to take the complex issues associated with human diversity into account. In fact, it is only by looking for similarities and differences among various ethnic, cultural, and racial groups that developmental researchers can distinguish principles of development that are universal from ones that are culturally determined. In the years ahead, then, it is likely that lifespan development will move from a discipline that primarily focuses on North American and European development to one that encompasses development around the globe (Fowers & Davidov, 2006; Matsumoto & Yoo, 2006; Kloep et al., 2009).

the life span. Consequently, some developmental experts may focus on physical development during the prenatal period, and others during adolescence. Some might specialize in social development during the preschool years, while others look at social relationships in late adulthood. And still others might take a broader approach, looking at cognitive development through every period of life.

In this book, we'll take a comprehensive approach, proceeding chronologically from the prenatal period through late adulthood and death. Within each period, we'll look at physical, cognitive, social, and personality development.

Cohort and Other Influences on Development: Developing With Others in a Social World

Bob, born in 1947, is a baby boomer; he was born soon after the end of World War II, when returning soldiers caused an enormous bulge in the birth rate. He was an adolescent at the height of the Civil Rights movement and protested against the Vietnam War. His mother, Leah, was born in 1922; her generation passed its childhood and teenage years in the shadow of the Depression. Bob's son, Jon, was born in 1975. Now building a career and starting a family, he is a member of what has been called Generation X. Jon's younger sister, Sarah, who was born in 1982, is part of the next generation, which sociologists have called the Millennial Generation.

These people are in part products of the social times in which they live. Each belongs to a particular **cohort**, a group of people born at around the same time in the same place. Such major social events as wars, economic upturns and depressions, famines, and epidemics (like the one due to the AIDS virus) work similar influences on members of a particular cohort (Mitchell, 2002; Dittman, 2005).

Cohort effects are an example of *history-graded influences*, biological and environmental influences associated with a particular historical moment. For instance, people who lived in New York City during the 9/11 terrorist attack on the World Trade Center experienced shared biological and environmental challenges due to the attack. In fact, the specter of terrorism is a history-graded influence that is common to people living in the United States today (Bonanno, Galea, Bucciarelli, & Vlahov, 2006; Breslau, Bohnert, & Koenen, 2010; Park, Riley, & Snyder, 2012).

From an educator's perspective: How would a student's cohort membership affect his or her readiness for school? For example, what would be the benefits and drawbacks of coming from a cohort in which Internet use was routine, compared with earlier cohorts before the appearance of the Internet?

In contrast, *age-graded influences* are biological and environmental influences that are similar for individuals in a particular age group, regardless of when or where they are raised. For example, biological events such as puberty and menopause are universal events that occur at about the same time in all societies. Similarly, a sociocultural event such as entry into formal education can be considered an age-graded influence because it occurs in most cultures around age 6.

Development is also affected by *sociocultural-graded influences*, the social and cultural factors present at a particular time for a particular individual, depending on such variables as ethnicity, social class, and subcultural membership. For example, sociocultural-graded influences will be considerably different for white and nonwhite children, especially if one lives in poverty and the other in affluence (Rose et al., 2003).

Finally, *non-normative life events* are specific, atypical events that occur in a particular person's life at a time when such events do not happen to most people. For example, a child whose parents die in an automobile accident when she is 6 has experienced a significant non-normative life event.

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cohort a group of people born at around the same time in the same place

REVIEW, CHECK, AND APPLY

REVIEW

LO1 What is the scope of the field of lifespan development?

- Lifespan development is a scientific approach to understanding human growth and change throughout life.

- The field covers a broad range of ages and topical areas. Its chief aim is to examine the links between human age groups and the areas of physical, cognitive, social, and personality development.

LO2 What are cohorts, and how do they influence development?

- Membership in a cohort, based on age and place of birth, subjects people to influences based on historical events (history-graded influences).

- People are also subject to age-graded influences, sociocultural-graded influences, and non-normative life events.

CHECK YOURSELF

1. Three assumptions made by lifespan developmentalists are: (1) a focus on human development, (2) an understanding of stability in addition to growth and change, and (3) _____.

   a the perception that development persists throughout our entire lives

   b the perception that childhood developmental changes are the only changes worth studying

   c the idea that some periods of the life span are more important than others

   d the perception that development is a stagnant process

2. A researcher wants to understand how androgens affect muscle growth and height. It would be most appropriate to say that this researcher studies _____.

   a cognitive development

   b personality development

   c social development

   d physical development

3. The time when children utter their first complete sentence is an example of _____.

   a a history-graded influence

   b an age-graded influence

   c a sociocultural-graded influence

   d a non-normative life event

APPLYING LIFESPAN DEVELOPMENT

- Many young people use the term "generation gap" to describe differences between them and their parents. Can you confidently conclude that such differences indeed reflect a "generation gap" (i.e., cohort effect) and not an age effect? Why or why not?

KEY ISSUES AND QUESTIONS: DETERMINING THE NATURE—AND NURTURE—OF LIFESPAN DEVELOPMENT

LO3   What are the key issues in the field of development?
LO4   How have developmental researchers resolved these issues?

Lifespan development is a decades-long journey through shared milestones, with many individual routes along the way. For developmentalists, the variations in lifespan development raise many questions. What are the best ways to think about the enormous changes that a person undergoes from before birth to death? How important is chronological age? Is there a clear timetable for development? How can one begin to find common threads and patterns?

These questions have been debated since lifespan development became established as a separate field in the late nineteenth and early twentieth centuries, though a fascination with the nature and course of humans' development can be traced back to the ancient Egyptians and Greeks.

In this section we examine four of the most important—and continuously argued—issues in the field of lifespan development. We also consider the resolutions to which researchers have come regarding these issues.

Continuous Change Versus Discontinuous Change

One of the primary issues challenging developmentalists is whether development proceeds in a continuous or discontinuous fashion. In **continuous change**, development is gradual, with achievements at one level building on those of previous levels. Continuous change is quantitative; the underlying developmental processes remain the same over the life span. In this view

continuous change gradual development in which achievements at one level build on those of previous levels

changes are a matter of degree, not of kind—like changes in a person's height. Some theorists suggest that changes in people's thinking abilities are also continuous, building on gradual improvements rather than developing entirely new processing capabilities.

In contrast, others see development as primarily a matter of **discontinuous change**, occurring in distinct stages. Each stage brings about behavior that is assumed to be qualitatively different from behavior at earlier stages. Consider cognitive development again. Some cognitive developmentalists suggest that our thinking changes in fundamental ways as we develop, not just quantitatively but qualitatively.

Most developmentalists agree that it makes little sense to take an either/or position on this issue. While many types of developmental change are continuous, others are clearly discontinuous (Flavell, 1994; Heimann, 2003; Gumz et al., 2010).

Critical and Sensitive Periods: Gauging the Impact of Environmental Events

If a woman comes down with a case of rubella (German measles) in the 11th week of pregnancy, the consequences for the child she is carrying—possible blindness, deafness, and heart defects—can be devastating. However, if she comes down with the same strain of rubella in the 30th week of pregnancy, damage to the child is unlikely.

The differing outcomes demonstrate the concept of critical periods. A **critical period** is a specific time during development when a particular event has its greatest consequences. Critical periods occur when the presence of certain kinds of environmental stimuli are necessary for development to proceed normally (Uylings, 2006).

Although early specialists in lifespan development placed great emphasis on critical periods, recent thinking suggests that individuals are more malleable, particularly in the domain of personality and social development. For instance, rather than suffering permanent damage from a lack of certain early social experiences, there is increasing evidence that people can use later experiences to help overcome earlier deficits.

Consequently, developmentalists are now more likely to speak of **sensitive periods** rather than critical periods. In a sensitive period, organisms are particularly susceptible to certain kinds of stimuli in their environments. In contrast to a critical period, however, the absence of those stimuli during a sensitive period does not always produce irreversible consequences.

It is important to understand the difference between the concepts of critical periods and sensitive periods: In critical periods, it is assumed that the absence of certain kinds of environmental influences is likely to produce permanent, irreversible consequences for the developing individual. In contrast, although the absence of particular environmental influences during a sensitive period may hinder development, it is possible for later experiences to overcome the earlier deficits. In other words, the concept of sensitive period recognizes the plasticity of developing humans (Armstrong et al., 2006; Hooks & Chen, 2008; Steele et al., 2013).

Lifespan Approaches Versus a Focus on Particular Periods

Early developmentalists tended to focus their attention on infancy and adolescence, largely to the exclusion of other parts of the life span. Today, however, developmentalists believe the entire life span is important, largely because developmental growth and change continue during every part of life—as we'll discuss throughout this book.

Furthermore, to fully understand the social influences on a person of a given age, we need to understand the person's social environment—the people who in large measure provide those influences. For instance, to understand development in infants, we need to unravel the effects of their parents' ages on their social environments. A 15-year-old, first-time mother and an experienced 37-year-old mother will provide parental influences of very different sorts. Consequently, infant development is in part an outgrowth of adult development.

discontinuous change development that occurs in distinct steps or stages, with each stage bringing about behavior that is assumed to be qualitatively different from behavior at earlier stages

critical period a specific time during development when a particular event has its greatest consequences and the presence of certain kinds of environmental stimuli are necessary for development to proceed normally

sensitive period a point in development when organisms are particularly susceptible to certain kinds of stimuli in their environments, but the absence of those stimuli does not always produce irreversible consequences

Additionally, as lifespan developmentalist Paul Baltes points out, development across the life span involves both gains and losses. With age, certain capabilities become more refined and sophisticated, while others decline. For example, vocabulary tends to grow throughout childhood and continue through most of adulthood, but certain physical abilities, like reaction time, improve until early and middle adulthood, and then begin to decline (Baltes, Staudinger, & Lindenberger, 1999; Baltes, 2003; Ghisletta et al., 2010).

The Relative Influence of Nature and Nurture on Development

One of the enduring questions of development involves how much of people's behavior is due to genetics (nature) and how much to the physical and social environment (nurture) (Wexler, 2006).

Nature refers to traits, abilities, and capacities that are inherited from one's parents. It encompasses any factor that is produced by the predetermined unfolding of genetic information—a process known as **maturation**. These genetic, inherited influences are at work as we move from the one-cell organism created at conception to the billions of cells that make up a fully formed human. Nature influences whether our eyes are blue or brown, whether we have thick hair throughout life or eventually go bald, and how good we are at athletics. Nature allows our brains to develop in such a way that we can read the words on this page.

In contrast, *nurture* refers to the environmental influences that shape behavior. Some influences may be biological, such as the impact of a pregnant mother's use of cocaine on her unborn child or the amount and kind of food available to children. Other influences are more social, such as the ways parents discipline their children and the effects of peer pressure on an adolescent. Finally, some influences are a result of societal factors, such as the socioeconomic circumstances in which people find themselves.

Although developmentalists reject the notion that behavior is the sole result of either nature or nurture, the nature–nurture question can cause heated debate. Take, for instance, intelligence. If intelligence is primarily determined by heredity and is largely fixed at birth, then efforts to improve intellectual performance later in life may be doomed to failure. In contrast, if intelligence is primarily a result of environmental factors, such as the amount and quality of schooling and home stimulation, then an improvement in social conditions could cause intelligence to increase.

Clearly, neither nature nor nurture stands alone in most developmental matters. The interaction of genetic and environmental factors is complex, in part because certain genetically determined traits have not only a direct influence on children's behavior, but an indirect influence in shaping children's *environments*. For example, children who cry a great deal—a trait that may be produced by genetic factors—may influence their environment by making their parents rush to comfort them whenever they cry. The parents' responsivity to their children's genetically determined behavior becomes an environmental influence on the children's subsequent development.

Similarly, although our genetic background orients us toward particular behaviors, those behaviors will not necessarily occur without an appropriate environment. People with similar genetic backgrounds (such as identical twins) may behave in very different ways; and people with highly dissimilar genetic backgrounds can behave quite similarly to one another in certain areas (Kato & Pedersen, 2005; Gangestad, 2010; Barnes & Boutwell, 2013).

In sum, the nature–nurture question is challenging. Ultimately, we should consider the two sides of the issue as ends of a continuum, with particular behaviors falling somewhere between the ends. The same can be said of the other controversies that we have considered. For instance, continuous versus discontinuous development is not an either/or proposition; some forms of development fall toward the continuous end of the continuum, while others lie closer to the discontinuous end. In short, few statements about development involve either/or absolutes (Deater-Deckard & Cahill, 2006; Rutter, 2006).

maturation the predetermined unfolding of genetic information

REVIEW, CHECK, AND APPLY

REVIEW

L03 What are the key issues in the field of development?

- Four important issues in lifespan development are continuity versus discontinuity in development, the importance of critical periods, whether to focus on certain periods or on the entire life span, and the nature–nurture controversy.

- These issues have been the subject of research and discussions since the field of development began.

L04 How have developmental researchers resolved these issues?

- Research and discussions on these issues have led to the conclusion that for three of them, no either–or answer makes sense.

- For the "focus on certain periods" issue, however, there is general agreement that development is not limited to childhood and adolescence, but continues through the life span.

