Test your knowledge of child development by deciding whether each of the following statements is true or false, and then check your answers as you read the chapter.

1. T □ F □ When teens are given statistical evidence to support an argument and personal opinions to support the same argument, they think logically and are more likely to base their own opinion on the statistical evidence.

2. T □ F □ Adolescents are able to study while listening to a favorite TV show because by this age their attentional processes are so well developed that they can split their attention between multiple activities.

3. T □ F □ The smarter you are, the more likely it is that you will also be creative.

4. T □ F □ Your moral values and beliefs are the best predictor of what you will actually do when faced with a moral dilemma.

5. T □ F □ Students who do a lot of texting do not differ from students who do not in their ability to spell or use Standard English.

6. T □ F □ Good writing skills are not as important in today’s tech-savvy business world.

7. T □ F □ Throughout the elementary school years and into high school, girls do more poorly in math than boys.

8. T □ F □ In the past 40 years we have cut the high school dropout rate by more than half.

9. T □ F □ Nearly half the 14 million jobs that will be created in the United States by 2018 will go to people with an associate’s degree or occupational certificate.

10. T □ F □ Many teens these days are overscheduled, spending most of their time after school in multiple organized activities like sports and music lessons.
Adolescence is a time of growth and consolidation in cognitive development. We begin this chapter by looking at the fourth stage in Piaget’s theory of cognitive development, the stage of formal operations. In middle childhood, children developed logical thinking, but their thinking was limited to concrete reality. In adolescence, thinking expands to include ideas that are hypothetical and abstract. We also look at development in the basic cognitive processes and in social cognition. Changes in the way adolescents think about and understand the world affect their moral development, so we look too at moral reasoning and the way it relates to moral behavior. The second half of the chapter is devoted to an examination of the contexts in which cognitive development in adolescence occurs. We take a detailed look at schools as one of these contexts and examine the experience vulnerable adolescents have in the school environment. We also look at the way high schools prepare adolescents to transition into the workforce or college. The other contexts for education we examine include the family, the peer group, and the community.

Piaget’s Stage of Formal Operations (12 Years and Older)

Thinking undergoes an important qualitative change as children enter adolescence. In middle childhood, children were able to think logically about concrete events but were not yet able to think about abstract or hypothetical concepts. Piaget’s stage of formal operations is marked by the development of abstract thinking. Being able to think abstractly means teenagers no longer take literally a statement such as “Don’t count your chickens before they hatch.” They understand this does not refer to actual chickens. More important, in the formal operational stage, teens can think about broad abstract concepts such as democracy rather than just concrete concepts, such as counting votes in an election. A younger child can think about doctors and nurses, but someone in formal operations can think about the field of medicine (LeHalle, 2006).

Piaget (1999) said that by the age of about 12 children begin to reason logically about hypothetical possibilities rather than only about the concrete world. He called this new ability hypothetico-deductive reasoning. It has also been referred to as scientific thinking because it is the type of thinking scientists use when they set out to test a hypothesis. Remember we examined the scientific process in Chapter 2. In adolescence, hypothetico-deductive reasoning allows individuals to generate new possibilities and form hypotheses that they can test to answer questions. To test their hypotheses, they must use deductive reasoning, a form of logic in which a general principle leads to a logical conclusion. Piaget believed that someone with formal operations is able to follow a logical process even if it does not fit reality. For example:

1. Brown cows give chocolate milk.
2. This is a brown cow.
3. Therefore, it gives chocolate milk.

Learning Questions

15.1 What changes occur as adolescents enter Piaget’s stage of formal operations?
15.2 How do basic cognitive processes change during adolescence?
15.3 How does moral reasoning develop during adolescence?
15.4 How is teen language different from language in children and adults?
15.5 What threats to academic achievement do high school students face and what factors support their success?
Obviously this is a false premise leading to a false conclusion, but the logical process behind it is sound. A concrete thinker would not be able to separate herself from reality to reach the logical conclusion and would instead proclaim that no cows give chocolate milk. Piaget believed formal operations allow adolescents to step back from the concrete reality to reason in this more abstract, purely logical way.

One consequence of this ability to think hypothetically is that teens may become idealistic because they now can imagine what could be rather than simply what is. Idealism can motivate them to engage in activities in which they are committed to a larger goal. However, it can also cause them to question adult authority, for example, by confronting rules. They realize that even though there is a rule, it doesn’t mean it always has to be that way. Other alternatives are just as reasonable and logical, and they may want to fight for these alternatives.

Formal operational thought also includes the ability to generate many possible solutions to a problem and test them before making a decision in order to discover which one is correct. To do this, you must understand that to measure the effects of any specific variable, you must hold all the other variables constant. To see one way in which Piaget tested this ability, see Active Learning: Formal Operations.

**Active Learning**

**Formal Operations**

Piaget tested children of various ages on what he called the “pendulum problem.” He provided each child with a pendulum, consisting of an object hanging from a string, and asked the child to figure out what determines how fast the string swings back and forth.

To carry out this activity yourself, find a length of string and attach an object to the end of it. Suspend the object so it can swing freely. Have available lighter and heavier objects and longer and shorter strings. Make a list of what you think might cause the string to swing quickly or slowly. Then write down the step-by-step process by which you would try to figure out which of the possibilities is the answer. If you have access to children of different ages, you can also do this with them, having each one generate her own list of possible causes and asking how she would test them.

Some possible answers to what determines how fast the string goes back and forth that you or the child might come up with are the weight at the end of the string, the length of the string, the strength of the initial push, and the height from which the weight is dropped.

To test these possibilities Piaget found that young children would simply try different combinations in an almost random fashion. For example, they might put a heavier weight on a longer string and then put a lighter weight on a shorter string, and in the process of trying different combinations they might stumble on the right answer. However, the hypothetico-deductive reasoning that appears in the stage of formal operations allows teens to approach this problem in a scientific way. They will think of possible answers to the problem and then test these specific hypotheses in a systematic way by controlling all the variables but the tested one. To learn the effect of the weight at the end of the string, they will vary the weight while keeping the length of the string, the strength of the initial push, and the height from which the weight is dropped the same. If varying the weight does not make a difference, they will test the strength of the initial push, and so on through all the possibilities. Did you (or a child you tested) carry out systematic experiments to determine the answer?

Have you figured out the answer to the pendulum problem? You can see the answer below.

**Answer:** It is the length of the string that determines how fast it goes back and forth.
When teens develop the ability to carry out the scientific process, they are able to take an idea or hypothesis and look at evidence to decide whether there is scientific support for it or not. This means they must understand what evidence is. Klaczynski (2001) had younger and older teens read the following:

Ken and Toni are teachers who are arguing over whether students enjoy the new computer-based teaching method used in some math classes. Ken’s argument is, “Each of the 3 years that we’ve had the computer class, about 60 students have taken it. They have written essays on why they liked or didn’t like the class. Over 85% of the students say they have liked it. That’s more than 130 of 150 students.” Toni’s argument is, “Stephanie and John (the two best students in the school, both high-honors students) have complained about how much they hate the computer-based class and how much more they like regular math classes. They say a computer can’t replace a good teacher” (p. 859).

Then the researchers asked the teens to rate how likely they would be to take the computer-based course and how likely they would be to take the lecture course. The teens also rated how intelligent they thought each argument was.

Scientifically, which do you think is the better argument? Which course would you take based on what you know? Clearly, if the question is whether you are going to like the class, the statistical evidence is stronger than the testimony of two students, even if they are the highest-performing students in the school. In this research, 18% of 12-year-olds chose the statistical evidence and 42% of 16-year-olds chose this option. Still, the majority at both ages chose the intuitive evidence based on two people’s opinions over the statistical evidence based on 150 students.

This type of choice may reflect the development of two systems of thought, one based on experience and the other on analysis (Kuhn, 2009). Effortless, intuitive thinking based on experience causes many people to make judgments without reflecting on all the possibilities. For example, Jonas plays violent video games but believes that he himself is not an aggressive person. On this basis he disagrees with research on large samples of teenagers showing that those who play these games are more likely than others to be aggressive. This is an example of putting personal experience above scientific thinking. To make a good argument against the research findings, Jonas would need to marshal other evidence based on more than his personal experience. For example, there might be a study in which boys who were aggressive before playing violent video games became more aggressive after playing, but other boys did not. Argument and counterargument, based on evidence, is the essence of the scientific process and develops only with formal operational thinking.

Piaget believed that not everyone reaches the stage of formal operations and that many people remain concrete thinkers all their lives. In one study in England, 14-year-old students tested on the pendulum task in 1976 were compared with 14-year-olds tested in 2007 (Shayer & Ginsburg, 2009). At both times, the majority of 14-year-olds did not reach the level of formal operations on this task, but the percentage who did declined over this time period from 23% to 10% for boys and from 25% to 13% for girls. Formal operational thinking continues to develop through adolescence, so it may be that these students will develop this level of thought later in their development. However, they may not ever develop formal operational thinking. There is some evidence that achieving this level of thought is not the product of maturation but rather is dependent on whether an individual’s education trains him or her to develop it (Artman, Cahan, & Avni-Babad, 2006).

Adolescent Egocentrism

As you recall, Piaget described young children in the preoperational stage as egocentric because they are unable to see things from the perspective of people other than...
themselves. David Elkind proposed that there is a resurgence of egocentrism in early adolescence that is different from that of the preoperational child. According to Elkind, adolescent egocentrism is expressed through what he has called the imaginary audience and the personal fable (Alberts, Elkind, & Ginsberg, 2007).

When Elkind refers to an imaginary audience, he means that young teens believe they are the center of other people's attention in the same way they are the center of their own. Teens may refuse to go to school because their hair looks bad, or they may become self-conscious about the way their body looks. In the young teen's mind, everyone at school will also be very aware of such perceived flaws. Although teens can in fact be very cruel to one another, the chances are that most are more concerned about how they themselves look than about how other people look.

Although the “audience” can be seen as harsh and judgmental, it can also be positive. One teen said “Sometimes when I see a good-looking girl/boy, I think that they are looking at me in a very admiring way” (Alberts et al., 2007, p. 75). Or a teen may be dancing at a party and think everyone is looking at her because of how cool she looks. She is sure all the other people around her are spending a great deal of energy noticing and thinking about her. In these ways the teen, like the preschooler, has difficulty seeing the world from someone else's point of view and realizing she is not the center of the other person's world. Elkind developed the Imaginary Audience Scale to measure this aspect of adolescent egocentrism (Elkind & Bowen, 1979). The following is an example from that scale:

**Instructions:** Please read the following stories carefully and assume that the events actually happened to you. Place a check next to the answer that best describes what you would do or feel in the real situation.

You are sitting in class and have discovered that your jeans have a small but noticeable split along the side seam. Your teacher has offered extra credit toward his/her course grade to anyone who can write the correct answer to a question on the blackboard. Would you get up in front of the class and go to the blackboard, or would you remain seated?

