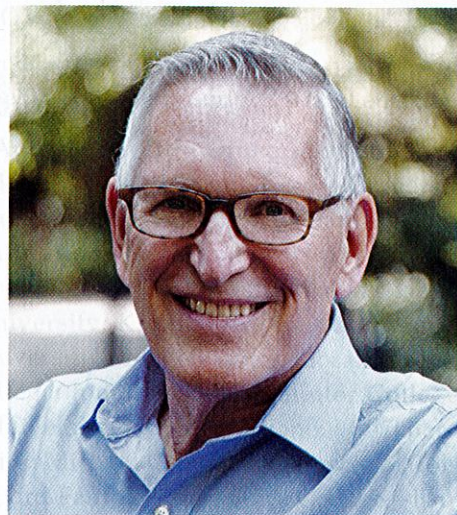


About the Author



Robert S. Feldman is professor of Psychological and Brain Sciences and Deputy Chancellor of the University of Massachusetts, Amherst. A recipient of the College Distinguished Teacher Award, he teaches psychology classes ranging in size from 15 to nearly 500 students. During the course of three decades as a college instructor, he has taught both undergraduate and graduate courses at Mount Holyoke College, Wesleyan University, and Virginia Commonwealth University in addition to the University of Massachusetts.

Professor Feldman, who initiated the Minority Mentoring Program at the University of Massachusetts, also has served as a Hewlett Teaching Fellow and Senior Online Teaching Fellow. He initiated distance learning courses in psychology at the University of Massachusetts.

A Fellow of the American Psychological Association, the Association for Psychological Science, and the American Association for the Advancement of Science, Professor Feldman received a B.A. with High Honors from Wesleyan University (and from which he received the Distinguished Alumni Award). He has an MS and Ph.D. from the University of Wisconsin-Madison. He is a winner of a Fulbright Senior Research Scholar and Lecturer award, and he has written more than 200 books, book chapters, and scientific articles.

Professor Feldman has edited *Development of Nonverbal Behavior in Children* and *Applications of Nonverbal Behavioral Theory and Research*, and co-edited *Fundamentals of Nonverbal Behavior*. He is also author of *Child Development*, *Understanding Psychology* and *P.O.W.E.R. Learning: Strategies for Success in College and Life*. His books have been translated into a number of languages, including Spanish, French, Portuguese, Dutch, Chinese, Korean, and Japanese. His research interests include honesty and deception in everyday life, work that he described in *The Liar in Your Life*, a trade book published in 2009. His research has been supported by grants from the National Institute of Mental Health and the National Institute on Disabilities and Rehabilitation Research.

Professor Feldman is president of the Federation of Associations of Behavioral and Brain Sciences Foundation, a consortium of social, behavioral, and brain science societies. In addition, he is on the Board of New England Public Radio.

Professor Feldman loves music, is an enthusiastic pianist, and enjoys cooking and traveling. He has three children, four grandchildren, and he and his wife, a psychologist, live in western Massachusetts in a home overlooking the Holyoke Mountain Range.

Chapter 1

An Orientation to Lifespan Development



Learning Objectives

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| LO 1.1 Define the field of lifespan development and describe what it encompasses. | LO 1.7 Describe how the cognitive perspective explains lifespan development. |
| LO 1.2 Describe the areas that lifespan development specialists cover. | LO 1.8 Describe how the humanistic perspective explains lifespan development. |
| LO 1.3 Describe some of the basic influences on human development. | LO 1.9 Describe how the contextual perspective explains lifespan development. |
| LO 1.4 Summarize four key issues in the field of lifespan development. | LO 1.10 Describe how the evolutionary perspective explains lifespan development. |
| LO 1.5 Describe how the psychodynamic perspective explains lifespan development. | LO 1.11 Discuss the value of applying multiple perspectives to lifespan development. |
| LO 1.6 Describe how the behavioral perspective explains lifespan development. | LO 1.12 Describe the role that theories and hypotheses play in the study of development. |

LO 1.13 Compare the two major categories of lifespan development research.

LO 1.14 Identify different types of correlational studies and their relationship to cause and effect.

LO 1.15 Explain the main features of an experiment.

LO 1.16 Distinguish between theoretical research and applied research.

LO 1.17 Compare longitudinal research, cross-sectional research, and sequential research.

LO 1.18 Describe some ethical issues that affect psychological research.

Chapter Overview

Module 1.1 Determining the Nature—and Nurture—of Lifespan Development

Defining Lifespan Development
The Scope of the Field of Lifespan Development
Influences on Lifespan Development
Key Debates in Lifespan Development

Developmental Diversity and Your Life: How Culture, Ethnicity, and Race Influence Development

Module 1.2 Theoretical Perspectives on Lifespan Development

The Psychodynamic Perspective: Focusing on the Inner Person
The Behavioral Perspective: Focusing on Observable Behavior
The Cognitive Perspective: Examining the Roots of Understanding

Neuroscience and Development: The Essential Principles of Neuroscience

The Humanistic Perspective: Concentrating on the Unique Qualities of Human Beings

The Contextual Perspective: Taking a Broad Approach to Development

Evolutionary Perspectives: Our Ancestors' Contributions to Behavior
Why It Is Wrong to Ask "Which Approach Is Right?"

Module 1.3 Research Methods

Theories and Hypotheses: Posing Developmental Questions
Choosing a Research Strategy: Answering Questions
Correlational Studies
Experiments: Determining Cause and Effect
Theoretical and Applied Research: Complementary Approaches
Measuring Developmental Change

From Research to Practice: Using Developmental Research to Improve Public Policy

Ethics and Research

Are You an Informed Consumer of Development? Thinking Critically about "Expert" Advice

Prologue: New Conceptions

What if for your entire life, the image that others held of you was colored by the way in which you were conceived?

In some ways, that's what it has been like for Louise Brown, who was the world's first "test tube baby," born by *in vitro fertilization (IVF)*, a procedure in which fertilization of a mother's egg by a father's sperm takes place outside of the mother's body.

Louise was a preschooler when her parents told her how she was conceived, and throughout her childhood she was bombarded with questions. It became routine to explain to her classmates that she in fact was not born in a laboratory.

As a child, Louise sometimes felt completely alone. "I thought it was something peculiar to me," she recalled. But as she grew older, her isolation declined as more and more children were born in the same manner.

In fact, today Louise is hardly isolated. More than 5 million babies have been born using the same procedure, which has become almost routine. And at the age of 28, Louise became a mother herself, giving birth to a baby boy named Cameron—conceived, incidentally, the old-fashioned way (Falco, 2012; ICMRT, 2012). ■

Looking Ahead

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 28 years ago are remarkably similar for all of us. LeBron James, Bill Gates, the Queen of England, you, and me—all of us are traversing the territory known as lifespan development.

In vitro fertilization is just one of the brave new worlds of recent days. 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 topics. Think about the range of interests that different specialists might focus on when considering Louise Brown:

- Lifespan development researchers who investigate behavior at the level of biological processes might determine if Louise's functioning prior to 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 that of 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 in lifespan development share one concern: understanding the growth and change that occur during the course of life. Taking many differing approaches, developmentalists study how both the biological inheritance from our parents and the environment in which we live jointly affect our behavior.

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 chapter, 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. 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 their answers, of course, developmentalists use the highly structured, formal scientific method, while parents mostly use the informal strategy of waiting, observing, engaging, and loving their kids.

MODULE 1.1

DETERMINING THE NATURE—AND NURTURE—OF LIFESPAN DEVELOPMENT

Have you ever wondered how it is possible that 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



Louise Brown and her son.

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 wondered what it is that makes a grandfather at 80 so similar to the father he was when he was 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. In this section, we'll examine how the field of lifespan development is defined, the scope of the field, as well as some basic influences on human development.

Defining Lifespan Development

LO 1.1 Define the field of lifespan development and describe what it encompasses.

Lifespan development is the field of study that examines patterns of growth, change, and stability in behavior that occur throughout the entire 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 about the nature and course of human development by applying scientific methods. They develop theories about development, and they use methodical, scientific techniques to validate the accuracy of their assumptions systematically.

Lifespan development focuses on *human* development. Although there are developmentalists who study the course of development in nonhuman species, the vast majority study people. Some seek to understand universal principles of development, whereas 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 and continuing until 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.

The Scope of the Field of Lifespan Development

LO 1.2 Describe the areas that lifespan development specialists cover.

Clearly, the definition of lifespan development is broad and the scope of the field is extensive. Typically, lifespan development specialists cover several quite 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; Muiños & Ballesteros, 2014).

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 skills, and intelligence. For example, specialists in cognitive development might want to see how problem-solving skills change over the course of life, or whether cultural differences exist in the way people explain their academic successes and failures, or how traumatic events early in life would remember them later in life (Alibali, Phillips, & Fischer, 2009; Dumka et al., 2009; Penido et al., 2012).