CHECK YOURSELF

1. Grady believes that human development occurs in small, measurable amounts. His sister Andrea disagrees and suggests that human development is more distinct and steplike. Their argument is most reflective of the _____ issue.

   a critical and sensitive period

   b nature and nurture

   c continuous and discontinuous

   d lifespan approach and particular period

2. A _____ is a specific time during development when a particular event has its greatest consequence.

   a critical period

   b sensitive period

   c genetic period

   d embryo period

3. Factors that are present outside critical periods have no influence on development.

   True

   False

APPLYING LIFESPAN DEVELOPMENT

- Are nature and nurture oppositional forces? Give examples of how they may interact.

MODULE 1.2 THEORETICAL PERSPECTIVES ON LIFESPAN DEVELOPMENT

In Europe, there was no concept of "childhood" until the seventeenth century. Instead, children were simply thought of as miniature adults. They were assumed to be subject to the same needs and desires as adults, to have the same vices and virtues, and to warrant no more privileges. They were dressed the same as adults, and their work hours were the same. Children also received the same punishments for misdeeds. If they stole, they were hanged; if they did well, they could achieve prosperity, at least so far as their station in life or social class would allow.

This view of childhood seems wrongheaded now, but at the time it was society's understanding of lifespan development. From this perspective, there were no differences due to age; except for size, people were assumed to be virtually unchanging, at least on a psychological level, throughout most of the life span (Aries, 1962; Acocella, 2003; Hutton, 2004; Wines, 2006).

It is easy to reject the medieval view but less clear how to formulate a contemporary substitute. Should our view of development focus on the biological aspects of change, growth, and stability over the life span? The cognitive or social aspects? Or some other factors?

Society's view of childhood, and what is appropriate to ask of children, has changed through the ages. These children worked full time in mines in the early 1900s.

In fact, people who study lifespan development approach the field from different perspectives. Each perspective encompasses one or more **theories**: broad, organized explanations and predictions concerning phenomena of interest. A theory provides a framework for understanding the relationships among a seemingly unorganized set of facts or principles.

We all develop theories about development, based on our experience, folklore, and stories in the media. However, theories in lifespan development are different. Whereas our own personal theories are haphazardly built on unverified observations, developmentalists' theories are more formal, based on a systematic integration of prior findings and theorizing. Theories allow developmentalists to summarize and organize prior observations, and they allow them to move beyond existing observations to draw deductions that may not be immediately apparent. In addition, theories are subject to rigorous testing through research. By contrast, the developmental theories of individuals are not subject to testing and may never be questioned at all (Thomas, 2001).

We'll consider the six major theoretical perspectives used in lifespan development—the psychodynamic, behavioral, cognitive, humanistic, contextual, and evolutionary perspectives—and discuss them in greater detail in later chapters. Each perspective emphasizes somewhat different aspects of development and steers developmentalists in particular directions. Furthermore, each continues to evolve, as befits a dynamic discipline.

THE PSYCHODYNAMIC, BEHAVIORAL, AND COGNITIVE PERSPECTIVES

LO5 Which theoretical perspectives have guided lifespan development?

LO6 What are the main characteristics of the psychodynamic, behavioral, and cognitive perspectives?

The Psychodynamic Perspective: Focusing on the Inner Person

When Marisol was 6 months old, she was involved in a bloody automobile accident—or so her parents tell her, since she has no recollection of it. Now, however, at age 24, she is having difficulty maintaining relationships, and her therapist is seeking to determine whether her current problems are a result of the earlier accident.

Looking for such a link might seem a bit far-fetched—but not to proponents of the **psychodynamic perspective**. Advocates believe that much behavior is motivated by inner forces, memories, and conflicts of which a person has little awareness or control. The inner forces, which may stem from childhood, influence behavior throughout the life span.

Freud's Psychoanalytic Theory. The psychodynamic perspective is most closely associated with Sigmund Freud. Freud, who lived from 1856 to 1939, was a Viennese physician whose revolutionary ideas had a profound effect not only on psychology and psychiatry, but on Western thought in general (Masling & Bornstein, 1996; Greenberg, 2012).

Freud's **psychoanalytic theory** suggests that unconscious forces act to determine personality and behavior. To Freud, the *unconscious* is a part of the personality about which a person is unaware. It contains infantile wishes, desires, demands, and needs that are hidden, because of their disturbing nature, from conscious awareness. Freud suggested that the unconscious is responsible for a good part of our everyday behavior.

According to Freud, everyone's personality has three aspects: id, ego, and superego. The *id* is the raw, unorganized, inborn part of personality that is present at birth. It represents primitive drives related to hunger, sex, aggression, and irrational impulses. The id operates according to the *pleasure principle*, in which the goal is to maximize satisfaction and reduce tension.

The *ego* is the part of personality that is rational and reasonable. The ego acts as a buffer between the external world and the primitive id. The ego operates on the *reality principle*, in which instinctual energy is restrained in order to maintain the safety of the individual and help integrate the person into society.

Finally, Freud proposed that the *superego* represents a person's conscience, incorporating distinctions between right and wrong. It begins to develop from age 5 or 6 and is learned from an individual's parents, teachers, and other significant figures.

Freud also addressed personality development during childhood. He argued that **psychosexual development** occurs as children pass through distinct stages in which pleasure, or gratification, is focused on a particular biological function and body part. As illustrated in Table 1-2, he suggested that pleasure shifts from the mouth (the *oral stage*) to the anus (the *anal stage*) and eventually to the genitals (the *phallic stage* and the *genital stage*).

According to Freud, if children are unable to gratify themselves sufficiently during a particular stage, or if they receive too much gratification, fixation may occur. *Fixation* is behavior reflecting an earlier stage of development due to an unresolved conflict. For instance, fixation at the oral stage might produce an adult unusually absorbed in oral activities—eating, talking, or chewing gum. Freud also argued that fixation is represented through symbolic oral activities, such as the use of "biting" sarcasm.

Erikson's Psychosocial Theory. Psychoanalyst Erik Erikson, who lived from 1902 to 1994, provided an alternative psychodynamic view, emphasizing our social interaction with other people. In Erikson's view, society and culture both challenge and shape us. **Psychosocial development** encompasses changes in our interactions with and understandings of one another, as well as in our knowledge and understanding of us as members of society (Erikson, 1963; Dunkel, Kim, & Papini, 2012).

Erikson's theory suggests that development proceeds throughout our lives in eight stages (see Table 1-2), which emerge in a fixed pattern and are similar for all people.
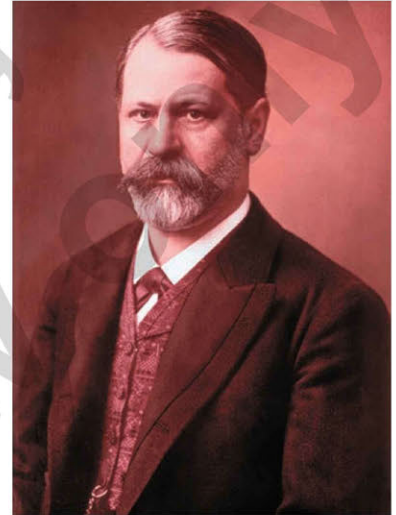
Sigmund Freud

theories broad explanations, and predictions about phenomena of interest

psychodynamic perspective the approach that states behavior is motivated by inner forces, memories, and conflicts that are generally beyond people's awareness and control

psychoanalytic theory the theory proposed by Freud that suggests that unconscious forces act to determine personality and behavior

psychosexual development according to Freud, a series of stages that children pass through in which pleasure, or gratification, is focused on a particular biological function and body part

psychosocial development according to Erikson, development that encompasses changes both in the understandings individuals have of themselves as members of society and in their comprehension of the meaning of others' behavior

TABLE 1-2 FREUD'S AND ERIKSON'S THEORIES

Approximate Age	Freud's Stages of Psychosexual Development	Major Characteristics of Freud's Stages	Erikson's Stages of Psychosocial Development	Positive and Negative Outcomes of Erikson's Stages
Birth to 12–18 months	Oral	Interest in oral gratification from sucking, eating, mouthing, biting	Trust vs. mistrust	*Positive*: Feelings of trust from environmental support *Negative*: Fear and concern regarding others
12–18 months to 3 years	Anal	Gratification from expelling and withholding feces; coming to terms with society's controls relating to toilet training	Autonomy vs. shame and doubt	*Positive*: Self-sufficiency if exploration is encouraged *Negative*: Doubts about self, lack of independence
3 to 5–6 years	Phallic	Interest in the genitals; coming to terms with Oedipal conflict, leading to identification with same-sex parent	Initiative vs. guilt	*Positive*: Discovery of ways to initiate actions *Negative*: Guilt from actions and thoughts
5–6 years to adolescence	Latency	Sexual concerns largely unimportant	Industry vs. inferiority	*Positive*: Development of sense of competence *Negative*: Feelings of inferiority, no sense of mastery
Adolescence to adulthood (Freud) Adolescence (Erikson)	Genital	Reemergence of sexual interests and establishment of mature sexual relationships	Identity vs. role diffusion	*Positive*: Awareness of uniqueness of self, knowledge of role to be followed *Negative*: Inability to identify appropriate roles in life
Early adulthood (Erikson)			Intimacy vs. isolation	*Positive*: Development of loving, sexual relationships and close friendships *Negative*: Fear of relationships with others
Middle adulthood (Erikson)			Generativity vs. stagnation	*Positive*: Sense of contribution to continuity of life *Negative*: Trivialization of one's activities
Late adulthood (Erikson)			Ego-integrity vs. despair	*Positive*: Sense of unity in life's accomplishments *Negative*: Regret over lost opportunities of life

Each stage presents a crisis or conflict that the individual must resolve. Although no crisis is ever fully resolved, the individual must at least address the crisis of each stage sufficiently to deal with demands made during the next stage of development. Unlike Freud, who regarded development as relatively complete by adolescence, Erikson suggested that growth and change continue throughout the life span (de St. Aubin, McAdams, & Kim, 2004).

Assessing the Psychodynamic Perspective. Freud's insight that unconscious influences affect behavior was a monumental accomplishment, and the fact that it seems at all reasonable to us shows how extensively the idea of the unconscious has pervaded thinking in Western cultures. In fact, work by contemporary researchers studying memory and learning suggests that we unconsciously carry with us memories that have a significant impact on our behavior.

Some of the most basic principles of Freud's psychoanalytic theory have been questioned, however, because they have not been validated by research. In particular, the notion that childhood stages determine adult personalities has little research support. In addition, because much of Freud's theory was based on a limited population of upper-middle-class Austrians living during a strict, puritanical era, its application to broad, multicultural populations is questionable. Finally, because Freud's theory focuses primarily on male development, it has been criticized as sexist and interpreted as devaluing women (Messer & McWilliams, 2003; Schachter, 2005; Gillham, Law, & Hickey, 2010).

Erikson's view that development continues throughout the life span is highly important—and has received considerable support. However, the theory also has its drawbacks. Like Freud's theory, it focuses more on men than women. Further, its vagueness makes it difficult to test rigorously. And, as with psychodynamic theories in general, it is difficult to make definitive predictions about a given individual's behavior using the theory (Zauszniewski & Martin, 1999; De St. Aubin & McAdams, 2004; Balsam, 2013).

The Behavioral Perspective: Focusing on Observable Behavior

When Elissa Sheehan was 3, a large brown dog bit her, and she needed dozens of stitches and several operations. From the time she was bitten, she broke into a sweat whenever she saw a dog, and in fact never enjoyed being around any pet.

To a lifespan development specialist using the behavioral perspective, the explanation for Elissa's behavior is straightforward: She has a learned fear of dogs. Rather than looking inside the organism at unconscious processes, the **behavioral perspective** suggests that the keys to understanding development are observable behavior and environmental stimuli. If we know the stimuli, we can predict the behavior. In this respect, the behavioral perspective reflects the view that nurture is more important to development than nature.

Behavioral theories reject the notion that people universally pass through a series of stages. Instead, people are affected by the environmental stimuli to which they happen to be exposed. Developmental patterns, then, are personal, reflecting a particular set of environmental stimuli, and behavior is the result of continuing exposure to specific factors in the environment. Furthermore, developmental change is viewed in quantitative, rather than qualitative, terms. For instance, behavioral theories hold that advances in problem-solving capabilities as children age are largely a result of greater mental *capacities*, rather than changes in the *kind* of thinking that children can bring to bear on a problem.

Classical Conditioning: Stimulus Substitution.

> 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. (Watson, 1925)

With these words, John B. Watson, one of the first American psychologists to advocate a behavioral approach, summed up the behavioral perspective. Watson, who lived from 1878 to 1958, believed strongly that we could gain a full understanding of development by carefully studying the stimuli that composed the environment. In fact, he argued that by effectively controlling—or *conditioning*—a person's environment, it was possible to produce virtually any behavior.

Classical conditioning occurs when an organism learns to respond in a particular way to a neutral stimulus. For instance, if the sound of a bell is paired with the arrival of meat, a dog will learn to react to the bell alone in the same way it reacts to the meat—by salivating and wagging its tail. The behavior is a result of conditioning, a form of learning in which the response associated with one stimulus (food) comes to be connected to another—in this case, the bell.