- ______ Go to the blackboard as though nothing had happened.
- ______ Go to the blackboard and try to hide the split.
- ______ Remain seated. (Elkind & Bowen, 1979)

The first answer reflects a willingness to be exposed to the imaginary audience. The second reflects more discomfort, and the third reflects the most discomfort. Elkind and Bowen (1979) found that the highest scores on this scale, indicating acute awareness of an imaginary audience, were found in eighth grade, a time when adolescents are particularly sensitive about their appearance.
A personal fable is a belief held by teenagers that their experiences are unique and different from those of all other people. For example, a girl whose boyfriend has broken up with her may think, “My mother could never understand what I am going through. She could never have felt a love like I felt.” Unfortunately, the personal fable can also be the basis of risky behaviors (Alberts et al., 2007). For instance, a teen may understand the effect of alcohol on reaction time but still believe he is such a good driver that “I can drive drunk and nothing will happen to me.” Or a teen might understand the risks of unprotected sex but still feel that “I won’t get pregnant—that only happens to other people.”

Recently, Martin and Sokol (2011) proposed that the imaginary audience and personal fable represent more than the egocentric focus on the self that we associate with adolescence. We can also see them as adaptations that help the adolescent deal with some of the important developmental tasks of this stage of life. Adolescents are encountering many new interpersonal situations and are understandably concerned about how they will be perceived in them. The imaginary audience gives them the chance to imagine what might happen and anticipate some ways to handle it. The personal fable, with its focus on the uniqueness of the individual, helps prepare the young person for the individuation (or separation) from family that typically comes as the adolescent moves into young adulthood.

Is Formal Operations the Final Stage?

Piaget’s studies led him to the conclusion that the stage of formal operations was the final, highest stage of mental development and, as we have already noted, not everyone reaches it. However, some theorists believe cognitive development can continue to another stage called postformal operations. Although this more advanced stage is beyond the scope of this chapter on adolescence, we briefly introduce it to show that adolescent thinking may not be the highest level of thought.

In the stage of postformal operations, the individual comes to understand that knowledge is not absolute; that is, there is not always one and only one right answer. Through this process, an individual can consider multiple perspectives and reconcile seemingly contradictory information (Labouvie-Vief, 2006). For example, people who agree with the following statements are indicating that they think at the postformal operational level: “I see that a given dilemma always has several good solutions,” “There are many ‘right’ ways to define any life experience; I must make a final decision on how I define the problems of life,” and “I am aware that I can decide which reality to experience at a particular time; but I know that reality is really multi-level and more complicated” (Cartwright, Galupo, Tyree, & Jennings, 2009, p. 185). Clearly the complexity of thought in this stage goes beyond the logical, abstract processes proposed by Piaget in the stage of formal operations.

Check Your Understanding

1. What characterizes Piaget’s stage of formal operations?
2. What is the role of the imaginary audience?
3. What is a personal fable?
4. How do postformal operations differ from formal operations?

Cognitive Processes

The cognitive processes we have examined as they develop earlier in life, including attention, memory, metacognition, executive function, and social cognition, all continue to develop from early to late adolescence.
Attention in Adolescence

When you sit down to read this book or do other academic work, do you have music on, answer text messages, and/or have a TV running in the background? If so, you are like many students who have become so confident in their ability to control their attention that they believe they can attend to several things at the same time. However, research does not support this belief. In fact, our brain can carry out only one thinking activity at a time. When we are multitasking, we really are switching back and forth between tasks. In doing so, we often lose track of our original task and miss whatever is occurring while we make these switches.

One area of great concern is that teens often believe they can use electronic media successfully while driving, switching their attention from the road to their device and back again, but research does not support this belief. Recent studies have shown that teens who talk on cell phones while driving have delayed reaction times to events on the road, weave between lanes, and are much more likely to have an accident. Teens who text message while driving increase their chances of being in an accident even more (Drews, Yazdani, Godfrey, Cooper, & Strayer, 2009). In fact, reaction time for people who either talk or text on a cell phone while driving is slower than the reaction times of drunk drivers (Strayer, Drews, & Crouch, 2006), yet 49% of young adults report they have texted while driving (Tison, Chaudhary, & Cosgrove, 2011). Teens are not the only ones texting and driving. Adults are also setting a model for this type of dangerous behavior when they use technology while driving. In most states, texting while driving is now against the law (Governors’ Highway Safety Association, 2014).

Use of electronic media can also interfere with schoolwork for teens. In one experimental study, adolescents were assigned to one of two groups. One group did homework with soap operas on TV in the background, and the other group did homework without background TV. Those with the TV on took longer to do their work because they were distracted by the programs, and even though the two groups spent the same amount of time actually looking at their homework, the students with TV remembered and understood less when they were tested on it (Pool, Koolstra, & van der Voort, 2003). Pool et al. (2003) argue that the distraction of TV interfered with the students’ ability to integrate all the information from the homework. Consequently, they ended up with a much more superficial understanding of the material and remembered less.

This finding has been confirmed in neurological research. It appears that when we try to do two things at once, we do not use the part of the brain designed for deep processing of information. Instead we use a different part designed for more superficial, rapid processing (Foerde, Knowlton, & Poldrack, 2006). Finally, research on study habits has shown that the students who perform worst on exams are those who study with many distractions: music, television, e-mail, and/or conversations with friends (Gurung, 2005). See the effects of multitasking for yourself by trying Active Learning: Studying and Distractions.
Active Learning

Studying and Distractions

1. Set a goal of reading 10 pages of this textbook when you are likely to have distractions. Note the time that you start reading. Every time you are interrupted, note how long the interruption lasts and write down what the interruption was. Be sure to include when you interrupt yourself by texting someone, getting a snack, making a phone call, looking up at the TV, and so forth. Write down the time you finish reading the 10 pages. Subtract your starting time from your ending time and then subtract the total time of all the interruptions.

2. Now find a time and place to read 10 more pages of this textbook where you are reasonably certain not to be interrupted and will not be tempted to interrupt yourself. Write down the time you start reading and the time you finish the 10 pages. Subtract to find out how long it took you.

3. Compare the results of studying both ways. Was one way more efficient than the other?

Bowman, Levine, Waite, and Gendron (2010) found that students who were interrupted with instant messages while reading a textbook online took much longer to do the same amount of reading than students who were not interrupted. If you are used to studying with the television, computer, and cell phone on, look at your results and decide for yourself whether the interruptions made you slower. You may want to consider putting off your other activities until you have finished studying. The end result is likely to be more efficient studying and more free time for you.

Memory in Adolescence

In Chapter 11, we saw that memory ability improved considerably during middle childhood. Developmental changes continue to occur through adolescence in the way the brain manages working memory. In Chapter 14, we learned that the prefrontal cortex continues to develop, and this area of the brain is central to working memory in adults. However, when working on a memory task, younger teens are more likely to use both the prefrontal cortex and the hippocampus. By age 18, teens use only the prefrontal cortex, as adults do (Finn, Sheridan, Kam, Hinshaw, & D’Esposito, 2010). We can only speculate about the effects of using two areas of the brain instead of the more efficient use of just the prefrontal cortex. This difference may help younger teens be more open to storing information in more different types of situations, thus expanding their accumulation of new knowledge, while at the same time making them less efficient at storing specific information on which they are focusing (Finn et al., 2010).

Much evidence suggests that teens who drink heavily develop subtle differences in cognitive abilities, including a lower ability to use working memory efficiently. However, it also appears that teens who have poorer working memory are more likely to begin drinking heavily (Squeglia et al., 2012). Young teens with lower working-memory ability are also more likely to act without thinking and lack the ability to delay gratification. These teens are more likely to have early and progressively greater alcohol use through adolescence (Khurana et al., 2013).

Metacognition

As children move toward adolescence, they become increasingly able to think about and regulate their own thoughts and cognitive activities. This process is called **metacognition**.
Metamemory specifically refers to the understanding of memory, how it works, and how to use it effectively.

To understand metacognition, think about what happens when you are studying for an exam in one of your courses. You might start by assessing how much you already know about a subject. That helps you determine how much time it will take you to prepare. You don’t want to make a mistake at this step by underestimating how much work you need to do. Next you can consider which strategies you will use to prepare for your exam. You would most likely choose a different approach when studying for an English Literature exam than for a Chemistry final. You continue to evaluate your level of understanding as your studying progresses, to gauge how much more you need to do or to reevaluate the strategies you are using. After you get your grade, you can evaluate the effectiveness of the strategies you used, so the next time you can prepare more effectively or more efficiently.

Each decision you make when directing your own learning is an indication of your level of understanding of how cognition and memory work (Winn, 2004). As adolescents get older they get better at evaluating their own learning accurately (Weil et al., 2013). Studies with students from middle schools (Gaskins & Pressley, 2007) and college (Cano & Cardelle-Elawar, 2004) have shown that students’ performance can be improved when they better understand how their cognitive processes work.

Executive Function

Executive function, the ability to organize and control our thinking and behavior to achieve a goal, continues to develop during adolescence. It is well known that teenagers are prone to engage in risky behavior, and the immaturity of executive function may be one reason. As with working memory, brain development underlies some of the further development of executive function. Further myelination and synaptic pruning, concepts you learned about in Chapter 5, occur in the prefrontal cortex, the area most responsible for executive function (Blakemore & Choudhury, 2006).

In a longitudinal study of teenagers, Boelema et al. (2013) examined three elements of executive function:

1. Control of attention, including focused attention, sustained attention, and inhibition
2. Information processing, including speed of processing
3. Cognitive flexibility, including the ability to shift attention to complete a task, and working memory (Boelema et al., 2013).

They examined Dutch adolescents by testing them at age 11 and then again at age 19 to determine the normative pattern of achievement of these aspects of executive function. They found that each aspect had its own timetable, but all improved over the teen years. Cognitive flexibility showed the most growth during this time, followed by speed of processing, and the smallest change was found in attention variables including inhibition. With the exception of cognitive flexibility, girls generally started at a higher level than boys, but boys went a long way toward catching up as they reached the end of their teen years. For most areas, teens from low-income families started at a lower level than their peers from higher-income families, but they seemed to catch up in the area of sustained attention. For inhibition, which is the ability to control our own behavior, there was even a larger difference between the high- and low-income groups by the end of adolescence.

Another central aspect of executive function is the ability to plan. Planning includes thinking through a task ahead of time and then evaluating the outcomes as you proceed through the task, changing what you are doing as necessary. This has often been assessed...
with the use of the game The Tower of Hanoi, shown in Figure 15.1, in which the goal is to move all the disks to the right-hand rod by moving one disk at a time and never putting a larger disk on top of a smaller disk. Simpler versions of this task have fewer disks to move. Planning ability continues to develop through adolescence (Best, Miller, & Jones, 2009). When working on the Tower of Hanoi task, adolescents spend a longer time than younger children thinking about the problem before they begin moving pieces and are quicker to solve the problem using fewer moves (Asato, Sweeney, & Luna, 2006).

