

## Studying Growth and Change Across the Life Span

**Y**ou know the stereotypes. Older women are judgmental and like to gossip. Old men are grumpy, like Carl Fredricksen in the movie *Up*. But how does an adult move from being an awesome person like YOU toward that caricature of aging? The short answer is they don't! In this book, we take a life span approach to adult development and aging. That means that we will focus on the ways in which adults stay the same across adulthood, as well as the ways in which they change. We will also highlight many of the factors that influence such stability and change. Of course, we will apply these themes to many of the important areas of life, including Biology and Health, Cognition, Emotions, Coping and Resilience, Social Relationships, Work, Leisure and Retirement, Disabilities, and Psychopathology. A unique feature of this textbook is that we also will carry some examples across the various chapters and return to the basic underlying principles of development as they apply to the specific content within each chapter. See Feature 1.1 for an introduction to the idea that the opioid crisis is a life span issue.

### FEATURE 1.1

#### THE OPIOID CRISIS AS A LIFE SPAN ISSUE

Opioid dependence has grown to the level of a national crisis. The CDC estimates that between the year 2000 and 2015, 91 Americans died each day from opioid overdoses. Contrary to stereotypes about illegal drugs, the CDC states that the driving factor for the increase in mortality is prescription abuse and misuse.

Opioid addiction poses other threats as well. Among infants whose mothers are opioid dependent, risks include preterm birth, Hepatitis C, and neonatal abstinence syndrome (NAS). NAS is a constellation of problems evident in neonates as a consequence of exposure to opioids during gestation. Nationwide, about 6 out of every 1,000 births involves NAS.

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In general, babies born with NAS remain in the hospital for about 2 weeks longer than neonates without NAS, putting a strain on mothers, the family, and health care system. In addition to the vulnerable physical state at birth, infants born with NAS may experience persistent learning and developmental challenges throughout childhood.

The strains on American families as a result of opioid abuse are well known. Mothers with opioid dependence may be estranged from their families. Others may have rich and supportive ties. Understanding the ways that families support or increase the burdens of mothers is an important knowledge gap. Better understanding these processes can inform interventions and support services for women and families.

Of the 56 million American grandparents, 5.7 million live with their young grandchildren. In more than 40%

of these co-resident dyads, the grandparent has primary responsibility for the grandchild's basic needs (U.S. Bureau of the Census, 2005). Compared to non-custodial grandparents, those raising grandchildren report more chronic health problems and more psychological distress (Hayslip & Patrick, 2006; Patrick & Tomczewski, 2007). Despite data showing that custodial grandparents reside in a variety of urban, suburban, and rural locations, research has focused on large metropolitan areas (Kohn & Smith, 2006). Yet significant differences exist across geographies. Grandparents in rural areas may encounter a variety of unmet needs and geographic isolation (Cohen & Pyle, 2000). With their relation to pain, addiction, and comorbid health conditions, opioid-related deaths are largely responsible for the decrease in life expectancy in the United States (Bohnert & Ilgen, 2019).

## Principles of Life Span Development

When researchers and clinicians began studying adult development, they faced resistance from the scientific community. As you may have learned in previous classes, many early theories of human development took the view that very few interesting changes happened after puberty. Some even claimed that after one had reproduced, there was only decline. Physicians and other researchers held many stereotypes. Take a look at the questions in Box 1.1. These items were introduced by Erdman Palmore (1977) in what is commonly called the Facts on Aging Quiz. Many people, including families, health professionals, and older adults themselves, hold a variety of positive and negative aging-related stereotypes like these. These negative attitudes are harmful to older adults and hinder the study of adult development and aging.

Whereas the study of childhood as a unique and important period of development began in the mid-1700s, it can be argued that gerontology and the scientific study of adult development and aging did not begin until the 1940s, after the end of World War II. Although many scientists contributed to the growth of the new field of gerontology, Paul Baltes is recognized as a true pioneer in the field of aging. His work continues to shape the field of aging in many ways, but one of his most enduring contributions is summarized in the Principles of Life Span Development, listed below (Baltes, Reese, & Lipsitt, 1980).

***Development is lifelong:*** That is, changes and adaptations occur throughout the life span, and there is no one “supreme” period in the life span. You have probably

## BOX 1.1

### AGE STEREOTYPES

Although there are several brief quizzes and checklists about age stereotypes, the most well known is probably that by Erdman Palmore (1977). He advanced this area of inquiry by publishing a brief measure that was fact-based, the Facts on Aging Quiz. His results showed that most adults, including those with advanced training in the helping professions, hold both negative and positive stereotypes about older adults. Although originally offered in a True-False format, other researchers have adapted different response formats and updated items. Even with these changes, for more than 40 years, its results have been replicated: We hold many age stereotypes. Below are just a few of the original items.