The same process of classical conditioning explains how we learn emotional responses. In the case of dog-bite victim Elissa Sheehan, for instance, Watson would say that one stimulus has been substituted for another: Elissa's unpleasant experience with a particular dog (the initial stimulus) has been transferred to other dogs and to pets in general.
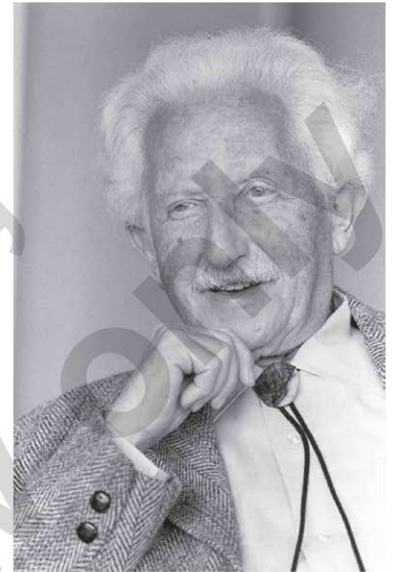
Erik Erikson

behavioral perspective the approach that suggests that the keys to understanding development are observable behavior and outside stimuli in the environment

classical conditioning a type of learning in which an organism responds in a particular way to a neutral stimulus that normally does not bring about that type of response

John B. Watson

Operant Conditioning. In addition to classical conditioning, the behavioral perspective accounts for other types of learning, especially what behavioralists call operant conditioning. **Operant conditioning** is a form of learning in which a voluntary response is strengthened or weakened by its association with positive or negative consequences. It differs from classical conditioning in that the response being conditioned is voluntary and purposeful rather than automatic (such as salivating). In operant conditioning, formulated and championed by psychologist B. F. Skinner (1904–1990), individuals learn to *operate* on their environments in order to bring about desired consequences (Skinner, 1975).

Whether or not children and adults will seek to repeat a behavior depends on whether it is followed by reinforcement. *Reinforcement* is the process by which a behavior is followed by a stimulus that increases the probability that the behavior will be repeated. Hence, a student is apt to work harder if he or she receives good grades; workers are likely to labor harder if their efforts are tied to pay increases; and people are more apt to buy lottery tickets if they are reinforced by winning occasionally. In addition, *punishment*, the introduction of an unpleasant or painful stimulus or the removal of a desirable stimulus, will decrease the probability that a preceding behavior will occur in the future.

Behavior that is reinforced, then, is more likely to be repeated, while behavior that receives no reinforcement or is punished is likely to be *extinguished* in the language of operant conditioning. Principles of operant conditioning are used in **behavior modification**, a formal technique for promoting the frequency of desirable behaviors and decreasing the incidence of unwanted ones. Behavior modification has been used in situations ranging from teaching people with severe retardation basic language to helping people with self-control problems stick to diets (Matson & LoVullo, 2008; Wupperman et al., 2012).

Social-Cognitive Learning Theory: Learning Through Imitation. A 5-year-old boy seriously injures his 22-month-old cousin while imitating a violent wrestling move he has seen on television. Although the baby sustained spinal cord injuries, he improved and was discharged 5 weeks after his hospital admission (Reuters Health eLine, 2002).

Cause and effect? We can't know for sure, but it certainly seems possible, especially to social-cognitive learning theorists. According to developmental psychologist Albert Bandura and colleagues, a significant amount of learning is explained by **social-cognitive learning theory**, an approach that emphasizes learning by observing the behavior of another person, called a *model* (Bandura, 1994, 2002).

⮞ **From a social worker's perspective:** How do the concepts of social learning and modeling relate to the mass media, and how might exposure to mass media influence a child's family life?

According to social-cognitive learning theory, behavior is learned primarily through observation and not through trial and error, as it is with operant conditioning. We don't need to experience the consequences of a behavior ourselves to learn it. Social-cognitive learning theory holds that when we see the behavior of a model being rewarded, we are likely to imitate that behavior. For instance, in one classic experiment, children who were afraid of dogs were exposed to a model, nicknamed the "Fearless Peer," who was seen playing happily with a dog (Bandura, Grusec, & Menlove, 1967). After exposure, the children who previously had been afraid were more likely to approach a strange dog than children who had not seen the model.

Assessing the Behavioral Perspective. Research using the behavioral perspective has made significant contributions, ranging from the education of children with severe mental retardation to the development of procedures for curbing aggression. At the same time, the perspective has experienced internal disagreements. For example, although part of the same behavioral perspective, classical and operant conditioning and social learning theory disagree in some basic ways. Classical and operant conditioning consider learning in terms of external stimuli and responses, in which the only important factors are the observable features of the environment. People and other organisms are like inanimate "black boxes"; nothing that occurs inside the box is understood—nor much cared about, for that matter.

operant conditioning a form of learning in which a voluntary response is strengthened or weakened by its association with positive or negative consequences

behavior modification a formal technique for promoting the frequency of desirable behaviors and decreasing the incidence of unwanted ones

social-cognitive learning theory learning by observing the behavior of another person, called a model

To social learning theorists, such an analysis is an oversimplification. They argue that what makes people different from rats and pigeons is the mental activity, in the form of thoughts and expectations. We cannot derive a full understanding of people's development without moving beyond external stimuli and responses.

In many ways, social learning theory has won this argument in recent decades. In fact, another perspective that focuses explicitly on internal mental activity—the cognitive perspective—has become enormously influential.

The Cognitive Perspective: Examining the Roots of Understanding

When 3-year-old Jake is asked why it sometimes rains, he answers "so the flowers can grow." When his 11-year-old sister Lila is asked the same question, she responds "because of evaporation from the surface of the Earth." And when their cousin Ajima, who is studying meteorology in graduate school, considers the same question, her extended answer includes a discussion of cumulo-nimbus clouds, the Coriolis Effect, and synoptic charts.

To a developmental theorist using the cognitive perspective, the difference in the sophistication of the answers is evidence of a different degree of knowledge and understanding, or cognition. The **cognitive perspective** focuses on the processes that allow people to know, understand, and think about the world.

The cognitive perspective emphasizes how people internally represent and think about the world. By using this perspective, developmental researchers hope to understand how children and adults process information and how their ways of thinking and understanding affect their behavior. They also seek to learn how cognitive abilities change as people develop, the degree to which cognitive development represents quantitative and qualitative growth in intellectual abilities, and how different cognitive abilities are related to one another.

Piaget's Theory of Cognitive Development. No one has had a greater impact on the study of cognitive development than Jean Piaget, a Swiss psychologist who lived from 1896 to 1980. Piaget proposed that all people pass through a fixed sequence of universal stages of cognitive development—and not only does the *quantity* of information increase in each stage, but the *quality* of knowledge and understanding changes as well. His focus was on the change in cognition that occurs as children move from one stage to the next (Piaget, 1952, 1962, 1983). Broadly speaking, Piaget suggested that human thinking is arranged into *schemes*, organized mental patterns that represent behaviors and actions. In infants, schemes represent concrete behavior—a scheme for sucking, for reaching, and for each separate behavior. In older children, the schemes become more sophisticated and abstract, such as the skills involved in riding a bike or playing an interactive video game. Schemes are like intellectual computer software programs that direct and determine how data from the world are looked at and handled (Parker, 2005).

Piaget suggested that the growth in children's understanding of the world could be explained by two basic principles: assimilation and accommodation. *Assimilation* is the process in which people understand a new experience in terms of their current stage of cognitive development and existing ways of thinking. In contrast, *accommodation* refers to changes in existing ways of thinking in response to encounters with new stimuli or events. Assimilation and accommodation work in tandem to bring about cognitive development.

Assessing Piaget's Theory. Piaget has profoundly influenced our understanding of cognitive development and is one of the towering figures in lifespan development. He provided masterly descriptions of intellectual growth during childhood—descriptions that have stood the test of literally thousands of investigations. Broadly, then, Piaget's view of cognitive development is accurate.

However, the specifics of the theory have been questioned. For instance, some cognitive skills clearly emerge earlier than Piaget suggested. Furthermore, the universality of Piaget's stages has been disputed. Growing evidence suggests that particular cognitive skills emerge on a different timetable in non-Western cultures. And in every culture, some people never seem to reach Piaget's highest level of cognitive sophistication: formal, logical thought
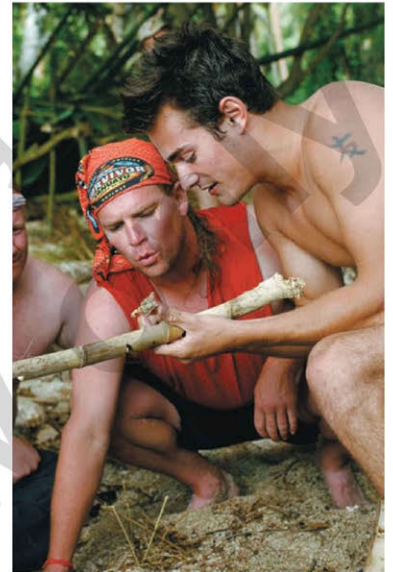
On the reality show *Survivor*, contestants often must learn new survival skills in order to be successful. What form of learning is prevalent?

cognitive perspective the approach that focuses on the processes that allow people to know, understand, and think about the world

(Kesselring & Müller, 2010; De Jesus-Zayas, Buigas, & Denney, 2012; Müller, Burman, & Hutchison, 2013).

Ultimately, the greatest criticism is that cognitive development is not necessarily as discontinuous as Piaget's stage theory suggests. Many developmental researchers argue that growth is considerably more continuous. These critics have suggested an alternative perspective, known as the information processing approach, that focuses on the processes that underlie learning, memory, and thinking throughout the life span.

Information Processing Approaches. Information processing approaches have become an important alternative to Piagetian approaches. **Information processing approaches** to cognitive development seek to identify the ways individuals take in, use, and store information.

Information processing approaches grew out of developments in computers. They assume that even complex behavior such as learning, remembering, categorizing, and thinking can be broken down into a series of individual, specific steps.

Like computers, children are assumed by information processing approaches to have limited capacity for processing information. As they develop, though, they employ increasingly sophisticated strategies that allow them to process information more efficiently.

In stark contrast to Piaget's view, information processing approaches assume that development is marked more by quantitative advances than qualitative ones. Our capacity to handle information changes with age, as does our processing speed and efficiency. Furthermore, information processing approaches suggest that as we age, we are better able to control the nature of processing and the strategies we choose to process information.

An information processing approach that builds on Piaget's research is known as neo-Piagetian theory. In contrast to Piaget's original work, which viewed cognition as a single system of increasingly sophisticated general cognitive abilities, *neo-Piagetian theory* considers cognition as made up of different types of individual skills. Using the terminology of information processing approaches, neo-Piagetian theory suggests that cognitive development proceeds quickly in certain areas and more slowly in others. For example, reading ability and the skills needed to recall stories may progress sooner than the abstract computational abilities used in algebra or trigonometry. Furthermore, neo-Piagetian theorists believe that experience plays a greater role in advancing cognitive development than traditional Piagetian approaches claim (Case, Demetriou, & Platsidou, 2001; Yan & Fischer, 2002; Loewen, 2006).

Assessing Information Processing Approaches. As we'll see in future chapters, information processing approaches have become a central part of our understanding of development. At the same time, they do not offer a complete explanation of behavior. For example, they have paid little attention to behavior such as creativity, in which the most profound ideas often are developed in a seemingly nonlogical, nonlinear manner. In addition, they do not take into account the social context in which development takes place—and theories that do this have become increasingly popular.

Cognitive Neuroscience Approaches. One of the most recent additions to the array of approaches are **cognitive neuroscience approaches**, which look at cognitive development at the level of brain processes. Like other cognitive perspectives, cognitive neuroscience approaches consider internal, mental processes, but they focus specifically on the neurological activity that underlies thinking, problem solving, and other cognitive behavior.

Cognitive neuroscientists seek to identify actual locations and functions within the brain that are related to different types of cognitive activities. For example, using sophisticated brain scanning techniques, cognitive neuroscientists have demonstrated that thinking about the meaning of a word activates different areas of the brain than thinking about how the word sounds when spoken.

Cognitive neuroscientists are also providing clues to the cause of *autism spectrum disorder*, a major developmental disability that can produce profound language deficits and self-injurious behavior in young children. For example, neuroscientists have found that the brains of children with the disorder show explosive, dramatic growth in the first year of life, making their heads significantly larger than those of children without the disorder (see Figure 1-1). By identifying children with the disorder very early in their lives, health care providers can
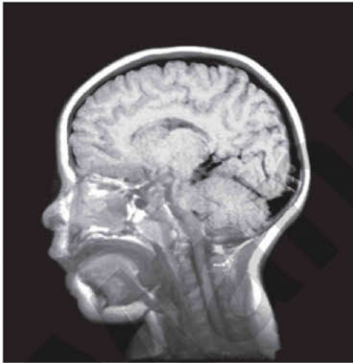
FIGURE 1-1 Brain Size Matters
Neuroscientists found evidence that the brains of children with autism spectrum disorder are somewhat larger than those of children without the disorder. This finding might help identify cases of autism spectrum disorder early, allowing for more effective intervention and treatment.

information processing approaches the model that seeks to identify the ways individuals take in, use, and store information

cognitive neuroscience approaches the approach that examines cognitive development through the lens of brain processes

provide crucial early intervention (Akshoomoff, 2006; Nadel & Poss, 2007; Lewis & Elman, 2008; Bal et al., 2010).