If adolescents are improving their ability to control their thoughts and behaviors to achieve a goal, why is it also true that they have a greater tendency to respond impulsively in many situations? Once again the answer is linked to brain maturation. Dopamine is a neurotransmitter, one of those chemicals that takes messages throughout the brain and nervous system. It helps carry messages of reward to the brain, and it appears that adolescence is a peak period for dopamine's availability and effective functioning (Luna, Paulsen, Padmanabhan, & Geier, 2013). This peak occurs around the same time that teens are most likely to seek immediate rewards, perhaps through risky behaviors (Wahlstrom, White, & Luciana, 2010). It appears that in teens the reward system is heightened while the control system in the brain is still developing.

Some have argued that a certain amount of risk taking in adolescents is important for the development of autonomy and learning about the larger world. Risk taking may have positive effects when it allows the teen to try new and exciting experiences, such as a trip to a foreign country. However, the obvious downside is the temptation to engage in activities that endanger the teen’s safety such as experimenting with drugs or driving too fast.

Risky behavior is even more likely to occur when a teen is with peers than when alone. In a simulated driving experience, teens and adults had to make decisions about whether to stop at a light as it turned yellow (Chein, Albert, O’Brien, Uckert, & Steinberg, 2011). They were told that the faster they completed the course they were driving on, the more money they would receive, but they clearly risked having a crash if they ran the yellow light and this would slow them down even more than stopping. While having their brain function monitored through an fMRI, the participants completed this course once while alone and a second time while being observed by two friends who were in a different room. Adolescents, but not adults, took more risks in their decision making and had more crashes when their peers were observing them. fMRI results indicated a heightened response of the reward system in the brain when teens believed their peers could see what they did. This same result has been found even if the peer is a stranger (Weigard, Chein, Albert, Smith, & Steinberg, 2014).
Creativity

Creativity is central to the ability to move beyond what we know to the realm of possibility. While people of any age can be creative, some of the cognitive changes during adolescence are abilities particularly important for creativity. Being cognitively flexible, being able to think through a task and anticipate the outcome, and thinking hypothetically and abstractly are all essential elements of the creative process. Certain changes in the brain allow for more flexible and creative thinking (Kleibeuker et al., 2013).

Where does creativity fit into our understanding of intelligence? Is it an independent characteristic, or is it closely related to intelligence so that people who are high (or low) on one are also high (or low) on the other? A substantial amount of research has examined the relationship between creativity and intelligence, and a number of studies have found that the correlation is positive but moderately low (Kim, 2005; Wallach & Kogan, 1965). Although a certain amount of intelligence is necessary to be creative, high intelligence is not sufficient by itself.

What do we mean when we talk about creativity? In the 1950s J. P. Guilford proposed that creativity is based on an ability to see multiple solutions to a problem—that is, the ability to use divergent thinking. In contrast, many academic situations require that we come up with one correct solution, which is the result of convergent thinking. Robert Sternberg (2003a) has defined creative thinking as “thinking that is novel and that produces ideas that are of value” (pp. 325–326), and in this sense, we need both divergent thinking to produce new ideas and convergent thinking to narrow the alternative ideas down to the one that is most practical or likely to succeed.

According to Guilford (1950), being able to think divergently requires fluency, which is the ability to find multiple solutions relatively quickly; flexibility, which is the ability to consider multiple alternatives or shift your mind-set; and originality, which is the ability to come up with solutions that are unique. Most of the tests used to measure creativity are based on these ideas. See how Active Learning: Creativity Tests serves to stimulate your own creative thinking.

Active Learning
Creativity Tests

The following items are similar to items used on various tests of creativity. Give yourself a specific amount of time (perhaps 1 or 2 minutes) and provide as many alternate answers to each challenge as you can. You might want to do this activity with a small group of friends so you can observe whether there are substantial differences in the way different individuals perform.

Word fluency
Write as many words beginning with a given letter as you can in a specified amount of time.

Alternate uses
Give as many possible uses for a given item that you can (for example, a brick, a bicycle tire).

Consequences
Give as many consequences as you can for a hypothetical situation (for example, what if we could live underwater? What if animals could talk?).

Making objects
Draw as many objects as you can using only a specific set of shapes (for example, one circle and two squares).

Decorations
Use as many different designs as possible to outline a common object.
Scoring of this type of test is often quite complex, so this activity is simply an opportunity to stimulate your creativity, not to rate the results. How quickly were you able to generate multiple answers that were highly original?

As we discussed in Chapter 12, Robert Sternberg believes there are three types of intelligence—analytical, practical, and creative. Although Sternberg believes schools should foster all three, he also believes classroom teachers undervalue creativity because they presume it is the same thing as general intelligence or they just don’t know how to teach it. He maintains that “to a large extent, creativity is not just a matter of thinking in a certain way, but rather it is an attitude toward life” and that “creative people are creative, in large part, because they have decided [author’s emphasis] to be creative” (Sternberg, 2003a, p. 333). Table 15.1 presents 12 decisions that Sternberg says underlie the decision to be a creative thinker. Can you think of ways that a classroom teacher could help adolescents develop these creative attitudes and mind-sets?

We need to encourage teens to be creative, to experiment and try new things, and to think about situations in fresh ways without being bound to old practices and ideas. We must allow them to try and fail without becoming discouraged. As adults, we can also provide a stimulating environment that exposes them to new experiences, and we can urge them to find a passion and follow it.

**TABLE 15.1 How to foster creative thinking**

<table>
<thead>
<tr>
<th>Decision</th>
<th>Description</th>
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<tbody>
<tr>
<td>Redefine the problem</td>
<td>Don’t necessarily accept things just because others people do. Allow yourself to see things differently.</td>
</tr>
<tr>
<td>Analyze your own ideas</td>
<td>Critique your own ideas and decide whether they are valuable and worth pursuing or not.</td>
</tr>
<tr>
<td>Sell your ideas</td>
<td>Just generating creative ideas is not enough. Because they challenge accepted ways of thinking, they must be “sold” to others.</td>
</tr>
<tr>
<td>Remember that knowledge is a double-edged sword</td>
<td>You cannot be creative without being knowledgeable, but existing knowledge also can hamper or hinder creative thinking.</td>
</tr>
<tr>
<td>Surmount obstacles</td>
<td>You need to be ready to “defy the crowd” and overcome these obstacles.</td>
</tr>
<tr>
<td>Take sensible risks</td>
<td>Rather than providing a safe and conventional answer, be willing to fail by trying new things.</td>
</tr>
<tr>
<td>Be willing to grow</td>
<td>Don’t become so invested in your own original creative ideas that you are afraid to branch out or explore new ones.</td>
</tr>
<tr>
<td>Believe in yourself</td>
<td>Maintain a sense of self-efficacy even when no one else seems to believe in you.</td>
</tr>
<tr>
<td>Tolerate ambiguity</td>
<td>Be willing to tolerate some level of uncertainty while you are waiting to see whether your ideas will pan out or not.</td>
</tr>
<tr>
<td>Find what you love and do it</td>
<td>You are likely to be most creative when doing things you really care about.</td>
</tr>
<tr>
<td>Allow time</td>
<td>Realize that it takes time for incubation, reflection, and selection to develop a creative idea.</td>
</tr>
<tr>
<td>Allow mistakes</td>
<td>Recognize that mistakes will happen, but use them as an opportunity to learn.</td>
</tr>
</tbody>
</table>

These are suggestions Robert J. Sternberg makes that he believes teachers can use in their classrooms to encourage creative thinking.

**SOURCE:** Adapted from Sternberg (2003a, pp. 333–335).
Social Cognition in Adolescence

Social cognition and theory of mind, the ability to understand another person’s thoughts, feelings, and beliefs, become more complex during adolescence in several ways. Anyone who has played poker knows that understanding what goes on in someone else’s mind gets increasingly complicated. A good poker player not only has to figure out what the other players are thinking (“I have a good hand”) but also has to keep in mind that the other players are trying to figure out what she is thinking. If she wants to bluff the others, she must make them think she has different cards than she really does. In other words, she is thinking about their thinking about her thinking. This is called recursive thinking and is an ability that is still developing through adolescence (Corballis, 2006). Figure 15.2 illustrates the way recursive thinking works.

Another way in which theory of mind becomes more complex is through its interaction with executive function, one aspect of which is the ability to inhibit, or stop, a behavior. Dumontheil, Apperly, and Blakemore (2010) gave a computer-based task to children, adolescents, and adults. All were shown a set of shelves with different objects on them, similar to what is shown in Figure 15.3. Although they could see balls of three sizes, a character called the Director could see only the two larger ones. In this task, the Director tells the person to move the small ball to the left. The person must inhibit an egocentric response, which is to move the small white ball, the one he or she can see but the Director cannot. Instead the person must move the green ball, which is the smallest one the Director can see. Dumontheil et al. (2010) found that older teens made fewer errors than younger teens, but more errors than adults. This result provides evidence that the ability to read another person’s mind, even at the level of knowing what they actually see, is still developing through adolescence.

Social cognition and theory of mind have also been related to certain social outcomes in adolescence. For example, adolescents who had shown less ability to understand others’ states of mind during childhood were more likely to become victims of bullies or to become both victim and bully (Shakoor et al., 2012). Therefore, it has been suggested that an important approach to preventing bullying is training in theory of mind. Goldstein and Winner (2012) attempted to promote theory of mind in teens through a 10-month intensive acting program while students in a control group took part in a

**FIGURE 15.2** Recursive thinking

Pictures like this have been used to test whether participants can describe the recursive thinking process. For instance, in the first picture, the boy is thinking about the girl and her father. In the second picture, the boy is thinking that he is thinking about himself. In the third picture, the boy is thinking about a girl thinking about what her father is thinking about her mother.

**SOURCE:** Oppenheimer (1986).
Moral Judgment

As adolescents develop the cognitive ability to think logically and hypothetically, they can think about the consequences of different decisions and this, in turn, affects the way they think about moral issues. As we learned in Chapter 10, Piaget believed moral judgments were based on a child’s level of cognitive development. Lawrence Kohlberg developed and expanded upon Piaget’s ideas.
Kohlberg’s Cognitive Developmental Theory

Kohlberg developed a series of moral dilemmas to assess moral judgment in children of different ages. Based on their responses, Kohlberg named and described stages of moral development. His most famous dilemma is a brief story titled “Heinz and the Drug”:

In Europe, a woman was near death from a rare form of cancer. There was one drug that the doctors thought might save her, a form of radium that a druggist in the same town had recently discovered. The druggist was charging $2,000, ten times what the drug cost him to make. The sick woman’s husband, Heinz, went to everyone he knew to borrow the money, but he could only get together about half of what [the drug] cost. He told the druggist that his wife was dying, and asked him to sell it cheaper or let him pay later. But the druggist said, “No.” So, Heinz got desperate and broke into the man’s store to steal the drug for his wife. Should the husband have done that? Why? (Kohlberg, 2005, p. 214)

Children and adolescents of different ages read this dilemma, and some immediately say Heinz should definitely break in to get the drug while others say it would be wrong to do so. In fact, Kohlberg was less interested in what someone thought Heinz should do than in understanding how they came to their decision. Someone who says he would break in because his wife would be angry at him if he did not is at quite a different level of moral thought than someone who says he would break in because human life is sacred. Likewise, someone who says he would not break in because he might get caught and sent to jail is at a different level than someone who says he would not break in because it is important to respect each other’s property.

