11.1 INTRODUCTION

11.1.1 How Do We Develop Throughout Our Lives?

Imagine you are home for a holiday break from school. Your young cousins are running through the house getting in trouble. Your grandmother is telling stories about when she was young, but she might not be able to hear you very well when you ask her a question. Your mother decides it would be a good time to bring out your baby pictures, and those awkward school photos from your childhood, and show them to your significant other. Your uncle wants to tell you about a mentoring program he is starting for college students just like you. In the middle of this, you are struck by how much you have grown, and maybe how you are different from these family members who are younger and older than you.

This chapter will explain how developmental psychologists think about change across the lifespan—what causes it, how it occurs across time, and how it occurs in major life areas. You will begin to understand how research is conducted to answer these questions. You will notice
that much of what you read focuses on changes from when you are born until you become an adult. This is not surprising, given that there are a lot of changes between those two points! You will also notice that this chapter includes information about changes that occur throughout adulthood into old age. Thus, you will have a good idea of change throughout the entire span of a person’s life, or Lifespan Development.

Human growth and development, then, can be captured in the concept of change—an indicator that something is different than it was before. What is different may be described as change that is quantitative, in the sense that there is more or less of something (such as spoken words), and/or change that is qualitative, in the sense that the essence of something has changed (such as ability to think abstractly). Developmental psychologists tend to divide the lifespan into common age groups ranging from before a person is born until old age, and these age groups reflect the concept of change that occurs across time. They also tend to focus on three broad areas of development when studying how people change across time: physical development—changes in body structure and function; cognitive development—changes in thinking; and psychosocial development—changes in relationships and their effects. Imagine how your physical appearance has changed from the time you were an infant! When you were a very young child, did you think your stuffed animals were alive? Now that you are an adult, which people in your life influenced and shaped you into the person you have become?

The earliest developmental changes occur before we are born, during three stages of the prenatal period. From birth until age one, we are in infancy. Childhood lasts until puberty, around age 12 or 13 when adolescence starts. It might surprise you that developmental psychologists consider that your teenage years actually last past age 18. Adulthood begins in your early 20s, and you are considered a young adult throughout your 30s. Middle age (sometimes called midlife) is what you experience in your 40s and 50s. It is not until you reach age 60 or 65 that you are considered to be in old age (or the senior years).

11.1.2 Where Do These Facts Come From?

We each have an understanding of our own development from living our individual lives. But you might wonder how developmental psychologists are able to make generalizations about what we can expect on average at different points in the lifespan. A theme of this course is that psychology is a science, with the goals of describing, explaining, predicting, and changing behavior. The information that you will read about in this chapter comes from research designed to answer the questions that are at the center of each goal. Describe: For example, what physical changes occur during adolescence? Explain: For example, how does parenting style affect a child’s behavior? Predict: For example, is attachment in infancy related to intimate relationships in adulthood? Change: For example, how can we improve quality of life in senior citizens? Studying development across the lifespan has provided answers to these and many other important questions. It has the potential to affect how you think about, and even change, your own development and the development of others.

Types of Research

Descriptive research, as its name implies, describes what is happening at each age. This can be accomplished by observing and describing one’s own behavior or by other people (researchers, parents, teachers) observing, and then recording their descriptions. In Chapter 1, you read about three descriptive methods—case studies, naturalistic observation, and questionnaire/survey methods of
collecting these data. So studying one three-year-old in depth, observing how teenagers interact with each other in the school cafeteria, and asking senior citizens to fill out a questionnaire on life satisfaction are all examples of descriptive research methods.

**Correlational research** allows us to look at the behavior of two existing groups of people and describe how a behavior of one group varies in relation to a behavior of the other group. Thus, you might find that, in a sample of adults from their early 20s to their late 70s, as age decreases, social interaction increases. Put another way, the younger adults report spending more time with their friends than do senior citizens. In this case you found a negative correlation between age and social interaction in adults. Does this correlation allow us to explain how or why young adulthood is associated with greater social interaction than older adulthood? We cannot say that simply being young explains why a person is more likely to spend time with friends. Perhaps there is something else, such as the use of technology that accounts for the differences between young adults and senior citizens. Young adults are more likely than senior citizens to use social networking sites or check in on their smartphones, so they are often aware of where to find their friends. Correlations provide more than simple description; they give us a window into how and why two behaviors are related, which is a beginning in our quest to explain and predict behavior.

If you want to **explain** and **predict** behavior, i.e., determine its cause and predict what is likely to happen under certain circumstances, you would need to use **experimental research**. This type of research involves randomly assigning the participants to either an **experimental group** or to the **control group**. Assuming that these two groups start out equal in all ways, when you do something **only** to the experimental group, such as give them an experience or put them in a certain situation, any differences at the end of the experiment between them and the control group are likely caused by the treatment (or what you did to the experimental group).

For example, if 3rd grade children are randomly assigned to two reading groups, both taught by the same teacher. Random assignment means that there will end up being equal numbers of smart and slow, confident and unsure, and any other combination of students in both reading groups. Consider that Group 1 is the experimental group, and the treatment is “teacher expectation” because the teacher has been informed (falsely) that all of the students in this group are intellectually gifted; Group 2 is the control group because the teacher has not been told any information about the students. At the end of the year we are likely to see that the students in Group 1 have actually achieved more than the students in Group 2. Because these students started out as equal achievers, we have some evidence that it was the teacher expectation of giftedness that caused those children to actually achieve more.

**Research Designs**

Think about your own physical, cognitive, or psychosocial development for a few minutes. What comes to mind? Are you comparing yourself to others who are younger than you? Older than you? By comparing yourself now to another person who is younger or older, you can get a sense of your development in relation to what is typical of others at various ages. Another way to get a sense of your development would be to think about how you have changed from age to age. Are you remembering yourself as a younger person and comparing your present self to the memory of that early image? If you thought about any of these things, you are following in the footsteps of developmental psychologists who are interested in researching these same questions using **cross-sectional** and **longitudinal research designs**.
Comparing yourself to people at different ages is similar to the *cross-sectional* design. In this design, multiple age groups of people are tested just once and a comparison is made between the age groups. For example, a psychologist may want to see how 10-year-olds differ from 16-year-olds on a memory test. Using the cross-sectional method, the psychologist would find a large group of 10-year-olds and an equally large group of 16-year-olds; then each person in both groups would be given the same memory test. Very quickly we could see if the groups differ.