- A. True or False: Most old people are senile/ have dementia.
- B. True or False: Most old people are set in their ways and unable to change.
- C. True or False: Most old people take longer to learn something new.
- D. True or False: Most old people are pretty much alike.
- E. True or False: Older workers have fewer job-related accidents than younger workers.

You might be surprised to learn that when Palmore published his quiz, his data showed that most people realized that dementia was not a usual part of the aging process. Thus, the answer to item A is false. As we will cover in subsequent chapters, dementia is a disease. Although the prevalence does increase with advanced age, most older adults do not have dementia.

In his early results, Palmore reported that 47% of undergraduates and 9% of graduate students incorrectly thought that most older people are unable to change. In fact, although many attitudes held by older adults are stable, they do change and adapt. Thus, the correct answer to item B is false.

Palmore (1977) reported that 47% of undergraduates and 30% of graduate students incorrectly responded to item C, stating that there were no age differences in how long it takes older and younger adults to learn new information. Thus, the correct answer to item C is true. As you will learn in Chapter 3, the answer to this question is complicated. Older adults do require more time to learn new information, but if given enough time to process the information, older adults often do learn (Hayslip & Chapman, 2007).

Late life is marked by heterogeneity. That is, older adults are more different from each other than are people at earlier ages in the life span. Most newborns are pretty much alike, but most 75-year-olds have been shaped and influenced by a range of different genetics; varying environmental conditions, including health behaviors; and some idiosyncratic life events. Thus, the correct response to item D is false. Most of Palmore's undergraduates (91%) and graduate students (98%) got that item correct.

About 42% of Palmore's undergraduates and 18% of the graduate students answered this one incorrectly. Item E is true. There are many explanations for why older workers have fewer on-the-job accidents compared to younger workers. As we will discuss in later chapters, older workers' experience and use of safety procedures may help reduce their accidents and injury rates. However, it is also likely that younger workers may be asked to perform the more dangerous tasks.

How do our attitudes and stereotypes develop? Most research suggests that these are formed from a combination of personal experiences and inaccurate information. If you hold some incorrect views about older adults, this textbook and your course should help! There is good evidence that focused course work in aging can reduce knowledge deficits (e.g., Snyder, C. S., Wesley, S. C., Lin, M. B., &

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May, J. D. [2008]. Bridging the gap: Gerontology and social work education. *Gerontology & Geriatrics Education*, 28(4), 1–21.

For a more recent version, scholars at the University of Missouri-Kansas City have updated the Facts on Aging Quiz and invite you to view it at <http://info.umkc.edu/aging/quiz/>.

The authors of the 2015 version grant permission for anyone to use the Facts on Aging Quiz for educational purposes as long as credit is given using the following citation: Breyspraak, L. & Badura, L. (2015). Facts on Aging Quiz (revised; based on Palmore [1977, 1981]). Retrieved from <http://info.umkc.edu/aging/quiz/>.

heard people say that the first three years of a child's life are the most important. You might have heard it said that if you do not learn a foreign language or how to play a musical instrument before age 12 years, it is much harder to do so later. It is true that events that occur early in the life span may have long-reaching effects. It is also true that our brains might be more or less able to learn new skills at different points in the life span. But development is possible throughout all the years of our lives.

***Development is multidimensional and multiply caused:*** From a developmental perspective, we are not a collection of different systems, such as bones and strength and vision. Each person is a single, integrated unit. Thus, each system of our being ages. But, as we will discuss, different factors may influence different systems of our body and person differently. For example, aging is associated with an increased risk for cognitive impairment. But we know that some nutritional deficits or sleep issues also influence memory problems. Thus, there are multiple causes for developmental changes, including biology, psychology, and lifestyle.

***Development is multidirectional and involves both gains and losses:*** At all ages, our growth is multidirectional; different areas of development may show growth or decline across the life span. For example, although older adults may approach certain decision-making and problem-solving tasks differently than younger adults, older adults often use a more sophisticated or efficient approach. Thus, they may compensate for declines in one area by applying new approaches to a problem (Patrick, Steele, & Spencer, 2013; Salthouse, 1980).

***The importance and frequency of biological and cultural factors shift over time:*** For example, infants and toddlers have many biological pushes, but the role of biology may be less important for a person in her 70s or 80s. The notion that different factors may exert stronger or weaker influences on development depending on when these factors occur is an exciting area of research. Early research in this area was conducted by Glen Elder (1979) and Caspi and Elder (1986). Their collective work suggests that large-scale events, like the Great Depression, exerted different influences on a child's future, depending on the child's gender, the family economic situation, and other factors. Similarly, other social movements may have

exerted fewer effects for older adults, as opposed to adolescents and emerging adults (Stewart and Healy, 1989).