Based on these different types of reasoning, Kohlberg described three levels of moral judgment: preconventional, conventional, and postconventional. He divided each level into two stages and these are described in Table 15.2. We describe here the broad outlines of the three major levels.

<table>
<thead>
<tr>
<th>Levels</th>
<th>Stages</th>
<th>Description (the basis for moral judgment)</th>
</tr>
</thead>
<tbody>
<tr>
<td>I. Preconventional</td>
<td>1. Heteronomous morality</td>
<td>Obey the word of authorities and fear punishment</td>
</tr>
<tr>
<td></td>
<td>2. Individualism, instrumental purpose, and exchange</td>
<td>Be fair; take everyone’s self-interest into account</td>
</tr>
<tr>
<td>II. Conventional</td>
<td>3. Mutual interpersonal expectations and conformity</td>
<td>Act so as to be seen as “good” by those around you, in accordance with their expectations, including caring, loyalty, and gratitude</td>
</tr>
<tr>
<td></td>
<td>4. Social system and conscience</td>
<td>Consider the good of society as a whole, maintaining order for the good of all</td>
</tr>
<tr>
<td>III. Postconventional</td>
<td>5. Social contract and individual rights</td>
<td>Understand that the rules of society may differ for different groups and that some values, such as life and liberty, are universal</td>
</tr>
<tr>
<td></td>
<td>6. Universal ethical principles</td>
<td>Follow self-chosen principles of equal rights even when they conflict with society’s rules</td>
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</table>

The first level, preconventional moral judgment, is most characteristic of young children. It is marked by self-interest and motivation based on rewards and punishments. In some circumstances, we all continue to think in these terms. For example, if you are driving faster than the speed limit and you hit the brakes when you see a police car, you are not thinking about the underlying reasons for the speed limit (such as safety or conserving gasoline). You are trying to get somewhere as fast as you can without getting caught breaking the law, and you hit your brakes because you don’t want to get an expensive speeding ticket.

In the second level, conventional moral judgment moves beyond self-interest to take into account the good of those around you. In the first substage, a person bases moral decisions on the moral expectations of important people in his life. Here “trust, loyalty, respect, and gratitude” are central values (Kohlberg, 1987, p. 284). In the second sub-stage, a person makes decisions based more on the expectations of society as a whole. Laws are to be followed because society would break down if everyone disobeyed them. In this stage, a person might respond to the Heinz dilemma by saying Heinz should not break in because if everyone did things like this, our society would be chaotic.

In the third level, postconventional moral judgment moves beyond society as a defining factor of what is moral or right. A person in this stage believes in the human rights of all people, so his or her moral judgments are based on universal principles that apply to all. Often these principles will correspond with society’s rules, but when they don’t, the person still chooses to follow the principles. For example, members of the organization Greenpeace broke the law in May 2014, when they tried to block a Russian oil tanker from offloading its cargo of oil from the Arctic. All were arrested but they felt that their moral principles were more important than the rules of their society. One protestor said, “This tanker is the first sign of a reckless new push to exploit the Arctic, a place of incredible beauty which is melting before our eyes” (Vidal, 2014, para. 7). Read about another situation in which an individual chose to break the law on behalf of what he believed was a higher moral purpose in Journey of Research: Kohlberg’s Life History and His Theory.

**JOURNEY OF RESEARCH**

Kohlberg’s Life History and His Theory

Many times individuals’ life experiences influence the theories they develop and the research they carry out. Lawrence Kohlberg’s research is clearly connected to his life history. Kohlberg served with the U.S. Merchant Marines after World War II. Later, he volunteered to help sail ships that would move Jewish refugees out of Europe to the British-controlled territory of Palestine. In doing so, he was breaking British law, which made it illegal for these refugees to enter Palestine. Kohlberg was captured and held in Cyprus until he was liberated by the Jewish fighting force known as the Haganah. His research in later years focused on how people make decisions about what is right and wrong. As we described above, the highest level in Kohlberg’s theory is one in which a person develops universal moral principles that may or may not conform to what a particular country or group of people believes is right. Can you see how his life experiences shaped his theoretical ideas?

SOURCE: Adapted from Levine (2002).

Like any stage theory, Kohlberg’s seems to suggest that individuals will progress through the levels in a steady and systematic way, but research has shown that this is often not the case. Although these stages are usually described in terms of children’s
development, Kohlberg believed that even adults can remain in the first stage of moral judgment, and many individuals, regardless of their age, do not move beyond the stage of conventional moral judgment.

Some recent research has highlighted the complex nature of our moral reasoning (Nucci & Turiel, 2009). In one set of studies, children and adolescents between 8 and 17 were given a scenario in which the protagonist had been working to save up the money she needed for something she really wanted to do with her friends but was still $10 short. While she is riding on an empty bus, another passenger gets on and drops a $10 bill when getting out the change for the fare. The participant is asked whether the protagonist should tell the other passenger she has dropped the money or stay silent and pick it up and keep it. In a second scenario, participants were asked to decide whether it is acceptable to hit a child who is hitting or hurting another child as a way of stopping the incident.

The responses of the 8-year-old participants looked very similar to those of the 17-year-old participants, but the responses of the 14-year-olds looked very different. Relatively few 8- and 17-year-olds said the protagonist had the right to keep the money dropped on the bus, compared to the number of 14-year-olds who said this. Likewise, more 8- and 17-year olds than 14-year-olds said people had an obligation to intervene if someone else was being hurt.

What is most interesting is the reasoning behind these decisions. The youngest and oldest participants saw these moral dilemmas in a pretty straightforward light, but the 14-year-olds saw them as much more ambiguous, and thus their decision about whether a behavior was right or wrong was more variable. For instance, an 8-year-old said to give the lost $10 back “because it is someone else’s $10 bill, she shouldn’t keep it because it is not hers” and a 17-year old said, “You don’t have the right to steal the money, and this is stealing because you know who dropped that money. It’s not like breaking into someone’s house, but it’s still stealing” (Nucci & Turiel, 2009, pp. 154–155). In both cases the participants were clear on what made the behavior wrong.

In contrast, a 14-year-old said, “He’s got every right to keep the ten dollars, like I said, because it’s in nowhere land. And it’s his, he found it. It’s not in the kid’s house or anything” (Nucci & Turiel, 2009, p. 154). For this 14-year-old, the decision to keep the money is seen as a personal prerogative because it is not clear it will necessarily harm the person who lost the money. If the money is “in nowhere land,” it is there for anyone’s taking. The explanation for these group differences offered by Nucci and Turiel (2009) is that the increasing cognitive abilities during adolescence allow the younger adolescents to consider more of the situational factors when making their decision and this makes the situation more complex and ambiguous for them.

Gender Differences in Moral Thought

When Kohlberg did his original research, he studied only boys. When he did include girls, they tended to perform at a lower level of moral reasoning than the boys. Carol Gilligan believed this occurred because Kohlberg’s theory was gender-biased and reflected a masculine view of morality. Gilligan argued that women do not have a lower level of morality than men but rather have a different type. Her idea was that women base their moral judgments more on what she called the principle of care while men base their judgments on impersonal, abstract justice, which she believed was the basis for Kohlberg’s stages. The perspective that women used to reason about Kohlberg’s moral dilemmas necessarily placed them at a lower level on his stages of moral reasoning. Although Gilligan did much of her research using real-life moral dilemmas, she also set up hypothetical dilemmas, such as the following fable she presented to children:
The Porcupine and the Moles

It was growing cold and a Porcupine was looking for a home. He found a most desir-able cave, but saw it was occupied by a family of Moles. “Would you mind if I shared your home for the winter?” the Porcupine asked the Moles. The generous Moles consented, and the Porcupine moved in. But the cave was small, and every time the Moles moved around they were scratched by the Porcupine’s sharp quills. The Moles endured this discomfort as long as they could. Then at last they gathered courage to approach their visitor. “Pray leave,” they said, “and let us have our cave to ourselves once again.” “Oh no!” said the Porcupine. “This place suits me very well.”


Gilligan believed girls and women would be more likely to respond in terms of everyone’s needs: “Cover the porcupine with a blanket [so that the moles will not be stuck and the porcupine will have shelter]” or “Dig a bigger hole!” (p. 7). Boys would be more likely to respond in terms of absolute right and wrong: “The porcupine has to go definitely. It’s the moles’ house” (p. 7).

Although several studies have reported such gender differences, the majority have found that both boys and girls think about morality from both the justice and the care perspectives (Jaffee & Hyde, 2000; Walker, 2006). Neither boys nor girls are consistent in the perspective they bring to resolving moral dilemmas, and the nature of the dilemma itself is the determining factor in which perspective they adopt (Walker & Frimer, 2009). In fact, Kohlberg’s original findings that men were more moral than women also have not been borne out. In more recent research, the only gender differences found in Kohlberg’s stages of moral reasoning have tended to favor girls, although these differences vary from country to country (Gibbs, Basinger, Grime, & Snarey, 2007). The major conclusion we can draw at the present time is that there is no clear gender difference in moral reasoning.

Cultural Differences in Moral Thought

Kohlberg believed the same stages of moral development he found in the United States would be found in cultures around the world. A review of studies carried out in 75 different countries found evidence for the universality of the move from preconventional to conventional morality (Gibbs et al., 2007). However, the universality of the move from conventional to postconventional moral reasoning has been much more controversial. Some have argued that the postconventional stage is reflective of Western and urban values. Which values represent the highest level of moral reasoning may differ from one culture to another, depending on the particular values of the culture. For example, in one study that compared Korean and British children, the researchers found that a concept Koreans refer to as *chung* could not be scored according to Kohlberg’s method. *Chung* is a central value in Korean society that translates as an emotional bond between people in which “the boundary between individuals was dimmed and a sense of one-ness, same-ness, affection, comfort, acceptance and so forth emerged” (Baek, 2002, p. 387). One example of how *chung* affects moral judgment comes from a 16-year-old Korean child’s response when asked whether Heinz should steal the drug for his wife even if he didn’t love her:

Even though he doesn’t love her, he should steal the drug. It is said that husband and wife live together based on *chung* rather than love. They (Heinz and his wife) might also have *chung* between them since they have been together for a long time.

(Baek, 2002, p. 384)
Although there are some cultural similarities, cross-cultural differences at the higher levels of moral thought may be the reflection of a Western bias in the way we assess moral reasoning rather than by any true differences in the level of moral reasoning in different cultures.