Cognitive neuroscience approaches are also on the forefront of cutting-edge research that has identified genes associated with disorders ranging from physical problems such as breast cancer to psychological disorders such as schizophrenia. Identifying the genes that make one vulnerable to such disorders is the first step in genetic engineering in which gene therapy can reduce or even prevent the disorder from occurring (DeLisi & Fleischhaker, 2007; Strobel et al., 2007; Ranganath, Minzenberg, & Ragland, 2008; Rodnitzky, 2012).

(1.1)
(1.2)
(1.3)

REVIEW, CHECK, AND APPLY

REVIEW

L05 Which theoretical perspectives have guided lifespan development?

- ◼ Lifespan development has been viewed from six major theoretical perspectives: the psychodynamic, behavioral, cognitive, humanistic, contextual, and evolutionary perspectives. Each emphasizes somewhat different aspects of development and steers developmentalists in particular directions.

L06 What are the main characteristics of the psychodynamic, behavioral, and cognitive perspectives?

- ◼ The psychodynamic perspective looks primarily at the influence of internal, unconscious forces on development.

- ◼ In contrast, the behavioral perspective focuses on external, observable behaviors as the key to development.

- ◼ The cognitive perspective focuses on mental activity, holding that individuals pass through stages in which their ways of thinking change both qualitatively and quantitatively.

CHECK YOURSELF

1. Which of the following is not a difference between Freud's psychoanalytic theory and Erikson's psychosocial theory?

    a Freud placed more emphasis on the influence of culture.

    b Erikson's theory breaks down adulthood into finer sub-stages.

    c Erikson placed less emphasis on sexual energy.

2. The _____ perspective suggests that the key to understanding one's actions involves observation of those actions and the outside stimuli in the environment.

    a psychodynamic

    b cognitive

    c behavioral

    d operant conditioning

3. Which of the following is NOT a concern with Piaget's cognitive perspective?

    a Everyone reaches Piaget's highest level of thought, suggesting that it isn't much of an achievement.

    b Some cognitive skills appear much earlier than Piaget originally thought.

    c The timing of cognitive skills differs as a function of culture.

    d Cognitive development does not appear to be as discontinuous as Piaget suggested.

APPLYING LIFESPAN DEVELOPMENT

- ◼ Can you think of daily examples of classical conditioning? What type of behaviors may be more easily conditioned?

THE HUMANISTIC, CONTEXTUAL, AND EVOLUTIONARY PERSPECTIVES

L07 What are the main characteristics of the humanistic, contextual, and evolutionary perspectives?

L08 Why is there no "right" approach to development?

The Humanistic Perspective: Concentrating on Uniquely Human Qualities

The unique qualities of humans are the central focus of the humanistic perspective, the fourth of the major theories used by lifespan developmentalists. Rejecting the notion that behavior is largely determined by unconscious processes, the environment, or cognitive processing, the **humanistic perspective** contends that people have a natural capacity to make decisions about their lives and to control their behavior. According to this approach, each individual has the ability and motivation to reach more advanced levels of maturity, and people naturally seek to reach their full potential.

humanistic perspective the theory that contends that people have a natural capacity to make decisions about their lives and control their behavior

The humanistic perspective emphasizes *free will*, the ability of humans to make choices and come to decisions about their lives. Instead of relying on societal standards, then, people are assumed to be motivated to make their own decisions about what they do with their lives.

Carl Rogers, one of the major proponents of the humanistic perspective, suggests that people need positive regard, which results from an underlying wish to be loved and respected. Because positive regard comes from other people, we become dependent on them. Consequently, our view of ourselves and our self-worth is a reflection of how we think others view us (Rogers, 1971; Motschnig & Nykl, 2003; Cornforth, 2010).

Rogers, along with another key figure in the humanistic perspective, Abraham Maslow, suggests that self-actualization is a primary goal in life. *Self-actualization* is a state of self-fulfillment in which people achieve their highest potential in their own unique way (Maslow, 1970; Jones & Crandall, 1991; Sheldon, Joiner, & Pettit, 2003; Malchiodi, 2012).

Assessing the Humanistic Perspective. Despite its emphasis on important and unique human qualities, the humanistic perspective has not had a major impact on the field of lifespan development. This is primarily due to its inability to identify any sort of broad developmental change that is the result of increasing age or experience. Still, some of the concepts drawn from the humanistic perspective, such as self-actualization, have helped describe important aspects of human behavior and are widely discussed in areas ranging from health care to business (Laas, 2006; Zalenski & Raspa, 2006; Elkins, 2009).

The Contextual Perspective: Taking a Broad Approach to Development

Although lifespan developmentalists often consider physical, cognitive, personality, and social factors separately, such a categorization has one serious drawback: In the real world, none of these broad influences occurs in isolation from any other. Instead, there is a constant, ongoing interaction between the different types of influence.

The **contextual perspective** considers the relationship between individuals and their physical, cognitive, personality, and social worlds. It suggests that a person's unique development cannot be properly viewed without seeing how that person is enmeshed within a rich social and cultural context. We'll consider two major theories that fall under this category, Bronfenbrenner's bioecological approach and Vygotsky's sociocultural theory.

The Bioecological Approach to Development. In acknowledging the problem with traditional approaches to lifespan development, psychologist Urie Bronfenbrenner (1989; 2000; 2002) has proposed an alternative perspective, the bioecological approach. The **bioecological approach** suggests that there are five levels of the environment that simultaneously influence individuals. Bronfenbrenner suggests that we cannot fully understand development without considering how a person is influenced by each of these levels.

- The *microsystem* is the everyday, immediate environment of children's daily lives. Homes, caregivers, friends, and teachers all are influences, but the child is not just a passive recipient. Instead, children actively help construct the microsystem, shaping their immediate world. The microsystem is the level to which most traditional work in child development has been directed.

- The *mesosystem* connects the various aspects of the microsystem. The mesosystem binds children to parents, students to teachers, employees to bosses, friends to friends. It acknowledges the direct and indirect influences that bind us to one another, such as those that affect a mother who has a bad day at the office and then is short-tempered with her son or daughter at home.

- The *exosystem* represents broader influences: societal institutions such as local government, the community, schools, places of worship, and the local media. Each of these institutions can have an immediate and major impact on personal development, and each affects how the microsystem and mesosystem operate. For example, the quality of a school will affect a child's cognitive development and potentially can have long-term consequences.

- The *macrosystem* represents the larger cultural influences on an individual, including society in general, types of governments, religious and political value systems, and other broad, encompassing factors. For example, the value a culture places on education affects

contextual perspective the theory that considers the relationship between individuals and their physical, cognitive, personality, and social worlds

bioecological approach the perspective suggesting that levels of the environment simultaneously influence individuals

the values of the people who live in that culture. Children are part of both a broader culture (such as Western culture) and members of one or more subcultures (for instance, Mexican American subculture).

- Finally, the *chronosystem* underlies each of the previous systems. It involves the way the passage of time—including historical events (such as the terrorist attacks in September of 2001) and more gradual historical changes (such as changes in the number of women who work outside the home)—affects children's development.

The bioecological approach emphasizes the *interconnectedness of the influences on development*. Because the various levels are related to one another, a change in one part of the system affects other parts. For instance, a parent's loss of a job (involving the mesosystem) has an impact upon a child's microsystem.

Conversely, changes on one environmental level may make little difference if other levels are not also changed. For instance, improving the school environment may have a negligible effect on academic performance if children receive little support for academic success at home. Similarly, the influences among family members are multidirectional. Parents don't just influence their child's behavior—the child also influences the parents' behavior.

Finally, the bioecological approach stresses the importance of broad cultural factors that affect development. Researchers in lifespan development increasingly look at how membership in cultural groups influences behavior.

Consider, for instance, whether you agree that children should be taught that their classmates' assistance is essential to getting good grades in school, or that they should plan to continue their fathers' businesses, or that they should take their parents' advice in choosing a career. If you have been raised in the most widespread North American culture, you would likely disagree with all three statements, since they violate the premises of *individualism*, the dominant Western philosophy that emphasizes personal identity, uniqueness, freedom, and the worth of the individual.

On the other hand, if you were raised in a traditional Asian culture, your agreement with the three statements is considerably more likely because the statements reflect the value orientation known as collectivism. *Collectivism* is the notion that the well-being of the group is more important than that of the individual. People raised in collectivistic cultures sometimes emphasize the welfare of the group at the expense of their own personal well-being.

According to Vygotsky, children can develop cognitively in their understanding of the world and learn what is important in society, through play and cooperation with others.

The individualism–collectivism spectrum is one of several dimensions along which cultures differ, and it illustrates differences in the cultural contexts in which people operate. Such broad cultural values play an important role in shaping the ways people view the world and behave (Garcia & Saewyc, 2007; Yu & Stiffman, 2007; Boles, Le, & Nguyen, 2010).

Assessing the Bioecological Approach. Although Bronfenbrenner regards biological influences as an important component of the bioecological approach, ecological influences are central to the theory. In fact, some critics argue that the perspective pays insufficient attention to biological factors. Still, the bioecological approach is important because it suggests the multiple levels at which the environment affects children's development.

Vygotsky's Sociocultural Theory. To Russian developmentalist Lev Semenovich Vygotsky, a full understanding of development is impossible without taking into account the culture in which people develop. Vygotsky's **sociocultural theory** emphasizes how cognitive development proceeds as a result of social interactions between members of a culture (Vygotsky, 1979, 1926/1997; Ferholt & Lecusay, 2010; Göncü, 2012).

Vygotsky, who lived a brief life, from 1896 to 1934, argued that children's understanding of the world is acquired through their problem-solving interactions with adults and other children. As children play and cooperate with others, they learn what is important in their society and, at the same time, advance cognitively. Consequently, to understand development, we must consider what is meaningful to members of a given culture.

sociocultural theory the approach that emphasizes how cognitive development proceeds as a result of social interactions between members of a culture

More than most other theories, sociocultural theory emphasizes that development is a *reciprocal transaction* between the people in a child's environment and the child. Vygotsky believed that people and settings influence the child, who in turn influences the people and settings. This pattern continues in an endless loop, with children being both recipients of socialization influences and sources of influence. For example, a child raised with his or her extended family nearby will grow up with a different sense of family life than a child whose relatives live far away. Those relatives, too, are affected by that situation and that child, depending upon how close and frequent their contact is with the child.

Assessing Vygotsky's Theory. Sociocultural theory has become increasingly influential, despite Vygotsky's death almost 8 decades ago. The reason is the growing acknowledgment of the central importance of cultural factors in development. Children do not develop in a cultural vacuum. Instead, their attention is directed by society to certain areas, and as a consequence, they develop particular kinds of skills. Vygotsky was one of the first developmentalists to recognize and acknowledge the importance of the cultural environment, and—as today's society becomes increasingly multicultural—sociocultural theory helps us to understand the rich and varied influences that shape development (Koshmanova, 2007; Rogan, 2007; Mahn & John-Steiner, 2013).

Sociocultural theory is not without its critics, however. Some suggest that Vygotsky's strong emphasis on the role of culture and social experience led him to ignore the effects of biological factors on development. In addition, his perspective seems to minimize the role that individuals play in shaping their environment.

Evolutionary Perspectives: Our Ancestors' Contributions to Behavior

One increasingly influential approach is the evolutionary perspective, the sixth and final developmental perspective that we will consider. The **evolutionary perspective** seeks to identify behavior that is the result of our genetic inheritance from our ancestors (Buss & Reeve, 2003; Bjorklund, 2005; Goetz & Shackelford, 2006).

Konrad Lorenz, seen here with geese who from their birth have followed him, considered the ways in which behavior reflects inborn genetic patterns.

Evolutionary approaches grow out of the groundbreaking work of Charles Darwin. In 1859, Darwin argued in *On the Origin of Species* that a process of natural selection creates traits in a species that are adaptive to its environment. Using Darwin's arguments, evolutionary approaches contend that our genetic inheritance not only determines such physical traits as skin and eye color, but certain personality traits and social behaviors as well. For instance, some evolutionary developmentalists suggest that behaviors such as shyness and jealousy are produced in part by genetic causes, presumably because they helped in increasing survival rates of humans' ancient relatives (Buss, 2003, 2012; Easton, Schipper, & Shackelford, 2007).

The evolutionary perspective draws heavily on the field of *ethology*, which examines the ways in which our biological makeup influences our behavior. A primary proponent of ethology was Konrad Lorenz (1903–1989), who discovered that newborn geese are genetically preprogrammed to become attached to the first moving object they see after birth. His work, which demonstrated the importance of biological determinants in influencing behavior patterns, led developmentalists to consider the ways in which human behavior might reflect inborn genetic patterns.

The evolutionary perspective encompasses one of the fastest growing areas within the field of lifespan development: behavioral genetics. *Behavioral genetics* studies the effects of heredity on behavior. Behavioral geneticists seek to understand how we might inherit certain behavioral traits and how the environment influences whether we actually display those traits. It also considers how genetic factors may produce psychological disorders such as schizophrenia (Li, 2003; Bjorklund & Ellis, 2005; Rembis, 2009).

