The Journey *of* Adulthood

Eighth Edition
Global Edition

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An Overview of Adult Development

MY JOURNEY OF adulthood began early, as did that of many women of my generation, when I married shortly after high school and began a family. But unlike many women in my peer group, I spent more time reading than I did having morning coffee with the other moms. I always took a book along to read while the kids had music lessons, baseball practice, and orthodontist appointments. The library was a weekly stop along with the grocery store and was as important to me. By the time my youngest child began kindergarten, I enrolled in college as a freshman—at the age of 29, which was much older than the average at that time. For the next 7 years, my children and I did our homework together at the kitchen table, counted the days to the next holiday break, and posted our grade reports on the refrigerator. Today, as adults, they tell me that they can't remember a time in their childhood when I wasn't in school. Just before I received my master's degree in developmental psychology, the marriage ended, and I spent some time as a single mother. I abandoned plans for a PhD and took a job at the university, teaching psychology courses and doing research on children's memory development. And just as my children began to leave the nest, I married a man whose own journey of adulthood had brought him to fatherhood rather late, making me stepmother of a 5-year-old, who quickly became an important part of my life. Not too

much later, the grandchildren began to arrive, and life settled into a nice routine. It seemed I had done it all—marriage, parenthood, career, single parenthood, stepparenthood, and grandparenthood; my life was full.

Suddenly, my 50th birthday loomed, and it seemed to represent so much more to me than turning "just another year older." The half-century mark was quite a shock and caused me to reevaluate my life. I realized that I wasn't ready to ride slowly into the sunset for the next several decades; I needed to get back on track and move forward with my education. The next fall I entered a PhD program in life-span developmental psychology at the University of Georgia. It was an invigorating experience and also very humbling. Instead of being the teacher, I was the student. Instead of supervising the research project, I was the newbie. Instead of being the one giving advice, I was the one who had to ask where the bookstore was, where to park, and how to use the copy machine. But 3 years later I was awarded a red-and-black hood in a formal graduation ceremony with my children and grandchildren, parents, and siblings cheering for me from the audience.

Now I teach part time at the local university and write college textbooks. Twelve years ago my husband and I moved from our city home to a country home in southeastern Florida, complete with a cypress stand in the front yard and a small pine forest in the back. Our neighbors have horses, and we wake to roosters crowing in the morning. Two of our younger grandchildren live nearby, and my typical day consists of teaching a university class in the morning and then picking up my 15-year-old grandson at high school so he can drive me around town on whatever errands I might have. He just got his learner's permit, and I am enjoying that magical year when he seemingly wants to go everywhere with me. Last week I helped my 10-year-old grandson with his fifth-grade science project—growing flowers with and without magnesium sulfate to see which have the brightest blooms. It was fun, but I was a little irked when "we" only got a B+.

Three years ago, with three adult children and eight grandchildren ranging in age from 7 to 25, my husband and I felt that our lives were settling down a little. But then my older son, who had been divorced for many years (and had four children in college), remarried and surprised us with Miss Lily Pearl—Grandchild #9! She just had her first birthday last week, and we can't imagine how we ever thought our family was complete without her. So if there is a message to take from this book it is this: development doesn't stop at 21—or 40 or 65. Your life will never stop surprising you until you breathe your last breath. My wish for you is that the surprises are mostly happy ones.

Basic Concepts in Adult Development

This book is about adult development, and it follows the tenets of **developmental psychology,** the field of study that deals with the behavior, thoughts, and emotions of individuals as they go through various parts of the life span. The field also includes child development, adolescent development, and **adult development,** which is the particular concern of this book. We are interested in the changes that take place within individuals as they progress from emerging adulthood (when adolescence is ending) to the end of life. Although many autobiographies give first-person accounts of people's lives and many interesting stories about people's experiences in adulthood, this book is based on **empirical research**—scientific studies of observable events that are measured and evaluated objectively. When personal accounts and examples are used (including the opening story about my life), they are chosen to illustrate concepts that have been carefully researched.

Some of you reading this are just beginning the journey of your own adult life; some of you are partway along the road, having traveled through your 20s, 30s, and perhaps 40s, 50s, and beyond. Whatever your age, you are traveling, moving through the years

and through the transformations that come along the way. We do not all follow the same itinerary on this journey; you may spend a long time in a location that I do not visit at all; I may make an unscheduled side trip. Or we may visit the same places but experience them very differently. Every journey has **individual differences,** aspects that are unique to the individual. You may not have experienced the trials of single parenthood as I have or the joys of grandparenthood, and I cannot relate to the independence you must feel when living alone or the confusion you experience when your parents divorce. Likewise, there also have to be some **commonalities,** typical aspects of adult life that most of us can relate to (either now or in the future). Most of us have moved out of our parents' homes (or plan to soon), experienced romantic relationships, entered college with some plans for the future, and either started a family or given some serious thought to parenthood. Without these common hopes and experiences, there would be no reason for a book on adult development. My goal for this book is to explore with you both the uniqueness and the common grounds of our adult lives.

Two of the concepts featured in this book are stability and change during the developmental process. **Stability** describes the important parts of our selves that make up a consistent core. It is the constant set of attributes that makes each of us the individuals that we are throughout our lifetimes. In other words, your 40-year-old self will be similar to your 20-year-old self in some ways, as will your 60-year-old self. For example, one of the stable themes of my adult life is a love for books. In fact, it goes back to my childhood. Some of my most prized possessions are the books in my library. I always have several books sitting around the house that I am in the process of reading. And 10 years ago I started a book club in my neighborhood that has become a big source of joy for me. Another theme that keeps popping up in my life is children, beginning early on with three younger sisters, then my own children, then my stepdaughter, nieces and nephews, then grandchildren. I have always had a toy box in my living room and sippy cups in the kitchen cabinet. In fact, the two themes of books and children often mix. I send books on birthdays for the children on my gift list, and when visiting children spend the night, I have a shelf of children's books in the guestroom, some of them that belonged to their own parents so many years ago. Perhaps you find stability in your life in terms of playing a musical instrument or participating in sports. The genre of books I read may change over the years, and your choice of musical selections or sporting events may be different from time to time, but the core essence of these stable themes remains an integral part of our lives.

CRITICAL THINKING

Which of your interests, developed sometime in your childhood, do you see yourself pursuing even after 10 years from now?

Change is the opposite force to stability. It is what happens to us over time that makes us different from our younger (and older) selves. An example from my life that illustrates this is travel. As a child I never traveled too far out of my home state of Florida. Almost all my relatives lived nearby, and those who didn't were more than happy to visit us in the warm climate during the winter. In fact, at the age of 35, I

Middle adulthood can bring large-scale changes in lifestyle and interests, as illustrated by this photo of author Barbara Bjorklund along the city wall of Siena, Italy.

had never been on an airplane. But when I married my current husband (and no longer had children living at home), I had the opportunity to travel with him to national conferences and accompany him on international trips as he collaborated with colleagues and worked as a visiting professor around the world. In the last 20 years, we have spent extended periods of time in Germany, Spain, and New Zealand. We have made shorter trips to Japan, China, Italy, Sweden, Norway, Denmark, England, Scotland, Wales, Austria, Switzerland, and Egypt. Last year we made it to Paris! I am an expert packer, and my office is filled with framed photos I have taken in many exotic locations. To compare myself at 30 and 50, my travel habits would constitute a dramatic change. Other examples of change in the adult developmental process occur when one becomes a parent, switches careers, or decides to move to another part of the country (or to an entirely different country). One way to view the journey of adulthood is to consider both the stability and the change that define our lives.

Still another way of looking at this journey is gauging how straight the road is. Some stretches of our lives are **continuous**—slow and gradual, taking us in a predictable direction. My gardening certainly fits this definition. In my earliest apartments I had potted plants, and when we rented our first house, I persuaded the landlord to let me put in a small flower garden. As our yards have grown bigger, so have my garden projects. I enjoy plant fairs, trade plant cuttings with friends, and of course, read books about gardening. I find it relaxing to spend time "digging in the dirt." I have increased my knowledge and skill over the years. Now that our yard is measured in acres instead of square feet, I'm in heaven. So far I have a butterfly garden in the front yard, and I'm working on a vegetable garden in the back. Hopefully I will continue to "develop" as a gardener for many years.

In contrast, our lives also have **stages,** parts of the journey where there seems to be no progress for some time, followed by an abrupt change. Stages are much like driving on a quiet country road for a long time and then getting onto a busy interstate highway (or vice versa). In my adult life I view the years of being home with my young children as a stage that was followed by the abrupt change of the youngest entering school and me starting college. I suddenly went from having minute-to-minute, hands-on parenting duties to the type that involve preparations the night before and then dropping the children off at school in the morning. And I also went from having mostly tasks that involved physical work and concrete thinking skills (how to get crayon marks off the walls) to those that required abstract thinking (Psychology 101). This mother/student stage continued for many years until I reached the single-mother/researcher stage. An interesting question in the study of adulthood is exploring how **typical** these stages of adult life are: Do most adults go through them along their journeys, and if so, do they go through them in the same order and at the same age? Or are they **atypical,** unique to the individual? I think that sending one's youngest child off to school is probably a universal event in a mother's life, signaling the end of one stage and the beginning of another, but I don't think that the transition from full-time mother to full-time student is typical, though it is more common today than it was a generation ago.

A final theme of this book has to do with inner versus outer changes. As we proceed along the journey of adulthood, many **outer changes** are visible and apparent to those we encounter. We enter early adulthood and become more confident in our step and our carriage; we fill out and mature; some of us become pregnant; some begin to lose their hair. In middle age many of us lose and gain weight, increase and decrease in fitness. **Inner changes** are not as apparent to the casual observer. We fall in and out of love, hold our children close and then learn to give them space. We look to our parents for guidance at the beginning of our journeys and then assist them at the end of theirs. And we grow in wisdom and grace. Of course the inner and outer changes are not independent of one another. Outer changes can affect the way we feel about ourselves, and vice versa. They also affect the way others perceive us, and this, in turn, affects our self-perceptions. Untangling this conceptual ball of yarn is another goal of this book.