Moral Thought and Moral Action

Would you describe yourself as an honest person? Do you help others whenever you can? People often believe their behavior mirrors their values. In other words, they adopt a trait approach to understanding morality (Doris, 2002). They see themselves as a moral person and believe they act based on that morality. However, a substantial amount of research has shown there is only a moderately strong link between moral judgment and moral behavior (Hardy & Carlo, 2011), suggesting that morality is more state-like than trait-like because any number of situational factors affect how likely it is that we behave in accordance with our moral values or beliefs.

When you are given a hypothetical moral dilemma, you are largely free of situational constraints that might influence your actual behavior, but real life is filled with them. For example, divinity students were told they were going to give a practice sermon. Some were told to talk about the Good Samaritan who helped others in a time of need, while others were given unrelated topics. Then some students were told they were going to be late for their sermon, and some were not. On the way to deliver the sermon, each divinity student saw a man who appeared to be in pain and needed help. What do you think determined whether a student stopped to give help? The students’ actual behavior was determined less by whether they had just been thinking about compassion and the Good Samaritan than by whether they were going to be late to give their sermon or not (Darley & Batson, 1973). These results clearly show how the constraints of the real world affect our moral behavior, even when we know what is the right thing to do.

Check Your Understanding

1. Describe the three levels of moral judgment in Kohlberg’s cognitive developmental theory.
2. According to Gilligan, how does the nature of boys’ and girls’ moral judgment differ?
3. What evidence is there that Kohlberg’s stages of moral judgment are or are not universal?
4. Describe the relationship between moral thought and moral action.

The Language of Teenagers

We now move from the topics of moral reasoning and moral behavior to a very different aspect of cognitive development: language. In one sense adolescent speech becomes more adult-like in that sentences are longer and grammar is more complex. However, adolescents are also more likely to use slang or made-up words, especially when talking among themselves. They may do this for fun, to bond with a particular group, or simply to identify with being an adolescent. Teens often change the meaning of a word to its opposite: That’s sick comes to mean it’s really good (Karmiloff & Karmiloff-Smith, 2001). Shortcuts may be developed. The very polite Hello, how do you do? becomes ‘sup? Adolescent slang sometimes catches on with the wider society and becomes part of the way everyone talks (Ely, 2003).
We were going to include a list of teen slang words here but realized that slang changes so fast that they would likely be outdated by the time this book was published. Instead, if you are not far beyond adolescence yourself, think about which words you use with your friends but not with older people, like your parents. Do you have any idea about the origin of those words? Were you using different words when you were in high school or middle school? Is the slang you use particular to the area of the country in which you live or to a particular group to which you belong? Different regions of the country and different subgroups within the country develop their own particular slang. For example, teens from Nebraska are less likely than teens from California to use slang pertaining to surfing.

In recent years, teens’ written language has been influenced by electronic communication, such as texting. Teens report sending a median of 60 texts a day, with older teens between ages 14 and 17 sending 100 texts a day, which far outdistances any other form of daily communication they use (Pew Internet & American Life Project, 2012). Since communicators try to make interactions as efficient as possible, they have developed shorthand methods, such as substituting the well-known **LOL** for *laugh out loud* and **u** for *you*. Try **Active Learning: Textisms** to see which ones you know.

### Active Learning

**Textisms**

Which of the following textisms can you translate?

1. **TYVM**
2. **WE**
3. **OATUS**
4. **IIRC**
5. **IM HO**
6. **NP**
7. **WBU**
8. **ROFL**
9. **OTO H**
10. **SFSG**

**Answers:**

Although some have expressed concern that the continual use of texting abbreviations will negatively affect a young person’s ability to spell or write Standard English, this does not appear to be the case (Varnhagen et al., 2010). When a group of college students who were regular users of “text speak” were compared to other college students who were not, there was no significant difference between the groups on tests of their literacy level or ability to correctly spell words they abbreviate when texting (Drouin & Davis, 2009). However, both frequent texters and those who did not frequently text *thought* that texting would hurt their ability to use Standard English. These shortcuts do occasionally sneak into students’ written school papers, so it is important for students to learn when it is appropriate to use them and when it is not.

While teens who communicate with others online do no more writing than other teens, the situation is different regarding blogging. About 28% of teens maintain a personal blog (Rideout et al., 2010), and blogging appears to promote more writing among teens. Of those who have a blog, 47% write outside of school assignments for their own personal reasons, while only 33% of teens without blogs do so. In addition, 65% of bloggers believe writing is important for their later success, while only 33% of nonbloggers have this belief (National Writing Project, 2014).
Teens may not be negatively affected by texting, but their overall level of writing skills remains relatively low. As shown in Figure 15.4, in 2011, only 27% of students at grades 8 and 12 were able to write at or above the proficient level on the National Assessment of Educational Progress (NAEP), with girls scoring higher than boys and those in suburban areas scoring higher than those in urban and rural areas (National Center for Education Statistics, 2012).

University and business leaders alike are concerned about the number of high school graduates who do not have good writing skills. A survey conducted in 2004 by the National Commission on Writing gathered information from the human resource directors of 120 major U.S. companies. Half the respondents said they take writing into consideration when hiring an employee (especially salaried employees) and that an applicant who submits a poorly written application might not be considered for any position. They also reported that two thirds of salaried employees have some responsibility for writing as part of their job and that communicating clearly plays a role in promotion and retention. One respondent to the survey succinctly said, “You can’t move up without writing skills” (p. 3). The National Commission on Writing concluded that employees’ writing deficiencies cost U.S. businesses as much as $3.3 billion a year. Although teens may have their own ways of talking and writing, when they enter the business world they need to have a good set of language and writing skills if they expect to be successful.

Check Your Understanding
1. How is teenagers’ speech different from that of adults?
2. How is texting affecting teens’ literacy skills?
3. Why are good writing skills still important for teenagers?

Adolescent Cognitive Development in Context

So far in this chapter, we have discussed the development of basic cognitive skills, such as attention and memory, as well as academic skills such as writing. However, cognitive development takes place within certain contexts, and in this section we discuss the roles played by schools, parents, peers, and community in promoting or inhibiting cognitive development for adolescents.

The Role of Schools

School is the context in which formal instruction promoting cognitive development occurs in adolescence. A major transition in the lives of young adolescents is the move from elementary school to middle school. This typically occurs when the child is 11 or 12 (grades 6–8). It is usually considered the most stressful school transition students experience (Grills-Taquechel, Norton, & Ollendick, 2010; Martinez, Aricak, Graves, Peters-Myszak, & Nellis, 2011).
At the same time that they are dealing with the bodily changes associated with puberty, young teens must also move from a school in which they spend most of their day with one teacher and one group of peers to a middle school in which they must negotiate interactions with many different teachers and a much larger peer group (Eccles, 2004; Ryan, Shim, & Makara, 2013). Suddenly they are no longer the oldest in their school but the youngest, and the influence of older teens may or may not be beneficial. Their contacts with a larger number of peers often result in shifts in their friendships. The workload and academic expectations usually increase significantly, and teens are expected to be more independent in managing their work.

Some of the exciting changes of middle school include more choice in classes, more school-based activities such as student government, and more after-school activities including sports and the arts. Although young teens can thrive during the time of this transition, for some it is a time of decreased academic motivation and lower achievement. Similar issues arise when teens transition to high school.

**Vulnerable Populations**

In this section, we describe some of the students who are more at risk of poor academic performance during middle and high school for a variety of reasons.

**Minority and Low-Income Students**

Young adolescents from low-income or ethnic minority families, especially boys, are particularly at risk during the transition from elementary to secondary education (Moilanen, Shaw, & Maxwell, 2010; Serbin, Stack, & Kingdon, 2013). These students have generally developed fewer of the academic and social skills needed for success before they enter middle school, and they often have less support from family and others in their environment. However, when low-income and ethnic minority boys have developed these skills and have the support they need, their performance does not necessarily suffer as they enter middle school (Serbin et al., 2013). School programs can also help. In one high school, Latino males entering ninth grade were paired with seniors who provided support and meaningful connections in the school environment. The graduation rate of this group rose to 81%, while students in a control group had a graduation rate of only 63% (Johnson, Simon, & Mun, 2014).

**Low-Performing Students**

In most high schools, students are separated based on their abilities and high-achieving teens generally have a very different experience from low-performing students. School accelerates their learning, while those in the lower tracks often find their learning slowing down (Hallinan & Kubitschek, 1999). In Chapter 12, we described a number of problems associated with ability tracking in elementary grades. Many of those problems apply as well to the tracking that occurs in high schools. Students in the lower tracks often have teachers with fewer qualifications and may get a watered-down
Curriculum. They are more likely to see school as less valuable to them and are less active in the school (Eccles & Roeser, 2009). Peers in these classes are also more likely to be disconnected from school, which can lead to discipline problems. The most experienced teachers are likely to make sure they are not assigned to these classes but rather to advanced classes which are more gratifying for them to teach (Eccles & Roeser, 2009). Placement in the lower tracks can have an influence on the rest of teenagers' lives, because it is an important factor that affects whether they eventually attend college.

**Adolescents With Specific Learning Disorder**

Problems that arise in the elementary school years can persist and become worse as children with specific learning disorder move into adolescence. Research that looked at the way adolescents with dyslexia coped found some important and interesting gender differences (Alexander-Passe, 2006). Girls were more likely to try to find ways to make themselves feel better about the situation. For instance, they were more likely than boys to try to avoid the tasks at hand or to distract themselves from their problems by socializing with friends rather than studying. In contrast, boys were more likely than girls to attack the situation directly in an attempt to deal with it. They showed persistence and hard work and tried to analyze their past attempts to figure out what went wrong and could be corrected in the future. In this study, being dyslexic had a greater effect on the academic and general self-esteem of girls than it had on the self-esteem of boys, and girls reported higher levels of depression. Similar patterns of gender differences in coping have been found in other research (Greenglass, 2002).

You will remember from Chapter 14 that problem-focused coping can be an effective strategy when stress is caused by a situation that you can realistically change. Research conducted in Australia has shown that coping interventions can help adolescents with specific learning disorder develop a stronger sense of control over their situation and increase their use of coping strategies such as working hard and engaging in active problem solving (Firth, Frydenberg, & Greaves, 2008). A particularly encouraging note comes from a study that followed a group of students with learning disorders from age 10 into young adulthood (Seo, Abbott, & Hawkins, 2008). Across a number of outcomes, including postsecondary school attainment, rates of employment, amount of earned income, and receipt of public assistance, there were no significant differences between students with learning disorders and their peers except that the former were more likely to be receiving public aid at age 21 (but not at age 24).

While not all research on students with specific learning disorder has found such positive adult outcomes (for example, Zadok-Levitan & Bronz, 2004), when young people are proactive in dealing with their condition, set goals for themselves, are self-aware and emotionally stable, and have good social support, they can be highly successful (Goldberg, Higgins, Raskind, & Herman, 2003; Seo et al., 2008). Many colleges offer support services, such as untimed tests or note-taking services, for students with identified disabilities. You may want to explore the services available on your campus for these students.