***Development involves a change in the allocation of biological resources:***

That is, early in life, much of our biological reserve is used for growth and repair. This is illustrated by the observation that young children recover quickly from the flu or a broken bone. As we reach midlife, our bodies begin to use more energy for maintenance. There may be even fewer available resources in late life. By the time we are old, most of our biological energy is used for maintenance, and relatively little is left for repair. That's why one in 3 older adults who experience a fall die within a year. They simply may not have the biological capacity to repair and recover.

***Development is plastic:*** Specifically, throughout our lives, we are capable of growth and change. With enough training and practice, even an old dog can learn new tricks! This is a critical idea for those who work with older adults. For example, physical and occupational therapy can help older adults. Even adults with dementia can demonstrate some growth and adaptation (Camp, 2010).

***Development is influenced by historical period and culture:*** Although development is a universal process, there are significant interindividual and intraindividual differences. In fact, it has been said that older adults are more different from each other than is a group of infants or children. The older adults have had more opportunity to be changed by history and culture. Three specific types of factors that influence heterogeneity among older adults are non-normative events, history-normative events, and age-normative influences. Nonnormative influences are those idiosyncratic events that occur for people, including such influences as an early illness, experiencing the death of a parent early in life, experiencing a religious conversion, or winning the lottery. These influences change that way a person approaches the rest of their life.

History-normative influences are those large, cultural events that may influence a group of people differently. For example, the Great Depression research by Elder (1979) and Caspi and Elder (1986) show good examples of the ways in which a historical event may influence a generation. In more recent history, the terrorist attacks in September 2001 continue to influence the development of Americans. Evidence suggests that those who were younger adults, rather than older adults in 2001, experience stronger negative effects of those attacks on psychological well-being (Holman, Silver, Mogle, & Scott, 2016).

Finally, age-normative influences are those that are related to a person's chronological age. In the United States, the average age of a first-time grandmother is about age 47 years. However, there are some grandmothers as young as age 27 years. It is considered atypical or age nonnormative to be a grandparent so young, but if one has their first child as a young teenager and that child also has offspring at a young age, the generations are narrow. This idea of age-normative influences speaks to the importance of historical time and culture as determinants of what is considered to be on-time or off-time.

## Generational Cohorts

Age-normative influences often differ across generational cohorts and may interact with history-normative and nonnormative influences. A **generational cohort** is a group of people who are born in the same historical period and who experience many of the same cultural and historical events in similar ways, but often differently than those who are older or younger. You have probably heard a lot about the Baby Boom generation. Following the end of World War II, America and the world experienced a significant increase in the number of babies born. In the United States, this was accompanied by a rise in factory jobs and the middle class and increased access to education for many. As those born between 1946 and 1964 aged, more elementary schools were needed. As they became teenagers, their tastes pushed music, entertainment, fashion, and food choices in the nation. This Baby Boom generation has

TABLE 1.1 Generational Cohorts

Name	Birth Years and Estimated Number of U.S. Births	Special Concerns	Description/Effects
Gen Z	1996– ? 84.8 million	Immigration Social Security	
Millennials	1981–1996 62 million	Immigration	Worldwide media, varied definitions of “family,” school-related violence, busy children with many structured activities
Gen X	1965–1980 55 million		
Baby Boomers	1946–1964 76 million		The American Dream, ambitious, growth of the suburbs and a teen culture; Hippies, Woodstock, Vietnam War
The Silent Generation	1925/1928–1945 47 million		Children in the Great Depression, rise of factories and corporations
The Greatest Generation*	1910–1925/1928 47+ million		

If you were born between 1980 and 1996, you are counted among the Millennials. If you were born after 1997, you are likely part of the Gen Z cohort. Cohorts generally do not get their ending year or name until the members have reached working age. That is why there is no listed end-date for Gen Z. Membership in generational cohort has important implications for many areas of our lives (Fry, 2018).

continued to push the politics and culture of the nation. Now that all of the Boomers are middle-aged and older adults, they continue to influence politics, health, and recreation services. See Table 1.1 for descriptions and comparisons across different cohorts.

However, an interesting trend is happening among the cohorts. Three big factors influence the numbers and proportions of older adults in a society: births, deaths, and immigration/emigration. If you examine Table 1.1, you will see that, like the Baby Boom generation, the Millennials and Gen Xers are also large cohorts in terms of the numbers of births. With increasing longevity, we will soon have a society with a large number of middle-aged Millennials and Gen Xers and a large number of late Baby Boomers still living. As these cohorts continue to age, their needs will begin to influence policy and services, too. But cohorts also grow as a function of immigration. Most immigrants to the United States are between the ages of 20 and 54 years; thus, they are part of the Gen Y, Millennial, and Gen Z cohorts. When Gen Z children migrate to the United States, they often are accompanied by Millennial and Gen Z cohort parents. Finally, many older immigrants die here, and others return to their native countries. Thus, migrants are contributing to a growth in non-Baby Boomer cohorts (Holzer, 2019).