Table 1.1 Approaches to Lifespan Development

Orientation	Defining Characteristics	Examples of Question Asked*
Physical development	Emphasizes how the brain, nervous system, muscles, sensory capabilities, and needs for food, drink, and sleep affect behavior	<ul style="list-style-type: none"> • What determines the sex of a child? (2) • What are the long-term results of premature birth? (2) • What are the benefits of breast milk? (4) • What are the consequences of early or late sexual maturation? (3) • What leads to obesity in adulthood? (4) • How do adults cope with stress? (4) • What are the outward and internal signs of aging? (3) • What is the relationship between aging and illness? (4)
Cognitive development	Emphasizes intellectual abilities, including learning, memory, problem solving, and intelligence	<ul style="list-style-type: none"> • What are the earliest memories that can be recalled from infancy? (6) • What are the intellectual consequences of watching television? (14) • What is intelligence and how is it measured? (8) • Are there benefits to bilingualism? (7) • What are the fundamental elements of information processing? (6) • Are there ethnic and racial differences in intelligence? (8) • What is cognitive development and how did Piaget revolutionize its study? (5) • How does creativity relate to intelligence? (8)
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	<ul style="list-style-type: none"> • Do newborns respond differently to their mothers than to others? (9) • What is the best procedure for disciplining children? (11) • When does a sense of gender identity develop? (12) • How can we promote cross-race friendships? (13) • What are the emotions involved in confronting death? (15) • How do we choose a romantic partner? (14) • What sorts of relationships are important in late adulthood? (13) • What are typical patterns of marriage and divorce in middle adulthood? (12) • In what ways are people affected by culture and ethnicity? (13)

*Numbers in parentheses indicate in which chapter 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 enduring 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, whereas a specialist in social development might examine the effects of racism or poverty or divorce on development (Evans, Boxhill, & Pinkava, 2008; Lansford, 2009; Tine, 2014). 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 to specialize in 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 (the period from conception to birth); infancy and toddlerhood (birth to age 3); the preschool period (ages 3 to 6); middle childhood (ages 6 to 12); adolescence (ages 12 to 20); young adulthood (ages 20 to 40); middle adulthood (ages 40 to 65); and late adulthood (age 65 to death).

It's important to keep in mind that these broad periods—which are largely accepted by lifespan developmentalists—are social constructions. A *social construction* is a shared notion of reality, one that is widely accepted but is a function of society and culture at a given time. Consequently, the age ranges within a period—and even the periods themselves—are in many ways arbitrary and often culturally derived. For example, later in the book we'll discuss how the concept of childhood as a special period did not even exist during the seventeenth century; at that time, children were seen 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

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.

personality development

development involving the ways that the enduring characteristics that differentiate one person from another change over the life span.

social development

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

in higher education, the age change from 19 to 20 has little special significance, coming as it does in the middle of the college years. For them, more substantial changes may occur when they leave college and enter the workforce, which is more likely to happen around age 22. Furthermore, in some non-Western cultures, adulthood may be considered to start much earlier, when children whose educational opportunities are limited 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-twenties. 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 engage in self-focused exploration (Arnett, 2010, 2011; de Dios, 2012; Sumner, Burrow, & Hill, 2015).

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 in determining the age at which a particular event is likely to occur. For example, the typical age of marriage varies substantially from one culture to another, depending in part on the functions that marriage plays in a given culture.

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 the life span. Consequently, some developmental experts 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 take a comprehensive approach to lifespan development, proceeding topically across the life span through physical, cognitive, and social and personality development. Within each developmental area, we consider various topics related to that area as a way to present an overview of the scope of development through the life span.

One of the first observations that we make is that no one develops alone, without interacting with others who share the same society and the same time period. This universal truth leads not to unity, but to the great diversity that we find in cultures and societies across the world and—on a smaller scale—within a larger culture as we discuss in the next section.

Influences on Lifespan Development

LO 1.3 Describe some of the basic influences on human development.

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 the beginning of protests 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 his own 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; Dittmann, 2005; Twenge, Gentile, & Campbell, 2015).

Cohort effects provide an example of *history-graded influences*, which are 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 (Bonanno et al., 2006; Laugharne, Janca, & Widiger, 2007; Park, Riley, & Snyder, 2012).

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 relatively the same time throughout 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 six.

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 prior to the appearance of the Internet?

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 children who are white and affluent than for children who are members of a minority group and living in poverty (Rose et al., 2003).

Finally, *non-normative life events* are specific, atypical events that occur in a 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 six years old has experienced a significant non-normative life event.

Key Debates in Lifespan Development

LO 1.4 Summarize four key issues in the field of lifespan development.

Lifespan development is a decades-long journey. Though there are some shared markers along the way—such as learning to speak, going to school, and finding a job—there are, as we have just seen, many individual routes with twists and turns along the way that also influence this journey.

For developmentalists working in the field, the range and variation in lifespan development raises a number of issues and 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 first became established as a separate field in the late nineteenth and early twentieth centuries, though a fascination with the nature and course of human development can be traced back to the ancient Egyptians and Greeks. We will look at some of these issues next.

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 in nature; the basic underlying developmental processes that drive change remain the same over the course of the life span. Continuous change, then, produces changes that are a matter of degree, not of kind. Changes in height prior to adulthood, for example, are continuous. Similarly, as we'll see later in the chapter, some theorists suggest that changes in people's thinking capabilities are also continuous, showing gradual quantitative improvements rather than developing entirely new cognitive processing capabilities.

In contrast, one can view development as being made up of primarily **discontinuous change**, occurring in distinct stages. Each stage or change brings about behavior that is assumed to be qualitatively different from behavior at earlier stages. Consider the example of cognitive development again. We'll see later in the chapter that some

continuous change

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

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.

cohort

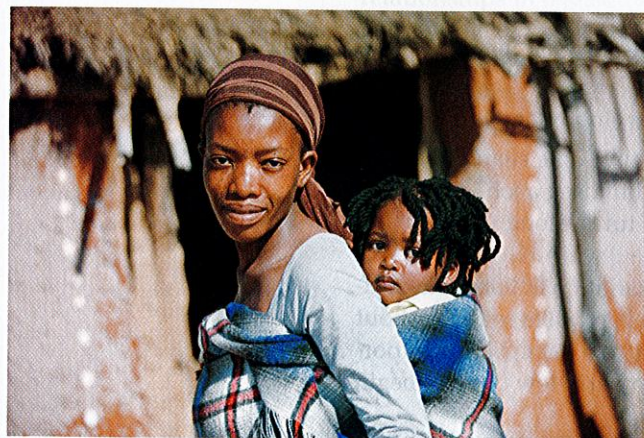
a group of people born at around the same time in the same place.

Developmental Diversity and Your Life

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 expressed in this passage? Is one right and the other wrong? Probably not, if we take into consideration the cultural context in which the mothers are operating. Different cultures and subcultures have their own views of appropriate and inappropriate childrearing, just as they have different developmental goals for children (Huijbregts et al., 2009; Chen & Tianying Zheng, 2012; Eeckhaut et al., 2014).



Culture, ethnicity, and race have significant effects on development.

It has become clear that in order to understand development, developmentalists must take into consideration broad cultural factors, such as an orientation toward individualism or collectivism. They must also consider finer ethnic, racial, socioeconomic, and gender differences if they are to achieve an understanding of how people change and grow throughout the life span. If developmentalists succeed in doing so, 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.

Efforts to understand how diversity affects development have been hindered by difficulties in finding an

appropriate vocabulary. For example, members of the research community—as well as society at large—have sometimes used terms such as *race* and *ethnic group* in inappropriate ways. *Race* is a biological concept, which should be employed to refer to classifications based on physical and structural characteristics of species. In contrast, *ethnic group* and *ethnicity* are broader terms, referring to cultural background, nationality, religion, and language.

The concept of race has proven especially problematic. Although it formally refers to biological factors, race has taken on substantially more meanings—many of them inappropriate—that range from skin color to religion to culture. Moreover, the concept of race 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 comparatively insignificant (Bamshad & Olson, 2003; Helms, Jernigan, & Mascher, 2005; Smedley & Smedley, 2005).

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 skin color? Is *Native American* preferable to *Indian*? Is *Hispanic* more appropriate than *Latino*? And how can researchers accurately categorize people with multiethnic backgrounds? The choice of category has important implications for the validity and usefulness of research. The choice even has political implications. For example, the decision to permit people to identify themselves as “multiracial” on U.S. government forms and in the U.S. Census initially was highly controversial (Perlmann & Waters, 2002).

In order to fully understand development, then, we need to take the complex issues associated with human diversity into account. 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 principles that are culturally determined. In the years ahead, then, it is likely that lifespan development will move from a discipline that focuses primarily on North American and European development to one that encompasses development around the globe (Fowers & Davidov, 2006; Matsumoto & Yoo, 2006; Kloep et al., 2009).

cognitive developmentalists suggest that as we develop, our thinking changes in fundamental ways, and that such development is not just a matter of quantitative change but of qualitative change.