**Girls and the STEM Disciplines**

When we talk about poor academic achievement, we don't usually think of girls as a vulnerable population. On average, girls do well in school, often outperforming their male classmates, but the one area in which they continue to lag regarding interest and involvement is the STEM disciplines—science, technology, engineering, and math. Women earn 60% of all bachelor's degrees but only 20% of degrees in the STEM fields (St. Rose, 2010), with the smallest numbers (18%) in Engineering and Computer Science (National Science Foundation, 2013).
The academic choices girls make that set them on a career pathway leading away from STEM careers begin early and persist and strengthen as they move into adolescence. High school girls are more likely than boys to say their goal in life is to help people, but they don’t see the STEM fields as a way to do so (Hill, Corbett, & St. Rose, 2010). In general, girls tend to see science as a solitary profession and link it with violence and “blowing things up” (Miller, Slawinski Blessing, & Schwartz, 2006), and they connect both these things with being male. With few women professionals in these STEM fields, girls also lack models and mentors to encourage them to pursue careers in the sciences (Blackwell, 2010; Else-Quest, Hyde, & Linn, 2010). As one young woman interested in engineering stated, “It’s intimidating being a girl who wants to go into the engineering field when it is definitely a male-dominated career” (Britsch, Callahan, & Peterson, 2010, p. 13).

For many years we attributed the shortage of women in these fields to lower ability and less interest in science and math, but we now have a very large body of research showing that girls do just as well as boys and take just as many science and math classes in high school as boys, although the particular courses vary. For instance, girls are more likely than boys to take biology, while boys are more likely than girls to take physics and engineering (Hill et al., 2010; National Science Foundation, 2012; Planty, Provasnik, & Daniel, 2007). Mathematical ability as measured by standardized tests is not significantly different in elementary school (Kenney-Benson, Pomerantz, Ryan, & Patrick, 2006; Lachance & Mazzocco, 2006), and girls frequently earn better grades in math classes than boys in elementary school and in high school (Kenney-Benson et al., 2006), although they do perform slightly more poorly than boys on “high stakes math tests,” including the SAT, the ACT, and advanced placement exams (Hill et al., 2010, p. 5). Later, we discuss a concept called stereotype threat that may help explain why this is the case.

The one area of ability in which there are small but significant cognitive differences that favor boys is in spatial relationships, and it has been argued that this difference is wired into the brains of boys and girls before birth. Traditionally, boys have performed better on several aspects of spatial relationships including mental rotation. The type of test used to assess this ability is shown in Figure 15.5 (Voyer, Voyer, & Bryden, 1995). However, we know our brains continue to develop in response to our experiences. Terlecki, Newcombe, and Little (2008) demonstrated that training girls on spatial skills using computer games such as Tetris, that are based on shapes, could produce large improvements in their abilities in this area, and Tzuriel and Egozi (2010) found that specific training on spatial skills erased gender differences in mental rotation in
first graders. Boys may have some initial genetic advantage in this area, or it may be that young boys gravitate toward activities that train those areas of the brain, such as playing with blocks. In either case, training can improve girls’ performance significantly.

Despite our understanding that ability level does not clearly differentiate boys from girls, the idea that boys are better than girls at math persists (Else-Quest et al., 2010). Girls buy into the misconception that girls are not as good at math as boys starting long before adolescence. In one study, second-grade girls thought they were better at math than boys, but by fourth-grade they believed boys were better at it (Muzzatti & Agnoli, 2007). One consequence is that girls whose math ability is equal to that of boys perceive themselves as less skilled and are less likely to choose a career they believe requires that skill (Correll, 2004; Hill et al., 2010).

Where do these mistaken ideas come from? In large part, they come from the girls’ social environment, including what happens in their school classrooms. There is evidence that within the school environment, girls are treated differently than boys, especially in science and math classes, in ways that subtly devalue their ideas and contributions. For example, when girls achieve at the same level as boys in math, teachers tend to attribute their success to hard work, while they attribute boys’ success to ability (Espinoza, da Luz Fontes, & Arms-Chavez, 2014). Despite a great deal of attention given to these issues in 1995 when Myra and David Sadker wrote their book Failing at Fairness: How Our Schools Cheat Girls, a follow-up book called Still Failing at Fairness published in 2009 by Sadker and Zittleman reported that unequal treatment of boys and girls in the classroom remains.

Ideas about gender and math are also reinforced by the media. In one study, college women were shown either neutral commercials or commercials that promoted the stereotype that women are worse at math and science than men. When they were then asked to choose a career area, women who saw the stereotyped commercials were more likely to choose careers that did not involve math and science than those who saw the neutral commercial (Davies, Spencer, Quinn, & Gerhardtstein, 2002). One successful intervention designed to displace these incorrect ideas taught girls that the brain is like a muscle that will grow when it is exercised rather than something that is fixed and unchangeable. When girls received this intervention, the gender gap on standardized tests in math disappeared (Good, Aronson, & Inzlicht, 2003). This new understanding of how the brain works countered the stereotype that girls are just not good at these subjects. Peers can also support a girl’s interest in science and math. Girls who have friends who do well in school are more likely to take advanced math classes themselves (Crosnoe, Riegle-Crumb, Field, Frank, & Muller, 2008).

The math anxiety that many girls experience is linked to the idea of stereotype threat. This notion suggests that when girls take a difficult math test, like the SAT, ACT, or an advanced placement exam, they become anxious because they begin to think they are proving the negative stereotype about girls and math to be correct. Anxiety and high math performance do not go well together because anxiety decreases the working
memory needed to carry out mathematical tasks (Schmader, 2010), and consequently, girls’ performance goes down. However, when girls are specifically told that a test has not shown any gender differences in the past, their performance remains equal to, or even better than, that of boys as shown in Figure 15.6 (Good, Aronson, & Harder, 2008). The effects of stereotype threat are found even for performance on the spatial ability tests we described above. When young women in college were reminded of being female, they did much worse than young men on this test. However, when they were reminded that they went to a select private college they did significantly better than the women who had been reminded about their sex (McGlone & Aronson, 2006). There is some question whether stereotype threat operates the same way for women from all ethnicities. In the study by Good et al. (2008) the effects of manipulating stereotype threat were found only for Anglo American students, but not for Asian American, Hispanic American, and African American students.

Girls are often unaware of the stereotypes they believe. Unconscious stereotypes have been assessed by implicit association tests (Greenwald, Poehlman, Uhlmann, & Banaji, 2009) which measure the strength of the automatic associations you make between concepts. You can try a brief version of this test by doing Active Learning: Implicit Associations Test. In a study of 34 countries, implicit associations between science and gender predicted sex differences in science and math achievement in eighth-grade students (Nosek et al., 2009). In another study, girls as young as 9 were already showing implicit gender-based stereotypes about math ability. Middle school girls showed stronger implicit association between gender and math ability than boys did and the strength of this association was related to the adolescent’s intentions or preference to take math classes and to their actual achievement in math (Steffens, Jelenec, & Noack, 2010).

When given a difficult test in math, Anglo American women who were told that there were no gender differences for this test did better than men and better than women who heard instructions emphasizing that they were taking a test of mathematics ability.

**SOURCE:** Good, Aronson, & Harder (2008).
Active Learning
Implicit Associations Test

Make cards with the following category words on them:

- math, arts, female, male

Now make cards with the following words:

- math, poetry, algebra, art, geometry, dance, calculus, literature, equations, novel,
- female, woman, girl, she, lady, male, man, boy, he, sir

1. Put the category cards with the words math and male together on your left and the cards with arts and female together on your right. Put the rest of the cards in a pile in front of you.

2. For each card in front of you, think quickly about which of the two piles the card would best fit in and place the card on the left-hand pile or on the right-hand pile. Time yourself as you sort these cards to the left or the right as you think they belong.

3. Now take back all the cards into a pile. Put the category cards with the words math and female on your left and the cards with arts and male on your right.

4. Again, time yourself as you sort the rest of the cards either left or right as you think they belong.

Did it take longer to do one of these sorts than the other? If you implicitly associate female with arts and male with math, it is easier and therefore quicker to sort each card in your pile into these combined categories than into the pairs associating the categories of math with female and arts with male.

You can find an online version of this test at https://implicit.harvard.edu/implicit.


Risk and Success in High School and College

We have described a number of groups who are at risk during their high school years. We now examine the outcomes for those at risk and those who thrive. A teen’s life trajectory is strongly influenced by whether the teen drops out of high school, completes high school but doesn’t go on to college, or continues on and completes college.

High School Dropouts

In 2012, about 7% of high school students dropped out of school without receiving a diploma or equivalency certificate. This is a decline from a 17% dropout rate in the 1970s, and we can see in Figure 15.7 that the percentage of students who drop out has declined for all racial and ethnic groups studied. Another bit of good news here is that one study found 63% of students who drop out of high school go on to eventually pass their GED (General Educational Development test) within 8 years of their original anticipated graduation date (National Center for Educational Statistics, 2004a). However, even with these improvements, the statistics mean that 1.1 million students did not graduate with their class (Rumberger, 2013). It is in everyone’s interest to find ways to keep these students in school so they successfully complete their education sooner rather than later. Also, it is
important to note that these statistics do not include people who are incarcerated. As one in ten black males age 18–24 is in prison, this changes the numbers significantly for that group (Heckman & LaFontaine, 2010).

Researchers have examined school records to determine whether there were developmental pathways that distinguished high school graduates from dropouts (Hickman, Bartholomew, Mathwig, & Heinrich, 2008). The differences they discovered are what we might expect. Students who eventually dropped out of high school performed more poorly on standardized tests and received lower course grades than graduates, had higher levels of grade retention and absenteeism, and had more problem behaviors. More surprising was the origin of these differences. They began in kindergarten and persisted throughout elementary school, with the gap between future dropouts and their peers who would graduate on time widening as the students moved into middle school and continued into high school. These findings suggest that programs of early intervention, such as Head Start, do not start too early because the origins of eventual school dropout arise very early in a child’s school career.

Although the dropout rate has been declining, there still is reason to be concerned about it and to look for ways to reduce it further. Young people who do not complete high school are ill-equipped for employment in today’s marketplace. They are more likely to be unemployed than high school graduates, and when they are employed, they earn less and hold jobs with less occupational status (Child Trends, 2013a).

The dropout rate has been steadily declining over the past 50 years. This is especially important because employment is much more dependent on higher education than it was in the past. The dropout rate for Hispanics is inflated because it includes a large number of immigrants in this age group who never attended school in the United States.

**NOTES.** * The status dropout rate measures the percentage of young adults aged 16 to 24 who were not enrolled in school and had not received a high school diploma or obtained a GED. This measure excludes people in the military and those who are incarcerated, but includes immigrants who never attended U.S. schools.