Sources of Change

Multiple explanations about what influences adult development are quite common, much to the dismay of students (and textbook authors). In fact, the types of influences that result in change have been classified as (a) normative age-graded influences, (b) normative history-graded influences, and (c) nonnormative life events. In the following section I will describe these various influences and give you some examples so you can see them at work in your own lives.

Normative Age-Graded Influences

When you hear the phrase "sources of change," your first thought is probably of what we call **normative age-graded influences,** those influences that are linked to age and experienced by most adults of every generation as they grow older. At least three types of age-graded influences impinge on the typical adult.

Biology. Some of the changes we see in adults are shared by all of us because we are all members of our species undergoing natural aging processes. This is often represented by the idea of a **biological clock,** ticking away to mark the common changes that occur with time. Many such changes are easy to see, such as hair gradually turning gray or skin becoming wrinklier. Others are not visible directly from the outside but occur inwardly, such as the loss of muscle tissue, which results in a gradual loss of physical strength. The rate at which such physical changes occur varies quite a lot from one person to another, as will be explained more fully in Chapter 2.

Shared Experiences. Another normative influence that is dictated for most of us by our ages can be envisioned by a **social clock** defining the normal sequence of adult life experiences, such as the timing of marriage, college graduation, and retirement. Even though our society has expanded the choices we have in the timing of these experiences, we still are aware of the "normative" timing of these events. Where we stand in relation to the social clock can affect our own sense of self-worth. The middle-aged man still living at home, the "perpetual student," the older working woman whose friends have retired—all may be doing well in important aspects of their lives, but if those lives are out of sync with what society expects in the way of timing, it may lead to some personal doubts. In contrast, the young adult who is CEO of his own high-tech company, the middle-aged woman who completes law school, and the octogenarian who finishes the Boston Marathon may have reason to celebrate over and above the face value of their accomplishments.

Another effect the social clock can have is **ageism,** a type of discrimination in which opinions are formed and decisions are made about others based solely on the fact that they are in a particular age group. Older adults are sometimes perceived to be cranky, sexless, forgetful, and less valuable than younger people. These stereotypes are perpetuated by television sitcoms, commercials, birthday cards, and jokes on Facebook. Emerging adults can also be targets of ageism, when they are perceived as being less capable than their older coworkers or when they are stereotyped as delinquents because of their style of clothes and speech. One of my goals for this book is to give a realistic and respectful look at adults of every age.

Another manifestation of the influence of the social clock in virtually all cultures is the pattern of experiences associated with family life. For example, the vast majority of adults experience parenthood, and once their first child is born, they begin a fixed pattern of shared social experiences with other parents that move along with their children's stages of life—infancy, toddlerhood, the school years, adolescence, and preparation to

leave home. Each of these periods in a child's life makes a different set of demands on parents—attending childbirth classes, setting preschool playdates, hosting scout meetings, coaching Little League baseball, visiting potential colleges—and this sequence shapes 20 or 30 years of most adults' lives, regardless of their own biological ages.

Obviously, shared developmental changes based on the social clock are much less likely to be universal than those based on the biological clock. But within any given culture, shared age-graded experiences can explain some of the common threads of adult development. In Chapter 5 I will discuss some of these shared experiences in the form of roles and role transitions in adulthood.

Internal Change Processes. At a deeper level, there may be shared inner changes resulting from the way we respond to the pressures of the biological and social clocks. For example, several theorists have observed that in early adulthood, particularly after the birth of children, parents tend to exaggerate traditional masculine or feminine traits. Then at midlife, after the children are grown and no longer living in the home, many men and women seek to balance their feminine and masculine qualities. Men tend to become more emotionally expressive and warmer than they were during the parenting years, whereas women become more assertive and independent. In fact, there is some evidence that such an expansion of gender qualities occurs in many cultures, as I will describe more fully in Chapter 5. For now my point is simply that this is an example of an internal change that may be linked to the biological and social clocks, but is not caused entirely by one or the other. It is determined by the way we respond to the changes they entail.

Normative History-Graded Influences

Experiences that result from historical events or conditions, known as **normative history-graded influences,** also shape adult development. These influences are helpful for explaining both the similarities found among people within certain groups and also the dissimilarities between people in those same groups. Both are important parts of a course on adult development.

The large social environments in which development takes place are known as **cultures,** and they can vary enormously in the ways they influence the adult life pattern: the expected age of marriage or childbearing, the typical number of children (and wives), the roles of men and women, class structures, religious practices, and laws. I was reminded of this on a trip several years ago, when a young Chinese mother in Beijing struck up a conversation with me, and we began talking about our families. She had a toddler daughter with her who was 2 1/2, just the age of my youngest grandson, I told her. "*Youngest* grandson?" she asked, "How many grandchildren do you have?" I told her I had eight, then realized from her expression of surprise that this was very unusual in China. She explained to me that since 1979 there has been a one-child policy in China. Almost all Chinese parents in urban areas limit their families to one child. She was an only child; her daughter was an only child (and the only grandchild of both sets of grandparents). The typical person in her culture has no siblings, no aunts or uncles, and no cousins. She asked to see pictures of my grandchildren and wanted to know their ages and details about them. We had a very friendly visit, but I could not help but wonder how different my life would be in that culture, and what her life will be like when she is my age.

A **cohort** is a more finely grained concept than a culture because it refers to a group of people who share a common historical experience at the same stage of life. The term is roughly synonymous with generation, but narrower—a generation refers to about 20 years, whereas a cohort can be a much shorter period. And a generation can refer to a much larger geographic area, whereas a cohort can be just one country or one region of

The terrorist attack of September 11, 2001, is surely a defining event for the cohorts who experienced it.

one country. For example, Cuban Americans who came to the United States in the 1960s to flee Fidel Castro make up an important cohort in south Florida.

One of the most studied cohorts in the social sciences is the group of people who grew up during the Great Depression of the 1930s. This was a time in the United States (and in most of the world) that crops failed, factories closed, the stock market crashed, unemployment skyrocketed, and without unemployment benefits and government social programs, the only help available was from family, neighbors, or churches (none of whom had much to share). Almost no one escaped the effects of this disaster. But what were its effects, and were people affected differently depending on what age they were when the Great Depression hit? That was the thrust of the research on growing up in the Great Depression done by sociologist Glen H. Elder, Jr. (1979). He found that the cohort of people who were teenagers in the depths of the Great Depression showed fewer long-term effects than those who had been in early elementary school at the same time. The younger cohort spent a greater portion of their childhood under conditions of economic hardship. The hardship altered family interaction patterns, educational opportunities, and even the personalities of the children, so that the negative effects could still be detected in adulthood. Those who were teenagers during the Great Depression did not show negative effects in adult life; on the contrary, some of them seemed to have grown from the experience of hardship and showed more independence and initiative in adulthood as a result. Thus two cohorts, rather close in actual age, experienced the same historical event

differently because of their ages. The timing of events interacts with tasks, issues, and age norms, producing unique patterns of influence for each cohort and helping to create common adult-life trajectories for those in the same cohort.

Although the era of the Great Depression is past, this research should remind us that every one of us, as an adult, bears the marks of the events we have lived through and the age-specific ways we reacted to those events. Do you remember the death of Princess Diana? Hurricane Katrina? Certainly all adults today remember the terrorist attacks of September 11. They all had effects on us, and a different effect depending on our ages. Less-dramatic happenings also have an influence on different cohorts, such as the economic conditions of the times, the political and religious climate, the educational system, and the popular culture. As many of these influences as possible need to be considered when researchers are comparing people of different ages to find age effects in some characteristic or ability. Table 1.1 shows some of the salient events that occurred in the recent past and the ages of seven different cohorts when these events happened. Find the decade of your birth in the row of dates across the top of the table and then review what age you were when various events happened. If you compare your own cohort with that of your parents (or your children), you will see that the sequence of history may have had different effects on members of the same family.

CRITICAL THINKING

Which decade of events in Table 1.1 is the most salient to you? Ask this of people who are younger or older than you. Is there some pattern here?

Nonnormative Life Events

Along with the aspects of yourself that you share with most other adults your age and in your culture, there are **nonnormative life events,** aspects that influence your life that are unique to you, not shared with many others. These can have an important effect on the pathway of your life. Examples of nonnormative life events are having one's spouse die in early adulthood, inheriting enough money to retire at age 40, taking over parental responsibility for one's grandchildren, and starting one's own business at 65.

Some of these events are nonnormative for anyone at any age, such as inheriting a large amount of money, but others are nonnormative because of the timing. The death of a spouse is, unfortunately, a normative event in older adulthood, but not so in the earlier years. And starting one's own business may be remarkable in early adulthood, but it is highly nonnormative at the age of 65. As pioneering developmental psychologist Bernice Neugarten advised us back in 1976, we have to pay attention not only to the event itself, but also to the timing. Events that are on time are much easier to cope with (even the death of a spouse) than those that are off time.

I can speak from experience as one who was off time in several aspects of my life—becoming a parent early, going to college late, becoming a grandparent early, going to graduate school late. It makes for a good opening chapter of a textbook, but it was not always easy. One problem is the lack of peers—I was always "the older one" or "the younger one," never just one of the group. You don't fit in with your age-mates because you are doing something different, but you don't fit in with your fellow students or soccer moms either because you are not their age. And if this situation is easy to deal with yourself, sometimes others have problems, such as administrators who don't want to hire beginning professors who are older than they are. So in the best of all possible worlds, it is probably easier to do things "on time" than march to your own drummer—I've just never lived in the best of all possible worlds.

