

Studying Child and Adolescent Development

CHAPTER

1



CHAPTER OUTLINE

- **Why Study Child and Adolescent Development?**
 - Teachers' Understanding of Development*
 - Schools as a Context for Development*
 - Current Status of Children and Adolescents*
- **Perspectives on Children's Development**
 - Definitions and Issues*
 - Biological Theories*
 - Psychoanalytic Theories*
 - Behavioral Theories*
 - Cognitive Theories*
 - Contextual Theories*
 - Importance of Multiple Theories*
- **Studying Children's Development**
 - Research Designs*
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 - Judging the Quality of a Study*
 - Research Ethics*
- **Chapter Summary**
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- **Activities**

STANLEY ROGERS HAS JUST STARTED AT A NEW MIDDLE SCHOOL; HE AND his family recently moved from a rural area in North Carolina to Cleveland Heights, Ohio. He has a slight build, with red hair and freckles, and dresses oddly compared to students at his new school. Considered a “geek” by other boys in his class, Stanley’s favorite subject is social studies. He has a particular passion for the history of the Civil War, to the point that his social studies teacher learns obscure facts from him. In other subjects besides social studies, Stanley shows less interest and refuses to do homework. Although highly capable, he does poorly on tests unless the topic interests him. Stanley’s English teacher is frustrated by his work habits and his lack of achievement, when obviously he is so capable. However, what is particularly bothersome to Stanley’s teacher is that he disturbs other students when he is not interested in a particular lesson. During small-group work, a study period, or even a group lesson, Stanley will wander around the classroom, make wisecracks, talk with other students, or put his head down to nap. Stanley’s teacher has tried several different approaches to change his behavior, such as reminding him about classroom rules, giving him a leadership role in small-group discussions, offering him special rewards for completing assignments, calling him out for disruptive behavior, assigning extra homework, keeping him after class, and talking with his parents. None of these strategies appear to be working. Stanley’s teacher is frustrated and feels her authority in the classroom is being challenged by this student.

Source: Adapted from Campoy, R. (2005). Case study analysis in the classroom. Becoming a reflective teacher. San Francisco: See pp. 147–148.

Teachers are easily frustrated when challenged by a student like Stanley. He is capable, and passionate about his interests. Stanley also wants to be accepted by his new classmates. What is the problem? Why is it difficult to keep Stanley engaged in classroom activities? What would you do if you were Stanley’s teacher?

To reach students like Stanley, teachers need to draw on their knowledge of children’s development. Student behavior in the classroom is often a complex interplay of many different individual characteristics (e.g., maturity, gender, ability) and family background, as well as classroom dynamics. For example, children entering a new school may feel vulnerable and uneasy. As young people enter early adolescence, peers can also exert considerable influence on classroom behavior. Most children can handle adjusting to new classrooms with competence, but others may need a good deal of support from teachers and other school personnel (Daniels, Beaumont, & Doolin, 2002). Problem behaviors, as with Stanley, can arise when teachers do not respond appropriately to the developmental needs of their students. As we will learn, the importance of developing a positive relationship with students is critical for children’s learning and adjustment in school (Comer, 2004; Pianta, 1999; Wentzel, 2002).

In this chapter, we begin to explore different theories of child development and their implications for teaching. This research can help teachers answer questions about how thinking processes unfold, how children determine right from wrong, when children begin to understand the feelings of others, why children lose interest in learning, how children learn self-discipline, why some adolescents are rejected by their peers, why some youths become aggressive and violent, and so forth. More important, child and adolescent development research can help educators to identify those behaviors that place children at risk for not succeeding in school. Last, child development research can help educators to create an educational environment that promotes the healthy development of all children. The Focus

on Research box on page 4 describes how child development research can help guide school reform efforts.

The first two sections of this chapter focus on the question: Why study children's development? Subsequent sections discuss the status of children in school today. We then turn to the theories of development that serve as the focus for this book, and the methods used to study children's development.

Why Study Child and Adolescent Development?

Teachers' Understanding of Development

Teachers hold varying points of view about children's development. Look at the photo below showing two classrooms—one from the 1950s (left) and one from the 1990s (right). What beliefs about children are guiding the teaching practices shown here? On the right, children appear to be passive learners, with the teacher as the main transmitter and source of knowledge. On the left, however, children are working in small groups, helping each other, and taking a more active role in their learning. Think about your own beliefs. Which of the two pictures best fits how you think children learn? How did you form these ideas?

Some teachers may have taken a formal course on child psychology, whereas others may construct a naive or commonsense theory of development from their own personal experiences and observations. For example, many prospective teachers believe that children primarily learn through the “teacher as teller” mode (see photo on left), and base those beliefs about learning from their own experiences (Kagan, 1992; Richardson, 1996). In other words, “teachers teach the way the way they were taught” (Nettle, 1998, p. 193). Other studies suggest that teachers' beliefs about their students are influenced by societal beliefs. For example, adolescents are often portrayed in the media as troubled, emotional, rebellious, and out of control due to hormonal changes. If teachers accept these societal views, it is likely to affect the way they teach and interact with adolescents.