In the end, it would be likely that the 16-year-olds do better on that memory test than the 10-year-olds. That gives us some insight into memory differences due to age, but the problem of the cross-sectional method is that we are comparing different people. Although this may seem obvious, the groups may differ on characteristics other than age. Who knows for certain that those 10-year-olds will grow up to have better memory skills at age 16? It could be that the results have nothing to do with growing to age 16, but instead that those 16-year-olds had extraordinary memory skills already.

To solve this problem, researchers can use another research method that is similar to when you think of yourself at different ages. The *longitudinal* design involves testing one single group of people at different points across time, as they age. Returning to our memory test, if a psychologist used the longitudinal method, he or she would have to find a large group of 10-year-olds and give them a memory test. Since our comparison age is 16, with this design, the psychologist would have to keep track of all these research participants for six years; then, at age 16, each person would be tested again. When we see that the same exact children did better on the same exact memory test at age 16 compared to when they were 10, we have pretty good evidence that there is something about growing older that is related to an increase in memory.

After reading this section on research, you may be thinking that experiments sound pretty good because they can demonstrate what causes what; and longitudinal research designs sound a-okay because they show the strongest evidence of age-related change. So is that how most developmental research is done? The answer is no, for good reasons. Many times in developmental research, it would be impossible or immoral to do a true experiment in which you get to use random assignment to decide what people experience. Could you imagine randomly assigning senior citizens to live at home or to live in a nursing home? It would be impossible, and many of you would agree that it would be immoral. Thus, much of the data you will read about were collected using descriptive methods that give us an idea of what things tend to happen at the same time, but cannot tell us what causes things to happen.

Likewise, longitudinal designs take a very long time and involve a lot of keeping track of people who move, don’t respond to emails, forget to come to appointments, and sometimes even die. If you need to test the same people years later, they may be impossible to find and your longitudinal study cannot be completed. In addition, there is the risk that a psychologist would wait years for the next round of testing only to learn that his or her ideas were wrong. Thus, much of the data you will read about was also collected using cross-sectional design because the results could be obtained much easier and faster.
11.2 NATURE AND NURTURE

11.2.1 What Causes Us to Change?

In the very beginning, people who studied children’s development argued about what causes us to change. Some people argued on the side of nature: these people believed that who we were going to be was in our biology, or using modern language, in our genes. If nature is all that drives our development, then a clone whose genes are 100% identical to your own would be like you in every way. Your clone would have the same abilities, talents, likes, and quirks.

Now cloning is a funky example, but the influences of nature probably make sense to you. When you think about who you are today, you likely see that you not only look like your biological parents but that you also seem to share some of their personality characteristics. This makes sense because your genes are a 50/50 mix from both of your parents. We know that certain personality traits, such as shyness, can have genetic roots.

However, others were cheering for nurture, or claiming that the environments we are in and the experiences we have are what cause us to change or develop into different types of people. Put another way, people are blank tablets upon which life writes the story. To revisit our cloning example, if nurture is all that drives development, it would be impossible for your clone to relive all the experiences that you have had up to this day. So regardless of the fact that your clone is genetically identical to you, this clone could grow up to have very different abilities, talents, likes, and quirks than you.

Again, back in reality, you probably see that the way your parents parented you, the specific schools that you attended, the traditions in your family, and the place you grew up have left their marks on you. The fact that you are in college suggests that you probably had at least one person in your life who helped you believe that an education is important, and many of you can probably point to a teacher or family member whose influence got you here today.

From witnessing the influences of nature and nurture in your own development, you naturally understand what developmental psychologists believe today: nature and nurture interact. An interaction means more than simply both of these things are important: it means that they are both important and they influence each other. Expressed another way, recall a central theme of this course: \[ B = f (P + E + PE) \]. Behavior is best understood as a function of things about the person (inside), things about the environment (outside), and the complex interaction of person and environment.

How does this complex interaction work? Let’s first examine how nature can influence nurture. For example, a child who has the genes (nature) to be shy and anxious will elicit, and therefore experience different parenting behaviors (nurture) than a child who has the genes to be outgoing and boisterous. Parents of a shy and anxious child may avoid yelling and instead spend more time soothing this sensitive child. If you have brothers and sisters, you may have seen this in your own family: your parents treated each child differently depending on his or her nature. Let’s take this one step further by asking how a quiet, soothing environment might have affected the shy, anxious child’s development. It could have helped the child relax at home, which in turn, led to a calmer child and parents. It could have also intensified the child’s shyness. Hence, nurture can affect nature. Some children are born with the genes (nature) to have average-range intelligence, but because they are raised in such a neglectful family environment (nurture), they can actually exhibit impaired intellectual functioning, also known as mental retardation. We should not make the mistake to think that biology is destiny, even when it comes to intelligence.
11.3 AREAS OF DEVELOPMENT—HOW DO WE DEVELOP THROUGHOUT OUR LIVES?

11.3.1 How Does My Body Develop Over Time?

Physical Development

It is a thing of wonder that all of us start out as two microscopic particles, are born as helpless babies, grow through childhood into our teenage years, and then become grown-ups who eventually age into senior citizens. The normal physical changes in size and ability, or normative physical change, is a well-documented phenomenon marked by typical changes in the body's size and functioning that tend to occur at certain predictable ages. Of course, as with any human trait, there can exist wide individual differences. Your own or your child's development may or may not match up with the average changes you are about to read. In most cases, a deviation from average physical development has little real significance, but in some cases, it can indicate a physical problem. If you are concerned, it is always a good idea to speak to a health care professional.