Most developmentalists agree that taking an either/or position on the continuous-discontinuous issue is inappropriate. While many types of developmental change are continuous, others are clearly discontinuous.

CRITICAL AND SENSITIVE PERIODS: GAUGING THE IMPACT OF ENVIRONMENTAL EVENTS. If a woman comes down with a case of rubella (German measles) in the first twenty weeks of pregnancy, the consequences for the child she is carrying are likely to be devastating: They include the potential for blindness, deafness, and heart defects. However, if she comes down with the exact same strain of rubella in the thirtieth week of pregnancy, damage to the child is unlikely.

The differing outcomes of the disease in the two periods 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 is necessary for development to proceed normally (Uylings, 2006).

Although early specialists in lifespan development placed great emphasis on the importance of critical periods, more recent thinking suggests that in many realms, individuals are more malleable than was first thought, particularly in the domain of personality and social development. For instance, rather than suffering permanent damage from a lack of certain kinds of early social experiences, there is increasing evidence that people can use later experiences to their benefit, to help them 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 environment. A sensitive period represents the optimal period for particular capacities to emerge, and children are particularly sensitive to environmental influences.

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; Hartley & Lee, 2015).

LIFESPAN APPROACHES VERSUS A FOCUS ON PARTICULAR PERIODS. On which part of the life span should developmentalists focus their attention? For early developmentalists, the answers tended to be infancy and adolescence. Most attention was clearly concentrated on those two periods, largely to the exclusion of other parts of the life span.

Today, the story is different. Developmentalists now believe that the entire life span is important, for several reasons. One is the discovery that developmental growth and change continue during every part of life—as we'll discuss throughout this book.

Furthermore, an important part of every person's environment is the presence of other people around him or her, the person's social environment. To fully understand the social influences on people of a given age, we need to understand the people who are in large measure providing 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 will provide parental influences of a very different sort from those provided by an experienced 37-year-old mother. Consequently, infant development is in part an outgrowth consequence of adult development.

In addition, 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 involve loss of skill and capacity. For example,

critical period

a specific time during development when a particular event has its greatest consequences and the presence of certain kinds of environmental stimuli is 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.

vocabulary tends to grow throughout childhood and continues this growth through most of adulthood. At the same time, certain physical abilities, like reaction time, improve until early and middle adulthood, when they begin to decline (Baltes, Staudinger, & Lindenberger, 1999; Baltes, 2003).

People also shift in how they invest their resources (in terms of motivation, energy, and time) at different points during the life span. Early in life, more of one's personal resources are devoted to activities involving growth, such as studying or learning new skills. As one grows older, more resources are devoted to dealing with the losses people face during late adulthood (Staudinger & Leipold, 2003).

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 their genetically determined nature and how much is due to nurture, the influences of the physical and social environment in which a child is raised. This issue, which has deep philosophical and historical roots, has dominated much work in lifespan development (Wexler, 2006).

In this context, *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 that is created at the moment of 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 of these 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 environmental 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 larger, societal-level 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 also 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 (Bradley & Corwyn, 2008; Stright, Gallagher, & Kelley, 2008; Barnes & Boutwell, 2012).

Similarly, although our genetic background orients us toward particular behaviors, those behaviors will not necessarily occur in the absence of 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 sometimes behave quite similarly (Coll, Bearer, & Lerner, 2004; Kato & Pedersen, 2005; Segal et al., 2015).

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 (Rutter, 2006; Deater-Deckard & Cahill, 2007).

maturation

the predetermined unfolding of genetic information.

Module 1.1 Review

- Lifespan development, a scientific approach to understanding human growth and change throughout life, encompasses physical, cognitive, social, and personality development.
- Developmentalists focus on physical development, cognitive development, and on personality and social development. In addition to choosing to specialize in a particular topical area, developmentalists also typically look at a particular age range.
- 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. Culture and ethnicity also play an important role in development, both broad culture and aspects of culture, such as race, ethnicity, and socioeconomic status.
- 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.

Journal Writing Prompt

Applying Lifespan Development: What are some examples of the ways culture (either broad culture or aspects of culture) affects human development?

MODULE 1.2

THEORETICAL PERSPECTIVES ON LIFESPAN DEVELOPMENT

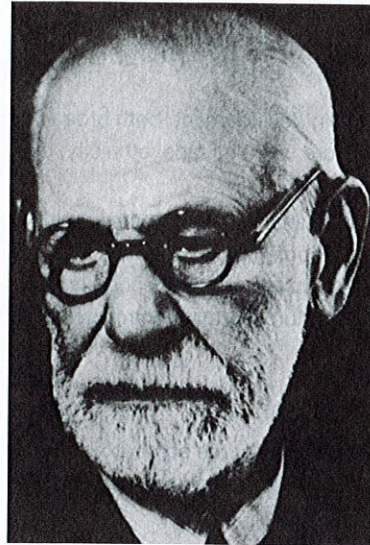
Until the seventeenth century in Europe, there was no concept of "childhood." Instead, children were simply thought of as miniature adults. They were assumed to be subject to the same needs and desires as adults, to have the same vices and virtues as adults, and to warrant no more privileges than adults. They were dressed the same as adults, and their work hours were the same as adults. 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 wrong-headed now, but at the time it was what passed for 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 (Ariès, 1962; Acocella, 2003; Hutton, 2004; Wines, 2006).

Although, looking back over several centuries, it is easy to reject the medieval view of childhood, it is 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?

People who study lifespan development approach the field from a number of different perspectives. Each general 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 built on unverified observations that are developed haphazardly, developmentalists' theories are more formal, based on a systematic integration of prior findings and theorizing. These theories allow developmentalists to summarize and organize prior observations, and they also permit them to move beyond existing observations to draw deductions that may not be immediately apparent. In addition, these theories are then subject to rigorous testing in the form of research. By contrast, the developmental theories of individuals are not subject to such testing and may never be questioned at all (Thomas, 2001).



Sigmund Freud.

psychodynamic perspective

the approach stating that 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, focuses on a particular biological function and body part.

psychosocial development

the approach that encompasses changes in our interactions with and understandings of one another, as well as in our knowledge and understanding of ourselves as members of society.

We will consider six major theoretical perspectives used in lifespan development: the psychodynamic, behavioral, cognitive, humanistic, contextual, and evolutionary perspectives. Each emphasizes somewhat different aspects of development and steers developmentalists in particular directions. Furthermore, each perspective continues to evolve and change, as befits a growing and dynamic discipline.

The Psychodynamic Perspective: Focusing on the Inner Person

LO 1.5 Describe how the psychodynamic perspective explains lifespan development.

When Marisol was six months old, she was involved in a bloody automobile accident—or so her parents tell her, since she has no conscious 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 to proponents of the **psychodynamic perspective**, it is not so improbable. Advocates of the psychodynamic perspective believe that much of 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 one's childhood, continually 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 ultimately had a profound effect not only on the fields of psychology and psychiatry but also 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, because of their disturbing nature, are hidden 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 real world outside of us 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 around age five or six 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 a series of stages in which pleasure, or gratification, is focused on a particular biological function and body part. As illustrated in Table 1.2 (which also contains material on Erik Erikson, who we discuss later), 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 conversely, 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 who is unusually absorbed in oral activities—eating, talking, or chewing gum. Freud also argued that fixation is represented through symbolic sorts of 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 in his theory of psychosocial development, emphasizing our social interaction with other people. In Erikson's view, society and culture both challenge and shape us. **Psychosocial development**

Table 1.2 Freud's and Erikson's Theories

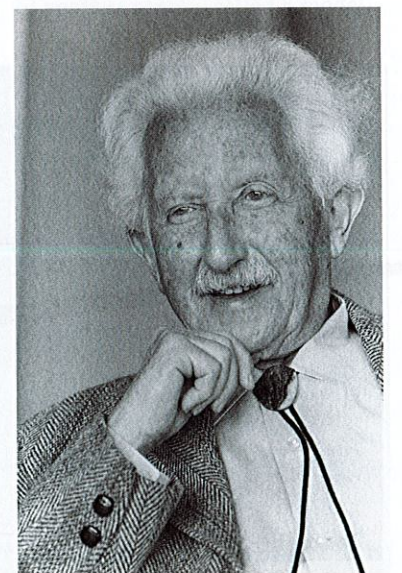
Approximate Age	Freud's Stages of Psychosexual Development	Major Characteristics of Freud's Stages	Erikson's Stages of Psychosocial Development	Positive and Negative Outcomes of Erikson's Stages
Birth to 12–18 months	Oral	Interest in oral gratification from sucking, eating, mouthing, biting	Trust vs. mistrust	<i>Positive:</i> Feelings of trust from environmental support <i>Negative:</i> 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	<i>Positive:</i> Self-sufficiency if exploration is encouraged <i>Negative:</i> 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	<i>Positive:</i> Discovery of ways to initiate actions <i>Negative:</i> Guilt from actions and thoughts
5–6 years to adolescence	Latency	Sexual concerns largely unimportant	Industry vs. inferiority	<i>Positive:</i> Development of sense of competence <i>Negative:</i> 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	<i>Positive:</i> Awareness of uniqueness of self, knowledge of role to be followed <i>Negative:</i> Inability to identify appropriate roles in life
Early adulthood (Erikson)			Intimacy vs. isolation	<i>Positive:</i> Development of loving, sexual relationships and close friendships <i>Negative:</i> Fear of relationships with others
Middle adulthood (Erikson)			Generativity vs. stagnation	<i>Positive:</i> Sense of contribution to continuity of life <i>Negative:</i> Trivialization of one's activities
Late adulthood (Erikson)			Ego-integrity vs. despair	<i>Positive:</i> Sense of unity in life's accomplishments <i>Negative:</i> Regret over lost opportunities of life

encompasses changes in our interactions with and understandings of one another as well as in our knowledge and understanding of ourselves as members of society (Erikson, 1963; Dunkel, Kim, & Papini, 2012; Jones et al., 2014).