Assessing the Evolutionary Perspective. There is little argument among lifespan developmentalists that Darwin's evolutionary theory provides an accurate description of basic genetic processes, and the evolutionary perspective is increasingly visible in the field of lifespan development. However, applications of the evolutionary perspective have been subjected to considerable criticism.

evolutionary perspective the theory that seeks to identify behavior that is a result of our genetic inheritance from our ancestors

Some developmentalists are concerned that because of its focus on genetic and biological aspects of behavior, the evolutionary perspective pays insufficient attention to the environmental and social factors involved in producing children's and adults' behavior. Other critics argue that there is no good way to experimentally test theories derived from this approach because humans evolved so long ago. For example, it is one thing to say that jealousy helped individuals to survive more effectively and another thing to prove it. Still, the evolutionary approach has stimulated research on how our biological inheritance influences at least partially our traits and behaviors (Buss & Reeve, 2003; Bjorklund, 2006; Baptista et al., 2008).

Why "Which Approach Is Right?" Is the Wrong Question

We have considered the six major perspectives on development—psychodynamic, behavioral, cognitive, humanistic, contextual, and evolutionary—summarized in Table 1-3 and applied to a specific case. It would be natural to wonder which of the six provides the most accurate account of human development.

For several reasons, this is not an appropriate question. For one thing, each perspective emphasizes different aspects of development. For instance, the psychodynamic approach emphasizes unconscious determinants of behavior, while behavioral perspectives emphasize overt behavior. The cognitive and humanistic perspectives look more at what people *think* than at what they do. The contextual perspective examines social and cultural influences on development, and the evolutionary perspective focuses on how inherited biological factors underlie development.

For example, a developmentalist using the psychodynamic approach might consider how the 9/11 terrorist attacks on the World Trade Center and Pentagon might affect children, unconsciously, for their entire life span. A cognitive approach might focus on how children perceived and came to interpret and understand terrorism, while a contextual approach might consider what personality and social factors led the perpetrators to adopt terrorist tactics.

Clearly, each perspective is based on its own premises and focuses on different aspects of development. Furthermore, the same developmental phenomenon can be looked at from a number of perspectives simultaneously. In fact, some lifespan developmentalists use an *eclectic* approach, drawing on several perspectives simultaneously.

TABLE 1-3 MAJOR PERSPECTIVES ON LIFESPAN DEVELOPMENT

Perspective	Key Ideas About Human Behavior and Development	Major Proponents	Example
Psychodynamic	Behavior throughout life is motivated by inner, unconscious forces, stemming from childhood, over which we have little control.	Sigmund Freud, Erik Erikson	This view might suggest that a young adult who is overweight has a fixation in the oral stage of development.
Behavioral	Development can be understood through studying observable behavior and environmental stimuli.	John B. Watson, B. F. Skinner, Albert Bandura	In this perspective, a young adult who is overweight might be seen as not being rewarded for good nutritional and exercise habits.
Cognitive	Emphasis on how changes or growth in the ways people know, understand, and think about the world affect behavior.	Jean Piaget	This view might suggest that a young adult who is overweight hasn't learned effective ways to stay at a healthy weight and doesn't value good nutrition.
Humanistic	Behavior is chosen through free will and motivated by our natural capacity to strive to reach our full potential.	Carl Rogers, Abraham Maslow	In this view, a young adult who is overweight may eventually choose to seek an optimal weight as part of an overall pattern of individual growth.
Contextual	Development should be viewed in terms of the interrelationship of a person's physical, cognitive, personality, and social worlds.	Urie Bronfenbrenner, Lev Vygotsky	In this perspective, being overweight is caused by a number of interrelated factors in that person's physical, cognitive, personality, and social worlds.
Evolutionary	Behavior is the result of genetic inheritance from our ancestors; traits and behavior that are adaptive for promoting the survival of our species have been inherited through natural selection.	Influenced by early work of Charles Darwin, Konrad Lorenz	This view might suggest that a young adult might have a genetic tendency toward obesity because extra fat helped his or her ancestors to survive in times of famine.

In the same way, the various theoretical perspectives provide different ways of looking at development. Considering them together paints a fuller portrait of the myriad ways human beings change and grow over the course of their lives. However, not all theories and claims derived from the various perspectives are accurate. How do we choose among competing explanations? The answer can be found through *research*, which we consider in the final part of this chapter.

REVIEW, CHECK, AND APPLY

REVIEW

L07 What are the main characteristics of the humanistic, contextual, and evolutionary perspectives?

- The humanistic perspective maintains that individuals have the ability and motivation to reach advanced levels of maturity and that people naturally seek to reach their full potential.

- The contextual perspective considers the relationship between individuals and their physical, cognitive, personality, and social worlds. Bronfenbrenner's bioecological approach and Vygotsky's sociocultural theory fall into this category.

- The evolutionary perspective attempts to identify behavior that is a result of our genetic inheritance.

L08 Why is there no "right" approach to development?

- The theoretical perspectives provide different ways of looking at development. Considering them together paints a fuller portrait of the myriad ways human beings change and grow over the course of their lives.

- However, not all theories and claims derived from the various perspectives are accurate.

CHECK YOURSELF

1. According to the humanistic perspective, people reject the urge to seek love and respect from others and strive to achieve personal independence free of societal interconnections.
   - ☐ True
   - ☐ False

2. Bronfenbrenner's bioecological approach and Vygotsky's sociocultural theory fall under the category of the _____ perspective.
   - a humanistic
   - b ethnological
   - c contextual
   - d evolutionary

3. Behavioral genetics belong to the _____ perspective, and study the effects of _____ on behavior.
   - a evolutionary, genetics
   - b behavioral, genetics
   - c evolutionary, nutrition
   - d behavioral, nutrition

APPLYING LIFESPAN DEVELOPMENT

- Choose one of the stages from Erikson's theory to describe your own personality development. Also evaluate how adequately Erikson's theory explains your development at that particular stage.

MODULE 1.3   RESEARCH METHODS

The Greek historian Herodotus wrote of an experiment conducted by Psamtik, the King of Egypt in the seventh century B.C. Psamtik was eager to prove a cherished Egyptian belief, that his people were the oldest race on earth. To test this notion, he developed a hypothesis: If a child was never exposed to the language of his elders, he would instinctively adopt the primal language of humanity—the original language of the first people. Psamtik was certain this would be Egyptian.

For his experiment, Psamtik entrusted two Egyptian infants to the care of a herdsman in an isolated area. They were to be well looked after, but not allowed to leave their cottage. And they were never to hear anyone speak a single word.

When Herodotus investigated the story, the priests of Hephaestus in Memphis told him that Psamtik's quest "was to know, after the indistinct babblings of infancy were over, what word [the children] would first articulate." Herodotus claims the experiment worked, but not as Psamtik had hoped. One day, when the children were 2 years old, they greeted the herdsman with the word "Becos!" The herdsman didn't know this word but when the children continued to use it, he contacted Psamtik. The king sent for the children who repeated the strange word to him. Psamtik did some research. Becos, it evolved, was "bread" in Phrygian. Psamtik had to conclude the Phrygians had preceded the Egyptians.

With the perspective of several thousand years, we can easily see the shortcomings—both scientific and ethical—in Psamtik's approach. Yet his procedure represents an improvement over mere speculation, and as such is sometimes looked upon as the first developmental experiment in recorded history (Hunt, 1993).

THEORIES, HYPOTHESES, AND CORRELATIONAL STUDIES

LO9   What roles do theories and hypotheses play in the study of development?
LO10 What sorts of studies and methods are used in correlational research?

Theories and Hypotheses: Posing Developmental Questions

Questions such as those raised by Psamtik drive the study of development. In fact, developmentalists are still studying how children learn language. Others are working on such questions as, What are the effects of malnutrition on intellectual performance? How do infants form relationships with their parents, and does day care disrupt such relationships? Why are adolescents particularly susceptible to peer pressure? Can mentally challenging activities reduce the declines in intellectual abilities related to aging? Do any mental faculties improve with age?

To answer such questions, developmentalists, like all psychologists and other scientists, rely on the scientific method. The **scientific method** is the process of posing and answering questions using careful, controlled techniques that include systematic, orderly observation and the collection of data. The scientific method involves three major steps: (1) identifying questions of interest, (2) formulating an explanation, and (3) carrying out research that either lends support to the explanation or refutes it.

The scientific method involves the formulation of theories, broad explanations, and predictions about phenomena of interest. For instance, the idea that there is a crucial bonding period between parent and child immediately after birth is a theory.

Developmental researchers use theories to form hypotheses. A **hypothesis** is a prediction stated in a way that permits it to be tested. For instance, someone who subscribes to the general theory that bonding is crucial might derive the hypothesis that effective bonding occurs only if it lasts for a certain length of time.

Choosing a Research Strategy: Answering Questions

Once researchers have formed a hypothesis, they must develop a research strategy to test its validity. There are two major categories of research: correlational research and experimental research. Correlational research seeks to identify whether an association or relationship between two factors exists. As we'll see, **correlational research** cannot determine whether one factor *causes* changes in the other. For instance, correlational research could tell us if there is an association between the number of minutes a mother and her newborn child are together immediately after birth and the quality of the mother–child relationship when the child reaches age 2. Such correlational research indicates whether the two factors are *associated* or *related* to one another, but not whether the initial contact caused the relationship to develop in a particular way (Schutt, 2001).

In contrast, **experimental research** is designed to discover *causal* relationships between various factors. In experimental research, researchers deliberately introduce a change in a carefully structured situation in order to see the consequences of that change. For instance, a researcher conducting an experiment might vary the number of minutes that mothers and children interact immediately following birth, in an attempt to see whether the bonding time affects the mother–child relationship.

Because experimental research is able to answer questions of causality, it is fundamental to finding answers to various developmental hypotheses. However, some research questions cannot be answered through experiments, for either technical or ethical reasons (e.g., it would be unethical to design an experiment in which a group of infants was offered no chance to bond with a caregiver at all). In fact, a great deal of pioneering developmental research—such as that conducted by Piaget and Vygotsky—employed correlational techniques. Consequently, correlational research remains an important tool for developmental researchers.

scientific method the process of posing and answering questions using careful, controlled techniques that include systematic, orderly observation and the collection of data

hypothesis a prediction stated in a way that permits it to be tested

correlational research research that seeks to identify whether an association or relationship between two factors exists

experimental research research designed to discover causal relationships between various factors

Correlational Studies

As we've noted, correlational research examines the relationship between two variables to determine whether they are associated, or *correlated*. For instance, researchers interested in the relationship between televised aggression and subsequent behavior have found that children who watch a good deal of aggression on television—murders, crime shows, shootings, and the like—tend to be more aggressive than those who watch only a little. In other words, viewing aggression and actual aggression are strongly associated, or correlated (Center for Communication & Social Policy, 1998; Singer & Singer, 2000; Feshbach & Tangney, 2008; Coyne et al., 2009).

But can we conclude that the viewing of televised aggression *causes* the more aggressive behavior? Not at all. Consider some of the other possibilities: It might be that being aggressive in the first place makes children more likely to choose to watch violent programs. In this case, the aggressive tendency causes the viewing behavior, not the other way around.

Or consider that there may be a *third* factor operating on both the viewing and the aggression. Suppose, for example, that children of lower socioeconomic status are more likely to behave aggressively *and* to watch higher levels of aggressive television than those raised in more affluent settings. In this case, the third variable—socioeconomic status—causes *both* the aggressive behavior and the television viewing. (The various possibilities are illustrated in Figure 1-2.)

In short, finding that two variables are correlated proves nothing about causality. Although the variables may be linked causally, this is not necessarily the case.

Correlational studies do provide important information, however. For instance, as we'll see in later chapters, we know from correlational studies that the closer the genetic link between two people, the more highly associated is their intelligence. We have learned that the more parents speak to their young children, the more extensive are the children's vocabularies. And we know from correlational studies that the better the nutrition that infants receive, the
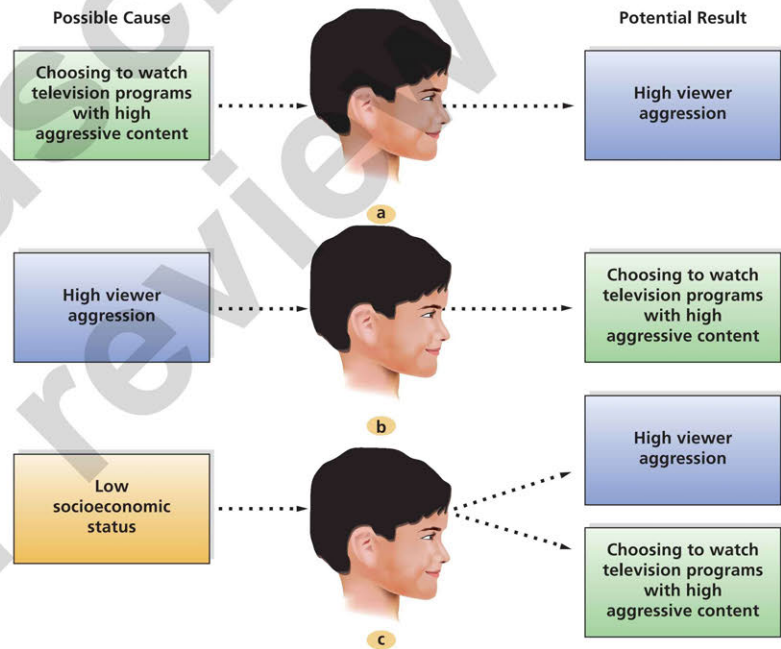
FIGURE 1-2 Finding a Correlation
Finding a correlation between two factors does not imply that one factor *causes* the other factor to vary. For instance, suppose a study found that viewing television shows with high levels of aggression is correlated with actual aggression in children. The correlation may reflect at least three possibilities: (a) watching television programs containing high levels of aggression causes aggression in viewers; (b) children who behave aggressively choose to watch TV programs with high levels of aggression; or (c) some third factor, such as a child's socioeconomic status, leads both to high viewer aggression and to choosing to watch television programs with high viewer aggression. What other factors, besides socioeconomic status, might be plausible third factors?

fewer the cognitive and social problems they experience later (Hart, 2004; Colom, Lluis-Font, & Andrés-Pueyo, 2005; Robb, Richert, & Wartella, 2009).