Let's take a look at physical development across the lifespan. The prenatal period begins with conception, when microscopic sperm and an ovum (egg) unite to mix the genetic material from the mother and father. This sets off a chain reaction wherein a genetic plan for a brand new person replicates itself to create a zygote. By the second week, the zygote consists of three different layers of cells, which are assigned different jobs. The top layer, or ectoderm, will become the skin and nervous system. The inner layer, or mesoderm, will become the muscles, skeleton, and cardiovascular system. The bottom layer, or endoderm, will make the internal organs, like the lungs, liver, and lining of the digestive tract.
After two weeks, this organism is now considered an *embryo*. It is during the six week period of the embryonic development that the brain, internal organs, and limbs are actually created. In addition, the embryo forms an external organ called the *placenta* (or afterbirth) that functions as a life-support system for the developing being. If the placenta is working correctly, the embryo becomes a *fetus* at eight weeks. For the remaining seven months of pregnancy, the fetus grows to about seven or eight pounds and 20 inches or so long, and the systems of the body start to function so a new baby can be born into the world. In particular, the neurons in the fetus’ brain multiply rapidly and start to take on specific functions. Brain waves can be detected five months into the fetal stage. As birth nears, the brain seems to get picky about which are the good neurons to keep around: programmed cell death occurs to rid the brain of unneeded or poorly functioning cells. With only one month left before birth, the remaining cells responsible for movement and our five senses get a layer of insulation in the form of a fatty coating of *myelin*. Myelin speeds up the transfer of information across these neurons.

For most babies, the physical changes of their prenatal development happen without problem. Other children are born with physical problems caused by an unusual genetic plan (such as an extra chromosome in Down Syndrome) or caused by a *teratogen*, a chemical, drug, or illness that the pregnant mother came in contact with (such as children born with Fetal Alcohol Syndrome because their mothers are alcoholics).

In *infancy*, typically considered the first year of life, babies triple their birth weight to about 22 pounds, grow eight or nine more inches, and develop the abilities to control their muscles. This set of abilities is referred to as *motor skills*, which include holding the head up, grasping objects, rolling over, and putting things in the mouth. New parents are especially excited by the motor skills that lead to movement and walking. For example, most babies can crawl by 8 to 10 months, and about 50% of babies are able to walk by their first birthday, or by the end of infancy. By 15 months, 90% can walk well. The normal range for walking is 9–17 months.
The period known as *childhood* ranges from age one until about age 11. *Motor skills* continue to develop such that children can run by 18 months, climb stairs like an adult by age four, and successfully walk on a balance beam by five or six years. These motor skills and other *milestones* in thinking and speech are also related to brain changes: myelination in the child’s cerebral cortex. During childhood, there is a big increase in body size, and parents will find that they need to replace their children’s wardrobe every year! Between ages one and eleven, a child’s weight increases to about 78 pounds, and height increases to about 4’4”. Brainwise, a six-year-old’s brain is almost as large as an adult brain, though its development is not nearly finished.

Another large leap in size occurs during the growth spurts of *adolescence*, or the teenage years (12–20). Hormonal changes caused by the hypothalamus and pituitary gland in the body cause the surge of sex hormones we know as *puberty*, which starts in girls during childhood (around age 10 or 11) and in boys during adolescence (around age 12 or 13). Both females and males grow taller, heavier, hairier (underarm and pubic hair), and develop the ability to reproduce. Female hormones cause girls to gain fat, develop breasts, and experience *menarche*, the start of their menstrual periods. The start of the menstrual cycle signals that pregnancy is possible because it implies that an ovum (egg) is being released each month. Male hormones cause boys to gain muscle, grow facial hair, have deeper voices, and produce sperm. By the end of adolescence, the average female is now 128 pounds and 5’4” tall; the average male is now 155 pounds and 5’9” tall.

The adolescent brain also shows an increase in complexity. Gray matter increases until about age 11 or 12, then puberty’s sex hormones encourage *synaptic pruning*. This is similar to the programmed cell death in prenatal development: excess neurons are gotten rid of to increase the speed of brain functions. The improved functioning and myelination of the frontal cortex eventually allows older teenagers greater ability to make plans and take responsibility for their actions. By age 18, the two hemispheres of the brain are better able to communicate, as the corpus callosum increases in size and myelination.

Puberty usually is completed for both sexes by about age 18, but developmental psychologists speak of *adulthood* starting in the early 20s. The young adult years range from 21 to 39; the midlife (or middle age) years range from 40 to 59. In *young adulthood*, we tend to experience good health and the peak of our physical strength; our brains have reached their peak of functioning in most areas. In *midlife*, it is common to experience weight gain and loss of muscle mass; these changes are related to decreasing metabolism and decreasing hormones. The decrease in hormones for women is especially noted in the experience of *menopause*, or the ending of menstrual periods, which signals that pregnancy is no longer possible.

Old age, or your *senior years*, ranges from 60 and beyond. By the mid-70s, we tend to see that most people have developed some sort of physical problem that affects their daily life; that also means that the first 15 years of the senior years does not necessarily bring life-changing physical decline. Common problems of the senior years are declines in vision, hearing, response time, strength, and resistance to temperature change. It is in these later years we are also most likely to develop chronic illness, such as heart disease, that will ultimately take our lives. In addition, the neurons in our brain become tangled or blocked by plaques (a protein substance) and have fewer neurotransmitters—the result is it takes longer to remember things.
11.3.2 How Does My Thinking Change Over Time? How Do We Explain These Changes?

Cognitive Development

It is true that you have experienced physical changes that have brought you to adulthood. In addition, you probably see that you think differently now than you did as a child. Changes in thinking across the lifespan are referred to as cognitive development. There are several ways to look at how and why these changes occur.

A Stage Theory of Thinking

A common way of conceptualizing how thinking changes as we age is to describe what thinking is like at certain ages. Stage theories say that at certain ages we should expect certain types of thinking—you reach a certain age, which puts you in that stage, and all of a sudden you can think in a brand new way. Often this change is seen as coming from within the person, more specifically because of biological factors that control maturational processes. Piaget’s Stage Theory of cognitive development is a good example of this.