According to the Pew Institute, although Millennials are currently the most racially and ethnically diverse cohort in U.S. history, Gen X is expected to be even more diverse (Fry & Parker, 2018). In fact, although 52% of Gen X identify as non-Hispanic whites, 25% are Hispanic, 14% are Black, 6% are Asian, and 4% are two or more races. In western states and urban areas, fewer Gen X members identify as non-Hispanic white than as Hispanic. Members of Gen X are also more likely than previous generations to be native-born Americans, but they are also more likely than Millennials to have at least one foreign-born parent. Gen X members are more highly educated and come from more highly educated families as well. These trends matter because they speak to the need for more inclusive services and policies for all adults, including older adults.

Gen Xers are slower to enter the workforce than previous cohorts. Compared to Millennials (30%) and Baby Boomers (48%), fewer Gen Xers (19%) were employed between the ages of 15 and 17 years. Similarly, fewer Gen Xers were employed between the ages of 18 to 21 years (58%) than were Millennials (72%) or Baby Boomers (80%; Fry & Parker, 2018). These cohort differences in employment may have repercussions for programs like Social Security.

## The Multidimensional Nature of Age

Just as development is multidimensional, age is multifaceted. Despite its nearly 80-year history as a field, the term “gerontology” remains difficult to define (Achenbaum & Levin, 1989). We will loosely define **gerontology** as both the study of older persons as a group and as the study of aging as a developmental process. When we examine older adults as a distinct group of people, issues related to attitudes and stereotypes, preferences, and group averages are important. When we focus on aging as a developmental process, we consider the kinds of factors that influence the different ways in which people age. Each approach has its own assumptions and research methods.

One reason that it is difficult to define gerontology is that we have different ways to define age. Most people first think of **chronological age** when thinking about aging. Chronological age is easy to define as the length of time one has been alive. Chronological age can be a useful index when we are making rough estimates or broad generalizations. For example, few Americans younger than age 15 years are married, although most people over age 35 years have been married at least once (Census, 2019). Thus, we would be surprised to meet a 12-year-old who is someone's spouse, and we are sometimes surprised to meet a 50-year-old person who has never married. Chronological age thus guides our thinking about whether some event or behavior is typical.

We often use chronological age as an index to categorize adults at different points in the life span. It is important to note, however, that any such categorization is somewhat arbitrary and is likely to be revised as new information is provided by newer cohorts. Daniel Levinson (1978, 1986, 2011) proposed a detailed sequence of developmental periods. He broadly defined childhood as ages birth to 22 years, early adulthood from ages 17 to 45 years, middle adulthood from ages 40 to 65 years, and late adulthood from ages 60 to 85 years. He argued that the different periods of adulthood were marked by structure-building experiences and structure-changing ones in which adults seek to form a coherent life structure. Each structure-building phase lasts about 5 to 7 years, with transitional periods between phases of building new structures. Within each structure-building phase, we make specific choices based on our values and goals. As we reach stability, we may begin to question whether those goals are still valued for us. It is at that point that we may enter into a transition or structure-changing period. Levinson (1978) argues that these periods are closely age-graded, with adults entering into each phase at about the same age:

1. From ages 17 to 22 years, we are engaged in the Early Adult transition, a bridge between pre-adulthood and early adulthood (Levinson, 1986). More recent conceptualizations refer to this period as emerging adulthood (Arnett, 2000).
2. From ages 22 to 28 years, we begin to build and maintain our initial approach to adulthood in the Entry Life Structure for Early Adulthood period.
3. From ages 28 to 33 years, we are engaged in the Age 30 Transition, which provides an opportunity to reevaluate and modify goals to be pursued in the next stage.
4. From ages 33 to 40 years, we use the Culminating Life Structure for Early Adulthood period to complete the goals of our youth.
5. A brief Midlife Transition from ages 40 to 45 years allows us to finalize those early goals and pivot toward middle age (Levinson, 1986). As we will discuss in later chapters, much has been learned about this midlife transition through the work of the Midlife in the United States (MIDUS) research group (Brim, Ryff, & Kessler, 2004).
6. Ages 45 to 50 years mark the Entry Life Structure for Middle Adulthood, during which one begins to identify new goals.



7. The Age 50 Transition, at ages 50 to 55 years, allows an adult to continue to modify and refine this life structure.
8. From ages 55 to 60 years, one works within the Culminating Life Structure for Middle Adulthood. Here, we complete our midlife goals and turn our focus to the next period.
9. During ages 60 to 65 years, we bridge from midlife to late adulthood in the Late Adult Transition.

Although there are some limitations to Levinson's approach, as there are with any framework, Levinson's later work (2011) suggested that these structures were similar for men and women and across different economic groups. One notable limitation extends from his focus on employment goals and transitions. Although he did acknowledge late life, Levinson's purpose was not to fully understand post-retirement years.