The Correlation Coefficient.   The strength and direction of a relationship between two factors is represented by a mathematical score, called a *correlation coefficient*, that ranges from +1.0 to −1.0. A *positive* correlation indicates that as the value of one factor increases, it can be predicted that the value of the other will also increase. For instance, if we administer a job satisfaction survey and find that the more money people make in their first job, the higher their job satisfaction, and the less money they make the lower their job satisfaction, we have found a positive correlation The correlation coefficient would be indicated by a positive number, and the stronger the association between salary and job satisfaction, the closer the number would be to +1.0.

In contrast, a correlation coefficient with a *negative* value informs us that as the value of one factor increases, the value of the other factor declines. For example, suppose we found that the more time adolescents spend using instant messaging on their computers, the worse their academic performance is. This would produce a negative correlation, a number between 0 and −1. More instant messaging would be associated with lower performance, and less instant messaging with higher performance. The stronger the association between instant messaging and school performance, the closer the correlation coefficient will be to −1.0.

Finally, it may be that two factors are unrelated to one another. For example, it is unlikely that we would find a correlation between school performance and shoe size. In this case, the lack of a relationship would be indicated by a correlation coefficient close to 0.

It is important to repeat that, even if a correlation coefficient is very strong, there is no way we can know whether one factor *causes* the other factor to vary. It simply means that the two factors are associated with one another in a predictable way.

Types of Correlational Studies.   There are several types of correlational studies. **Naturalistic observation** is the observation of a naturally occurring behavior without intervention. For instance, an investigator who wishes to learn how often preschool children share toys might observe a classroom over a 3-week period, recording how often the preschoolers spontaneously share with one another. The key point is that the investigator observes without interfering (e.g., Prezbindowski & Lederberg, 2003; Mortensen & Cialdini, 2010; Fanger, Frankel, & Hazen, 2012).

Though naturalistic observation has the advantage of identifying what children do in their "natural habitat," there is an important drawback to the method: Researchers are unable to exert control over factors of interest. For instance, in some cases researchers might find so few naturally occurring instances of the behavior of interest that they are unable to draw any conclusions at all.

Ethnography and qualitative research.   Increasingly, naturalistic observation employs *ethnography*, a method that borrows from anthropology and is used to investigate cultural questions. In ethnography, the goal is to understand a culture's values and attitudes through careful, extended examination. Typically, researchers act as participant observers, living for a period of weeks, months, or even years in another culture. By carefully observing everyday life and conducting in-depth interviews, researchers can obtain a deep understanding of life within another culture (Dyson, 2003).

Ethnographic studies are an example of a broader category of research known as qualitative research. In *qualitative research*, researchers choose particular settings of interest and seek to carefully describe, in narrative fashion, what is occurring, and why. Qualitative research can be used to generate hypotheses that can later be tested using more objective, quantitative methods.

Although ethnographic and qualitative studies provide a fine-grained view of behavior in particular settings, they suffer from several drawbacks. As mentioned, the presence of a participant observer may influence the behavior of the individuals being studied. Furthermore, because only a small number of individuals are studied, it may be hard to generalize the findings to other settings. Finally, ethnographers carrying out cross-cultural research may misinterpret and misconceive what they are observing, particularly in cultures that are very different from their own (Polkinghorne, 2005).

Case studies involve extensive, in-depth interviews with a particular individual or small group of individuals. They often are used not just to learn about the individual being interviewed, but to derive broader principles or draw tentative conclusions that might apply to others. For example, case studies have been conducted on children who display unusual genius
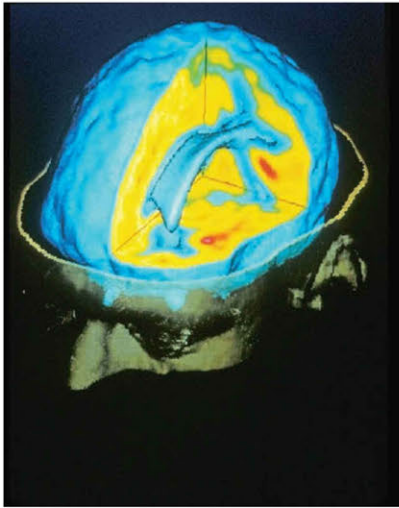
naturalistic observation a type of correlational study in which some naturally occurring behavior is observed without intervention in the situation

case studies studies that involve extensive, in-depth interviews with a particular individual or small group of individuals

This fMRI shows activity in different regions of the brain.

and on children who have spent their early years in the wild, apparently without human contact. These case studies have provided important information to researchers and have suggested hypotheses for future investigation (Wilson, 2003; Ng & Nicholas, 2010; Halkier, 2013).

Using *diaries*, participants are asked to keep a record of their behavior on a regular basis. For example, a group of adolescents may be asked to record each time they interact with friends for more than 5 minutes, thereby providing a way to track their social behavior.

Surveys represent another sort of correlational research. In **survey research**, a group of people chosen to represent some larger population are asked questions about their attitudes, behavior, or thinking on a given topic. For instance, surveys have been conducted about parents' use of punishment on their children and on attitudes toward breastfeeding. From the responses, inferences are drawn regarding the larger population represented by the individuals being surveyed.

Psychophysiological Methods.   Some developmental researchers, particularly those using a cognitive neuroscience approach, make use of psychophysiological methods. **Psychophysiological methods** focus on the relationship between physiological processes and behavior. For instance, a researcher might examine the relationship between blood flow in the brain and problem-solving ability. Similarly, some studies use infants' heart rate as a measure of their interest in stimuli to which they are exposed (Santesso, Schmidt, & Trainor, 2007; Field, Diego, & Hernandez-Reif, 2009; Mazoyer et al., 2009).

Among the most frequently used psychophysiological measures:

- **Electroencephalogram (EEG).** The EEG uses electrodes placed on the skull to record electrical activity in the brain. The brain activity is transformed into a pictorial representation of brain wave patterns, permitting the diagnosis of disorders such as epilepsy and learning disabilities.
- **Computerized axial tomography (CAT) scan.** In a CAT scan, a computer constructs an image of the brain by combining thousands of individual x-rays taken at slightly different angles. Although it does not show brain activity, it does illuminate the structure of the brain.
- **Functional magnetic resonance imaging (fMRI) scan.** An fMRI provides a detailed, three-dimensional computer-generated image of brain activity by aiming a powerful magnetic field at the brain. It offers one of the best ways of learning about the operation of the brain, down to the level of individual nerves.

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survey research a type of study where a group of people chosen to represent some larger population are asked questions about their attitudes, behavior, or thinking on a given topic

psychophysiological methods research that focuses on the relationship between physiological processes and behavior

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REVIEW, CHECK, AND APPLY

REVIEW

LO9   What roles do theories and hypotheses play in the study of development?

- Theories are systematically derived explanations of facts or phenomena.
- Theories suggest hypotheses, which are predictions that can be tested.

LO10   What sorts of studies and methods are used in correlational research?

- Correlational studies examine the relationship, or correlation, between two factors without demonstrating causality.
- Correlational methods include naturalistic observation, ethnography, case studies, survey research, and psychophysiological methods.

CHECK YOURSELF

1. Consider the following steps of the scientific method and rank them from first to last.

   a ___Formulating an explanation.

   b ___Carrying out research that either lends support to the explanation or refutes it.

   c ___Identifying questions of interest.

2. A researcher tested a class of students and found that more body hair is associated with greater preference for aggressive sports. She concluded that playing aggressive sports results in more body hair. This researcher committed the mistake of:

   a confusing correlation with causation

   b not including a control group

   c mixing up age effects with cohort effects

3. A researcher stands near an intersection and writes down the time it takes for the lead driver to start up after the light turns green. The researcher records the gender and approximate age of the driver. This researcher is most likely engaged in _____.

   a a case study

   b naturalistic observation

   c an ethnography

   d survey research

4. Researchers using correlational methods typically use a study group and a control group to isolate cause-and-effect relationships.

   ▪ True

   ▪ False

APPLYING LIFESPAN DEVELOPMENT

- "Correlational studies are not meaningful because they are irrelevant to the study of causation." Do you agree or disagree with this statement? Why?

EXPERIMENTS: DETERMINING CAUSE AND EFFECT

LO11   What are the characteristics of experimental research?
LO12   Why is it important to think critically about "expert" advice?

In an **experiment**, an investigator or experimenter typically devises two different conditions (or *treatments*) and then compares how the behavior of the participants exposed to each condition is affected. One group, the *treatment* or *experimental group*, is exposed to the treatment variable being studied; the other, the *control group*, is not.

For instance, suppose you want to see if exposure to movie violence makes viewers more aggressive. You might show a group of adolescents a series of movies with a great deal of violent imagery. You would then measure their subsequent aggression. This group would constitute the treatment group. For the control group you might show a second group of adolescents movies that contain no violent imagery, and measure their subsequent aggression. By comparing the amount of aggression displayed by members of the treatment and control groups, you would be able to determine if exposure to violent imagery produces aggression in viewers. In fact, this describes an experiment conducted at the University of Louvain in Belgium. Psychologist Jacques-Philippe Leyens and colleagues found that the level of aggression rose significantly for the adolescents who had seen the movies containing violence (Leyens et al., 1975).

The central feature of this experiment—and all experiments—is the comparison of the consequences of different treatments. The use of both treatment and control groups allows researchers to rule out the possibility that something other than the experimental manipulation produced the results found in the experiment. For instance, if a control group was not used, experimenters could not be certain that some other factor, such as the time of day the movies were shown or even the mere passage of time, produced the observed changes. By using a control group, experimenters can draw accurate conclusions about causes and effects.

Independent and Dependent Variables. The **independent variable** is the variable that researchers manipulate in the experiment (in our example, it is the type of movie participants saw—violent or non-violent). In contrast, the **dependent variable** is the variable that researchers measure to see if it changes as a result of the experimental manipulation. In our example, the degree of aggressive behavior shown by the participants after viewing violent or nonviolent films is the dependent variable. (One way to remember the difference: A hypothesis predicts how a dependent variable *depends* on the manipulation of the independent variable.) Every experiment has an independent and dependent variable.