Jean Piaget, a Swiss biologist, was born in 1896. When he became a parent, his interest switched to children’s development as he noticed his own children making certain predictable mistakes in thinking at certain ages. Piaget observed and interviewed many children, and from this descriptive research he formed a stage theory about how children develop logical thought.

According to Piaget, the first stage, the sensorimotor stage starts at birth and continues until age two. As it sounds, the child thinks through seeing, touching, tasting, hearing, and smelling.

Fuzzy Tastes Different! During the sensorimotor stage, infants and toddlers rely on their basic sensory and motor skills to explore and make sense of the world around them. Piaget believed that infants and toddlers were acquiring very practical understandings about the world as they touch, feel, taste, push, pull, twist, turn, and manipulate the objects they encounter.
Piaget suggested that the youngest children in this stage make a mistake in thinking because they do not have *object permanence*. Lacking object permanence, children believe that things they can no longer see have actually disappeared forever. The classic test of this is to get a baby’s attention with a rattle, then cover the rattle with a cloth. Even if the baby can still hear the sound, if he lacks object permanence he will not search for the rattle under the cloth. Seeing is believing, so he no longer believes that the rattle is there if he cannot see it. This idea applies to people in the child’s life, too! This lack of object permanence is used to explain why babies around age six months cry very hard when their caregivers leave them: because they cannot see them at that moment, the babies think that these important people have disappeared forever! I’d cry, too, if that happened! By age two, children develop object permanence and would not be tricked by the rattle test; they also handle separation from their caregivers better.

The ages of two to seven years old are in the next stage, which Piaget called the *preoperational stage*. Don’t worry, the operational part has nothing to do with surgery! A good thing to remember is that “operations” are the same thing as “logical thoughts.” So this stage tells you that, although the child is thinking beyond just her senses, she is not yet logical at all: she is pre-, or before, the ability to have logic. This lack of logic gives way to very funny mistakes in thinking during the preschool and early school ages. For example, Piaget found that the youngest children in this stage could not figure out that people sitting on different sides of the table from them would see different views of the centerpiece in the middle. This failure to be able to guess another person’s perspective, or experience, Piaget called *egocentrism*.

As you can see, the children can see the world only from their own eyes. They are stuck, or centered, in their own experience. This also explains why your three-year-old thinks you can see what is on the TV in the living room while you are making dinner in the kitchen. If they can see it, they think you can, too.

Another thinking mistake from the early preoperational years shows that these children are very much tricked by appearances. If something is spread out to take up more space, appears taller or wider, the young preoperational child will make the mistake to assume that it has magically transformed into more than was there before. Piaget says these kids *do not have conservation*: they do not understand that changing the shape of a liquid or solid does not add or subtract to how much of it exists.

One of the fun tests to do if you have these young children in your life is to demonstrate that they lack *conservation* of volume. Start out with two identical short, wide, clear glasses filled equally with juice. Ask the child if there are equal amounts of juice in these two glasses and even it out until he agrees. Then, right in front of the child, pour one of the glasses of juice into a taller, narrower, clear glass. The “waterline” will be higher in this second glass, so when you ask the child if there is STILL the same amount of juice in the two glasses he will likely say, “no” if he does not have conservation of volume.
By age seven, children will be able to guess what others can see or not see, and they are no longer tricked by changing the appearance of an amount of liquid or solid. The **concrete operational** stage includes ages seven to eleven. Going back to the definition of “operations,” you see that children have developed some sort of **basic logic**, but in this case it only applies to things they can experience firsthand, or in a “concrete” sort of way. This also means that they cannot think logically about things they cannot or have never experienced themselves. The thinking mistakes they make are when they have to imagine something they have not or cannot experience directly.

For example, an eight-year-old would easily be able to look at her three classmates, Margaret, Hakim, and Ari, and tell you who is the tallest. But that same eight-year-old would have trouble correctly answering this riddle about people whom she has never met:

*Chen is taller than Kathy but shorter than Maria. Kathy is shorter than both Maria and Chen. Who is the tallest?*

As an adult you probably were able to figure out that Maria is the tallest, but this sort of ability to correctly imagine what is not “real” does not develop until the last of Piaget’s stages.

At about the age of 12, and on through adulthood, Piaget believed we are in the **formal operational** stage. If you have “formal operations,” it means that you have finally developed real logical thought. Congratulations! But what is real logical thought? This is the ability to reason about hypothetical situations, situations you have not or cannot directly experience.

If you think about many of your classes in high school and here in college, you see that you are asked to understand and reason about things you have never experienced yourself, such as life in a tribal village in Africa, or things that you cannot directly experience, such as the anatomy of a single electron. And for Piaget, that means you have reached the highest type of thinking: **abstract** (or hypothetical) **reasoning**.
In the years after Piaget, others suggested that our thinking continues to change in young adulthood. Borrowing from Piaget’s terms, they called this post-formal thinking, or what comes after logical thought. And post-formal thinking also has a process of developing. As an older teenager you may have felt (or may still feel) that you can use logic to determine an answer that is always right or wrong in life. But then when you meet others, who also think logically but have very different ideas of what is right or wrong, you begin to think that all ideas are equally good. Then, college teachers or your bosses want you to choose one idea and show the evidence of why it is true or good, so you begin to think that ideas with the most support are the right ones. But life also shows you that even when logic and evidence suggest a choice is “right” your heart might say that it is “wrong.” So the post-formal thinker is an adult who understands that in life there can never be a 100% right answer all of the time; that considering all the evidence is very important in making decisions; but also that emotions color and affect every decision that a human being makes. Big stuff compared to “where did the rattle go?,” right?

Concepts in Action: Piaget’s Stages of Development—To view this material, refer to eBook.