Sources of Stability

In my discussion so far, I have focused on explanations of change. However, some traits and behaviors show patterns of stability, having little or no change for significant

Table 1.1 Selected Events from 1980 to 2013 and the Ages at Which They Were Experienced by Seven Cohorts

Year	Event	1940 Cohort	1950 Cohort	1960 Cohort	1970 Cohort	1980 Cohort	1990 Cohort	2000 Cohort
1980		**Age: 40s**	**Age: 30s**	**Age: 20s**	**Age: Teens**	**Age: Children**	**Age: Not born yet**	**Age: Not born yet**
1981	Ronald Reagan becomes president of the U.S.							
1981	Prince Charles and Diana (Princess of Wales) marry							
1981	AIDS identified							
1983	Sally Ride becomes first woman in space							
1989	Berlin Wall falls							
1989	Students massacred in China's Tiananmen Square							
1989	George H. W. Bush becomes president of the U.S.							
1990		**Age: 50s**	**Age: 40s**	**Age: 30s**	**Age: 20s**	**Age: Teens**	**Age: Children**	**Age: Not born yet**
1991	Collapse of USSR							
1991	Operation Desert Storm begins							
1993	Bill Clinton becomes president of the U.S.							
1994	O. J. Simpson arrested for murder							
1994	Kurt Cobain commits suicide							
1995	Oklahoma City bombing							
1997	Death of Princess Diana							
1999	Columbine High School massacre							
2000		**Age: 60s**	**Age: 50s**	**Age: 40s**	**Age: 30s**	**Age: 20s**	**Age: Teens**	**Age: Children**
2001	George W. Bush becomes president of the U.S.							
2001	World Trade Center/Pentagon attacked by terrorists							
2003	Iraqi War begins							
2003	Saddam Hussein captured by U.S. forces in Tikrit							
2004	Tsunami kills 230,000 in Indonesia area							
2005	Hurricane Katrina hits New Orleans							
2009	Barack Obama becomes president of the U.S.							
2009	Michael Jackson dies							
2010		**Age: 70s**	**Age: 60s**	**Age: 50s**	**Age: 40s**	**Age: 30s**	**Age: 20s**	**Age: Teens**
2010	Earthquake devastates Haiti							
2011	Sen. Gabrielle Giffords is shot in Arizona							
2011	President Mubarak of Egypt resigns after Arab Spring protests							
2011	Tsunami devastates Japan							
2011	Prince William marries Kate (Duchess of Cambridge)							
2011	Osama bin Laden is killed by Navy SEALS							
2012	Sandy Hook elementary school massacre							
2012	Jerry Sandusky convicted of 45 counts of child molestation							
2012	Superstorm Sandy hits northeast U.S.							
2013	Lance Armstrong admits using illegal drugs and doping							

periods of time. To understand adult development, we must also explore and understand different types of stability. I have divided them according to the classic nature–nurture dichotomy, the biology we are born with and the environment we experience around us.

Genetics

Each of us inherits, at conception, a unique combination of genes. A very large percentage of these genes is identical from one member of the species to the next, which is why our developmental patterns are so much alike—why children all over the world walk at about 12 months, why we go through puberty in our early teens and menopause around 51. But our genetic inheritance is individual as well as collective. The study of **behavior genetics,** or the contributions genes make to individual behavior, has been a particularly active research topic in recent decades. We now know that specific heredity affects a remarkably broad range of behaviors, including cognitive abilities such as IQ, physical characteristics, such as height or body shape or a tendency to fatness or leanness, personality characteristics, and even pathological behavior, such as a tendency toward alcoholism, schizophrenia, or depression (Plomin, DeFries, Knopik, et al., 2012). The extent to which these traits and tendencies remain in place throughout our lives shows the influence of heredity on stability in development.

In searching for genetic influences on variations in adult behavior, behavior geneticists rely primarily on **twin studies.** These are studies that compare monozygotic twins with dizygotic twins on some behavior. Such studies are based on the fact that *monozygotic twins* develop from the same sperm and ovum and thus share exactly the same genetic patterning at conception, whereas *dizygotic twins* each develop from a separate sperm and ovum and are therefore no more alike, genetically, than any other pair of siblings. In typical twin studies, measurements of some trait or ability are taken on each twin, and then the pairs are compared to see how similar their scores are. If the monozygotic twin pairs are more similar for that trait or ability than the dizygotic twin pairs, then it is taken as evidence that the trait or ability is more influenced by genetics than by environmental factors.

Twin studies are difficult to do because the statistics involved require large numbers of participants, and it is difficult for a researcher to recruit hundreds of pairs of twins. For this reason, several countries that have central databanks of their citizens' birth records and health records have taken the lead in this type of research. The largest databank of twins is in Sweden at the Karolinska Institute in Stockholm. It maintains a database of information on over 85,000 twin pairs. Several studies in this book were based on data from the Swedish Twin Study database, as you will soon find out.

Environment

If our genetic makeup contributes to the parts of ourselves that remain relatively stable over time, so does our environment. Although neither our biology nor our upbringing dictates our destiny, both have long-term effects. The lifelong effect of early family experience has been clearly demonstrated by the Grant Study of Harvard Men. Psychiatrist George Vaillant (2002), the study's current director, has concluded that those who lived in the warmest, most trusting homes as children are more apt to be living well-adjusted lives in adulthood than those who spent their childhoods in the bleakest

homes. Men from the warmest homes are more able, as adults, to express emotions appropriately and openly, to see the world and the people in it as trustworthy, and to have friends with whom they enjoy leisure-time activities. Vaillant's interpretation is that parents who provide basic trust to their children (in this case, their sons), instill a sense of self-worth, good coping skills, the ability to form meaningful relationships, and in general construct a solid foundation for the core values the child will take with him or her throughout adulthood. And what's more, subsequent studies show that these data could predict which men at age 75 would most likely be aging successfully (i.e., are healthy and happy) and which would be aging unsuccessfully (i.e., are sick and sad). Taken together, Vaillant's studies show that at least for extreme situations, early childhood environment can set the course for a lifetime of either emotional openness, trust, and good health or loneliness, mistrust, and illness. This research led Vaillant to propose a major theory of personality development that will be discussed in Chapter 8.

Interactionist View

Of course there are no simple partitions between genes and environment, and we can't separate their contributions to the stability we experience throughout adulthood. Most developmentalists now subscribe to an **interactionist view** in which one's genetic traits determine how one interacts with the environment and even the environment itself (Greenberg, Halpern, Hood, et al., 2010). For example, a boy with a genetic makeup that promotes avoiding risks will grow up with a certain pattern of interactions with his parents and siblings and will seek out friends and activities that do not involve high risk. Teachers may view this as stable and sensible and steer him to a career such as accounting. The result is a young adult with risk-avoiding genes working in a low-risk career environment and enjoying low-risk activities with his friends. He will no doubt marry someone who shares these interests, giving him even more support for this lifestyle. You can imagine the life course of this person, perhaps having one child, living in the same home and working in the same job until retirement. Quiet evenings would be spent at home or at the neighborhood tavern. He would have good health because of regular checkups, exercise, and sensible eating habits. He (and his wife) would use their seatbelts and drive defensively. Vacations would be carefully planned tours of scenic places, and retirement would bring regular golf games with the same friends each week and volunteer work with the foster grandparent program at the local elementary school. Risk avoidance is the theme of this person's life, but can we really say it was caused by his genetic makeup? Or was it the environment? It's the interactionist's chicken-and-egg dilemma.

Recently, a biological mechanism has been identified for this interaction between genes and environment. **Epigenetic inheritance** is a process in which the genes one receives at conception are modified by subsequent environmental events that occur during the prenatal period and throughout the life span (Kremen & Lyons, 2011). This process by which genes are modified is known as **DNA methylation** because it involves the chemical modification of DNA through the addition of a methyl group, resulting in reduced gene expression. This type of inheritance explains how the environment can cause permanent, lifelong characteristics that were not part of the original genetic endowment at conception. For example, autopsies of adults who committed suicide show that those who had a history of childhood abuse are more apt to have modified glucocorticoid receptor

genes in their brains than both adults who committed suicide but had no history of childhood abuse and a control group of adults who died of other causes (McGowan, Sasaki, D'Alessio, et al., 2009). As you will learn in Chapter 10, glucocorticoid receptors determine how an individual responds to stress. In this case, it seems that early childhood experiences bring forth changes in the children's genetic expression that have lifelong consequences. This will also be discussed more in Chapter 3.

A Word About "Age"

Most people know that age is just a number. Perhaps ages in childhood give valid information about what to expect in the way of appearance or behavior, but once a child reaches adolescence, many more factors take over. In fact, the further we venture on the journey of adulthood, the more variability there is among people our "own" age. Several types of age have been identified, and they illustrate the many dimensions of adult development.

CRITICAL THINKING

How old are you? What would you estimate your biological age to be? Your social and psychological age? How do they match with your chronological age?

The number of years that have passed since your birth or the number of candles on your last birthday cake is your **chronological age.** As I mentioned before, this may be important in childhood, when all 7-year-olds look similar and have similar interests and abilities, but in adulthood, this number is seldom relevant, except for young adulthood when driving, purchasing alcohol, and voting are determined by chronological age and in older adulthood when eligibility for Social Security and Medicare are determined by chronological age. However, your development in adulthood does not occur because the clocks have struck a certain number of times any more than because the heat from your birthday candles reaches a certain temperature. It may be related, but chronological age does not *cause* developmental changes.

Biological age is a measure of how an adult's physical condition compares with others. "He has the memory of a 50-year-old" and "She runs like a 30-year-old" are examples of informal measures of biological age. Of course, it depends on the person's chronological age. Having the memory of a 50-year-old means one thing if the person is 70, a much different thing if 30! As you will see in Chapter 2, biological age is used to evaluate aging of the physical systems, such as with bone density scans, in which patients' bones are compared to those of a healthy 20-year-old. Biological age can often be affected by lifestyle changes, as will also be discussed in Chapter 2.

Another type of age is **psychological age,** which is a measure of how an adult's ability to deal effectively with the environment compares to others. A 30-year-old woman who can't pay her electric bill because she couldn't resist buying designer jeans and is often late for work because she oversleeps is functioning like a teenager. Her psychological age is much below her chronological age.