Erikson's theory suggests that developmental change occurs throughout our lives in eight distinct stages (see Table 1.2). The stages emerge in a fixed pattern and are similar for all people. Erikson argued that each stage presents a crisis or conflict that the individual must resolve. Although no crisis is ever fully resolved, making life increasingly complicated, 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 called into question, however, because they have not been validated by subsequent research. In particular, the notion that childhood stages determine adult personalities



Erik Erikson.

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 may be interpreted as devaluing women (Guterl, 2002; Messer & McWilliams, 2003; Schachter, 2005).

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's than women's development. It is also vague in some respects, making it difficult for researchers to test rigorously. And, as is the case with psychodynamic theories in general, it is difficult to make definitive predictions about a given individual's behavior using the theory. In sum, then, the psychodynamic perspective provides good descriptions of past behavior but imprecise predictions of future behavior (Zauszniewski & Martin, 1999; de St. Aubin & McAdams, 2004).

The Behavioral Perspective: Focusing on Observable Behavior

LO 1.6 Describe how the behavioral perspective explains lifespan development.

When Elissa Sheehan was three, 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 outside stimuli in the environment. 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.

From the perspective of a child-care provider

How important to you think it is to have an understanding of the behavioral perspective and how would you apply it to your daily work?

Behavioral theories reject the notion that people universally pass through a series of stages. Instead, people are assumed to be 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 are able to 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 a person's environment, it was possible to produce virtually any behavior.



John B. Watson.

behavioral perspective

the approach suggesting that the keys to understanding development are observable behavior and outside stimuli in the environment.

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 presentation 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.

OPERANT CONDITIONING. In addition to classical conditioning, other types of learning, especially what behaviorists 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 to bring about desired consequences (Skinner, 1975).

Whether 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 their buying habits 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; Wirth, Wabitsch & Hauner, 2014).

SOCIAL-COGNITIVE LEARNING THEORY: LEARNING THROUGH IMITATION. A five-year-old boy seriously injures his 22-month-old cousin while imitating a violent wrestling move he had seen on television. Although the baby sustained spinal cord injuries, he improved and was discharged five 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).

If operant conditioning makes learning a matter of trial and error, social-cognitive learning theory makes learning a product of observation. 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

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.

operant conditioning

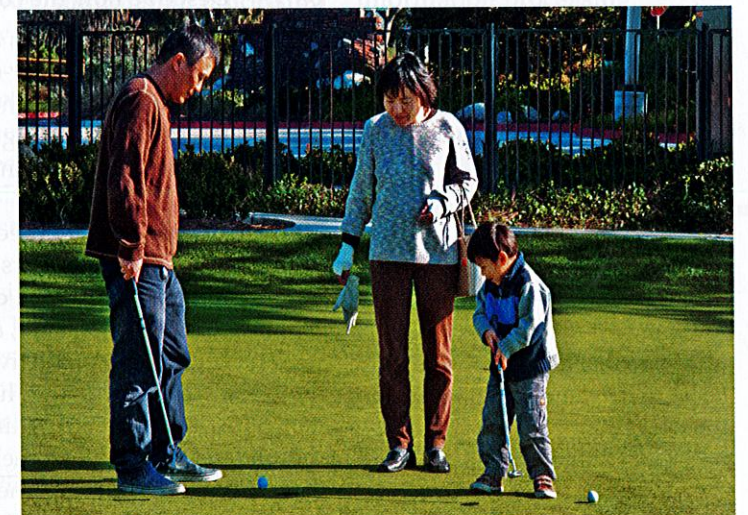
a form of learning in which a voluntary response is strengthened or weakened by its association with positive or negative consequences.

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.



What form of learning is being demonstrated in this picture?

“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.

Bandura suggests that social-cognitive learning proceeds in four steps (Bandura, 1986). First, an observer must pay attention and perceive the most critical features of a model’s behavior. Second, the observer must successfully recall the behavior. Third, the observer must reproduce the behavior accurately. Finally, the observer must be motivated to learn and carry out the behavior.

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?

ASSESSING THE BEHAVIORAL PERSPECTIVE. Research using the behavioral perspective has made significant contributions, ranging from techniques for educating children with severe mental retardation to identifying procedures for curbing aggression. At the same time, some controversies surround the behavioral perspective. For example, although they are part of the same general behavioral perspective, classical and operant conditioning and social learning theory diverge in some basic ways. Both classical and operant conditioning present learning in terms of external stimuli and responses, in which the only important factors are the observable features of the environment. In such an analysis, people and other organisms are like inanimate “black boxes,” nothing that occurs inside the box is understood—nor much cared about, for that matter.

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

In many ways, social learning theory has come to predominate in recent decades over classical and operant conditioning theories. In fact, another perspective that focuses explicitly on internal mental activity has become enormously influential. This is the cognitive approach, which we consider next.

The Cognitive Perspective: Examining the Roots of Understanding

LO 1.7 Describe how the cognitive perspective explains lifespan development.

When three-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 cumulonimbus 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.

cognitive perspective

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

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 is on the change in cognition that occurs as children move from one stage to the next (Piaget, 1952, 1962, 1983).

Broadly speaking, Piaget suggests 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 that directs and determines how data from the world are looked at and dealt with.

Piaget suggests that the growth in children’s understanding of the world can 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 masterful descriptions of how intellectual growth proceeds during childhood—descriptions that have stood the test of literally thousands of investigations. Broadly, then, Piaget’s broad view of the sequence 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 according to 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 (McDonald & Stuart-Hamilton, 2003; Genovese, 2006; De Jesus-Zayas, Buigas, & Denney, 2012).

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. They contend that children, like computers, have limited capacity for processing information. As children 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*

information processing approaches

models that seek to identify the ways individuals take in, use, and store information.

considers cognition as being 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 sorts of 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. Information processing approaches have become a central part of our understanding of development, but they do not offer a complete explanation for 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. Among the most recent additions to the array of approaches taken by lifespan developmentalists, **cognitive neuroscience approaches** 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 activity. 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*, 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 provide crucial early intervention (Nadel & Poss, 2007; Lewis & Elman, 2008; Howard et al., 2014).

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 (Strobel et al., 2007; Ranganath, Minzenberg, & Ragland, 2008; Rodnitzky, 2012). (Also see the *Neuroscience and Development* box.)

Assessing Cognitive Neuroscience Approaches. Cognitive neuroscience approaches represent a new frontier in child and adolescent development. Using sophisticated measurement techniques that many of them developed only in the last few years, cognitive neuroscientists are able to peer into the inner functioning of the brain. Advances in our understanding of genetics also has opened a new window into both normal and abnormal development and has suggested a variety of treatments for abnormalities.

Critics of the cognitive neuroscience approach have suggested that it sometimes provides a better *description* than *explanation* of developmental phenomena. For instance, finding that children with autism have larger brains than those without the disorder does not explain why their brains became larger—that's a question that remains to be answered. Still, such work not only offers important clues to appropriate treatments but, ultimately, can also lead to a full understanding of a range of developmental phenomena.

cognitive neuroscience approaches

approaches that examine cognitive development through the lens of brain processes.

Figure 1.1 The Autistic Brain

Neuroscientists have found evidence that the brains of children with autism are somewhat larger than those of children without the disorder. This finding might help identify cases of autism early, allowing for more effective intervention and treatment.



Neuroscience and Development

The Essential Principles of Neuroscience

It is quiet in the computer lab as three students download assignments in preparation for upcoming midterm exams. Jonathan, a business major, reviews an article on how advertising influences buying behavior; Christina, a music and special education major, reads about how music helps motor control in children with cerebral palsy; and Marisha, a criminal justice major, takes notes on an article about variables that influence early release from prison. None of these students is enrolled in bioscience program, yet they all have one thing in common as they prepare for their tests: neuroscience

Contemporary neuroscience and its sub-areas addresses an array of relevant problems with methods and insights from brain research and encourages translation of this research to the application of new scientific knowledge to every facet of the human condition. In order to address awareness of our increasing understanding of neuroscience, the Society for Neuroscience (SfN) has spearheaded an effort in which hundreds of neuroscientists and educators across the United States developed eight concepts within four overarching concepts that contain fundamental principles (named *Neuroscience Core Concepts*) they believe everyone should know about the brain and the nervous system.