Social Interaction and Thinking

Let’s take a look at a second theory of cognitive development. Those of you who have or work with children likely recognize that at certain ages, they tend to think in certain ways. But have you even wondered if you have any direct effect on their thinking? In his Socio-cultural Theory, Lev Vygotsky, a Russian psychologist born in 1896, emphasized how adults raise the thinking levels of children through their social interactions. You can remember his theory because you see both the words “social” and “culture” in the title. How is this different from Piaget’s Stage Theory? While both theories address cognitive development, Vygotsky’s theory emphasizes how factors “outside” the child, i.e., adults in the environment, interact with factors “inside” the child, i.e. maturation, to influence how the child thinks. According to Vygotsky, adults transfer their higher level of thinking to children through verbal interactions, especially when giving children hints or instructions. These hints or instructions are termed scaffolding. Just like a metal scaffold holds up a wall that is not yet solid, the hints and instructions we give children allow them to think about and do things that they could not on their own.

For example, when you were first learning addition, you looked at “4 + 5 = ?” and did not know what to do. Then your teacher told you something like this:

Okay, hold up four fingers on your left hand. Now that plus sign means that we have to add more to those fingers. So hold up five fingers on your right hand. Now count how many fingers you are holding up! Right, it is nine. So write the number nine after the equal sign. Four plus five equals nine! Good job!

By giving you those instructions, you were able to complete the problem and you began to think about addition. Just as metal scaffolding is removed as a wall becomes solid, adults decrease the amount of scaffolding that they provide as children master the task on their own. In time, your teacher gave you fewer and fewer hints until you could do addition problems without any help.
In adult development we still experience Vygotsky’s ideas. If you take a new job, another adult who has greater knowledge about this job will train you. At first you may need a lot of scaffolding, since she has to tell you how to do all these new things. Then you may need just some hints and explanations to do your job correctly. But quite quickly, that knowledge will have been transferred to you and you do your job well without any scaffolding.

**Information Processing Theories**

So far, we have understood cognitive development as something that just happens as children reach certain ages, or as something that is encouraged by getting hints from adults. These theories came to us largely from people who published their ideas in the 1930s, and yet they still ring true today. A third way to think about thinking comes to us from the 1990s. *Information-Processing Theories* describe thinking using a computer model to explain the increasing complexity of thinking across the lifespan. The use of computer terminology to describe and explain human thinking is a powerful reminder of the influence of historical events and social culture on behavioral science. How can a cold machine be like a complex human being? One way that information-processing theorists compare the two has to do with hardware and software. If you buy a new computer with better hardware, you can run more advanced software; as the brain of a child matures, it can understand much more complex things. In this case the brain is compared to hardware and knowledge is compared to software. Thus, development is simply seen as upgrading.

One common reason many of you may have upgraded your last computer was to increase the amount of memory available to you for your music, films, pictures, and schoolwork of course. Memory is another similarity between computers and humans, and the information-processing theorists refer to it as *storage*, regardless of whether they are talking about computers or humans. To get something into storage you first require *input*: you have to type your paper into the computer; and to remember something you have to pay attention to it in the first place (why your professors often ask you to take notes; writing makes you pay attention).

When you get something out of storage and use it, that is *output*. You click “print” and out comes your finished paper; you sit down to take a test and out of your brain flow all the ideas you had stored, hopefully. Information-processing research has shown us that having a lot in storage (remembering a lot) about a particular topic can make output (how well you do something) better. Chi’s classic study in 1978 found that children who knew a lot about chess were able to remember chessboard arrangements better than adults who knew very little about chess. Normally adults do better on memory tests than children do; in this case we see how having a lot in storage about a topic makes you perform better (output), even overcoming normal age differences.

**11.3.3 How and Why are Relationships Important to My Development?**

*Psychosocial Development*

Because human babies are born quite helpless, they require care. Usually this comes from parents, but it can also come from other caregivers, such as grandparents and daycare providers. This fundamental, primary relationship is the first of many that we will have as we get older. As we are influenced by and participate in our culture, we develop a broad array of relationships with varying degrees of intimacy and stability. The study of *psychosocial development* addresses the importance of relationships in our lives beginning with infant attachment, continuing in parenting style, and ending with a systems approach.
**Attachment Relationships**

The first relationship you experienced was with your caregivers. It does not matter if you were born to two parents, if you only had one parent, if you were adopted as a newborn, or if your grandparents acted as parents and raised you since birth. The adults who cared for you on a daily basis when you were an infant and toddler shared a special relationship with you, an *attachment* relationship. It is different than the feelings of love or bonding that a child can share with many people. Instead, an attachment relationship is something only shared between a child and his or her everyday caregivers.

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*The Importance of Attachment.* Secure attachment in infancy forms the basis for emotional bonds in later childhood. At one time, attachment researchers focused only on the relationship between mothers and infants. Today, the importance of the attachment relationship between fathers and children is also recognized.

John *Bowlby* wrote about this relationship as one that sets your expectations about all other relationships. Basically he believed that your early caregivers taught you if you can trust other people to take care of you when you need it. If they responded quickly and correctly to your needs in the first years of your life, you grew up to expect good treatment from others; if they ignored or did not respond correctly to your needs in your first years of life you grew up to expect poor treatment from others. Bowlby called this expectation of how relationships work the *Internal Working Model.* Bowlby predicted that getting your needs met as a baby would lead to a lifetime of good relationships; babies who did not have their needs met would instead experience a lifetime of bad relationships. So we have good reason to study the quality of relationships that young children share with their caregivers!