Experimenters must make sure their studies are not influenced by factors other than those they are manipulating. For this reason, they take great care to make sure that the participants in both the treatment and control groups are not aware of the purpose of the experiment (which could affect their responses or behavior) and that the experimenters do not influence who is chosen for the control and treatment groups. The procedure that is used for this is known as random assignment. In *random assignment*, participants are assigned to different experimental groups or "conditions" purely on the basis of chance. This way the laws of statistics ensure that personal characteristics that might affect the outcome of the experiment are divided proportionally among the participants in the different groups, making the groups equivalent. Equivalent groups achieved by random assignment allow an experimenter to draw conclusions with confidence.
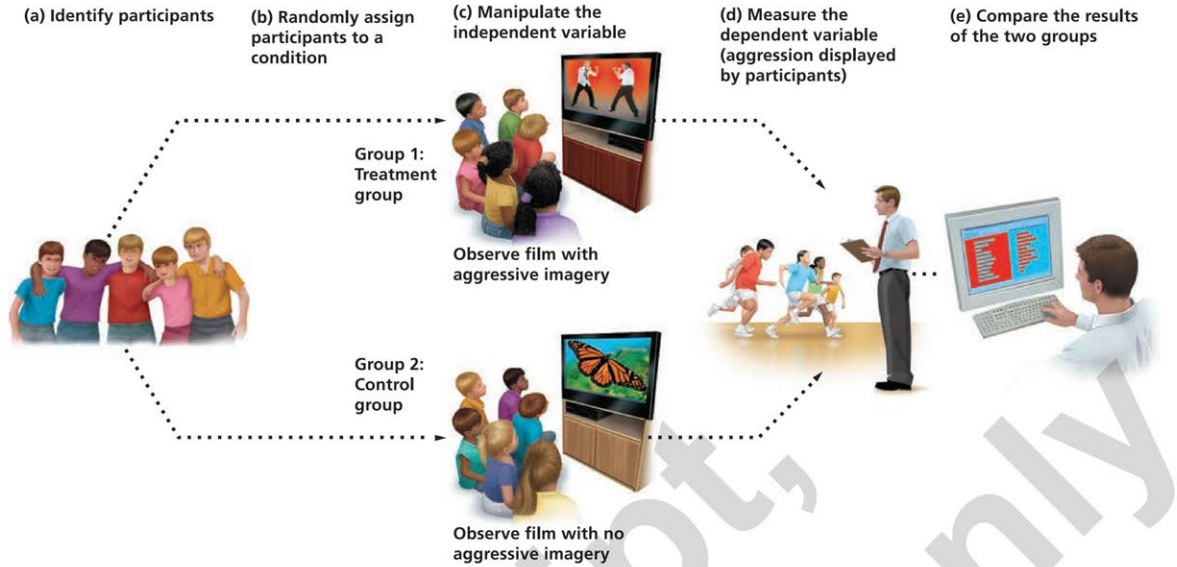
Figure 1-3 illustrates the Belgian experiment on adolescents exposed to films containing violent or non-violent imagery, and the effects of such imagery on subsequent aggressive behavior. As you can see, it contains each of the elements of an experiment:

- An independent variable (the assignment to a violent or nonviolent film condition)
- A dependent variable (measurement of the adolescents' aggressive behavior)
- Random assignment to condition (viewing a film with violent imagery versus a film with nonviolent imagery)
- A hypothesis that predicts the effect the independent variable will have on the dependent variable (that viewing a film with violent imagery will produce subsequent aggression)

experiment a process in which an investigator, called an experimenter, devises two different experiences for participants

independent variable the variable that researchers manipulate in an experiment

dependent variable the variable that researchers measure to see if it changes as a result of the experimental manipulation

(a) Identify participants | **(b) Randomly assign participants to a condition** | **(c) Manipulate the independent variable** | **(d) Measure the dependent variable (aggression displayed by participants)** | **(e) Compare the results of the two groups**

Group 1: Treatment group

Observe film with aggressive imagery

Group 2: Control group

Observe film with no aggressive imagery

FIGURE 1-3 Elements of an Experiment
In this experiment, researchers randomly assigned a group of adolescents to one of two conditions: viewing a film that contained violent imagery or viewing a film that lacked violent imagery (manipulation of the independent variable). Then participants were observed later to determine how much aggression they showed (the dependent variable). Analysis of the findings showed that adolescents exposed to aggressive imagery showed more aggression later (based on an experiment by Leyens et al., 1975).

Given the advantage of experiments—that they provide a means of determining causality—why aren't experiments always used? The answer is that there are some situations that a researcher, no matter how ingenious, simply cannot control. And there are some situations in which control would be unethical, even if it were possible. For instance, no researcher would be able to assign different groups of infants to parents of high and low socioeconomic status in order to learn the effects of such status on subsequent development. In situations in which experiments are logistically or ethically impossible, developmentalists employ correlational research.

Furthermore, keep in mind that a single experiment is insufficient to answer a research question definitively. Before complete confidence can be placed in a conclusion, research must be *replicated*, or repeated, sometimes using other procedures and techniques with other participants. Sometimes developmentalists use a procedure called *meta-analysis*, which permits the combination of results of many studies into one overall conclusion (Peterson & Brown, 2005; Le et al., 2010).

Choosing a Research Setting. Deciding *where* to conduct a study may be as important as determining *what* to do. In the Belgian experiment on the influence of exposure to media aggression, the researchers used a real-world setting—a group home for boys who had been convicted of juvenile delinquency. They chose this **sample**, the group of participants chosen for the experiment, because it was useful to have adolescents whose normal level of aggression was relatively high, and because they could incorporate the films into the everyday life of the home with minimal disruption.

Using a real-world setting (as in the aggression experiment) is the hallmark of a field study. A **field study** is a research investigation carried out in a naturally occurring setting. Field studies capture behavior in real-life settings, where research participants may behave more naturally than in a laboratory.

Field studies may be used in both correlational studies and experiments. They typically employ naturalistic observation, the technique in which researchers observe a naturally occurring behavior without intervening or changing the situation. A researcher might examine behavior in a child-care center, view the groupings of adolescents in high school corridors, or observe elderly adults in a senior center.

sample the group of participants chosen for the experiment

field study a research investigation carried out in a naturally occurring setting

Because it is often difficult to control the situation and environment enough to run an experiment in a real-world setting, field studies are more typical of correlational designs than experimental designs. Most developmental research experiments are conducted in laboratory settings. A **laboratory study** is a research investigation conducted in a controlled setting explicitly designed to hold events constant. The laboratory may be a room or building designed for research, as in a university psychology department. Their ability to control the settings in laboratory studies enables researchers to learn more clearly how their treatments affect participants.

Theoretical and Applied Research: Complementary Approaches

Developmental researchers typically focus on either theoretical research or applied research. **Theoretical research** is designed to test some developmental explanation and expand scientific knowledge, while **applied research** is meant to provide practical solutions to immediate problems. For instance, if we were interested in the processes of cognitive change during childhood, we might carry out a study of how many digits children of various ages can remember after one exposure to multidigit numbers—a theoretical approach. Alternatively, we might focus on the more practical question of how teachers can help children to remember information more easily. Such a study would represent applied research, because the findings are applied to a particular setting and problem.

There is not always a clear distinction between theoretical and applied research. For instance, is a study that examines the consequences of ear infections in infancy on later hearing loss theoretical or applied? Because such a study may help illuminate the basic processes involved in hearing, it can be considered theoretical. But if it helps to prevent hearing loss, it may be considered applied (Lerner, Fisher, & Weinberg, 2000).

In fact, as we discuss in the accompanying "From Research to Practice" box, research of both a theoretical and an applied nature has played a significant role in shaping and resolving a variety of public policy questions.

In experimental research, developmentalists use controlled conditions to discover causal relationships between various factors.

Measuring Developmental Change

How people grow and change through the life span is central to the work of all developmental researchers. Consequently, one of the thorniest research issues they face concerns the measurement of change and differences over age and time. To solve this problem, researchers have developed three major research strategies: longitudinal research, cross-sectional research, and sequential research.

Longitudinal Studies: Measuring Individual Change. If you were interested in learning how a child develops morally between 3 and 5, the most direct approach would be to take a group of 3-year-olds and follow them until they were 5, testing them periodically.

This strategy illustrates longitudinal research. In **longitudinal research**, the behavior of one or more study participants is measured as they age. Longitudinal research measures change over time. By following many individuals over time, researchers can understand the general course of change across some period of life.

The granddaddy of longitudinal studies, which has become a classic, is a study of gifted children begun by Lewis Terman about 80 years ago. In the study—which has yet to be concluded—a group of 1,500 children with high IQs were tested about every 5 years. Now in their 80s, the participants—who call themselves "Termites"—have provided information on everything from intellectual accomplishment to personality and longevity (Feldhusen, 2003; McCullough, Tsang, & Brion, 2003; Subotnik, 2006).

Longitudinal research has also provided insight into language development. For instance, by tracing how children's vocabularies increase on a day-by-day basis, researchers have been able to understand the processes that underlie the human ability to become competent in using language (Gershkoff-Stowe & Hahn, 2007; Oliver & Plomin, 2007; Childers, 2009; Fagan, 2009).

laboratory study a research investigation conducted in a controlled setting explicitly designed to hold events constant

theoretical research research designed specifically to test some developmental explanation and expand scientific knowledge

applied research research meant to provide practical solutions to immediate problems

longitudinal research research in which the behavior of one or more participants in a study is measured as they age

Longitudinal studies can provide a wealth of information about change over time, but they have drawbacks. For one thing, they require a tremendous investment of time, because researchers must wait for participants to become older. Furthermore, participants often drop out over the course of the research. Participants may drop out of a study, move away, or become ill or even die as the research proceeds.

Finally, participants who are observed or tested repeatedly may become "test-wise" and perform better each time they are assessed as they become more familiar with the procedure. Even if the observations of participants in a study are not terribly intrusive (such as simply recording, over a lengthy period of time, vocabulary increases in infants and preschoolers), experimental participants may be affected by the repeated presence of an experimenter or observer.

Consequently, despite the benefits of longitudinal research, particularly its ability to look at change within individuals, developmental researchers often turn to other methods. The alternative they choose most often is the cross-sectional study.

From Research to Practice

Does the Head Start preschool program actually work?

Are there drawbacks to using infant day care?

What are some effective ways to bolster schoolgirls' confidence in their math and science aptitude?

Are children better off with a mother and a father than they are with two mothers or two fathers?

Should children with developmental disabilities be schooled in regular classrooms, or are they better off in special classrooms with other children who are similarly disabled?

Each of these questions represents a national policy issue that can be answered only by considering the results of relevant research studies. By conducting controlled studies, developmental researchers have made a number of important contributions affecting education, family life, and health on a national scale. Consider, for instance, the variety of ways that public policy issues have been informed by various types of research findings (Brooks-Gunn, 2003; Maton et al., 2004; Mervis, 2004; Aber et al., 2007):

- *Research findings can provide policymakers a means of determining what questions to ask in the first place.* For example, studies of children's caregivers (some of which we'll consider in Chapter 10) have led policymakers to question whether the benefits of infant day care are outweighed by possible deterioration in parent–child bonds. Research has also disconfirmed the widespread belief that childhood vaccinations are linked to autism spectrum disorder, contributing invaluable evidence to the controversy over the risks and benefits of mandatory child immunization (Price et al., 2010).

- *Research findings and the testimony of researchers are often part of the process by which laws are drafted.* A good deal of legislation has been passed based on findings from developmental researchers. For example, research revealed that children with developmental disabilities benefit from exposure to children without special needs, ultimately leading to passage of national legislation mandating that children with disabilities be placed in regular school classes as often as possible. Research showing that children raised by same-sex couples fare just as well as children raised by a mother and a father has undermined an often-used but baseless argument that same-sex marriage is harmful to children (Gartrell & Bos, 2010).

- *Policymakers and other professionals use research findings to determine how best to implement programs.* Research has shaped programs designed to reduce the incidence of unsafe sex among teenagers, to increase the level of prenatal care for pregnant mothers, to encourage and support women in the pursuit of math and science studies, and to promote flu shots for older adults. The common thread among such programs is that many of the details of the programs are built on basic research findings.

- *Research techniques are used to evaluate the effectiveness of existing programs and policies.* Once a public policy has been implemented, it is necessary to determine whether it has been effective and successful in accomplishing its goals. To do this, researchers employ formal evaluation techniques, developed from basic research procedures. For instance, researchers have continually scrutinized the Head Start preschool program, which has received massive federal funding, to ensure that it really does what it is supposed to do—improve children's academic performance.

  Similarly, careful studies of DARE, a popular program meant to reduce children's use of drugs, began to find that it was ineffective. Using the research findings of developmentalists, DARE instigated new techniques, and preliminary findings suggest that the revised program is more effective (Rhule, 2005; University of Akron, 2006).

By building on research findings, developmentalists have worked hand in hand with policymakers, and research has a substantial impact on public policies that can benefit us all.

- *What are some policy issues affecting children and adolescents that are currently being debated nationally?*

- *Despite the existence of research data that might inform policy about development, politicians rarely discuss such data in their speeches. Why do you think that is the case?*

Cross-Sectional Studies. Suppose again that you want to consider how children's moral development, their sense of right and wrong, changes from ages 3 to 5. Instead of following the same children over several years, we might look simultaneously at three groups of children: 3-year-olds, 4-year-olds, and 5-year-olds, perhaps presenting each group with the same problem and then seeing how they respond to it and explain their choices.

Such an approach typifies cross-sectional research. In **cross-sectional research**, people of different ages are compared at the same point in time. Cross-sectional studies provide information about differences in development between different age groups.

Cross-sectional research takes far less time than longitudinal research: Participants are tested at just one point in time. Terman's study might have been completed 75 years ago if Terman had simply looked at a group of gifted 15-year-olds, 20-year-olds, 25-year-olds, and so forth, up to 80-year-olds. Because the participants would not be periodically tested, there would be no chance that they would become test-wise, and problems of participant attrition would not occur. Why, then, would anyone choose to use a procedure other than cross-sectional research?

The answer is that cross-sectional research brings its own set of difficulties. Recall that every person belongs to a particular *cohort*, the group of people born at around the same time in the same place. If we find that people of different ages vary along some dimension, it may be due to differences in cohort membership, not age per se.

Consider a concrete example: If we find in a correlational study that people who are 25 perform better on a test of intelligence than those who are 75, there are several possible explanations other than that intelligence declines in old age. Instead, the finding may be attributable to cohort differences. The 75-year-olds may have had less formal education than the 15-year-olds because members of the older cohort were less likely to finish high school and attend college than members of the younger one. Or perhaps the older group received less adequate nutrition as infants than the younger group. In short, we cannot rule out the possibility that age-related differences in cross-sectional studies are actually cohort differences.

Cross-sectional studies may also suffer from *selective dropout*, in which participants in some age groups are more likely to stop participating than others. For example, suppose a study of cognitive development in preschoolers includes a long test of cognitive abilities, which young preschoolers find more difficult than older preschoolers. If more young children quit than the older preschoolers and if it is the least competent young preschoolers who drop out, then the remaining sample of that age group will consist of the more competent young preschoolers—together with a broader and more representative sample of older preschoolers. The results of such a study would be questionable (Miller, 1998).