Noting that age 65 years is a marker of economic late life, Bernice Neugarten (1974) further divided late life into the period of young-old, from ages 55 to 75 years, and old-old, aged 75 and over. In more recent years, scholars also address the oldest-old, referring to those over age 85 years, noting similarities and differences across these more fine-grained age groups (Cohen-Mansfield et al., 2013).

Chronological age may not be a useful index for many areas, however. For example, knowing that someone is age 25 years may tell us little about their physical abilities, emotional health, or occupational status. So, too, there are many differences among older adults. Because of the limited utility of chronological age, we often make use of other indices. Thus, we sometimes rely on measures of biological age, functional age, social age, and psychological age. Although we only briefly define these concepts in this chapter, we will return to them in subsequent discussions throughout the book. **Biological age**, also termed physiological age, relates to the multidimensional aspect of life span development. That is, different systems may age at different rates. Thus, we can use a variety of biomarkers to estimate how well an organism is adapting and functioning (Karasik, Demissie, Cupples, & Kiel, 2005). Biological age is affected by genetics, environment, and the interaction between the two (Holliday, 2006; Scheidt, 2015). **Functional age** refers to how well a person is able to live independently in the community based on whether they are able to complete basic activities of daily living (BADLs) and instrumental activities of daily living (IADLs). BADLs relate to hygiene and personal care, including bathing, dressing, grooming, and transferring. IADLs include higher order tasks that are needed to live independently in the community, such as managing medications, doing housework, and preparing meals. IADLs may rely on either physical health and strength (e.g., housework, shopping) or on complex cognitive skills (e.g., taking medication, managing finances; Patrick, Johnson, Goins, & Brown, 2004).

**Social age** acknowledges the cultural and age-normative expectations that one faces (Hayslip, Patrick, & Panek, 2011). Throughout our lives, we take on and relinquish roles. Some of these are considered to be on-time or age appropriate. Other behaviors are considered to be off-time or age inappropriate. Think back to some of the stereotypes that Palmore (1977) investigated in his Facts on Aging Quiz. Many

dealt with social age stereotypes. There is strong evidence that being the recipient of others' negative stereotypes can have negative effects on a person's health and well-being (Ory, Hoffman, Hawkins, Sanner, & Mockenhaupt, 2003). Work by Levy (1996) showed that others' negative stereotypes influenced an older person's actual memory performance and physiological functioning. Negative stereotypes resulted in poorer performance on memory tasks and higher cardiovascular reactivity.

More recent examinations of social age extend to a person's own assessment of their perceived age. This self-assessment of how old one feels based on their thoughts and behaviors is sometimes described as **psychological age**. Perceived age is a subjective estimate of how old one feels. It combines what one knows about their current health; social activities, within the context of their vitality; illness; and family predispositions (Patrick, Nehr Korn-Bailey, & Carney, 2018). For example, Shinan-Altman and Werner (2019) recently examined perceived age among both middle-aged and older adults. Across the age groups, people reported feeling younger than their chronological age, although middle-aged adults reported feeling closer to their desired age than did the older adults! Adults who felt closer to their desired age reported better emotional well-being.

## Developmental Research Methods: Disentangling Chronological Age, Historical Period, and Generational Cohort

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Gerontology is the study of older adults as a specific group, but it also encompasses aging as a process. Thus, depending on which definition one uses, the emphasis differs. In order to address these different questions, gerontologists use a variety of research techniques. In fact, the kinds of questions we ask directly influence the kinds of research methods we use, which in turn influence the conclusions we can draw.

We have already discussed chronological age and linked it to generational cohort. For example, the youngest Baby Boomers turned 55 in 2019. Their chronological age is naturally tied to their birth cohort, but also to the historical time or period in which we examine them. Take a look at Table 1.2 to get a better idea of how age, cohort, and time of measurement are directly related to one another. Because age, cohort, and time of measurement are confounded, gerontologists rely on specific research designs to disentangle these effects from each other.

For scholars who are most interested in the ways that younger adults differ from middle-aged and older adults, the simplest research method to use is a **cross-sectional** method. A cross-sectional design compares groups of different ages at a single point in time. Cross-sectional studies are useful for when we want to gauge **average interindividual differences**. For example, a medical institution might want to better understand its clients' needs. The reproductive health services used by 20-year-olds might be very different from those used by adults in their 50s or 80s. For example, men and women in their 20s might be particularly interested in contraception (e.g., birth control pills, implants), whereas men and women in their 50s might be less concerned with birth control but still interested in detecting sexually transmitted infections (STIs) and cancers of the reproductive system (Graf &

**TABLE 1.2** Age, Cohort, and Time of Measurement

The following table shows how age, cohort, and time of measurement are confounded or intertwined. The numbers within the table represent the age ranges for specific birth cohorts at each time of measurement.