Mary *Ainsworth*, a student of Bowlby’s, devised a clever way to look at that relationship. A female assistant would welcome an 18-month-old child with his mother to the laboratory room, which was set up like a pediatrician’s waiting room, with toys for the child and a chair for the mother. At one point, the mother is instructed to briefly leave the room and then return; at another point, the mother briefly leaves again and the female assistant attempts to comfort the child. Not surprisingly this study is called the *strange situation*, because the toddler finds himself in an unexpected experience! Depending on how the child reacts, the relationship between him and his mother is identified as being a good one—a secure attachment relationship, or a poor one—a type of insecure attachment relationship. Ainsworth described four *basic types of attachment*—secure, avoidant, ambivalent, and disorganized.
In the strange situation, most American children show that they share a good or secure attachment relationship with their caregivers. They get upset when the parent leaves, they are easily soothed when the parent returns, and they are soothed much better by the parent than by the laboratory assistant. Looking at the home life of these children, we find responsive parents who quickly and correctly take care of the child’s physical and psychological needs. These are children who are learning that they can trust their caregivers, and thus trust others to take care of them. According to Bowlby, we should expect that they will have a lifetime of good quality relationships. Research does seem to support that they have better social skills and friendships during childhood and adolescence. Also, children who share a secure attachment relationship with their caregivers grow up to have a lower rate of divorce as adults.

Other children exhibit one of three insecure attachment types of relationships with their caregivers. For example, children with avoidant attachment relationships don’t seem to want to have anything to do with their caregivers. In the strange situation, they do not get upset when the parent leaves the room, they avoid the parent when the parent returns, and they do not seem to prefer the parent over the laboratory assistant! At home, they also have very little to do with their parents, which is not surprising as their parents are often cold, rejecting, or over-stimulating. These kids are learning that they cannot trust their caregivers, and thus they cannot trust others, to take care of their physical and psychological needs. They are lone wolves even as toddlers because they have already learned to expect little from others.

What about parents who sometimes fulfill their children’s needs, and sometimes ignore them? Children who share an ambivalent attachment relationship with their caregivers have been parented in this unpredictable sort of way. In the strange situation, these children really freak out when their parents leave. However, when the parent comes back, the child can’t seem to decide whether they want to be with the parent or if they are angry with the parent; sometimes they hit or act aggressively to their parent to show this anger. It is as if they are saying, “Sometimes you are there for me; sometimes you are not. It makes me nervous and angry.” These children are unsure if they can trust their caregivers, and thus they are unsure if they can trust others, to take care of their physical and psychological needs.

The last type of insecure relationship is quite rare. A disorganized attachment relationship with caregivers is characterized by confusion or disorientation on the part of the child while in the strange situation. Basically, these children do not have the typical, normal, good and bad reactions that most children show. This is because we usually see this sort of attachment relationship when children are in homes with a history of abuse, neglect, or severe mental illness. The reality that these children grow up in is so different from average that their behavior is noticeably different.

**Attachment and Culture**

The strange situation test has been used across the globe to measure attachment patterns. Overall, the secure attachment relationship is the most common type in all cultures. However, cultural beliefs about parenting and children are related to how common specific attachment types are in a given country.

For example, German parents think that their young children should be very independent, so it might not surprise you that their babies demonstrate more avoidant attachment relationships than American babies. On the other hand, mothers of the Dogon tribe of Mali value keeping their babies close and nursing them whenever they seem hungry. This sensitivity produced an amazing finding: none of the Dogon babies demonstrated an avoidant attachment relationship.
Some have also argued that it is not fair to use the strange situation in cross-cultural research because it may be too strange for some babies! For example, in Japan, it is very unusual for a mother to leave her baby alone. Japanese babies tested in the strange situation get really upset and react like they have an ambivalent attachment relationship. However, it is likely that many of those babies share a secure attachment, but the intense strangeness of being left alone made their reaction seem like an insecure attachment.

Cultural contexts influence how psychological concepts are interpreted. A child’s reaction to the strange situation may be telling us more about his culture’s parenting practices than about the quality of the relationship he shares with his parent. (Germany: Grossman et al., 1985; Mali: True et al., 2001; Japan: Takahashi, 1990.)

The good news about attachment relationships is that they can change. Parents can learn to be more sensitive and responsive to their children’s needs, and so even poor relationships can be turned into secure attachment relationships. Also, as long as a child shares one secure attachment relationship, he is likely to have good outcomes; the worst outcomes are when the child shares insecure relationships with all caregivers.

**Parenting Styles**

Attachment research focuses on how responsive parents are during the earliest years, but *parenting* is at least an 18-year-long experience! So what makes a good parent no matter how old the child happens to be? Psychologists look at the amount of *warmth* and *control* a parent shows toward the child. *Warmth* means how much love and positive emotions are expressed to the child. *Control* means how many rules and punishments the parent puts upon the child.

Diana *Baumrind* applied warmth and control to create four types, or styles, of parents. Each style is related to different results in a child’s behavior and success in life. For example, the *authoritative* parent is considered very high in *warmth* and medium in *control*. Being high in warmth, this parent is affectionate toward the child, may often say, “I love you,” and tries to create a positive atmosphere with the child. Being medium in control means that this parent has fair, age-appropriate rules, and when those rules are broken, there is punishment that is also fair and age-appropriate. You can think of the authoritative parent as being like a good coach. A good coach is supportive and encouraging to the players; a good coach expects the players to do their personal best and follow the rules, and will hold them to that by giving out fair punishments if necessary.
Authoritative parents are very interested in teaching their children to think and show appropriate independence. We see this in how they are willing to dialogue with their children about the rules. These parents still have the final say in what is a rule, but they are willing to listen to their child’s ideas. For example, a mother might tell her six-year-old daughter that it is bedtime because it is 7 p.m. The daughter complains, saying that it is summer vacation, that she does not have school the next day, that it is still very light out at 7 pm so it is hard to sleep...she wants to wait until 9 pm to go to bed. Instead of getting angry with the daughter for questioning her authority, the authoritative parent will consider the girl’s points. This parent might answer, “You are right that you could go to bed later in the summer, but I think 9:00 is too late. So it is okay with me if you stay up until 8:00, but when school starts again, you will need to go to bed at the regular time of 7:00.”

Authoritative parents’ combination of high warmth and medium control is considered to be the best type of parenting. For most, this parenting produces children who have the best social skills, do the best in school, are most liked by their friends and teachers, and have the fewest problems with the law in adulthood.