Answer "true" or "false" to the statements below to learn how much you know about the brain and its workings.

True or False?

1. The most complex organ in the body is the brain.
2. There are one hundred billion neurons in the brain.

3. All body systems are influenced by the nervous system.
4. Communication between neurons occurs using both electrical and chemical signaling.
5. Every thought, perception, and behavior is the result of combinations of signals among neurons.
6. The foundation of the nervous system is based on circuits that are determined by genetics.
7. The nervous system is changed by the experiences a person has.
8. Challenging the brain with mental and physical activity maintains its structure and function.
9. Some neurons continue to be created throughout the life span.
10. Intelligence is the outcome of the brain's reasoning, planning, and solving problems.
11. The brain allows us to communicate using language.
12. The brain creates curiosity.

For more information, go to the SfN Web site (<http://www.sfn.org/index.aspx?pagename=brainfacts>)

Source: Society for Neuroscience (SfN) (2015). *Brain Facts*. Washington, DC: SfN.

Answers: All of these statements are true. Score one point for each correct answer.

The Humanistic Perspective: Concentrating on the Unique Qualities of Human Beings

LO 1.8 Describe how the humanistic perspective explains lifespan development.

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 our behavior is largely determined by unconscious processes, by learning from our environment, or by rational 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. 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.

Carl Rogers, one of the major proponents of the humanistic perspective, suggests that all people have a need for positive regard that 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; Mottschning & Nykl, 2003). Rogers, along with another key figure in the humanistic perspective, Abraham Maslow, suggests

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

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; Sheldon, Joiner, & Pettit, 2003; Machiodi, 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. Its lack of influence 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 (Zalenski & Raspa, 2006; Elkins, 2009; Beitel et al., 2014).

The Contextual Perspective: Taking a Broad Approach to Development

LO 1.9 Describe how the contextual perspective explains lifespan development.

Although lifespan developmentalists often consider development in terms of physical, cognitive, personality, and social factors separately, this categorization has one serious drawback: In the real world, none of these broad influences occurs in isolation from any other. Instead, the different types of influence interact constantly.

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, called the bioecological approach. The **bioecological approach** suggests that five levels of the environment simultaneously influence individuals. Bronfenbrenner suggests that we cannot fully understand development without considering how a person is influenced by each of these levels (illustrated in Figure 1.2).

- The *microsystem* is the everyday, immediate environment in which children lead their daily lives. Homes, caregivers, friends, and teachers all are influences that are part of the microsystem, 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 at 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, and friends to friends. It acknowledges the direct and indirect influences that bind us to one another, such as those that affect a mother or father who has a bad day at the office and then is short-tempered with her or his son or daughter at home.
- The *exosystem* represents broader influences, encompassing 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 affect 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 of the home), affect 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 of the system. For instance, a parent's loss of a job (involving the mesosystem) has an impact on 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 and subcultural 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.

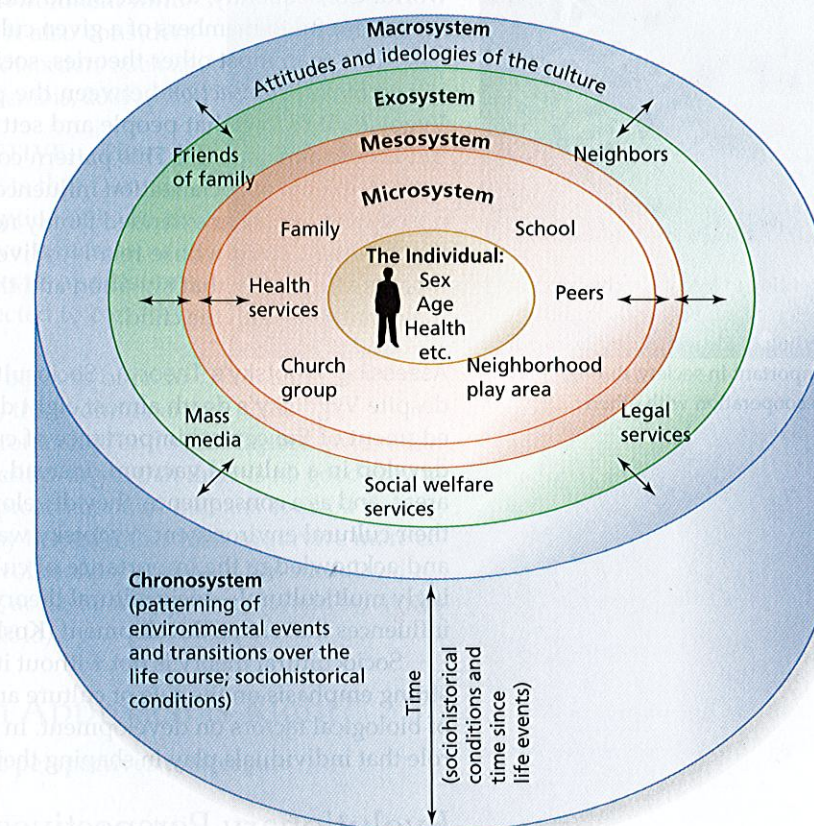
On the other hand, if you were raised in a traditional Asian culture, your agreement with the three statements would be considerably more likely because the statements reflect the value orientation known as *collectivism*—the notion that the well-being of the group is more important than that of the individual. People raised in collectivistic cultures tend to emphasize the welfare of the groups to which they belong, sometimes even at the expense of their own personal well-being (Leung, 2005; Garcia & Saewyc, 2007; Yu & Stiffman, 2007).

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.

YGOTSKY'S SOCIOCULTURAL THEORY. To Russian developmentalist Lev Semenovich Vygotsky, a full understanding of development was 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, 1926/1997, 1979; Edwards, 2005; Göncü, 2012).

Figure 1.2 Bronfenbrenner's Approach to Development

Urie Bronfenbrenner's bioecological approach to development offers five levels of the environment that simultaneously influence individuals: the macrosystem, exosystem, mesosystem, and microsystem.



contextual perspective

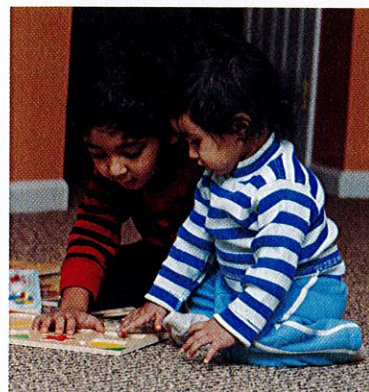
the theory that considers the relationship between individuals and their physical, cognitive, personality, and social worlds.

bioecological perspective

the perspective suggesting that different levels of the environment simultaneously influence individuals.

sociocultural theory

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



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.

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 in their understanding of the world. Consequently, to understand the course of development, we must consider what is meaningful to members of a given 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 a considerable distance away. Those relatives, too, are affected by that situation and that child, depending on 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 eight 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 that are an outcome of their cultural environment. Vygotsky was one of the first developmentalists to recognize and acknowledge the importance of culture, and—as today's society becomes increasingly multicultural—sociocultural theory is helping us to understand the rich and varied influences that shape development (Koshmanova, 2007; Rogan, 2007; Frie, 2014).

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.

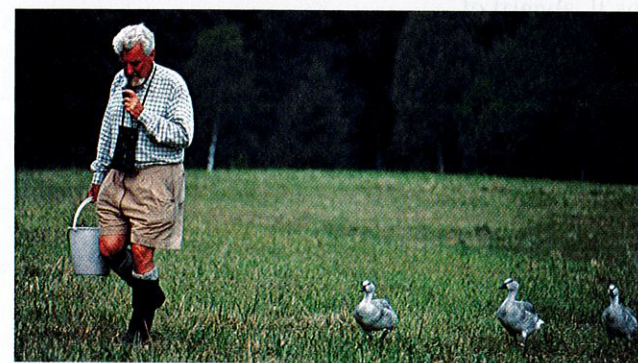
Evolutionary Perspectives: Our Ancestors' Contributions to Behavior

LO 1.10 Describe how the evolutionary perspective explains lifespan development.

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 & Kern, 2003; Bjorklund, 2005; Goetz & Shackelford, 2006).

Evolutionary approaches have grown out of the groundbreaking work of Charles Darwin. In 1859, Darwin argued in his book *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 determines not only 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 increase the survival rates of humans' ancient relatives (Easton, Schipper, & Shackelford, 2007; Buss, 2003, 2009, 2012).

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, ultimately led developmentalists to consider the ways in which human behavior might reflect inborn genetic patterns.