Social age is based on the expected roles a person takes on at a specific point in his or her life. A woman who has her first child at 40 is taking on a role that has a social age at least a decade younger. A 23-year-old who works full time, goes to school full time, and sends money home to help support her grandmother has a social age much greater than her years. Sometimes biological age, psychological age, and social age are considered in a package as **functional age,** or how well a person is functioning as an adult compared to others. But it seems clear that the question, "How old are you?" has a number of answers.

As developmental psychologists, we try not to depend solely on chronological age when investigating some aspect of adult behavior. As you will see in the following chapters, many studies use age groups (young adults compared to middle-aged groups) or roles (couples without children compared to couples with children). Often they avoid the chronological age question by comparing the same people before and after they take on a role, such as parenthood or retirement. It is important to keep in mind that development and chronological age do not travel hand in hand, and this becomes more and more apparent the older we get.

Setting the Course: Some Guiding Perspectives

Before any questions about adult development can be asked, we need to determine what platform to stand on—the base from which we set the course of this journey. The next 10 chapters in this book cover specific areas of development and include specific theories to guide that research, but two broad approaches are used for all the chapters, and they define the tone of the book.

CRITICAL THINKING

Think in what all ways you and your classmates differ from the youth of the 1940s. Choose a country other than your own. How are you different from the students of that country?

Life-Span Developmental Psychology Approach

One major approach of this text is the **life-span developmental psychology approach,** which states that development is lifelong, multidimensional, plastic, contextual, and has multiple causes (Baltes, Reese, & Lipsitt, 1980). Psychologist Paul Baltes and his colleagues introduced these ideas in 1980, and although this approach sounds very ordinary today, it defined a turning point in developmental psychology, which before that time was focused almost exclusively on child development. The major points of the life-span developmental approach are illustrated in Table 1.2, along with some examples of each, and as you read them over, you will see that this approach opened the door for the study of development at all ages—not just your 12-year-old brother, but also you, your fellow students, your parents, your professor, and even your grandparents.

CRITICAL THINKING

In Bronfenbrenner's system, what are the specific influences on your development at each level? Does one level have more influence than the others? Do you think this is true of others or unique to you?

Bioecological Model of Development

A second major approach this text takes is based on the **bioecological model,** which points out that we must consider the developing person within the context of multiple environments. This idea is that development must take place within biological, psychological, and, especially, social contexts that change over time, and that these various influences are in constant interaction (Lerner, 2006; Sameroff, 2009). These ideas were introduced by psychologist Urie Bronfenbrenner in 1979 and have been modified over the last three decades (Bronfenbrenner & Morris, 2006). Bronfenbrenner proposed five systems: the *microsystem,* the *exosystem,* and the *macrosystem,* as shown in Figure 1.1 with the *mesosystem* being the interaction between elements in the microsystem. In addition, there is the *chronosystem,* which reflects the fact that the other three systems are dynamic—constantly changing over time. This change can be as individual as physical maturation or as encompassing as a large-scale earthquake or an economic recession in one's country.

The major point of Bronfenbrenner's theory, and other developmental contextual approaches in general, is that individuals and their development cannot be studied

Table 1.2 Life-Span Developmental Psychology: Concepts, Propositions, and Examples

Concept	Proposition	Example
Life-span development	Human development is a lifelong process. No single age is more important than another. At every age, various developmental processes are at work. Not all developmental processes are present at birth.	A 38-year-old single woman makes plans to adopt a child; a 52-year-old bookkeeper becomes less satisfied with her job now that her kids are grown and she has more attention to give to her work; a 75-year-old Civil War buff becomes uninterested in attending re-enactments and begins taking a class in memoir writing. They are all experiencing development.
Multidirectionality	We develop in different directions and at different rates. Developmental processes increase and decrease. At one time of life, we can change in some areas and remain stable in others.	Some intellectual abilities increase with age, and some decline. Young adults show independence when they complete college and start a career, but show dependence at the same time when they remain in their parents' home.
Development as gain and loss	Development is a combination of gains and losses at every age, and we need to learn how to anticipate and adapt to both.	Middle-aged adults may lose their parents, but gain a new feeling of maturity. Young adults add a baby to their family, but may lose some equality in their marriage. Workers start losing speed and precision as they age, but they gain expertise.
Plasticity	Many aspects of development can be modified. Not much is set in stone, but there are limits.	Young people who enter adulthood with behavior problems or substance-abuse problems can overcome them and become responsible, successful adults. Couples with a lot of conflict in their marriages during the child-rearing years can be happy once the children are grown. Fathers can stay home with kids and be nurturing and attentive while mothers work outside the home. Older parents can change their values as a result of their young adult children's lifestyles.
Historical embeddedness	Development is influenced by historical and cultural conditions.	People who grew up in the 1970s have more open attitudes toward legalizing drugs than earlier or later cohorts. Those who lived through the Great Depression have different attitudes toward work than members of other cohorts.
Contextualism	Development depends on the interaction of normative age-graded, normative history-graded, and nonnormative influences.	Each of us is an individual because of the interaction of influences we share with other adults in general, those we share because of the times we live in, and those that are unique to us
Multidisciplinary	The study of human development across the life span does not belong to psychology alone. It is the territory of many other disciplines, and we can benefit from the contributions of all.	Contributions to the study of development come from the field of psychology, but also from sociology, anthropology, economics, public health, social work, nursing, epidemiology, education, and other disciplines. Each brings a different and valuable point of view.

Source: Adapted from Baltes (1987).

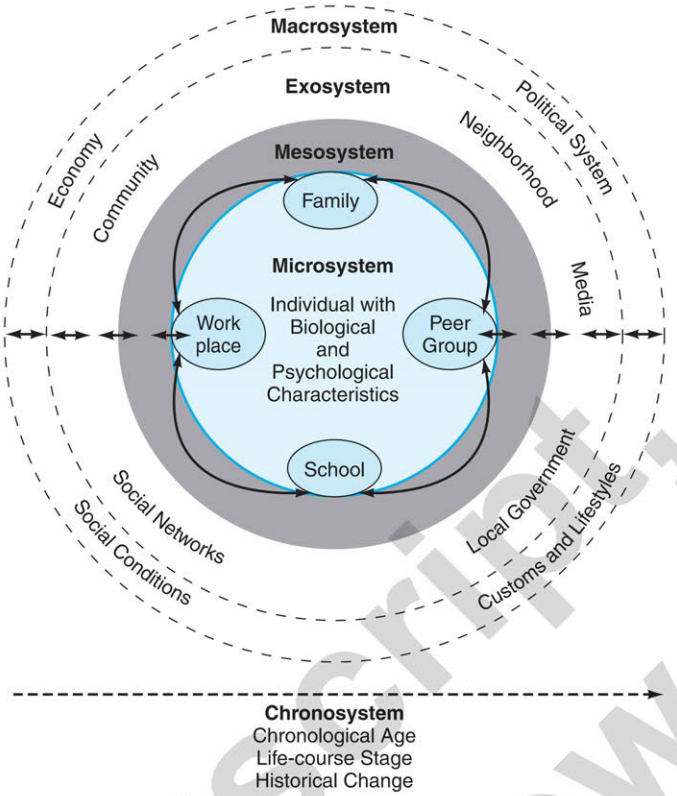

Figure 1.1 Bronfenbrenner's model of the ecological-systems approach to studying development. He suggested that researchers look beyond behavior in laboratory settings and consider how development takes place within multiple environments and through time.

Source: Based on Bronfenbrenner (1979).

"out of context." Rather, we must consider the social environment, from family and friends through community and the broader culture—all in interaction—when trying to explain the factors that influence the course of a person's journey to and through adulthood.

As you will see throughout this text, recent research in most areas of the social sciences has reflected this model, investigating the development of adults in the context of their lives as individuals, as partners in relationships, as parents in families, as workers on job sites, and as members of particular cultural groups and cohorts.

Developmental Research

To understand adult development, it is important to know a little about the research process because information today in the social sciences is, for the most part, science based. I won't attempt to present a whole course on research methods and statistics, but I will cover some of the methods that are used in the studies I describe in the upcoming chapters of this text.

All reseach begins with questions. Suppose, for example, that I want to know something about change or stability in personal relationships over the adult years—relationships with a spouse, with other family members, or with friends. Or suppose that I wanted to study memory over adulthood. Older adults frequently complain that they can't remember things as well as when they were younger. Is this a valid perception? Is there really a loss in

memory ability in old age, or earlier? How would I go about designing research to answer such questions? In every instance, there is a set of decisions:

- Should I study groups of people of different ages, or should I study the same group of people over time, or some combination of the two? This is a question dealing with basic research *methods.*
- How will I measure the behavior, thought, or emotion I am studying? How can I best inquire about the quality of marriage—with a questionnaire or in an interview? How do I measure depression—is there a set of questions I can use? These are questions of research *measures.*
- What will I do with the data? Is it enough merely to compare the average number of friends, or the average relationship satisfaction described by subjects in each age group? What else would I want to do to tease out some of the possible explanations? These are questions of research *analysis.*
- What do the results mean? Depending on the research method, measures, and analysis, what is the overall conclusion? What is the answer to the research question I began with? These are questions of research *design.*

Methods

Choosing a research method is perhaps the most crucial decision the researcher makes. This is true in any area of science, but there are special considerations when the topic of study is development. There are essentially three choices: (a) You can choose different groups of subjects at each of a series of ages and compare their responses—in other words, the cross-sectional method; (b) you can study the same subjects over a period of time, observing whether their responses remain the same or change in systematic ways—the longitudinal method; or (c) you can combine the two in any of several ways, collectively called sequential methods.

Development encompasses both gains and losses. Sometimes a health crisis (loss) can result in a healthy new lifestyle (gain).

A **cross-sectional study** in developmental psychology describes a study that is based on data gathered at one time from groups of participants who represent different age groups. Each subject is measured or tested only once, and the results give us information about differences between the groups.