**Due to changes in the race categories, estimates from 2003 are not strictly comparable to estimates from 2002 and before. After 2001, the Black race category includes Hispanics.
Non-College-Bound Adolescents

In 1988, the American Youth Policy Forum drew attention to another group of students they called the **forgotten half** who may be at risk in a different way. These are high school students who **do** graduate from high school but who do not continue their education by going to college. Because slightly more than two thirds of high school students go to college today, this group may now have become the “forgotten third,” but it still represents a substantial portion of high school students (NCES, 2013). The American Youth Policy Forum (2014) stated that these high school students were being shortchanged by the school system because they were not adequately prepared for the transition from school to work (see also America’s Promise Alliance, 2009).

While higher education is still a pathway to prosperity for many young people, the fact that only 4 in 10 young adults obtain either an associate’s degree or a bachelor’s degree before they reach their mid-20s means college cannot be the only pathway. One reason so many students drop out of school is that they cannot see the connection between what they are studying and opportunities in the workplace (Symonds, Schwartz, & Ferguson, 2011).

Most European countries place a much greater emphasis on vocational education than the United States does. European students who do not plan to go to college enter apprenticeship programs that provide “a multi-year sequence of work-based and school-based learning opportunities providing formal certification of participants’ competence” (Hamilton & Hamilton, 1997, p. 1) at the end of their training. Employers in Europe make this investment in training young people because they know it will make a highly qualified workforce available to them. Figure 15.8 shows the percentage of adolescents in various European countries who participate in these programs. There are few programs like this for students in the United States.

The School-to-Work Opportunities Act of 1994 created school programs that supported non-college bound students in the United States in their transition from school into productive careers (Hamilton & Hamilton, 1999) by providing information about careers and a range of work-related experiences. This approach allowed students, regardless of their eventual level of education, to make better informed decisions as they move through the educational system. A review of research on these programs found that although school-to-work programs did not raise grades, they did reduce dropout rates and increased college enrollment. The programs helped students think about their future plans and develop skills useful in the workplace. However, this program’s funding expired in 2001 and was not renewed. Although the American Recovery and Reinvestment Act of 2009 provides some funding that might include school-to-work programs, it does not mandate the creation of these types of programs (American’s Future Workforce, 2013).

A report from the Harvard Graduate School of Education, titled *Pathways to Prosperity*, estimates that **nearly half the 14 million jobs that will be created by 2018 will go to people with an associate’s degree or occupational certificate** (Symonds et al., 2011). The report concluded that a high school diploma is essential and college is desirable but “[t]he lessons from Europe strongly suggest that well-developed, high-quality vocational education programs provide excellent pathways for many young people to enter the adult work force” (p. 38).
An evaluation of the effectiveness of various types of school-to-work transition programs found that cooperative education programs that combine classroom education and work experience, school enterprise programs that provide goods or services within the school environment, and internship/apprenticeship programs were positively related to employment for men (Neumark & Rothstein, 2005). The benefits for women were less clear, but internship/apprenticeship programs did have a positive effect on earnings.

**College-Bound Students**

Not all high school students are struggling. In fact many are thriving. According to the Federal Interagency Forum on Child and Family Statistics (2013b), in 2009, three quarters of high school graduates had successfully completed Algebra II, over a third had taken a mathematics course in analysis/precalculus, and over two thirds had taken at least one course each in biology and chemistry. During the 2009–2010 school year, over 1.8 million high school students took at least one advanced placement course (Aud, KewalRamani, & Frohlich, 2011). Students who receive a score on an advanced placement exam that exceeds a required minimum can use the course to fulfill a degree requirement in their college coursework. Slightly more females (56%) than males take advanced placement tests, although more males than females (61% versus 54%) receive a score above the required minimum.
About two thirds of high school graduates enroll in college in the fall immediately following their high school graduation (NCES, 2013a). From the high school graduating class of 2013, 68.4% of women and 63.5% of men were attending college in the fall. The enrollment rate by race/ethnicity was: Asian: 79.1%, White: 67.1%, Black: 59.3%, Latino: 59.9% (Bureau of Labor Statistics, 2014a).

Ideally, everyone who is intellectually capable should have the opportunity to attend college. However, some groups of students receive better preparation than others. Fewer than half those who take the SAT are prepared to succeed in college, a number that has not changed since 2009 (The College Board, 2013). Not being at this level of readiness can slow—or even derail—a student’s college career. Fifty-four percent of students who achieved a benchmark level of achievement on the SAT completed college in 4 years, while only 27% of those who didn’t meet this level graduated in 4 years. It is apparent that SAT scores are linked to family income, as shown in Table 15.3. Although these tests are good predictors of academic performance in college, high school grades have been found to be even better, especially for minority and first-generation students (Hiss & Franks, 2014) so many colleges are dropping the SAT and ACT as major admissions requirements.

**TABLE 15.3 SAT scores for college-bound seniors by family income, 2013**

<table>
<thead>
<tr>
<th>Family income</th>
<th>Reading</th>
<th>Math</th>
<th>Writing</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>$0–$20,000</td>
<td>435</td>
<td>462</td>
<td>429</td>
<td>1326</td>
</tr>
<tr>
<td>$20,000–$40,000</td>
<td>465</td>
<td>482</td>
<td>455</td>
<td>1402</td>
</tr>
<tr>
<td>$40,000–$60,000</td>
<td>487</td>
<td>500</td>
<td>474</td>
<td>1461</td>
</tr>
<tr>
<td>$60,000–$80,000</td>
<td>500</td>
<td>511</td>
<td>486</td>
<td>1497</td>
</tr>
<tr>
<td>$80,000–$100,000</td>
<td>512</td>
<td>524</td>
<td>499</td>
<td>1535</td>
</tr>
<tr>
<td>$100,000–$120,000</td>
<td>522</td>
<td>536</td>
<td>511</td>
<td>1569</td>
</tr>
<tr>
<td>$120,000–$140,000</td>
<td>526</td>
<td>540</td>
<td>515</td>
<td>1581</td>
</tr>
<tr>
<td>$140,000–$160,000</td>
<td>533</td>
<td>548</td>
<td>523</td>
<td>1604</td>
</tr>
<tr>
<td>$160,000–$200,000</td>
<td>539</td>
<td>555</td>
<td>531</td>
<td>1625</td>
</tr>
<tr>
<td>More than $200,000</td>
<td>565</td>
<td>586</td>
<td>563</td>
<td>1714</td>
</tr>
</tbody>
</table>

This table makes it very clear that family income correlates with SAT scores. What do you think might account for this correlation?

Like the transition from elementary school to middle school or the transition from middle school to high school, the transition from high school to college can be stressful, and for many of the same reasons. College students usually have a great deal more autonomy than high school students, and many are living away from home for the first time. Despite their course work in high school, students may not have the academic preparation they need to be successful (Venezia & Jaeger, 2013). The skills and attitudes required to be successful in college are “habits of the mind” that include “critical thinking, an inquisitive nature, a willingness to accept critical feedback, an openness to possible failure, and the ability to cope with frustrating and ambiguous learning tasks” (Venezia & Jaeger, 2013, p. 120). Although older adolescents are capable of these things, as college students, they may find it difficult to meet all these expectations.

There are various ways of measuring college completion, but one of the most common is the 6-year-completion rate. This is the percentage of first-time undergraduate students at 4-year institutions who complete all their requirements for a bachelor’s degree within 6 years. In 2011, the completion rate for 4-year institutions was 59% (NCES, 2013a). There was variability among different types of institutions; private nonprofit institutions had the highest completions rates (65%), and private for-profit institutions the lowest (42%). Not surprisingly, the most selective institutions had the highest completion rate (88%). The overall rate was higher for females than for males (61% versus 56%). At 2-year institutions the completion rate for an associate’s degree within 3 years was 31%.

Completion rates are important because students who drop out of college often end up with significant education-related debt but none of the benefits they hoped for from a degree. Most college campuses devote considerable resources to their student support services. Efforts prior to college admission that help ensure students are well prepared for the demands of college, together with having given thought to the fit between their needs and the characteristics of the campus they have chosen, can help boost the likelihood that incoming students will be successful in college.

The Role of Family

The important people in our lives, including our friends and family, provide another crucial context for cognitive development during adolescence. Parents provide the structure and routine that supports achievement, are important role models for their children, and instill values and set expectations related to academic success (Roche & Ghazarian, 2012; Wang & Sheikh-Kahlil, 2014).

Effective parenting can occur in any type of family, but some family structures create added stress for parents and their children. These stresses, in turn, can interfere with children’s focus on academics and parents’ ability to support their child’s efforts in school. As we described in Chapter 13, adolescents growing up in single-parent families formed by divorce are twice as likely as those with two parents to leave school before high school graduation (Martin et al., 2004). They are less than half as likely to attend college (Elliott, 2009) and less likely to complete college if they do begin (Biblarz & Gottainer, 2000).

Parenting style also relates to children’s achievement in school. In Chapter 10, we learned about four types of parenting style as described by Diana Baumrind (2013)—authoritative, authoritarian, permissive, and disengaged—each of which has a different balance of control and warmth. Adolescents raised by authoritative parents, who not only are loving but also give structure and set limits, have higher achievement orientation than children raised with other parenting styles; that is, they are more motivated to learn and do well in school and less likely to drop out during high school (Aunola, Stattin, & Nurmi, 2000; Blondal & Adalbjarnardottir, 2014; Pong, Johnston, & Chen, 2010; Spera, 2005).
Part VI  Adolescence

A good deal of cross-cultural research has found that cultural background affects how adolescents see their parents’ behaviors and the impact those behaviors have on them. In collectivist cultures, greater amounts of control and the expectation that children will unquestionably obey their parents fits well with cultural values and expectations (Rudy & Grusec, 2006). Consequently, these parental behaviors may not have the same negative impact that they often have on adolescents in Western cultures.

Parents’ views of their children’s ability also are an important influence on the way children assess their own abilities (Tiedemann, 2000). In a way, parental beliefs can become a type of self-fulfilling prophecy for their children’s behavior. To illustrate this point we return to our earlier discussion of girls’ beliefs about their ability to do well in math and science. If parents see girls as less capable in math, their daughters, in turn, may begin to see themselves in that way and come to believe they are less capable. This may lead them to exert less effort or express more dislike for math, and the parents’ prophecy is fulfilled when their daughters then perform more poorly. For instance, when parents offer uninvited help with their daughters’ math homework, the girls are more likely to perceive their math abilities negatively (Bhanot & Jovanovic, 2005). Uninvited help unintentionally conveys the message that parents do not see girls as capable of doing this homework on their own. Parents, just like teachers (Espinoza et al., 2014), tend to attribute their daughters’ success to the girls’ hard work and their sons’ success to both talent and effort (Jacobs, Davis-Kean, Bleecker, Eccles, & Malanchuk, 2005). Although boys and girls may be equally successful, they get different messages about why they are successful. Which type of career would you want to pursue, one that you could achieve in only if you worked really hard, or one that you were naturally good at?