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

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

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 such 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.

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 (Bjorklund, 2006; Baptista et al., 2008; Del Giudice, 2015).

Why It Is Wrong to Ask “Which Approach Is Right?”

LO 1.11 Discuss the value of applying multiple perspectives to lifespan development.

We have considered the six major perspectives used in lifespan development—psychodynamic, behavioral, cognitive, humanistic, contextual, and evolutionary—summarized in Table 1.3, which applies the theories to the case of a young adult who is

WATCH THINKING LIKE A PSYCHOLOGIST: EVOLUTIONARY PSYCHOLOGY



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.

overweight. 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.

Each perspective is based on its own premises and focuses on different aspects of development—the way different maps of the same geographical area focus on different aspects and features of that area. In the same way, the same developmental phenomenon can be looked at from a number of perspectives. In fact, some lifespan developmentalists use an eclectic approach, drawing on several perspectives simultaneously.

The various theoretical perspectives provide different ways of looking at development. Considering them together paints a fuller portrait of the many ways humans change and grow over the life span. However, not all theories and claims derived from the various perspectives are accurate. How do we choose among competing explanations? The answer is *research*, which we consider in the final module of this chapter.

Module 1.2 Review

- The psychodynamic perspective looks primarily at the influence of internal, unconscious forces on development.
- The behavioral perspective focuses on external, observable behaviors as the key to development.
- The cognitive perspective focuses on the processes that allow people to know, understand, and think about the world.
- The humanistic perspective concentrates on the theory that each individual has the ability and motivation to reach more advanced levels of maturity and that people naturally seek to reach their full potential.
- The contextual perspective focuses on the relationship between individuals and the social context in which they lead their lives.
- The evolutionary perspective seeks to identify behavior that is a result of our genetic inheritance from our ancestors.
- The various theoretical perspectives provide different ways of looking at development. An eclectic approach paints a more complete picture of the ways humans change over the life span.

Journal Writing Prompt

Applying Lifespan Development: What examples of human behavior have you seen that seem to have been inherited from our ancestors because they helped individuals survive and adapt more effectively? Why do you think they are inherited?

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, he learned that Psamtik sought to learn what the first word the children would say. Herodotus claims the experiment worked, but not as Psamtik had hoped. One day, when the children were two 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 turned out, 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 seen as the first developmental experiment in recorded history (Hunt, 1993).

Theories and Hypotheses: Posing Developmental Questions

LO 1.12 Describe the role that theories and hypotheses play in the study of development.

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 later 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**, the broad explanations and predictions about phenomena of interest that scientists create. 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

LO 1.13 Compare the two major categories of lifespan development research.

Once researchers have formed a hypothesis, they must develop a research strategy for testing 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 be used to 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 two years of age. 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

scientific method

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

theories

explanations and predictions concerning phenomena of interest, providing a framework for understanding the relationships among an organized set of facts or principles.

hypothesis

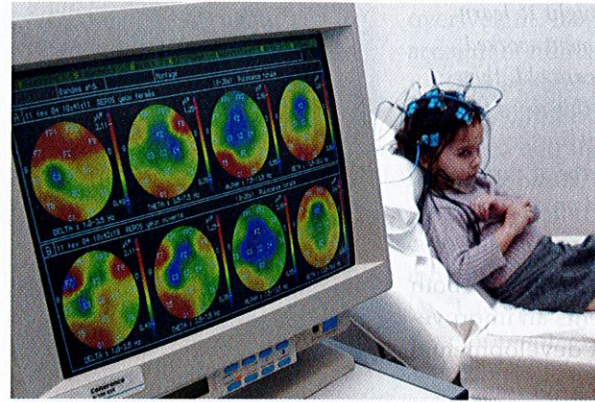
a prediction stated in a way that permits it to be tested.

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.



In experimental research, one uses controlled conditions to attempt to discover causal relationships between various factors.

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 amount of 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 in the developmental researcher’s toolbox.

Correlational Studies

LO 1.14 Identify different types of correlational studies and their relationship to cause and effect.

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 of aggression and actual aggression are strongly associated, or correlated (Center for Communication & Social Policy, 1998; Singer & Singer, 2000; Feshbach & Tangney, 2008).

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 1.3.)

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. Still, we have learned a lot from correlational studies. For instance, we have learned 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 have learned that the better the nutrition that infants receive, the fewer the cognitive and social problems they experience later (Hart, 2004; Colom, Lluís-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 find that the more money people make in their first job after college, the higher their scores on a survey of job satisfaction, and that people who make less money have lower scores when surveyed about their job satisfaction, we have found a positive correlation. (Higher values of the factor “salary” are associated with higher values of the factor “job satisfaction,” and lower values of “salary” are associated with lower values

of “job satisfaction.”) The correlation coefficient, then, 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 greater the number of hours adolescents spend texting, the worse their academic performance is. Such a finding would result in a negative correlation, ranging between 0 and –1. More texting would be associated with lower performance, and less texting would be associated with better performance. The stronger the association between texting and school performance, the closer the correlation coefficient would 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.

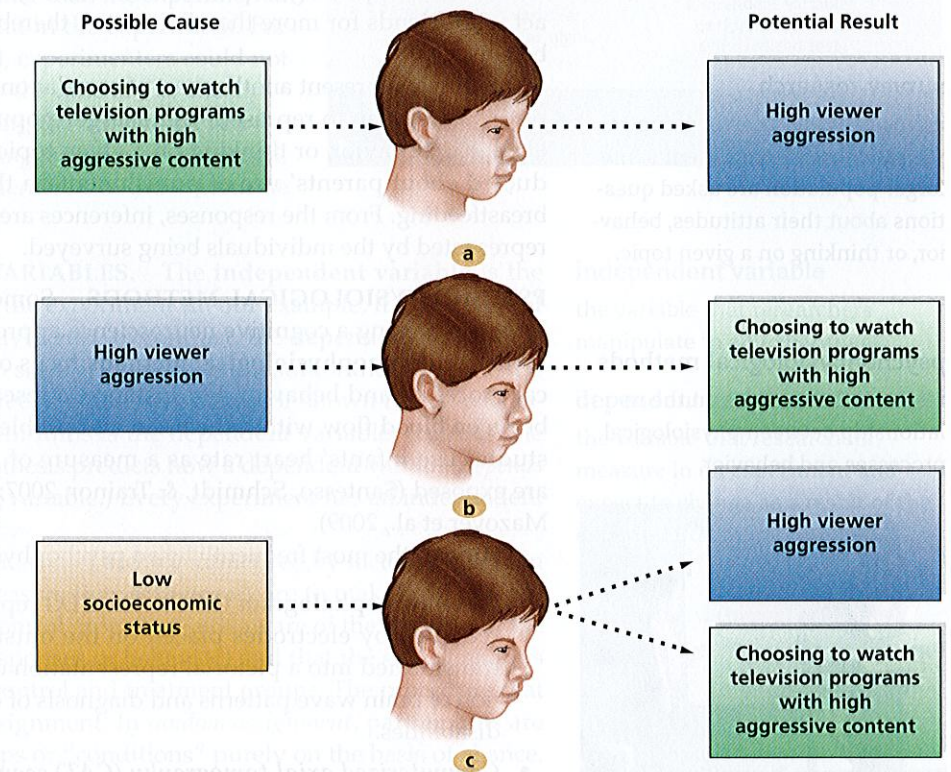
TYPES OF CORRELATIONAL STUDIES. There are several types of correlational studies. **Naturalistic observation** is the observation of a naturally occurring behavior without intervention in the situation. For instance, an investigator who wishes to learn how often preschool children share toys with one another might observe a classroom over a three-week period, recording how often the preschoolers spontaneously share with one another. The key point about naturalistic observation is that the investigator simply observes the children, without interfering with the situation whatsoever (e.g., Fanger, Frankel, & Hazen, 2012; Nilsen et al., 2014).

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. In addition, children who know they are being watched may modify their behavior as a result of the observation. Consequently, their behavior may not be representative of how they would behave if they were not being watched.

Increasingly, naturalistic observation employs *ethnography* a method borrowed from the field of anthropology and used to investigate cultural questions. In ethnography, a researcher’s goal is to understand a culture’s values and attitudes through careful, extended examination. Typically, researchers using ethnography 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 are able to obtain a deep understanding of the nature of life within another culture (Dyson, 2003).

Figure 1.3 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 levels of aggression. What other factors, besides socioeconomic status, might be plausible third factors?



naturalistic observation

a type of correlational study in which some naturally occurring behavior is observed without intervention in the situation.

case study

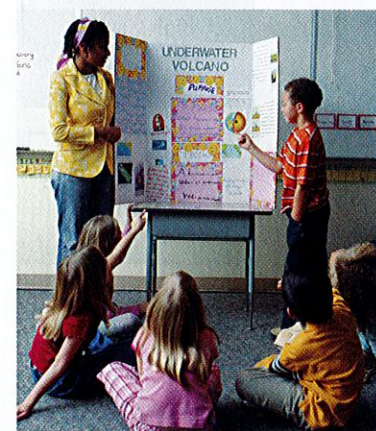
study that involves extensive, in-depth interviews with a particular individual or small group of individuals.