Here is an example of a study using the cross-sectional method. Public health researcher Paul Cleary and his colleagues were interested in knowing whether there were any differences in personal health practices for adults of different ages (Cleary, Zaborski, & Ayanian, 2004). The researchers were part of a large-scale project known as the Midlife in the United States (MIDUS) National Survey, so they included questions pertaining to personal health in the surveys sent out to 7,000 participants between the ages of 25 and 74. One of the questions was, "How much effort do you devote to your personal health?" Answers were given as scores on a 10-point scale, with 1 being "very little effort" and 10 being "very much effort." When the results were compiled, the researchers divided them into five groups according to the age of the participants and then by gender, resulting in 10 data points, each giving the average score for one gender at one age group. Figure 1.2 shows the results displayed on a graph. As you can see, the average responses to the question, "How much time do you devote to your personal health?" were between 6.8 and 7.8 points. The most obvious result (to me) was that women in every age group responded that they devoted more effort to their health than men, with the biggest difference being in the two groups of people 35 to 44 and 45 to 54 years of age. Men and women were the most similar in the older years of 65 to 74. Women's health efforts increased steadily across the adult years, whereas men's actually declined slightly at 35 to 44 years and then began a sharp increase. Just considering age in general, the figure shows us that the older we get, the more effort we spend on our health. Of course, there are many more findings in the MIDUS study, and I will be discussing them in more detail in later chapters, but for now, this gives you a good example of a cross-sectional research study.

Some cross-sectional studies do not use age groups. Instead they use stages in life, such as comparing young couples without children to couples who have already had their first child to see the effects of parenthood on a marriage. Or comparing young people entering college with those who are graduating to see the effects of education on political views. But all cross-sectional studies are designed to test different people at the same point in

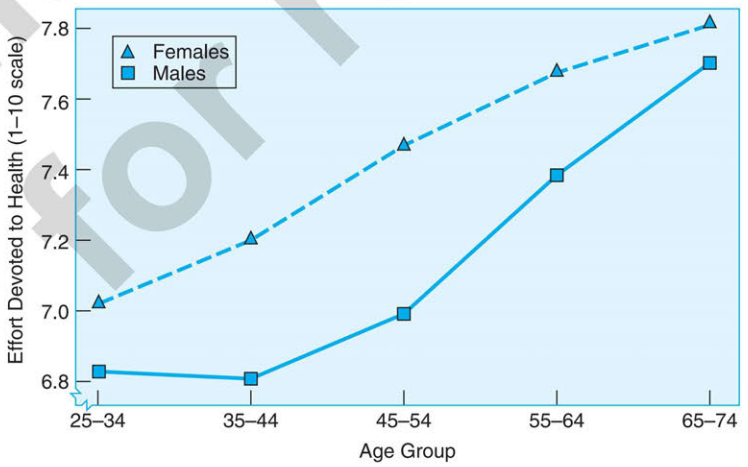

Figure 1.2 Cross-sectional data showing that the amount of effort spent on personal health care increases with age and is greater for women than for men at every age.

Source: Cleary, Zaborski, & Ayanian (2004).

time—kind of a shortcut for following those people throughout that time period and charting individual changes. The benefit is that it is quicker, easier, and less expensive than following the same people around the whole time. The downside is that it only shows *age differences,* not change. When cross-sectional studies are done with older adults, it is possible that the people in the older groups do not represent the general population as well as those in the younger groups, due to transportation problems, chronic health concerns, and difficulty in recruiting older participants. It is also the case that older participants are those who have survived into old age and may be healthier and wealthier (and perhaps wiser). But again, the minimal time and effort it takes to conduct cross-sectional studies makes them attractive to most researchers, and many of these problems can be predicted and controlled for.

A **longitudinal study,** by contrast, is one in which a researcher follows the same group of people over a period of time, taking measurements of some behavior of interest at regular intervals. In comparison to the cross-sectional study discussed earlier, a longitudinal study might start with a group of people who are 35 to 44, asking how much effort they devote to their health. Then, 10 years later, the researchers could find the same people, now at the ages of 45 to 54, and ask them the same question again. Finally, another 10 years later, the last data could be gathered when the participants are 55 to 64 years of age. Then comparisons could be made, telling the story of these individuals, at least in regard to *age-related changes* in the time they devoted to their health over their middle years (not just *age-related differences* as are revealed by correlational studies).

An example of a study using the longitudinal method is one done by psychologist Nancy Galambos and her colleagues, who were interested in the development of self-esteem in young adults (Galambos, Barker, & Krahn, 2006). They began the study at the end of the school year in 1984 by giving out questionnaires to 983 high school seniors in a large western Canadian city. Among other things, the questionnaire contained six items from a self-esteem inventory in which participants read such statements as, "On the whole I am satisfied with myself" and "I feel that I have a number of good qualities." They rated each item on a scale of 1 (strongly disagree) to 5 (strongly agree). As Figure 1.3 shows, a year later, when the participants were 19, they received a second questionnaire containing the same questions (and others). Of the 983 original participants, 665 returned the second questionnaire. The third year the process was repeated, and 547 participants, who were now 20 years of age, returned the third questionnaire. Two years later, the researchers sent out a fourth questionnaire and received 503 in return. Finally, in 1992, when the participants were 25 years of age, the final questionnaire was sent out, and the return was 404. Although this return was only 45% of the original sample size, the response rate is typical of longitudinal studies.

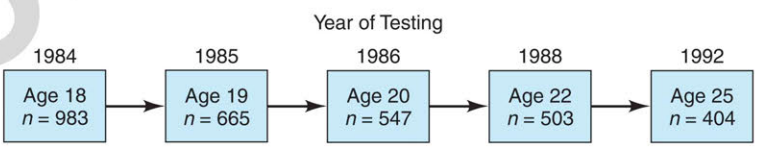

Figure 1.3 Model of a longitudinal study in which 983 students were surveyed in 1984 and then again in 1985, 1986, 1988, and 1992. Note their ages and also the number of students who returned the questionnaires (*n*).

Source: Data from Galambos, Barker, & Krahn (2006).

Galambos and her colleagues compiled the data on self-esteem by finding average scores for the group of participants at each age they were surveyed. They also divided the group into male and female subgroups. The results are shown in Figure 1.4. As the graph shows, the average scores for these young adults range between 3.75 and 4.05, and self-esteem for both groups increased between the ages of 18 and 25. There is also a different rate of increase for the males and the females. The males had higher self-esteem at 18, but by 25, their rate was not much higher than that of the females. The females had lower scores at 18, but their rate of increase was greater than that of the males.

The longitudinal method used by Galambos and her colleagues truly demonstrates *change* because the same participants were tested at each age. There were only 404 participants (compared to over 7,000 in the cross-sectional study described earlier), but the data points on the graph show increases in self-esteem for the same participants over the course of 7 years. Another plus for longitudinal studies is that the participants are from the same cohort, which increases the probability that the changes in self-esteem are age related and not the result of some normative history-graded influence on that cohort. However, the minuses of longitudinal studies should be apparent. From the first wave of testing to the published article, the study took 22 years! This method is time consuming and expensive. In a profession that bases promotion and tenure on annual publication lists, researchers need to balance longitudinal studies with shorter-term work to not "perish" due to lack of publications. The most ambitious longitudinal studies I am aware of are done in large European research institutes. For example, in the Berlin Study of Aging, there are 40 researchers on the staff and hundreds of students and paid researchers. The study began in 1990 by assessing 516 people between 70 and 100 years of age, and it took 14 sessions for each person to receive the initial assessment—a project that took the research staff 3 years (Baltes & Mayer, 1999). In the next three decades, surviving participants were assessed eight more times. Some of the participants outlived the principle investigator, psychologist

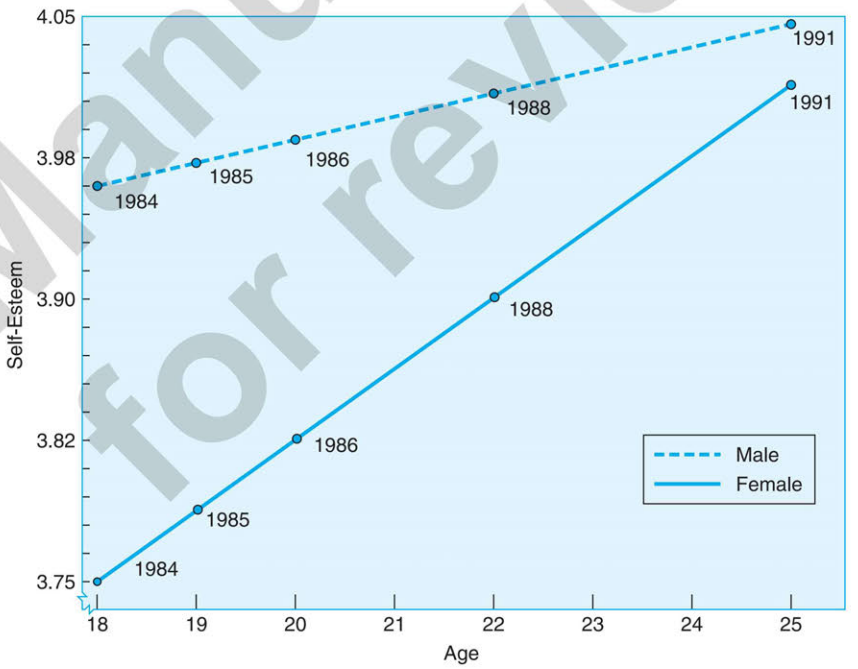

Figure 1.4 Young adults increase in self-esteem between the ages of 18 and 25, according to this longitudinal study. Note the different rates of increase for males and females.

Source: Galambos, Barker, & Krahn (2006).

Paul Baltes, who died at the age of 67 in 2006. The findings from the Berlin Study of Aging and similar research efforts will be discussed in the upcoming chapters of this book.