The Role of Peers

Most adolescents spend a good deal of time in the company of other teens, and these peers can exert a considerable amount of influence on their academic achievement. This influence is both direct (for example, peers can accept or reject the high achiever) and indirect (for example, peers model academic behaviors and attitudes). Peers who devalue academic achievement can draw adolescents away from their schoolwork, but high-achieving peers exert a positive influence on an adolescent’s own academic achievement (Hamm, Schmid, Farmer, & Locke, 2011; Lynch, Lerner, & Leventhal, 2013).

Teachers can intervene to change and support peer norms and expectations for academic success. The SEALS (Supporting Early Adolescent Learning and Social Success) professional development program has been designed to help sixth-grade teachers use the transition to middle school as a time to orient students toward positive engagement with academics by supporting “peer cultures of effort and achievement” (Hamm, Farmer, Lambert, & Gravelle, 2014, p. 216). In an intervention study, schools with the SEALS program were compared to a control group of schools without the program. As a result of what they learned in this training program, teachers became more attuned to the different peer groups that existed in their classes and were better able to manage the social dynamics, including bullying, that can interfere with learning. They were
better able to use peers to promote positive classroom behavior. Students’ attraction to peers who devalued school decreased, setting the stage for higher achievement through middle school and high school. Basically, young teens who participated learned that they could work hard in school and not give up acceptance and high esteem from their peers.

We have discussed contributions that parents and peers make to teens’ motivation to succeed in school. **Active Learning: Academic Motivation** provides you with questions for thinking about the influences you (or a teen you know) experienced that helped shape your approach to school.

### Active Learning

**Academic Motivation**

Teens’ motivation to do well in school is affected by both family and friends. You can carry out this activity in two ways. You can ask yourself these questions regarding how you felt during high school, or you can interview a teenager using these questions as a basis for further conversation about academic motivation:

- Did you talk about school much with members of your family?
- Did you think your family influenced the way you felt about school or how hard you tried?
- Was it important to you to try to do well in school to please your parents/guardians?
- How many of the friends you spent time with did well in school?
- How much did spending time with friends keep you from doing your schoolwork?
- Did you think your friends would make fun of you for doing well in school?

When considering your answers, think about whether family and friends have had different influences on your academic motivation or whether they influenced you in similar ways. Many times teens are influenced by parents to achieve and then choose friends who also are high achievers. However, it can also happen that teens are friends with others who reject school, and that influence may play a larger role than their parents on their motivation to do well in school.

**SOURCE:** Adapted from Urdan, Solek, & Schoenfelder (2007); Wong & Taylor (1996).

### The Role of the Community: Positive Youth Development

The characteristics of the community in which the adolescent lives also influence cognitive development and academic achievement. Probably the most direct way we see this influence is through the quality of the neighborhood schools the adolescent attends, but communities offer numerous other opportunities and experiences beyond school that also contribute to cognitive development.
A new way of thinking about development has emerged that adds a great deal to our understanding of the role activities play in the lives of young people. This approach is often called the positive youth development approach, because its primary focus is on finding ways to help young people reach their full potential (U.S. Department of Health and Human Services [USDHHS], 2007). It does more than help young people avoid the pitfalls associated with too much unsupervised time (Eccles & Templeton, 2002; National Research Council and Institute of Medicine, 2004; Roese & Peck, 2003); it strives to identify the people, contexts, circumstances, and activities that help youth develop to their maximum potential. When organizations and communities give adolescents the chance to exercise leadership, build their skills, and engage in positive and productive activities, youth have the building blocks they need to grow into “healthy, happy, self-sufficient adults” (USDHHS, 2007, para. 1).

The Search Institute in Minneapolis has identified a set of 40 developmental assets that serve as these building blocks. It defines a developmental asset as “common sense, positive experiences, and qualities that help influence choices young people make and help them become caring, responsible adults” (Search Institute, 2012, para. 1). Constructive use of time is one of the sets of assets and can include creative activities such as lessons or practice in music, theater, or other arts, youth programs in the community, membership in a religious institution, and time spent at home rather than just hanging out with friends with nothing special to do.

Survey research conducted by the Search Institute found that only 21% of the youth surveyed said they participated in creative activities at least at the level the Search Institute considers adequate to support youth development, though 57% participated in youth programs, 58% participated in a religious community, and 51% did not spend more than 2 days a week outside their home just hanging out with friends. These results would indicate that for many young people, there still is room for higher levels of participation in the community that can support positive development, and there is particularly room for more adolescents to find creative outlets through the arts.

Different types of activities contribute to different aspects of cognitive development or contribute in different ways. For instance, earlier in the chapter we described a program in which older children and teens who received acting training over the course of a year showed gains in social cognition (Goldstein & Winner, 2012). Larson and Brown (2007) found that teens learn valuable lessons from involvement in theater programs. They learn more about understanding and managing emotions and they find new ways to deal with frustration and to celebrate success together as a result of these experiences.

Participation in service-oriented activities in the community also can directly contribute to academic success (Furco, 2013; Kraft & Wheeler, 2003; Schmidt, Shumow, & Kackar, 2007). This type of activity has an impact on a wide variety of academic outcomes, including “subject matter learning, standardized test performance, school attendance, earned grades, motivation for learning, and engagement in school” (Furco, 2013, p. 11). In addition, Roese and Peck (2003) found that vulnerable youth who were highly active in both
school and community sports activities were twice as likely to graduate from high school and go on to college as students who did not have this level of engagement. On the other hand, vulnerable youth who spent time working in paid employment and simply watching television or hanging out with friends were less likely to go on to postsecondary education (Peck, Roeser, Zarrett, & Eccles, 2008).

Some worry that many adolescents are stressed out by doing too much, but relatively few young people appear to be overscheduled with organized activities. Figure 15.9 gives an overview of the amount of time spent in various activities. It is not surprising that adolescents tend to engage in more activities than younger children. In one national survey, 92.4% of U.S. teens took part in at least one activity, 27.1% in one to three, 31.4% in four to six, and 33.9% in seven or more activities in the previous year (Substance Abuse and Mental Health Services Administration, Office of Applied Studies, 2007). However, Mahoney, Harris, and Eccles (2006) found that only 3% to 6% of youth ages 5 to 18 report spending more than 20 hours a week in organized activities. These authors conclude that only 1 in 10 children could be described as overscheduled. That might still be too many, but overscheduling doesn’t seem to be a typical pattern.

Perhaps more important, when older children and adolescents ages 9 through 19 were asked to describe why they participated in activities such as sports, after-school programs, clubs, and religious youth groups, the reasons they gave included enjoyment and excitement, encouragement and support from parents and friends, opportunities to challenge themselves and build skills, and anticipated social interactions with others. Mahoney et al. (2006) point out that in most cases adolescents have their own internal motivations for seeking out and participating in these experiences. In addition to the positive effect participation has on school-related outcomes, these activities are related to lower levels of substance abuse and better overall psychological adjustment (Mahoney et al., 2006).

Check Your Understanding

1. What can schools do to promote or inhibit cognitive development in adolescents?
2. What factors contribute to the risk of underperformance in school for minority, low-income, and low-performing students?
3. What are some reasons why girls tend to stay away from the STEM fields?
4. What might a European-style apprenticeship program accomplish for U.S. students who do not plan to go on to college?
5. Compare the roles of family and peers in adolescents’ academic success.
Conclusion

The cognitive changes that occur during adolescence allow the young person to think logically not just about concrete things but also about abstract and hypothetical concepts. Growth in basic cognitive processes affects the adolescent’s social relationships and moral judgment and prepares the adolescent to cope with the increasing challenges of the school environment. Although some adolescents struggle with these challenges, most handle them quite well, and these educational experiences prepare them for their transition into young adulthood as they enter higher education and the workforce.

Chapter Summary

15.1 What changes occur as adolescents enter Piaget’s stage of formal operations?

In the stage of formal operations, adolescents develop the ability to think about abstract concepts and use hypothetico-deductive reasoning. However, a type of egocentric thinking reappears in the form of the imaginary audience and the personal fable. The belief in the personal fable can be associated with risk-taking during adolescence. Some theorists believe there is a stage of postformal operations beyond Piaget’s fourth stage.

15.2 How do basic cognitive processes change during adolescence?

Although teens think they can multitask successfully, research indicates they process information more superficially when they do this. The parts of the brain used for working memory continue to change over the teen years. Both metacognition and metamemory improve, and executive function continues to develop which improves adolescents’ ability to plan. Teachers can support creativity in the classroom by requiring both divergent and convergent thinking. Adolescents’ changing abilities are reflected in their social cognition, including the ability to engage in recursive thinking, and in further development in theory of mind.

15.3 How does moral reasoning develop during adolescence?

Kohlberg has described three levels of moral judgment: preconventional, conventional, and postconventional moral judgment. Many people (including most adolescents) reason at the conventional level, but some adolescents are cognitively capable of reasoning at the postconventional level. Most research supports the idea that there are no gender differences in levels of moral judgment. Men and women alike base their judgments on both justice and care, depending upon context. Research finds only a moderately strong link between moral reasoning and moral behavior.

15.4 How is teen language different from language in children and adults?

Adolescents’ speech is more complex in grammar and subject matter than children’s speech and differs from adult speech in its use of slang, especially in texting. Good writing skills remain important for success in the world of business.

15.5 What threats to academic achievement do high school students face and what factors support their success?

The transitions from elementary school to middle school and from high school to college are challenging because what we expect from the young person changes each time. Most adolescents are able to handle these transitions well, but minority, low-income, and low-performing students are particularly vulnerable to school failure or underachievement. Although girls generally do well in all subjects in school, including math, they still are not as likely as boys to have careers in the STEM disciplines. The idea that girls are not good at math or science persists in the form of a stereotype threat, which can have a negative effect on girls’ performance in high-stakes testing situations. Girls with specific learning disorder are more likely to try to distract themselves and make themselves feel better about their difficulties, while boys are more likely to try to attack the situation and try to fix it. The high school dropout rate in the
United States has fallen by half in recent years, but low-income and Latino students continue to be more likely to drop out of high school than other groups of students. Many who drop out eventually earn a GED. The forgotten half who graduate from high school but do not go to college may not be well prepared to enter the workforce. The European model of apprenticeships provides alternate pathways to success for these young people but is rare in the United States. Slightly over two thirds of high school graduates enroll in college immediately following their graduation. College completion rates range from 88% in 6 years for very selective schools to 31% in 3 years for 2-year institutions. The family, peers, and the larger community play an important role in supporting adolescents’ educational attainment.

**Key Terms**

- Conventional moral judgment 517
- Convergent thinking 512
- Developmental assets 536
- Forgotten half 530
- Formal operations 503
- Hypothetico-deductive reasoning 503
- Imaginary audience 506
- Metacognition 509
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