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.



Naturalistic observation is utilized to examine a situation in its natural habitat without interference of any sort. What are some disadvantages of naturalistic observation?

experiment

a process in which an investigator, called an experimenter, devises two different experiences for participants and then studies and compares the outcomes.

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 also 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 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 (Goldsmith, 2000; Cohen & Cashon, 2003; Wilson, 2003).

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 within the brain and problem-solving capabilities. 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 are the following:

- **Electroencephalogram (EEG).** The EEG reports electrical activity within the brain recorded by electrodes placed on the outside of the skull. That brain activity is transformed into a pictorial representation of the brain, permitting the representation of brain wave patterns and 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.

Experiments: Determining Cause and Effect

LO 1.15 Explain the main features of an experiment.

In an **experiment**, an investigator or experimenter typically devises two different conditions (or *treatments*) and then studies and compares the outcomes of the participants exposed to those two different conditions in order to see how behavior 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 aggressive 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 whether

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 his 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, the need to sit still during the movie, or even the mere passage of time, produced the changes that were observed. By using a control group, then, 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 nonviolent). 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. (Here is 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.

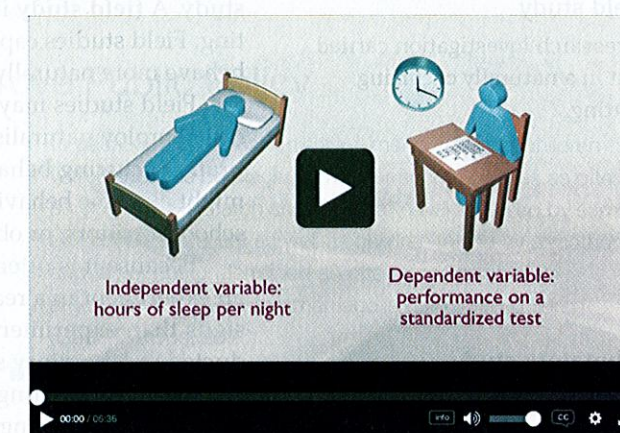
Experimenters must make sure their studies are not influenced by factors other than those they are manipulating. For this reason, they take great care to make sure that the participants in both the treatment and control groups are not aware of the purpose of the experiment (which could affect their responses 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.

Given these advantages, 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 combining the results of many studies into one overall conclusion (Peterson & Brown, 2005).

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 selected for the experiment, because it was useful to have adolescents whose normal level of aggression was relatively high and because they could incorporate showing the films into the everyday life of the home with minimal disruption.

WATCH THE BASICS: SCIENTIFIC RESEARCH METHODS

**independent variable**

the variable that researchers manipulate in an experiment.

dependent variable

the variable that researchers measure in an experiment and expect to change as a result of the experimental manipulation.

sample

the group of participants chosen for the experiment.

field study

a research investigation carried out in a naturally occurring setting.

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.

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.

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. Researchers can exert enough control in a laboratory study to learn how their treatments affect participants.

Theoretical and Applied Research: Complementary Approaches

LO 1.16 Distinguish between theoretical research and applied research.

Developmental researchers typically focus on either theoretical research or applied research. **Theoretical research** is designed specifically to test some developmental explanation and expand scientific knowledge, whereas **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 how children learn by examining ways in which elementary school instructors can teach 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 research (Lerner, Fisher, & Weinberg, 2000).

In fact, as we discuss in the *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.

Measuring Developmental Change

LO 1.17 Compare longitudinal research, cross-sectional research, and sequential research.

How people grow and change through their life spans 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's moral development changes between the ages of three and five, the most direct approach would be to take a group of three-year-olds and follow them until they were five, testing them periodically.

Such a strategy illustrates longitudinal research. In **longitudinal research**, the behavior of one or more study participants is measured as they age. Longitudinal research

From Research to Practice

Using Developmental Research to Improve Public Policy

Does the Head Start preschool program actually work?

Does restricting teens' access to the Internet protect them from online harassment?

How are soldiers and their families affected when they return from war?

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 (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, the winding down of the wars in Iraq and Afghanistan has prompted questions about the impact on returning U.S. service members, with research showing that war has a lasting impact not only on them but also on their partners, children, and other family members whose needs should be considered in any interventions supporting the health and adjustment of veterans. Research has also disconfirmed the widespread belief that childhood vaccinations are linked to autism, contributing invaluable evidence to the controversy over the risks and benefits of mandatory child immunization (Price et al., 2010; Lester, Paley, Saltzman, & Klosinski, 2013).
- *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 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, 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. Other research on intervention strategies to prevent online harassment of adolescents shows that monitoring teens' Internet access is actually many times more effective than attempting to restrict it (University of Akron, 2006; Khurana, Bleakley, Jordan, & Romer, 2014).

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.

Shared Writing Prompt

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?

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 five 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).



Cross-sectional research allows researchers to compare representatives of different age groups at the same time.

Longitudinal research has also provided great 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).

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

In addition, participants may become "test-wise" and perform better each time they are assessed as they become more familiar with the procedure. Finally, they 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 in conducting research. The alternative they choose most often is the cross-sectional study.

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

cross-sectional research

research in which people of different ages are compared at the same point in time.

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.

Assessing Cross-Sectional Studies. 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.

However, cross-sectional research brings its own difficulties. Recall that every person belongs to a particular *cohort* of individuals born at around the same time in the same place. If we find that people of different ages vary along some dimension, the differences 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 whether 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 three years old, four years old, or five years old at the time the study begins.

The study continues for the next several years, with each participant tested annually. Thus, the three-year-olds would be tested at ages three, four, and five; the four-year-olds at ages four, five, and six, and the five-year-olds at ages five, six, and seven. 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.

Ethics and Research

LO 1.18 Describe some ethical issues that affect psychological 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.

In order to help researchers avoid ethical problems, the major organizations of developmentalists, including the Society for Research in Child Development and the American Psychological Association, have developed comprehensive ethical guidelines for researchers. Among the basic principles that must be followed are those involving freedom from harm, informed consent, the use of deception, and maintenance of participants' privacy (American Psychological Association, 2002; Toporek, Kwan, & Williams, 2012; Joireman & Van Lange, 2015):

- **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 seven, participants must voluntarily agree to be in a study. For those under 18, their parents or guardians must also provide consent.

The requirement for informed consent raises some difficult issues. Suppose, for instance, researchers want to study the psychological effects of abortion on adolescents. Although they may be able to obtain the consent of an adolescent who has had an abortion, the researchers may need to get her parents' permission as well because she is a minor. But if the

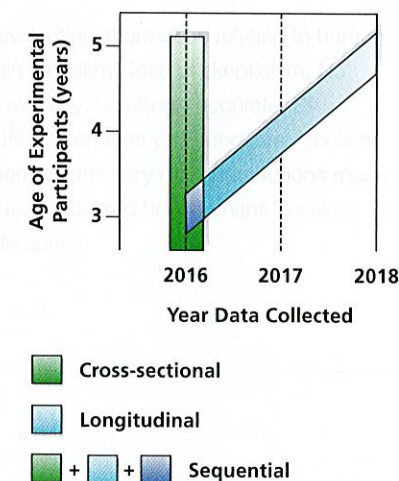


Figure 1.4 Research Techniques for Studying Development

In a cross-sectional study, three-, four-, and five-year-olds are compared at a similar point in time (in the year 2016). In longitudinal research, a set of participants who are three years old in 2016 are studied when they are four years old (in 2017) and when they are five years old (in 2018). Finally, a sequential study combines cross-sectional and longitudinal techniques; here, a group of three-year-olds would be compared initially in 2016 with four- and five-year-olds but would also be studied one and two years later, when they themselves were four and five years old. Although the graph does not illustrate this, researchers carrying out this sequential study might also choose to retest the children who were four and five in 2016 for the next two years. What advantages do the three kinds of studies offer?

sequential studies

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

WATCH SPECIAL TOPICS: ETHICS AND PSYCHOLOGICAL RESEARCH



adolescent hasn't told her parents about the abortion, the mere request for permission from the parents would violate her privacy—leading to a breach of ethics.

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?

- **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, such a procedure is ethical only if it causes no harm to participants, has been approved by a review panel, and ultimately includes a full debriefing, or explanation, for participants when the study is over (Underwood, 2005).
- **Participants' privacy must be maintained.** If participants are videotaped during the course of a study, for example, they must give their permission for the videotapes to be viewed. Furthermore, access to the tapes must be carefully restricted.

Are You 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 best-sellers such as *Chicken Soup for the Soul: On Being a Parent* to magazine and newspaper columns that provide advice on every imaginable topic, 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 or on television or the Internet 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 is likely to be the result of years of study, and its accuracy is probably high. If you don't know the organization,

investigate further to find out more about its goals and philosophy.