Cohort	Time of Measurement			
	2025	2015	2005	1995
Baby Boomers (1945–1965)	60–80	50–70	40–60	30–50
Gen X (1965–1980)	45–60	35–50	25–40	15–30
Millennials (1981–1996)	29–44	19–34	9–24	Not born to 14
Gen Z (?–1996)	?–29	?–19	?–9	Not born

If a researcher wanted to compare different age groups at a single point in time, she would conduct a **cross-sectional study**. Thus, she could sample participants from within a single column to make those age group comparisons. However, when she compares age groups, the birth cohort also varies.

If she wanted to examine change over time, she would sample from within a single row, using a **longitudinal design**. Here, she could track the same people across many decades. However, when we study age changes, we are examining only a single cohort.

We could remedy the problem of studying only a single cohort by explicitly examining the changes associated with historical time by sampling from adults along the diagonal. Here, we could study 30-year-olds in 1995, 30-year-olds in 2005, and 30-year-olds in 2015. Sometimes called a **time-lag design**, in this approach, time of measurement is confounded with birth cohort.

Patrick, 2015). Thus, conducting a cross-sectional study would provide the medical center with useful information that it could use to target specific groups and frame public health messages.

Cross-sectional studies have many benefits. They can be completed in a relatively short period of time. They can be useful for illuminating average age differences and similarities. Compared with other designs, cross-sectional studies may have lower costs in terms of study personnel. They are also highly flexible. Researchers can collect cross-sectional data via face-to-face or telephone interviews, web-based surveys, and lab-based quasi-experimental designs. However, cross-sectional designs have limitations. The chief limitation related to age is that cross-sectional studies can only address age differences. They are not able to detect reasons for age differences, and as noted, age is confounded with cohort and time of measurement. Cross-sectional studies may overestimate the magnitude of age differences. Moreover, if we conduct a cross-sectional test comparing 20-year-olds with 40-year-olds today, it is likely that these age differences will not characterize differences between 20-year-olds and 40-year-olds in the future. Moreover, we cannot even conclude that today's 20-year-olds will respond like today's 40-year-olds in the future.

Many gerontologists are interested in examining change over time. To do so, they rely on a longitudinal design. Following the same group of people across a row in Table 1.2, one would be using a longitudinal design that could answer questions

about age changes and stability. Thus, they examine **average intraindividual change**. Longitudinal designs are a powerful means of considering growth and change over time. However, they are expensive in terms of research effort and participant burden. Moreover, longitudinal designs are limited by their confounds with both age and historical time of measurement. Thus, they may underestimate the true effect of age change. Historical time can influence the results of longitudinal studies in several ways. For example, one of the largest studies of middle-aged adults, the Midlife in the United States (MIDUS), began in 1995/1996. The study is currently housed at the University of Wisconsin (<http://midus.wisc.edu/>). Life in the United States in the 1990s was very different than it is today. For example, in 1997, only 36.6% of Americans had a computer in the home. Now, more than 80% of us carry smart phones in our pockets! When the MIDUS study began, it included a few questions about technology use, including this one: “How often do you use a computer (such as to send e-mail or search the Internet)?” Answers included Daily, Several times a day, Once a week, Several times a month, Once a month, and Never. Although that item might have been appropriate for a time when only about one third of Americans had a computer in the home, the historical changes make that question less useful for understanding how technology use by adults changed over the past 25 years. Thus, one limitation to longitudinal studies is that the earlier measures may no longer be appropriate for subsequent waves of data collection.

We could remedy some of the limitations of a longitudinal study by explicitly examining the changes associated with historical time. Using Table 1.2, we could examine cohort differences by sampling adults along the diagonal, studying 30-year-olds in 1995, in 2005, and in 2015. When a design holds age constant and samples across time of measurement and generational cohort, it is a time-lag design. Time-lag designs can add important insights to our understanding of historical changes in a society. For example, a recent study by Oosterhoff, Wray-Lake, Palmer, and Kaplow (2019) used data from 110,000 adolescents over a 40-year period from 1976 to 2015. The research team examined selected social concerns, including crime, hunger and poverty, race relations, and others. Using sophisticated statistical procedures, they learned that the social concerns noted by adolescents followed historical trends related to specific sociopolitical occurrences. For example, adolescents’ concerns about race relations were higher in the 1990s, a time when racial tensions and crime rates were particularly high. Similarly, adolescents’ views on economic and employment outlooks mapped closely to the prevailing economic landscape in the country, with less optimistic outlooks during times of economic recession. Given that adolescence is an important time during which political and social consciousness are formed, these cohort-sensitive analyses may be informative for future policy debates when these adolescents are in the workforce. For another example of cohort changes, see Box 1.2, about changes in attitudes about legalizing marijuana. Although time-lag designs are useful for understanding changes in society over time, age and time of measurement are confounded.