Another drawback to longitudinal studies is **attrition,** or participant dropout. The Galambos study began with a fairly general sample of high school students, but as the years went by, each wave of data collection yielded fewer and fewer returns. More than half of the original participants were absent from the last wave of the study. When attrition is present, we need to ask whether those who dropped out might have made a difference in the results. The researchers mentioned this in the discussion section of their journal article. They said that the self-esteem scores of those who dropped out and those who remained in the study did not differ in the earlier parts of the survey in which all participated. However, there were some other differences. Those who remained in the study were more apt to be from families with higher socioeconomic levels and more apt to continue to live with their parents in the years following graduation. The researchers caution us that the results of the study may not apply to young adults who do not fit this profile (Galambos, Barker, & Krahn, 2006).

One of the ways to combine the positive aspects of the cross-sectional design with those of the longitudinal design is to use the **sequential study,** which is a series of longitudinal studies begun at different points in time. In the simplest form, one longitudinal study (Cohort 1) is begun with participants who are in one age group. Several years later, a second longitudinal study (Cohort 2) is begun with participants who are the same age as the Cohort 1 participants were when the study began. As the two studies progress, they yield two sets of longitudinal data, but they also give cross-sectional data.

For example, a sequential study was conducted by psychologist Susan Krauss Whitbourne and her colleagues (Whitbourne, Zuschlag, Elliot, et al., 1992) to answer the question of whether young adults' personalities change or remain stable as they moved into middle age. The study began in 1966 with a group of 347 undergraduate students at the University of Rochester whose average age was 20. They were given a personality inventory questionnaire asking them, among other things, to rate statements about their industry (or work ethic) according to how well each described them. In Figure 1.5, this group is shown in the top left box labeled Cohort 1, 1966. In 1977, this group was on average 31 years old, and the researchers sent out questionnaires again, receiving 155 in return, as shown in the box labeled Cohort 1, 1977. Also in 1977 a new group of 20-year-old students from the University of Rochester were given the personality inventory questionnaire (Cohort 2, 1977). In 1988 the process was repeated for the participants in Cohort 1, who were now 42 years of age, and Cohort 2, who were now 31 years of age. As you can see, 99 of the original 347 in Cohort 1 returned questionnaires, and 83 of the original 296 in Cohort 2 returned questionnaires.

At this point, there are two longitudinal studies going on, Cohort 1 with data available for the ages of 20, 31, and 42, and Cohort 2 with data available for the ages of 20 and 31. There is also a cross-sectional study going on, with a group of 20-year-olds, a group of 31-year-olds, and a group of 42-year-olds. Figure 1.6 shows how Whitbourne and her colleagues analyzed the results. The top line shows the industry scores for Cohort 1 at ages 20, 31, and 42. The scores increase sharply between 20 and 31, and the increase becomes more gradual from 31 to 42. This definitely shows change in personality

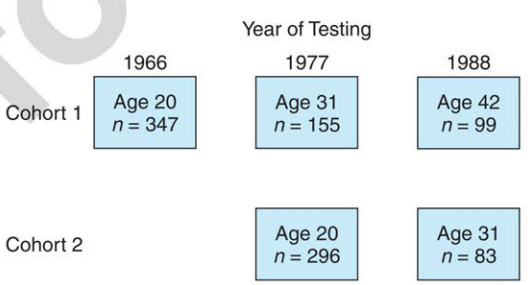

Figure 1.5 Model of a sequential study in which two cohorts were followed beginning at age 20. One cohort was followed for 22 years; one for 11 years. Note ages and number of participants (*n*).

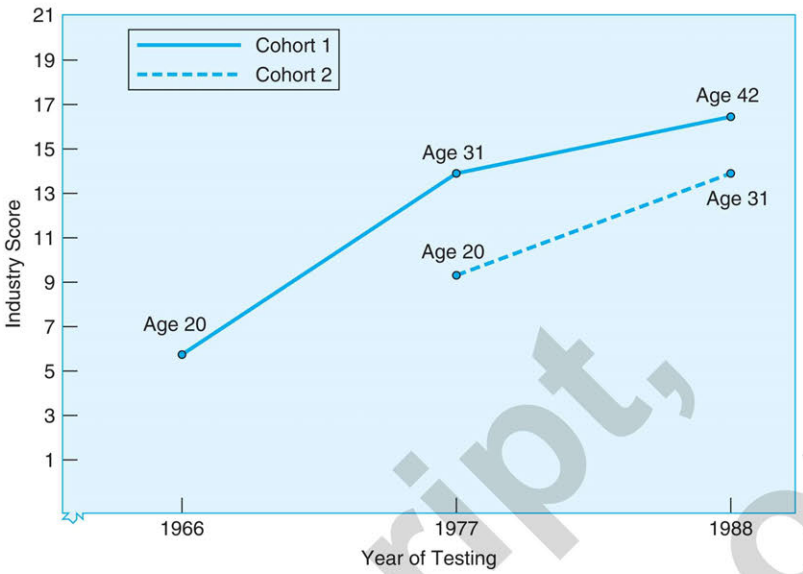

Figure 1.6 Results from a sequential study of two cohorts tested at three ages and at three different points in time. Comparing longitudinal results, Cohort 1 shows a sharper increase in industry scores between 20 and 31 years than does Cohort 2, though both have similar scores at age 31. Cross-sectional results suggest that the normative history-graded influences (Vietnam War, civil rights issues) lowered the young adults' scores in 1966.

Source: Adapted from Whitbourne, Zuschlag, Elliot, et al. (1992).

traits during adulthood, but does the same hold for other cohorts? The lower line in the figure shows the pattern for Cohort 2, tested at 20 years and 31 years of age. The pattern is different than for Cohort 1. First, the industry scores are much higher at age 20 for Cohort 2 (6.54 for Cohort 1 and 9.19 for Cohort 2), and second, the rate of increase is much slower for Cohort 2. Still, both groups had similar industry scores at the age of 31 (13.58 for Cohort 1 and 14.32 for Cohort 2). The researchers suggest that the 20-year-olds in Cohort 1 were in college during the 1960s, when the work ethic of the establishment was being questioned and rejected, and their low scores on industry were reflections of that era. Once out of school and in the workplace, this group had some catching up to do. Their catching up is represented by the sharp increase in industry scores, which at 31 are very close to the scores of Cohort 2, who were not part of the protest era. Clearly there are nonnormative history-graded influences going on here. Perhaps the normative age-graded pattern of change in the personality trait of industry is more like that of Cohort 2, but when history (the Vietnam War, civil rights issues) brings about a large student protest movement, it causes a detour in the journey of adulthood for many in that cohort, although in the case of the personality trait of industry, these college students were able to catch up to speed and be back on track by the time they were age 31. We will revisit this study in Chapter 8 when I cover personality development, but for now it serves as a good example of using the sequential method to study development.

Measures

Once the research design is determined, the next major set of decisions has to do with how to measure the behavior of interest. Each method has its own set of advantages and disadvantages, and I will discuss them here briefly.

One of the most common instruments used to gather data is a **personal interview,** that is, having the experimenter ask the participant questions, one-on-one. Personal interviews can be *structured,* like a multiple-choice test, or

CRITICAL THINKING

How would you design a questionnaire for your class to find out other students' opinions on the classroom design (the light, seating, room temperature, and so forth)?

open ended, like an essay test, or a combination of both. All the major longitudinal studies I have described so far, for example, included extensive interviews. Many cross-sectional studies of adult life also involve structured interviews. Personal interviews have the advantage of allowing the interviewer to clarify questions and ask follow-up questions. Participants feel comfortable talking to a human being and not just writing answers on an impersonal questionnaire. Drawbacks are that the participants might provide responses they feel are socially acceptable to the interviewer, and similarly, the interviewer's feelings toward the participant might cloud the recording or coding of responses, especially with very long interviews. Building rapport between interviewer and participant can be a plus or a minus.

This problem is avoided by using the **survey questionnaire,** a paper-and-pencil form consisting of structured and focused questions that participants can fill out on their own. Survey questionnaires are usually given out on a large scale, such as through the mail or at large gatherings of people. The advantages are that they can reach a large number of people in a wide geographic range. Participants may be more truthful and forthcoming about sensitive topics with a survey than if talking face-to-face with an interviewer. Survey questionnaires are much less expensive and time consuming than personal interviews. Drawbacks for mailed questionnaires are that there is a low return rate (about 30% of participants return the first questionnaire). Group-administered questionnaires have fewer lost participants, but can be affected by peer influence (especially if given out in the social environment of high school auditoriums or retirement condominium recreation rooms). Survey questionnaires are also incredibly difficult to construct.

Some of the problems of survey questionnaire construction can be avoided by using **standardized tests.** These are instruments that measure some trait or behavior and have already been established in your field of interest. Drawbacks are that many of these tests are owned by publishing companies, and you have to purchase the right to use them in your research. An example is measuring IQ using the Wechsler Scales or personality using the MMPI or the Myers-Briggs Type Indicator. However, a number of tests are also available at no charge that have been standardized and published in research articles, along with instructions for administering and scoring them. For example, researchers in a number of studies in this text measure depression in their participants with an instrument known as the CES-D-10, or the Center for Epidemiological Studies Short Depressive Symptoms Scale (Radloff, 1977). This test is easily retrieved from the Internet after a quick search and is shown in Chapter 3, Table 3.7. It is a good example of a standardized test that is easily scored and has a good record of **validity** (it measures what it claims to measure) and **reliability** (it does so consistently). How to select a standardized test for your own research? There are reference books that review tests periodically, such as the *Mental Measurements Yearbook* (Spies, Carlson, & Geisinger, 2010), but the advice I give students is to read similar studies published by other researchers and use what they use. Selecting a research measure is probably not the best time to be creative.

These are by no means the only research measures available. As you will see throughout this text, there are many ways to measure human behavior, from complex brain imaging techniques to one-item questionnaires ("How would you rate your health? Circle one of the following: Very Good, Good, Average, Poor, Very Poor"). Depending on the research question, it's important to find the most appropriate way to measure the behavior of interest.