Finally, cross-sectional studies have an additional, and more basic, disadvantage: They are unable to inform us about changes in individuals or groups. If longitudinal studies are like videos taken of a person at various ages, cross-sectional studies are like snapshots of entirely different groups. Although we can establish differences related to age, we cannot fully determine if such differences are related to change over time.

Sequential Studies. Because both longitudinal and cross-sectional studies have drawbacks, researchers have turned to some compromise techniques. Among the most frequently employed are sequential studies, which are essentially a combination of longitudinal and cross-sectional studies.

In **sequential studies**, researchers examine a number of different age groups at several points in time. For instance, an investigator interested in children's moral behavior might begin a sequential study by examining the behavior of three groups of children, who are either 3, 4, or 5 years old at the time the study begins.

The study continues for the next several years, with each participant tested annually. Thus, the 3-year-olds would be tested at ages 3, 4, and 5; the 4-year-olds at ages 4, 5, and 6; and the 5-year-olds at ages 5, 6, and 7. By combining the advantages of longitudinal and cross-sectional research, this approach permits developmental researchers to tease out the consequences of age *change* versus age *difference*. The major research techniques for studying development are summarized in Figure 1-4.
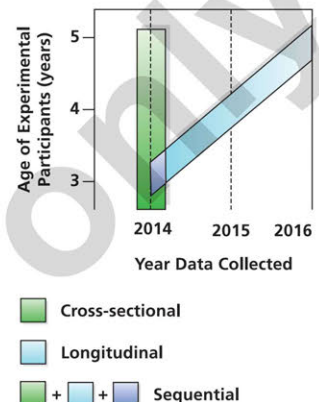
FIGURE 1-4 Research Techniques for Studying Development

In a *cross-sectional study*, 3-, 4-, and 5-year-olds are compared at a similar point in time (in 2014). In *longitudinal research*, a set of participants who are 3 years old in 2014 are studied when they are 4 years old (in 2015) and when they are 5 years old (in 2016). Finally, a *sequential study* combines cross-sectional and longitudinal techniques; here, a group of 3-year-olds would be compared initially in 2014 with 4- and 5-year-olds, but would also be studied 1 and 2 years later, when they themselves were 4 and 5 years old. Although the graph does not illustrate this, researchers carrying out this sequential study might also choose to retest the children who were 4 and 5 in 2014 for the next 2 years. What advantages do the three kinds of studies offer?

cross-sectional research research in which people of different ages are compared at the same point in time

sequential studies research in which researchers examine a number of different age groups over several points in time

Ethics and Research

In the "study" conducted by Egyptian King Psamtik, two children were removed from their mothers and held in isolation in an effort to learn about the roots of language. If you found yourself thinking this was extraordinarily cruel, you are in good company. Clearly, such an experiment raises blatant ethical concerns, and nothing like it would ever be done today.

But sometimes ethical issues are more subtle. For instance, U.S. government researchers proposed a conference to examine possible genetic roots of aggression. Some researchers had begun to raise the possibility that genetic markers might be found that would identify particularly violence-prone children. If so, it might be possible to track these children and provide interventions to reduce the likelihood of later violence.

Critics objected strenuously, however, arguing that identification might lead to a self-fulfilling prophecy. Children labeled as violence-prone might be treated in a way that would actually *cause* them to be more aggressive. Ultimately, under intense political pressure, the conference was canceled (Wright, 1995).

In order to help researchers deal with ethical problems, the major organizations of developmentalists, including the Society for Research in Child Development and the American Psychological Association, have developed ethical guidelines for researchers. Among the principles are those involving freedom from harm, informed consent, the use of deception,

Becoming an Informed Consumer of Development

Thinking Critically About "Expert" Advice

If you immediately comfort crying babies, you'll spoil them.

If you let babies cry without comforting them, they'll be untrusting and clingy as adults.

***

Spanking is one of the best ways to discipline your child.

Never hit your child.

***

If a marriage is unhappy, children are better off if their parents divorce than if they stay together.

No matter how difficult a marriage is, parents should avoid divorce for the sake of their children.

There is no lack of advice on the best way to raise a child or, more generally, to lead one's life. From bestsellers such as *Chicken Soup for the Soul: On Being a Parent,* to magazine and newspaper columns that provide advice on every imaginable topic, to a myriad of websites and blogs, each of us is exposed to tremendous amounts of information.

Yet not all advice is equally valid. The mere fact that something is in print, on television, or on the Web does not make it legitimate or accurate. Fortunately, some guidelines can help distinguish when recommendations and suggestions are reasonable and when they are not:

- Consider the source of the advice. Information from established, respected organizations such as the American Medical Association, the American Psychological Association, and the American Academy of Pediatrics reflects years of study and is usually accurate. If you don't know the organization, investigate it further to find out more about its goals and philosophy.

- Evaluate the credentials of the person providing advice. Trustworthy information tends to come from established, acknowledged researchers and experts, not from persons with obscure credentials. Consider where the author is employed and whether he or she has a particular political or personal agenda.

- Understand the difference between anecdotal evidence and scientific evidence. Anecdotal evidence is based on one or two instances of a phenomenon, haphazardly discovered or encountered; scientific evidence is based on careful, systematic procedures. If an aunt tells you that all her children slept through the night by 2 months of age and therefore your child will too, that is quite different from reading a report that 75 percent of children sleep through the night by 9 months. Of course, even with such a report, it would be a good idea to find out how large the study was or how this number was arrived at.

- If advice is based on research findings, there should be a clear, transparent description of the studies on which the advice is based. Who were the participants? What methods were used? What do the results show? Think critically about the way the findings were obtained before accepting them.

- Don't overlook the cultural context of the information. An assertion may be valid in some contexts, but not in all. For example, it is typically assumed that providing infants the freedom to move about and exercise their limbs facilitates their muscular development and mobility. Yet in some cultures, infants spend most of their time closely bound to their mothers—with no apparent long-term damage (Kaplan & Dove, 1987; Tronick, 1995).

- Don't assume that because many people believe something, it is necessarily true. Scientific evaluation has often proved that some of the most basic presumptions about the effectiveness of various techniques are invalid.

In short, the key to evaluating information relating to human development is to maintain a healthy dose of skepticism. No source of information is invariably, unfailingly accurate. By keeping a critical eye on the statements you encounter, you'll be in a better position to determine the very real contributions made by developmentalists to understanding how humans develop over the course of the life span.

and maintenance of participants' privacy (Sales & Folkman, 2000; American Psychological Association, 2002; Fisher, 2003, 2004, 2005; Curlette & Kern, 2010; Toporek, Kwan, & Williams, 2012):

- **Researchers must protect participants from physical and psychological harm.** Their welfare, interests, and rights come before those of researchers. In research, participants' rights always come first (Sieber, 2000; Fisher, 2004).

- **Researchers must obtain informed consent from participants before their involvement in a study.** If they are over the age of 7, participants must voluntarily agree to be in a study. If under 18, parents or guardians must also provide consent.

  Informed consent can be a sensitive requirement. Suppose, for instance, researchers want to study the psychological effects of abortion on adolescents. To obtain the consent of an adolescent minor who has had an abortion, the researchers would need to get her parents' permission as well. But if the adolescent hasn't told her parents about the abortion, the request for parental permission would violate her privacy—leading to a breach of ethics.

- **The use of deception in research must be justified and cause no harm.** Although deception to disguise the true purpose of an experiment is permissible, any experiment that uses deception must undergo careful scrutiny by an independent panel before it is conducted. Suppose, for example, we want to know the reaction of participants to success and failure. It is ethical to tell participants that they will be playing a game when the true purpose is actually to observe how they respond to doing well or poorly on the task. However, this is ethical only if it causes no harm to participants, has been approved by a review panel, and includes a full explanation for participants when the study is over (Underwood, 2005).

- **Participants' privacy must be maintained.** If participants are videotaped during a study, for example, they must give their permission for the videotapes to be viewed. Furthermore, access to the tapes must be carefully restricted.

From the perspective of a health care provider: Do you think there are some special circumstances involving adolescents, who are not legally adults, that would justify allowing them to participate in a study without obtaining their parents' permission? What might such circumstances involve?

REVIEW, CHECK, AND APPLY

REVIEW

L011 What are the characteristics of experimental research?

- Experimental research seeks to discover cause-and-effect relationships.

- Experiments typically create two different conditions and use an experimental group and a control group.

- Researchers measure age-related change by longitudinal studies, cross-sectional studies, and sequential studies.

L012 Why is it important to think critically about "expert" advice?

- Scientific evaluation has shown that some practices supposedly based on developmental research are at best dubious and at worst invalid.

- The key to evaluating information relating to human development is to maintain a healthy dose of skepticism.

CHECK YOURSELF

1. If a control group is not used in an experiment, the researcher cannot rule out the possibility that something other than the treatment produced the observed outcome.
    - ■ True
    - ■ False

2. Replication studies are generally discouraged in research because they do not provide any new knowledge.
    - **a** True
    - **b** False

3. In a _____ research study, researchers are interested in measuring change in a single group of subjects over time.
    - **a** correlational
    - **b** cross-sectional
    - **c** longitudinal
    - **d** sequential

APPLYING LIFESPAN DEVELOPMENT

- ■ What possible obstacles would you encounter if you were to devise an experiment to study the effect of the absence of a father on children? How can you get around these obstacles and devise a feasible study to study the effect?

PUTTING IT ALL TOGETHER
INTRODUCTION

MARCO RUIZ, watching the large, multigenerational reunion we encountered in the chapter opener, found himself pondering many of the questions that developmentalists study formally. Putting himself into his Grandpa's mind, he thought about how the traits for which his grandfather was noted might show up—or not—in the members of the generations at the reunion. He considered both inherited characteristics and personality traits and habits potentially acquired from social and environmental interactions. Marco's "thought experiment" on five generations of his grandfather's extended family gave him a lot to ponder, given the size and diversity of his experimental "sample."

MODULE 1.1 — BEGINNINGS

- Marco's consideration of his five-generation household mirrors the work of developmentalists with a wide range of interests, including those who focus on genetic versus environmental influences, cognitive changes across the life span, and social and personality development. *(pp. 28–29)*

- The age range of Marco's family mirrors the full range that developmentalists cover, from before birth to old age. *(pp. 29–31)*

- Each family member naturally experiences different cohort influences, which interact with their shared genetic heritage. *(pp. 32–33)*

- Key issues in development are reflected in Marco's thoughts, including the nature–nurture issue and continuity versus discontinuity. *(pp. 32–36)*

THEORETICAL PERSPECTIVES ON LIFESPAN DEVELOPMENT — MODULE 1.2

- Developmentalists with different perspectives might guide Marco's musings. Erikson might help Marco interpret generational differences in his family in terms of stages along the life span; Piaget might illuminate little Alicia's developing thought processes; and Vygotsky might underscore the importance of social interactions in cognitive, social, and physical development. *(pp. 37–47)*

- Marco is likely to understand that it is best to avoid considering any particular theoretical perspective either all wrong or all right. *(pp. 47–48)*

RESEARCH METHODS — MODULE 1.3

- Marco reveals an instinctive knack for constructing theories about development and considering informal hypotheses to test them. *(pp. 49–51)*

- Marco asks questions about the development of his family members and himself through a combination of a sort of "life experiment" and naturalistic observation. *(pp. 51–52)*

- In a sense, Marco's curiosity about development contains elements of the case study (i.e., observing his family's life), longitudinal research (i.e., reflecting on and interpreting generational traits in his family), and the cross-sectional study (i.e., the family reunion) is a cross-section of development across the life span). *(pp. 53–58)*

What would an EDUCATOR do?

How could you prepare Terri and Tony, little Alicia's parents, for the changes in educational practice that may have occurred since they were in school? What might you tell them to look for in gauging young Alicia's cognitive, physical, and social readiness for school? What ideas could you give them to help Alicia prepare for school? Do you think Alicia's parents may need to be cautioned against taking Alicia's learning for granted, given their extended family's history of successful school experiences?

What would a PARENT do?

Marco is a parent and grandparent who is also a son and grandson. How would you suggest he balance his "upward" responsibilities toward his father and grandfather with his "downward" responsibilities toward his children and their children? Marco and Louise's children themselves represent a range of developmental stages and ages. How would you help them deal differently with the needs and potential sources of support that such a variety of children offers?

What would YOU do?

How would you help Marco understand his varying roles as a father, son, grandson, and grandfather? What things would you suggest that Marco's father and grandfather could help him with or advise him about? Has the role of father and grandfather changed too much for cross-generational wisdom to be shared helpfully?

What would a HEALTH CARE PROVIDER do?

How would you help Marco and Louise understand the different stages of development, with all their varying states of physical, cognitive, and emotional health, represented in their family? How could you help them accept their power and limitations in perceiving and responding to their family's varied physical and emotional needs? How could you help Marco and Louise prepare for a death in their family (e.g., grandparent, parent, spouse, children, grandchildren)?

Do you agree or disagree with their responses? Why? What concepts that you've read about back up their opinion?