In comparison, the authoritarian parent is very low in warmth yet very high in control. So even though these parents love their children, they rarely express it in words or affection, and they often seem serious or stern when they are around their children. Being high in control means that these parents have rules for almost everything, and often these are not age-appropriate rules, so the children often fail to follow them and in turn receive a lot of strong punishment.

This makes authoritarian parents much like military drill sergeants. They are not warm-and-fuzzy, instead they are dead serious. Drill sergeants bark out orders and may ask their troops to do things that may be impossible. Since war is life or death, if the troops don’t comply, there will be harsh punishments. The authoritarian parent values obedience to authority. They are not interested in dialoguing with their kids about rules; instead they expect that they will be obeyed without question. The six-year-old in the previous example would likely be in big trouble for arguing and not just going to bed “like she should.” Not surprisingly, authoritarian parents often work at a type of job in which they have little control and they succeed, or at least keep their job, by simply following orders. So this is the value they feel they should pass on to their children.

The complete opposite to an authoritarian parent is a permissive parent who is very high in warmth yet very low in control. This means that permissive parents express the love they feel for their children by expressing affection often, saying “I love you,” and creating a very positive atmosphere when spending time with their children. Where they go wrong is that they have very few rules, if any, for their children, and those rules can be easily broken without fear of much punishment. For a comparison, you can think of permissive parents trying to be like friends to their children. Friends are very positive and supportive toward each other, but they do not try to set rules for or punish each other. This works out well in friendship, but does not have the best results in parenting.

If we go back to our example of the six-year-old who asked for a later bedtime, we would guess that the permissive parent would say, “Sure, sweetheart!” This sort of agreeableness might sound good to a six-year-old, but we know that children need parents to set appropriate rules for them to grow up to be successful adults in a society that has rules and laws.

However, the parent who has the most damaging effect on children is the indifferent/uninvolved parent. These parents are low in both warmth and control. They do not express love or affection to their children, and they do not seem to enjoy being with them. The children have very few, if any rules, and they know they will not receive much punishment if a rule is broken. This parent is basically
checked out. Indifferent/uninvolved parents are the ultimate in, “He’s just not that into you,” but sadly, the people they are “not that into” are their children. For whatever reasons, these parents just can’t or just don’t want to be involved in their children’s lives.

The six-year-old requesting a later bedtime might be met with a harsh, “Whatever. Just stop bugging me. You are such a brat.” For this girl, the fun of staying up late would not make up for the lack of warmth and control in her family life. As you might guess, children parented in this sort of way are most likely to grow up to have problems in relationships and with the law.

*Attachment* theories and research on *parenting* both *describe* the first social relationship in life and *explain* how it can affect *psychosocial development* throughout the lifespan. Take a moment to consider relationships in your own life and how they have shaped your development. Other than your parents or primary caregivers, who or what comes to mind as a powerful influence on your development? Psychologist, Urie *Bronfenbrenner* created *Ecological Systems Theory* to explain how we are part of a larger system wherein all social relationships, even with people we do not know personally, can affect and be affected by our development.

**Social Context of Relationships**

*Ecological Systems Theory* is often depicted as five circles within a circle (Figure 11.2 below). At first glance, this diagram appears to illustrate how a child is simultaneously “acted upon” by people and environments both near (proximal) to him and far (distal) from him. Recall a central theme of this course, that $B = f(P + E + PE)$. Now, take a closer look at the illustration and imagine how the child is not only affected by his environments, but also affects them in very real ways. Consider the child as the center of proximal and distal social environments, constantly affecting and being affected by them. Resist the temptation to simplify a child’s development by isolating parts of the circle in an attempt to describe them and explain how they work. No part of any circle functions independently of any part of any other circle.

*Figure 11.2 Ecological Systems Theory*
How would you describe a child’s *microsystem(s)*? These are the people (and their systems) who interact directly with the child: parents/family, caregivers, and peers, as well as the school and religious setting. When you were a child, how would you have described your microsystems? Can you remember individuals in each microsystem? As you look back on your childhood and adolescence, you can probably see how the friends you chose seemed to influence your development. In childhood and in adolescence, children tend to choose friends who are a lot like they are and come from families similar to their own. You can imagine, then, how our friends tend to reinforce our natural tendencies as well as the values our parents teach us. For example, at all ages, we tend to earn about the same grades as our friends, and in the teen years, we have the similar attitudes toward school as our friends do.

The *mesosystem* is the next concentric circle moving away from the child, and in it, the primary influences in the microsystem interact with each other—parents with other caregivers, caregivers with peers, parents with schools, and so on. These relationships continue to influence the child’s development through their interactions with each other, around the child. You probably have an idea if the high school you attended was a “good” one in your area, or maybe you heard your parents talking about how they chose a certain school district or private school because it would offer you a better education. Parents usually choose schools that reinforce their values. In addition, schools offer opportunities for children to have relationships with other students and teachers who can also have important influence. Many of you can probably name a teacher who had a big effect on who you are today.

For Bronfenbrenner, the influence of relationships does not end with the people you know. Although the people in the next concentric circle, *exosystem*, may never meet the child, they still have indirect influence on his development. The way your parents parented you and what you learned in school were also influenced by where your parents worked, who was there to support your parents, and the laws and benefits provided by your government. An example that includes all of these exosystem relationships would be how you were cared for as an infant.

Our government policies allow both men and women to work for pay. Let’s say your mother and father both worked at companies that employ more than 50 workers; so, when you were born, they both qualified for Family and Medical Leave: three months of unpaid leave from their jobs. Your mom decided to take three months off, and during that time she joined La Leche League and met other mothers who helped her so she was able to successfully breastfeed you. Your dad did not take that time off because your parents needed his income so that they could pay for private daycare for you when your mom went back to work. They have to pay for private daycare because their employers and our government do not offer childcare, and because your closest relatives, your grandparents, lived too far away for them to care for you as a baby. These parenting decisions were very much influenced by the exosystem and by decisions made by people you never met.