Analyses

Once the research method has been chosen and the behavior has been measured, researchers must make another set of decisions about how to analyze the resulting data. Some of the statistical methods now being used are extremely sophisticated and complex. I'll

be describing a few of these in later chapters when I discuss specific studies that include them. At this early point, all I want to do is talk about the two most common ways of looking at adult development.

The most common and the simplest way to describe age-related differences is to collect the data (scores, measurement results) for each group, find the means (averages), and determine whether the differences in the means are large enough to be significant, a process known as **comparison of means.** With cross-sectional studies, the means of the age groups are compared. With longitudinal studies, the means of the scores for the same people at different ages are compared. With sequential studies, both comparisons are possible. However, the similarity remains—we are looking for an age-related pattern of change.

If the group of participants is large enough, it is often possible to divide it into smaller groups and look for age differences or continuities in the subgroups, such as women versus men, working class versus middle class, those with young children versus those without young children. If the same pattern appears in all subgroups, we'd be more likely to conclude that this is a significant age-related pattern. However, if the change is different for the subgroups (as is often the case), it opens the door for follow-up questions. For example, in the cross-sectional study described earlier (Cleary, Zaborski, & Ayanian, 2004), researchers divided the age groups into gender groups also, and they found that different patterns emerged for men and women in the amount of time spent on health-related activities. Not only did the researchers find answers to their questions about age-related change (yes, it increases with age), but they also found that it increased more for men, and men started out at a disadvantage. That gave the researchers the opportunity to speculate on why men seem to have so little concern about their health at 25 and do not change in this respect until about 45. In contrast, women have more concern at 24, and they increase in concern their whole lives. Perhaps at 25, women are concerned with childbearing and visit their doctors more often. Perhaps the cultural emphasis on women's appearance causes them to notice subtle signs of aging sooner, whereas men "coast" for awhile until the signs are more evident. These questions make for good discussion and inspire new research to find answers.

Comparisons of means for different age groups, either cross-sectionally or longitudinally, can give us some insights into possible age changes or developmental patterns, but they cannot tell us whether there has been stability or change within individuals. For this information, a different type of analysis is required: a **correlational analysis.** A correlation is simply a statistic that tells us the extent to which two sets of scores on the same people tend to vary together. Correlations (r) can range from +1.00 to –1.00. A positive correlation shows that high scores on the two dimensions occur together. A negative correlation tells us that high scores on one dimension occur with low scores on the other. The closer the correlation is to 1.00 (positive or negative), the stronger the relationship. A correlation of 0.00 indicates no relationship.

CRITICAL THINKING

In your opinion, what kind of correlational pattern will emerge if we conduct a study on people who eat lots of fruits and green vegetables and their health? And what about those who meditate and their scores in the test of attention?

For example, height and weight are positively correlated: taller people generally weigh more, shorter people less. But the correlation is not perfect (not +1.00) because there are some short, heavy people, and some tall, light people. If you are on a diet, the number of pounds you lose is negatively correlated with the number of calories you eat: high calories go with low weight loss. But this correlation, too, is not a perfect –1.00 (as any of you who have dieted know full well!).

Correlations are also used to reveal patterns of stability or change. For example, researchers interested in personality traits might give personality assessments to participants over a number of years and then correlate the early scores with the later scores for each person. A high positive correlation would show stability for that trait.

Ultimately, however, correlations can tell us only about relationships; they cannot tell us about causality, even though it is often very tempting to make the conceptual leap from a correlation to a cause. Some cases are easy. If I told you that there was a negative correlation between the per capita incidence of television sets in the countries of the world and the infant mortality rates in those countries, you would not be tempted to conclude that the presence of TV *causes* lower infant mortality. You'd look for other kinds of societal characteristics that might explain the link between the two facts such as income level. But if I tell you there is a correlation between the amount of time adults spend with friends and family and the overall life satisfaction those adults report, you would be much more tempted to jump to the conclusion that greater happiness is *caused* by contact with friends and family. And it may be. But the correlation, by itself, doesn't tell us that; it only tells us that there is a relationship. It remains for further research and theorizing to uncover the causal links, if any. Perhaps the greater life satisfaction people have, the more time their friends and family want to spend with them.

One unique way correlational analyses are used in developmental research is to determine the genetic contributions to various behaviors and abilities. I introduced twin studies in an earlier section and will just explain them in a little more detail here. The typical twin study involves comparing two types of twins, monozygotic and dizygotic, on the behavior you are interested in. For a simple example, let's use height (and twins of the same sex to rule out sex differences). Each twin would be measured and the height recorded. Then two correlations would be computed comparing the twins—one for monozygotic twins and one for dizygotic twins. Which do you think would be more similar in height? Of course the monozygotic twins because they have the same genes, and height is something that is determined by inheritance to a great extent. But what about other characteristics, like IQ, the tendency toward alcoholism, how religious one is? Those are all characteristics that have been shown to be influenced by heredity to a significant extent. And the research that revealed this involved correlational analyses.

CRITICAL THINKING

If adopted children are more similar to their adoptive parents on some measure than to their biological parents, what conclusions could you make from that?

For example, in a study using data from the Swedish Twin Registry, epidemiologist Erica Spotts and her colleagues (Spotts, Neiderhiser, Towers, et al., 2004) investigated whether marital happiness is influenced by heredity. They gave a test of marital happiness to over 300 pairs of twins (all women) and their husbands. About half of the women were monozygotic twins and half were dizygotic twins. When the scores were analyzed, the monozygotic twin pairs were more alike than the dizygotic twin pairs. As you can see in Figure 1.7, if one monozygotic twin wife was happy in her marriage, the other twin tended to be happy too—and if one was unhappy, there was a good chance that the other was too. Their marital happiness scores were positively correlated. This was not the case for the dizygotic twin wives, whose correlations were about half what the monozygotic twins' correlations were. Comparing the two types of twins' correlations shows the extent of the genetic contribution to marital happiness because the monozygotic twins share the same genes, whereas the dizygotic twins share only half, and as in the case of height, we would not expect them to be as similar.

CRITICAL THINKING

What are some specific ways women can pass on their level of marital happiness to their husbands? What about marital unhappiness?

In a surprise twist, the researchers also gave the marital happiness questionnaires to the husbands of the twins, who were not related to each other or to anyone else in the study. As you can see in the figure, the husbands of the monozygotic twins also were more similar in their marital happiness scores than the husbands of the dizygotic twins. It seems that the genetic endowment of the monozygotic twins not only gave the women similar outlooks on marriage, but that the women, in turn, influenced the marital happiness of their husbands.

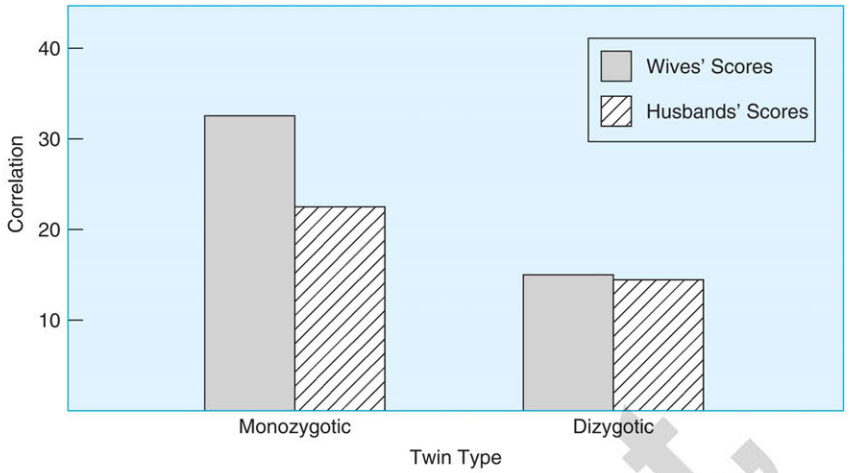

Figure 1.7 Wives who are monozygotic twin pairs are more similar in their marital happiness than wives who are dizygotic twin pairs. Interestingly, this genetic effect carried over to their husbands who were not related (compare striped columns).

Source: Data from Spotts, Neiderhiser, Towers, et al. (2004).

Another way of analyzing data is the **meta-analysis.** This approach combines data from a large number of studies that deal with the same research question. A researcher conducting a meta-analysis selects a research question, such as whether or not aerobic exercise affects cognitive functioning in older adults. This has been a topic of interest for several decades and is a prominent topic in Chapter 4 of this text. A number of studies have shown that older adults (and laboratory animals) who participate in vigorous physical activity have better cognitive abilities than their age-mates who are sedentary. However, the studies have used different age groups, different types of physical activity, and different measures of cognitive ability (not to mention different species). Psychologists Stanley Colcombe and Arthur Kramer (2003) reviewed this research and conducted a meta-analysis to evaluate the combined results. The first step was an online search to find all the studies of human cognition published in a certain time frame (2000–2001) that had any mention of age, fitness, exercise, and a number of other key words. They narrowed down the 167 articles to 18 (totaling 101 participants) that were longitudinal, supervised (not surveys), dealt with aerobic exercise, had participants assigned randomly to exercise and nonexercise groups, and had participants over the age of 55. They regrouped the data in the studies to fit one overall scheme. Participants' data were divided into three groups: 55–65, 66–70, and 71+. The cognitive tasks that were measured were divided into four types: planning, speed, control, and visuospatial. As you can see in Figure 1.8, the researchers found that the participants in the exercise groups performed significantly better on all four types of cognitive tasks than those who were in the nonexercise groups, no matter what age or gender and no matter what type of aerobic exercise was done. These are very impressive results. This meta-analysis tells us that the smaller, individual studies were all tapping into the same big pot—the idea that aerobic exercise is good for the cognitive functioning of people over 55.

Designs

The closing statement researchers are allowed to make depends on what kind of research design has been used, experimental or nonexperimental. If it is experimental, researchers are able to say their findings show that their factor of interest *caused* the change observed in their subjects. If it is not experimental research, they must limit themselves to saying that their results show a relationship or an association with the change.