Other designs have been proposed to separate these confounds (Schaie, 1965, 1970). These designs are extensions of cross-sectional, longitudinal, and time-lag designs. Science, including the behavioral sciences like gerontology, progress when researchers are able to ask and answer interesting questions. Changes in

## BOX 1.2

### COHORT CHANGES IN ATTITUDES ABOUT LEGALIZING MARIJUANA USE

Students sometimes find the ideas underlying age differences, history effects, and cohort changes difficult to grasp. Campbell, Twenge, and Carter (2017) provide a good example of these concepts. Using data from more than 9 million high school seniors from 1968 to 2015, they examined cohort differences in attitudes toward legalizing marijuana.

An age effect would be seen in a longitudinal change in attitudes from adolescence through emerging adulthood through mid and late life. If we consistently saw that youth favor legalizing marijuana but become less positive across adulthood, this would be evidence for an age effect. In contrast, history or period effects reflect systemic changes in attitudes, in which after some specific point in history, an entire culture becomes more or less positive toward legalization, regardless of age group. Finally, generational differences or cohort effects would be observed if current 20-year-olds are more positive than prior groups of 20-year-olds.

Using this large data set, Campbell et al. found evidence for a general increase in support for legalizing marijuana from 1972 to 2014, controlling for age and birth cohort. They noted a trend toward more positive attitudes beginning in the early 1990s with a large increase around 2006.

In terms of age effects, there was evidence of age differences. When asking whether they would favor legalization of marijuana use, about 37% of 20-year-old, 25% of mid-40-year-olds, and about 13% of 80-year-olds favored legalization.

But the most important finding was that despite some age differences and some cohort effects, the general public seems to have become more favorable toward marijuana legalization. When an entire society or culture changes in the same way, we have evidence for period effects. Campbell and colleagues report an increase overall in the early 1970s, a dip in favorable attitudes in the 1980s, with a renewed positive view emerging in after the year 2000.

research methodology support the acquisition of scientific knowledge (Schaie, 1992). For example, Schaie (1992) advocated designing studies which would allow us to counter the inherent weaknesses of the three more traditional research designs. In fact, his most efficient design would include a series of longitudinal and cross-sectional designs. Returning to Table 1.2, imagine conducting a longitudinal study for each row. By default, we would also have cross-sectional studies for each column. Of course, over time, we would have sufficient data to examine differences and similarities along the diagonals.

A **time-sequential design** is similar to conducting multiple cross-sectional studies at different points in time. Thus, using Table 1.2, a researcher could compare different age groups within the 1995 column and then replicate that study in 2015, with a new sample. Doing so would allow the researcher to examine age and time of measurement across different cohorts. Similarly, if the researcher wanted to examine both age and cohort effects, she could use a **cohort sequential design** to sample from two or more different birth cohort rows over time. Finally, a researcher who was interested in examining cohort and time of measurement effects could sample from multiple diagonals, thereby conducting a **cross-sequential study**.

## Theoretical Frameworks

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Research designs are important tools for asking and answering questions about adult development and aging. So, too, are the theoretical frameworks that can guide our questions and help us to interpret the findings of our studies. Although several theories try to help us to understand adult development, we will discuss only two well-supported theories in this chapter.