Even broader influence comes from the *macrosystem*. These are relationships in the broadest sense and again show how people whom the child has never met influence his development. In the macrosystem, we find people who share the same culture, ethnicity, and historical experiences as the child. For example, because the American culture believes that girls and boys, women and men, should have equal educational opportunities, you are in a college class with people from both sexes. As you meet lots of people in these classes, you may realize that the way you look, your family background, or your religion have given you a different experience from others in the same culture. Finally, you might see that historical experiences that you lived through, such as the 9/11 tragedies, have influenced you differently than they influence later generations. The macrosystem is a good example of theme four of this book as it touches upon the cultural context of development.
The last relationship that Bronfenbrenner added, the *chronosystem*, reminds us of our relationship with time. The way your parents influence you and you influence your parents; the effect of your friends and schooling; your parents’ experiences and governmental policies; even your culture and individual experiences; depending upon your age at the time, these influences will vary in their impact on your development. When something happens is as important as what happens.

### 11.4 B = \( F (P + E + PE) \) PLUS TIME!

#### 11.4.1 What’s the Bigger Picture?

Speaking of time, what theories in developmental psychology describe and explain how and why people change from birth through adulthood? These *lifespan* views add a developmental twist to \( B = f(P + E + PE) \) by adding *time* as another factor that can influence behavior. One such theory comes to us from Erik *Erikson’s Psychosocial Theory*. Influenced by Freud’s ideas that early experiences affect us psychologically, Erikson believed that our lives are divided into eight stages that correspond to eight *dilemmas*, or problems, that we must solve correctly. If we fail to solve a dilemma correctly, we grow older, but we will be unable to correctly solve the dilemma of the next stage. Let’s look at a few selected stages.

The first stage is during the first year of life. The dilemma is called *trust vs. mistrust*: can the baby learn to trust others to take care of her needs? This dilemma should remind you of attachment theory. Using the vocabulary of attachment theory, we could say that if you shared a secure attachment relationship with your parent, you successfully solved Erikson’s first dilemma.

Jumping to Erikson’s fifth stage, we arrive at adolescence. Erikson believed that teens are trying to solve the dilemma of *identity vs. role confusion*. Modern research into adolescent development supports the idea that preteens have their identities set by their parents and teachers, but by late adolescence most teens have discovered their own likes and dislikes, their own talents and preferences. You may remember as a child that you went along with whatever your parents dressed you in, asked you to eat, or asked you to do. As a teenager, you may have argued with your parents about these things as you tried to figure out who you are. Most kids grow up to be much like their parents, but even so, you probably see how you are distinct from your parents in certain ways. If you see this distinction you have successfully solved this dilemma of adolescence.

While previous theories in this chapter did not go beyond adolescence, Eriksons’ theory continues into and through adulthood. Young adulthood presents the dilemma of *intimacy vs. isolation*, so it would not be surprising that you would choose to marry or find a life partner during your 20s or 30s and thus successfully solve this dilemma.

In the midlife years, the 40s and 50s, Erikson believes that psychologically healthy people focus less on themselves and focus more on helping the next generations—hence the term *generativity*. Thus you will successfully have solved the dilemma of *generativity vs. stagnation* if your midlife years include things like parenting, grandparenting, or mentoring others at work.

Successful completion of all the earlier dilemmas sets you up in your senior years (60s and older) to successfully solve the last dilemma: *integrity vs. despair*. You can imagine that living a life in which you learned to trust others, to trust yourself, to take risks, to learn from school and life, to know who you are, to form lasting romantic relationships, and to mentor others, that you would look back and say, “I have lived a good life.” It would feel like a good life because your experiences
form an integrated whole. If instead, you failed to successfully complete one or more dilemmas, it is easy to imagine yourself as an older person who has despair, or sadness, about the experiences they have missed.

An even more holistic, or comprehensive, lifespan view is the Life-span Perspective. Psychologists working from this framework believe that development is influenced by so many sources that we cannot limit ourselves to just a few theories or just a few areas of study to explain it.

One of these psychologists, Paul Baltes, and his colleagues describe the Life-span Perspective in terms of four concepts. First, we change in multiple directions: sometimes we gain abilities and strengths, sometimes we lose those same things or replace them with new. For example, as a general rule memory skills increase until young adulthood and show some decline in the senior years; yet people also believe that seniors possess more wisdom than young adults.

Second, Baltes et al. demonstrate that our development is plastic, or flexible. Plasticity means that we can learn how to adapt to changes. For example, there is some evidence that giving senior citizens memory training can reduce the impact of aging on memory. Even without formal training, you probably have noticed that the older people in your life come up with many tricks to help them remember things.

The third concept of the Life-span Perspective has to do with the time and environment you experience during development. Baltes calls this a historical context, to imply that each person’s history is taking place in different eras and consists of different experiences. We can only imagine that when the tech-savvy young adults of today become senior citizens that they will rely more heavily on technology to overcome memory issues than any prior generation. Growing old in the mid-2000s will likely be a different experience than growing old at the turn of the century because of the cultural experiences between those points in time.

Finally, the Life-span view includes the idea that change has multiple causes. We talked about this when we addressed nature and nurture: how we develop is influenced by biology and experience. To this list, Baltes would add our psychological experiences, which have to do with how we think and feel, and our stage in the life-cycle, the influence of time. So the loss of memory in our senior years is not simply a physical change in the brain, but it is influenced by experiences such as memory training. In addition we will likely have an emotional reaction to this change in our thinking, although most seniors accept memory loss as a common experience of their age group.
11.5 CONCLUSION

If your family gatherings cause you to wonder about your development and the development of others, hopefully this chapter has answered some questions and perhaps raised your curiosity about others. As you can see, there is no one theory that explains all of the change that humans experience across the lifespan, and even the theories that do exist may not apply perfectly to an individual.

Even so, if we are familiar with the average experience of change during a lifetime we are more likely to be understanding toward ourselves and others at different ages. Often we are simply acting our ages! These theories offer some answers for why children, teens, young adults, midlife adults, and older adults do the things they do. The theories also allow you to predict what you and others will be like in the future. Finally they suggest good choices for the people whose futures are in your hands.