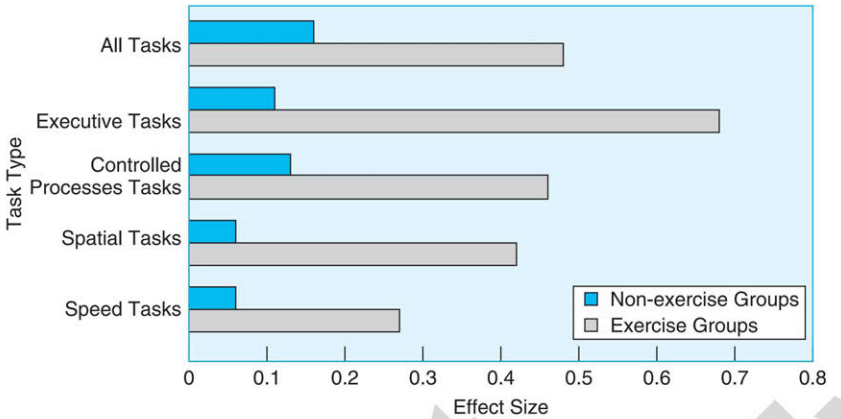

Figure 1.8 Meta-analysis of 18 studies shows that aerobic exercise causes better performance in older adults on four types of cognitive tasks.

Source: Colcombe & Kramer (2003).

The distinctions between experimental and nonexperiental designs could fill a whole book (and there are a number of good ones available), but for now, let me just say that the feature that distinguishes experimental designs from nonexperimental designs is how much control the experimenter has over the way the study is conducted. In the strictest sense of the word, an **experimental design** has a control group, the participants are selected randomly from the population of interest, they are assigned randomly to groups, there is random assignment of groups to treatment and control conditions, and there is a high degree of control over any outside factors that might affect the outcome. The more of these features that are present, the stronger the case the researcher can make for causality. Table 1.3 shows three types of experimental designs and the presence or absence of these controls.

Experimental designs include true experiments, pre-preexperiments, and quasi-experiments, depending on which of the controls listed in the table are present. These experiments are difficult to conduct and are not very useful in answering developmental research questions. One reason is that when comparisons are made between age groups (or between groups of people at different stages of life, such as preretirement versus postretirement), the participants cannot be assigned to groups; they are already in one group

Table 1.3 Experimental Designs and Their Comparative Features

	Pre-Experimental Design	True Experimental Design	Quasi-Experimental Design
Presence of a control group?	In some cases, but usually not	Always	Often
Random selection of subjects from a population?	No	Yes	No
Random assignment of subjects to groups?	No	Yes	No
Random assignment of treatment to groups?	No	Yes	No
Degree of control over extraneous variables	None	Yes	Some

Source: Salkind (2011).

or the other. That automatically takes a large amount of control out of the hands of the researcher and opens the door for a number of problems.

Other designs include descriptive research and qualitative research. **Descriptive research** tells the current state of the participants on some measure of interest. The number of people of different ages who die of suicide each year is descriptive research. The rate of births to unmarried women over the past 50 years is descriptive research. And the cross-sectional, longitudinal, and sequential studies discussed earlier are descriptive research. What they have in common is the lack of a high level of experimenter control described earlier in Table 1.3. They are still valuable sources of information on development.

Qualitative research is, quite simply, research without the numbers. It is a very old tradition that has only recently been included in developmental sciences. Although research without numbers may sound very enticing to students who have just completed a statistics course, it is not really a replacement for **quantitative research** (research with the numbers), but a different approach that is used to supplement quantitative research. Qualitative research includes case studies, interviews, participant observations, direct observations, and exploring documents, artifacts, and archival records. If you have ever done genealogy research to find your family history in old records and documents, you have done a form of qualitative research.

CRITICAL THINKING

If you wanted to understand changes in people's ability to handle stress in life, as well as to grow with it, what kind of qualitative research approaches would you use for the purpose?

An example of qualitative research is a study by sociologists Amy Hequembourg and Sara Brallier (2005). They were interested in the role transitions that go on among adult siblings when their elderly parents need care. We have long been aware that daughters are most likely to be the major caregiver of an aging parent, but these researchers found eight brother–sister pairs and interviewed them at length about their roles and feelings about their caregiving responsibilities. They recorded the answers in detail and then spent many months analyzing them. The finished product was a very interesting view of these families. Yes, the sisters did more, but sometimes they were pleased to be in that role. And other times the brothers stepped in and took over. There was evidence of adult sisters and brothers growing closer to each other as they shared the care for their parents. Although it was a study of only 16 participants, it gave more depth than a questionnaire sent out to 5,000. Clearly there is a place in developmental psychology for this type of research, and I am pleased to see it being discussed in research methods books.

Qualitative research is not easy. It needs to be carefully planned, the sources need to be wisely chosen, and questions need to be designed to focus on the topic at hand. If the research involves spending a lot of time with the people being interviewed, the experimenter needs to be able to remain as objective as possible. Data must be recorded precisely and completely. And then the findings need to be organized and written up to share with others.

Qualitative research is an excellent way to begin a new line of research. Epidemiologist David Snowden, former director of the Nun Study of the School Sisters of Notre Dame, started his research by visiting with the elderly nuns in a convent in Minnesota. As a beginning professor, he had no idea what he wanted to do for a research program, but one day he stumbled onto a room that contained the archives of the convent. Each sister had a file going back to her first days as a nun, often 50 or 60 years before. They had all written essays about their childhoods and why they wanted to be nuns. Snowdon (2001) wrote that "for an epidemiologist, this sort of find is equivalent to an archaeologist's discovering an undisturbed tomb or a paleontologist's unearthing a perfectly preserved skeleton" (p. 24). From this beginning, he began the research that became his career. For example, he and his colleagues (Riley, Snowdon, Desrosiers, et al., 2005) found that the more complex the language in the essays the nuns had written as young women, the less

likely they were to have Alzheimer's disease in late adulthood. Some of his other research findings are discussed later in this text, but for now, this serves as a good example of qualitative research based on archival records.

A Final Word

On a personal note, I approach the topic of this book both as a developmental psychologist and on a more personal level. Like many people, I am on this journey of adulthood with my sisters, my husband, my friends, my adult children, and now my college-aged grandchildren who are in emerging adulthood, so my interest is both scientific and personal. I want to understand how it all works and why, both because that is what I have chosen for my career and also because it is what I think about a good deal of the time that I am not at work. My journey through adulthood is no doubt similar to yours, but it is also different in other ways. What I am searching for in this text are the basic rules or processes that account for both the similarities and the differences. I hope you can share with me the sense of adventure in the scientific search as well as in the personal journey.

Summary

1. Developmental psychology includes the study of change and stability over time during childhood, adolescence, and adulthood. The study of adult development covers the time from emerging adulthood to the end of life and is based on empirical research.
2. This text covers individual differences between people and also the commonalities they share. It looks at stability and change, continuity and stages, typical development and atypical development, and the outer and inner changes that occur over the years of adulthood.
3. Sources of change in adulthood are classified into three types: (a) Normative age-graded influences are linked to age and happen to most people as they grow older. They come from both biological and environmental causes, and also from interactions between the two. (b) Normative history-graded influences are factors that affect only some people or groups. These changes include cultural conditions and cohort experiences. One of the best-studied cohorts is the group of people who lived through the Great Depression. (c) Nonnormative life events are unique to the individual and cause developmental changes that are not shared by many.
4. Sources of stability in adulthood include genetics and environmental influences and also the intereactions between the two.
5. The word *age* has many more meanings than how many years one has been alive (chronological age). In various usages it also designates estimates of a person's physical condition compared to others (physical age), the abilities one displays in dealing effectively with the environment (psychological age), and the roles one has taken on (social age). The last three make up a person's functional age. Developmental psychologists seldom depend on chronological age alone in their studies because of these factors. Instead, most use age groups or stages in life.
6. This text will approach the topic of adult development using the tenets of life-span developmental psychology, a set of ideas introduced by Baltes in 1980 that

encouraged psychologists to study development at many ages and to view development in a broader scope than they had before.

7. A second approach this text will take is based on the ecological systems view introduced by Bronfenbrenner in 1979. This set of ideas inspired psychologists to consider the whole person, not just the isolated behavior of a participant in a laboratory experiment.

8. The first step in doing developmental research is to select a research method. There are three possibities: (a) cross-sectional studies gather data on a group of people representing different age groups, (b) longitudinal studies follow the same people over a longer period of time, gathering data at several points along the way, and (c) sequential studies combine the preceding methods by conducting two longitudinal studies during different time periods, thereby making it possible to do both longitudinal and cross-sectional comparisons. There are pros and cons to each method.

9. After a method is chosen, a researcher needs to choose an appropriate measure. Some of the most common ones in developmental research are personal interviews, survey questionnaires, and standardized tests.

10. The next step in developmental research is selecting analyses. Most research uses either comparison of means, which involves computing the means of the measurement scores for each group and testing them statistically to see if they are significantly different, or correlational analysis, in which the researcher compares scores on several measurements for the participants to see if there is a relationship between the characteristics being measured. Correlations are used to show both change and stability. They are also used to demonstrate heritability by comparing scores of monozygotic twin pairs with scores of dizygotic twin pairs.

11. The meta-analysis is another way to analyze research data. It combines data from a number of previously published studies that focus on the same research question. This is done by combining the data and reanalyzing it as a larger, more powerful study.

12. The final step in developmental research involves stating conclusions, and this depends on whether the research design was experimental or not. If the design was experimental, it is possible to conclude that the results of the study were caused by the factor of interest. Experimental designs include true experiments, preexperiments, and quasi-experiments, and they differ in the amount of control the experimenter has over the conditions of the study and the outside factors that might also cause similar results. Experimental designs are not often used in developmental research.

13. Research designs that are not experimental provide valuable knowledge about development even though researchers cannot conclude that their factor of interest caused the results. These designs include descriptive research and qualitative research.