- **Evaluate the credentials of the person providing advice.** Information coming from established, acknowledged researchers and experts in a field is likely to be more accurate than that coming from a person whose credentials are obscure. 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 two months of age and therefore so can your child, 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 conclusion is based.** Who were the participants in the study? What were the methods used? What do the results show? Think critically about the way in which the findings were obtained before accepting them.
- **Do not overlook the cultural context of the information.** Although an assertion may be valid in some contexts, it

may not be true in all situations. 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 (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 their life spans.

Module 1.3 Review

- Theories in development are systematically derived explanations of facts or phenomena. Theories suggest hypotheses, which are predictions that can be tested.
- Correlational research seeks to identify whether an association or relationship between two factors exists. Experimental research is designed to discover *causal* relationships between various factors.
- Naturalistic observation, case studies, and survey research are types of correlational studies. Some developmental researchers also make use of psychophysiological methods.
- Experimental research seeks to discover cause-and-effect relationships by the use of a treatment group and a control group. By manipulating the independent variable and observing changes in the dependent variable, researchers find evidence of causal links between variables. Research studies may be conducted in field settings, where participants are subject to natural conditions, or in laboratories, where conditions can be controlled.
- Theoretical research is designed specifically to test some developmental explanation and expand scientific knowledge, whereas applied research is meant to provide practical solutions to immediate problems.
- Researchers measure age-related change through longitudinal studies, cross-sectional studies, and sequential studies.
- Developmental researchers must follow ethical standards for conducting research. Ethical guidelines for researchers cover freedom from harm, informed consent, the use of deception, and preservation of participant privacy.

Journal Writing Prompt

Applying Lifespan Development: Formulate a theory about one aspect of human development and a hypothesis that relates to it.

Epilogue

As we've seen, the scope of lifespan development is broad, touching on a wide range of topics that address how people grow and change through the course of life. We've also found that there are a variety of techniques by which developmentalists seek to answer questions of interest.

Before proceeding to the next chapter, take a few minutes to reconsider the prologue of this chapter—about Louise Brown, the first child to be born through *in vitro* fertilization. Based on what you now know about lifespan development, answer the following questions:

1. What are some of the potential benefits, and the costs, of the type of conception—in *in vitro*—that was carried out for Louise's parents?

2. What are some questions that developmentalists might ask about the possible effects being conceived via *in vitro* fertilization had on Louise's physical, cognitive, and personality and social development?
3. Louise reported feeling lonely and isolated as a child. Why do you think this occurred, and what effects might it have on her as an adult?
4. Louise's own son was conceived in the traditional manner. How do you think his development will differ from that of his mother, and why?

Looking Back

LO 1.1 Define the field of lifespan development and describe what it encompasses.

Lifespan development is a scientific approach to questions about growth, change, and stability in the physical, cognitive, social, and personality characteristics at all ages from conception to death.

LO 1.2 Describe the areas that lifespan development specialists cover.

Some developmentalists focus on physical development, examining the ways in which the body's makeup helps determine behavior. Other developmental specialists examine cognitive development, seeking to understand how growth and change in intellectual capabilities influence a person's behavior. Still other developmental specialists focus on personality and social development. In addition to choosing to specialize in a particular topical area, developmentalists also typically look at a particular age range.

LO 1.3 Describe some of the basic influences on human development.

Each individual is subject to normative history-graded influences, normative age-graded influences, normative sociocultural-graded influences, and non-normative life events. Culture—both broad and narrow—is an important issue in lifespan development. Many aspects of development are influenced not only by broad cultural differences but also by ethnic, racial, and socioeconomic differences within a particular culture.

LO 1.4 Summarize four key issues in the field of lifespan development.

Four key issues in lifespan development are as follows: (1) whether developmental change is continuous or discontinuous; (2) whether development is largely governed by critical periods during which certain influences or experiences must occur for development to be normal; (3) whether to focus on certain particularly important periods in human development or on the entire life span; and (4) the nature–nurture controversy, which focuses on the relative importance of genetic versus environmental influences.

LO 1.5 Describe how the psychodynamic perspective explains lifespan development.

The psychodynamic perspective is exemplified by the psychoanalytic theory of Freud and the psychosocial theory of Erikson. Freud focused attention on the unconscious and on stages through which children must pass successfully to avoid harmful fixations. Erikson identified eight distinct stages of development, each characterized by a conflict, or crisis, to work out.

LO 1.6 Describe how the behavioral perspective explains lifespan development.

The behavioral perspective typically concerns stimulus–response learning, exemplified by classical conditioning, the operant conditioning of Skinner, and Bandura's social-cognitive learning theory.

LO 1.7 Describe how the cognitive perspective explains lifespan development.

Within the cognitive perspective, the most notable theorist is Piaget, who identified developmental stages through which all children are assumed to pass. Each stage involves qualitative differences in thinking. In contrast, information processing approaches attribute cognitive growth to quantitative changes in mental processes and capacities, and cognitive neuroscience approaches focus on biological brain processes.

LO 1.8 Describe how the humanistic perspective explains lifespan development.

The humanistic perspective contends that people have a natural capacity to make decisions about their lives and control their behavior. The humanistic perspective emphasizes free will and the natural desire of humans to reach their full potential.

LO 1.9 Describe how the contextual perspective explains lifespan development.

The contextual perspective considers the relationship between individuals and their physical, cognitive, personality, and social worlds. The bioecological approach stresses the interrelatedness of developmental areas and the importance of broad cultural factors in human development. Vygotsky's sociocultural theory emphasizes the central influence on cognitive development exerted by social interactions between members of a culture.

LO 1.10 Describe how the evolutionary perspective explains lifespan development.

The evolutionary perspective attributes behavior to genetic inheritance from our ancestors, contending that genes determine not only traits such as skin and eye color, but certain personality traits and social behaviors as well.

LO 1.11 Discuss the value of applying multiple perspectives to lifespan development.

The various theoretical perspectives provide different ways of looking at development. An eclectic approach paints a more complete picture of the ways humans change over the life span.

LO 1.12 Describe the role that theories and hypotheses play in the study of development.

Theories are broad explanations of facts or phenomena of interest, based on a systematic integration of prior findings and theories. Hypotheses are theory-based predictions that can be tested. The process of posing and answering questions systematically is called the scientific method.

LO 1.13 Describe the two major categories of lifespan development research.

Researchers test hypotheses by correlational research (to determine whether two factors are associated) and experimental research (to discover cause-and-effect relationships).

LO 1.14 Identify different types of correlational studies and their relationship to cause and effect.

Correlational studies use naturalistic observation, case studies, and survey research to investigate whether certain characteristics of interest are associated with other characteristics. Some developmental researchers also make use of psychophysiological methods. Correlational studies lead to no direct conclusions about cause and effect.

LO 1.15 Explain the main features of an experiment.

Typically, experimental research studies are conducted on participants in a treatment group who receive the experimental treatment and participants in a control group who do not. Following the treatment, differences between

the two groups can help the experimenter to determine the effects of the treatment. The independent variable is the variable that researchers manipulate in the experiment, whereas the dependent variable is the variable that researchers measure in an experiment and expect to change as a result of the experimental manipulation. Experiments may be conducted in a laboratory or in a real-world setting.

LO 1.16 Distinguish between theoretical research and applied research.

Theoretical research is designed specifically to test some developmental explanation and expand scientific knowledge, while applied research is meant to provide practical solutions to immediate problems.

LO 1.17 Compare longitudinal research, cross-sectional research, and sequential research.

To measure change across human ages, researchers use longitudinal studies of the same participants over time, cross-sectional studies of different-age participants conducted at one time, and sequential studies of different-age participants at several points in time.

LO 1.18 Describe some ethical issues that affect psychological research.

Ethical issues that affect psychological research include the protection of participants from harm, informed consent of participants, limits on the use of deception, and the maintenance of privacy.

Key Terms and Concepts

lifespan development	4	operant conditioning	15	naturalistic observation	27
physical development	4	behavior modification	15	case study	28
cognitive development	4	social-cognitive learning theory	15	survey research	28
personality development	5	cognitive perspective	16	psychophysiological methods	28
social development	5	information processing approaches	17	experiment	28
cohort	6	cognitive neuroscience approaches	18	independent variable	29
continuous change	7	humanistic perspective	19	dependent variable	29
discontinuous change	7	contextual perspective	20	sample	29
critical period	9	bioecological perspective	20	field study	30
sensitive period	9	sociocultural theory	21	laboratory study	30
maturation	10	evolutionary perspective	22	theoretical research	30
psychodynamic perspective	12	scientific method	25	applied research	30
psychoanalytic theory	12	theories	25	longitudinal research	30
psychosexual development	12	hypothesis	25	cross-sectional research	32
psychosocial development	12	correlational research	25	sequential studies	33
behavioral perspective	14	experimental research	25		
classical conditioning	15				