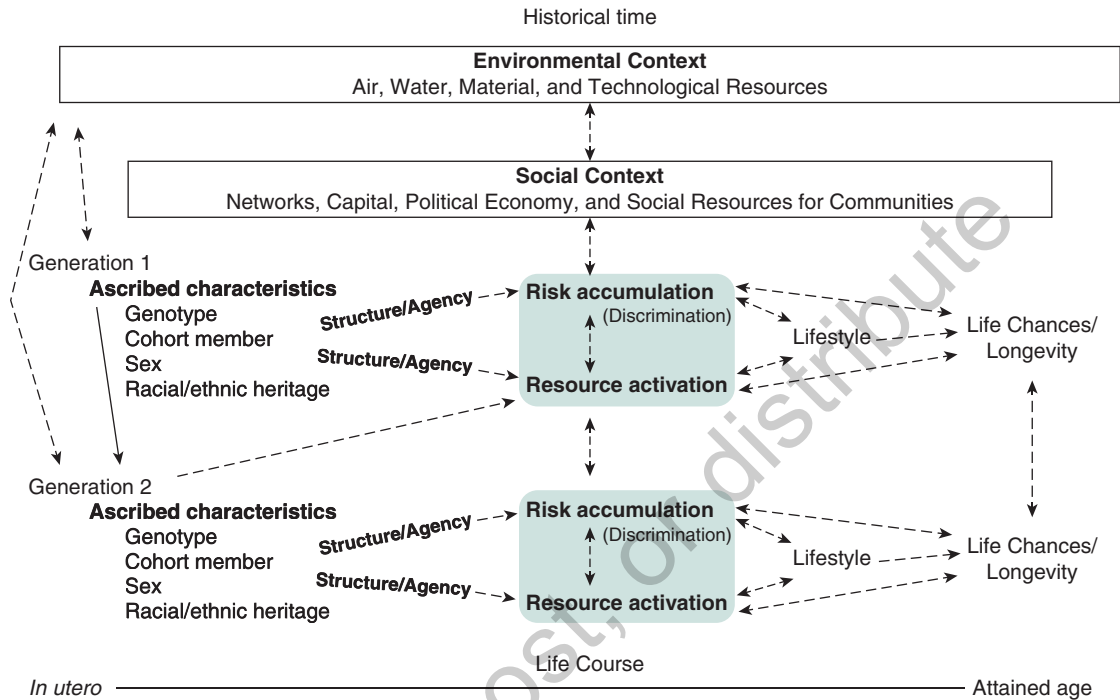
**Socioemotional Selectivity Theory** (SST), formulated and investigated by Laura Carstensen and her colleagues (Carstensen, Isaacowitz, & Charles, 1999), is among the leading theories in the study of adult development and aging. We will continue to discuss SST throughout this textbook because it has a broad range of applications. In its most simple version, SST proposes that humans are unique in our ability to ponder time and our own limited life span (Carstensen, 1993). Knowing that our time is limited, we prioritize different goals at different points in our lives. For example, younger adults value knowledge and seek out social partners from whom they can learn about themselves and the world. In contrast, middle-aged adults already have a solid sense of who they are and the world; they want social partners who maximize their emotional well-being (Carstensen, 1993). According to SST, our time horizon—whether we view our time left as expansive or very constricted—influences with whom we spend our time, whether we pursue health-promotion behaviors, how we spend and invest our money, to which information we attend and remember, and what kinds of marketing ads appeal to us. Note that although time horizon is correlated with chronological age, it is not identical. In fact, early studies demonstrated that young men with AIDS, whose life expectancies were shortened by disease, often preferred social partners with whom they could enjoy maximal emotional connection, similar to the choices of much older adults (Carstensen & Fredrickson, 1998).

## Cumulative Dis/Advantage

This approach is rooted in a much earlier sociological framework known as Double Jeopardy, the idea that some social structures disadvantage certain groups of people and make adaptation to aging especially challenging. When researchers began to examine this idea, they focused initially on African American and White American adults. In terms of age differences, both African American and White older adults reported more chronic health conditions. However, researchers also noted that at the same chronological age, many African Americans had more chronic health problems and fewer supportive resources than their White age-peers. As research expanded to examine a variety of disadvantaging factors, multiple frameworks emerged. We will discuss these group differences in more detail in Chapter 2.

The tenets of **Cumulative Dis/Advantage Theory** state that **health disparities** observed between older racial, ethnic, and other members of underrepresented groups are the result of the accumulation of risks and exposures across the life span (Ferraro, Kemp, & Williams, 2017). Moreover, the majority of the factors that influence these disparities and those that contribute the most to these group differences are preventable. Among the factors disproportionately associated with racial and ethnic

FIGURE 1.1



Source: Ferraro, Kemp, and Williams. "Diverse Aging and Health Inequality by Race and Ethnicity." *Innov. Aging*. 2017; 1(1). Oxford University Press.

minority status and that lead to more chronic health conditions and more severe symptoms are exposure to environmental hazards, poverty, unhealthy or high-risk health behaviors, and limited access to affordable and high-quality health care (Ferraro et al., 2017). We are now learning that the stresses and accumulated disadvantages experienced by an individual may continue to be observed in their offspring.

As shown in Figure 1.1, Ferraro and his colleagues propose an interactive and cumulative effect of various environmental, social, and health effects that act upon an individual across time. Based on this model and the implications, they argue for increased attention to models that focus on the life span, an increased attention to individual differences within groups, and a sharper focus on the environmental context in which aging occurs. These are themes to which we will return frequently in subsequent chapters.

## Summary and Conclusion

Aging is a life span phenomenon that includes biological, psychological, and socio-historical influences. As you engage in the research presented in this textbook, keep an open mind, be attentive to ways in which you can improve your own health and aging, and be ready to identify ways in which you can contribute to applying your own expertise to the problems of aging.

## TERMS

Average interindividual difference 10	Cross-sequential study 13	Psychological age 10
Average intraindividual change 12	Cumulative Dis/Advantage Theory 14	Social age 9
Biological age 9	Functional age 9	Socioemotional Selectivity Theory (SST) 14
Chronological age 8	Generational cohort 6	Time sequential design 13
Cohort sequential design 13	Gerontology 7	Time-lag design 11
Cross-sectional study 11	Health disparities 14	
	Longitudinal design 11	

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