Compare these two images of classrooms from the 1950s (left) and 1990s (right). What changes do you see in teaching practices?

Source: Jack Moebes/CORBIS and Will Hart/Photo Edit.



Focus on Research

Dr. James P. Comer is considered one of America's leading architects of school reform and perhaps the only prominent reformer who views children's development as the center of all educational programs. In a 1997 interview for *Phi Delta Kappan*, Dr. Comer stated, "I have maintained a steady focus on child development and this is what I have tried to bring to education. Even people in education who are sensitive to child development focus on curriculum/instruction/assessment first, and I argue that it should be development first and that development should guide everything else" (Goldberg, 1997, p. 599).

For more than 25 years, Comer has been working with schools using a collaborative process of reform that brings together teachers, principals, parents, health professionals, and community members to create educational programs that foster the development of children. The basic premise of Comer's School Development Program (SDP) is that "all children have the potential to succeed in school and in life, and that the realization of this potential depends on how well educators, families, and communities work together to create environments that support child development; children who are developing well can learn adequately" (Comer & Haynes, 1999, p. 601). The SDP has three important components: (a) a governance and management team that develops a comprehensive school plan, assessment strategy, and staff development program; (b) a mental health or school support team; and (c) a parents' program (Comer, Haynes, Joyner, & Ben Avie, 1996). These three teams work together to promote students' learning and development using

Dr. James P. Comer: Putting Children First

Comer's guiding principles of collaboration, consensus, and no-fault problem solving to create a climate of competence, mutual respect, and trust in the school. Additionally, the SDP team uses six developmental pathways as a framework for making decisions that benefit students. These are physical, cognitive, language arts, social, psychological, and ethical. To educate the whole child, Comer believes that schools must develop a balanced curriculum that is not only focused on cognitive development but also addresses a broad spectrum of children's developmental needs.

One of the first schools to implement the Comer program was Martin Luther King Jr. Elementary School in New Haven, Connecticut—a predominantly African American, low-income, inner-city school. At the beginning of the project in 1968, its students were an average of 19 months below grade level in language arts and 18 months below grade level in reading. Students' scores in both areas were at grade level in 1979 and were 12 months above grade level in 1984. Additionally, parent involvement had increased, school absences and behavior problems had decreased, and staff turnover was nearly zero. These changes occurred without any dramatic change in the socioeconomic backgrounds of the children attending the school.

Today, Comer's School Development Program is operating in more than 700 elementary, middle, and high schools across the United States, and in Trinidad and Tobago. *For Dr. James Comer, education and development are one in the same.*

The connection between teacher beliefs about children's development and instructional practices is demonstrated in a study of school readiness by Mary Lee Smith and Lorrie Shepard (1988). Using a set of open-ended questions, the researchers asked 40 kindergarten teachers in one school district to think about particular children who were not ready for school and to speculate about the reasons for their lack of readiness. The researchers then examined teachers' statements to identify beliefs about (a) the nature of development and early learning, (b) rates of development, (c) causes of unreadiness, and (d) methods of remediation. In this study, the concept of teachers' beliefs referred to those propositions a teacher "holds to be true" (p. 309).

The study showed several noteworthy findings. First, the teachers differed in the extent to which they viewed the development of school readiness as influenced by internal or environmental processes. Nearly half the teachers were labeled “nativists” because they construed development as a maturational process that was “largely or completely outside the influence of parents or teachers” (p. 314). The remaining teachers all believed that school readiness could be influenced by teachers, parents, and other environmental forces, but they differed with respect to the sort of intervention they would recommend for a child who was not ready for school. A large majority of this group believed that additional instruction would increase readiness or would correct specific deficits in readiness. Only 3 of the 40 teachers viewed the development of school readiness as a complex interaction between the child’s characteristics and the environment provided by the caregivers. Second, the results of this study indicated that teachers’ beliefs about the development of school readiness influenced their decisions to recommend an extra year of kindergarten. Teachers who held nativist beliefs were the most likely to recommend retention, whereas teachers with nonnativist views reported lower rates of retention.

In summary, many studies indicate that teachers’ beliefs about children and how they develop have important implications for how they teach and interact with students (Borko & Putnam, 1996; Kagan, 1992; Smith & Shepard, 1988). Research further suggests that teachers are most effective in their teaching when they attempt to understand their students as individuals (Kagan, 1992). Thus, one of the most important reasons to study children’s development is to become a teacher who makes a difference in young people’s lives.

Most states require a course on child and adolescent development to meet teacher licensing and certification standards. Additionally, a growing number of states are basing their requirements for new teacher certification on the 10 principles of effective teaching identified by INTASC (Interstate New Teacher Assessment and Support Consortium). We have listed the 10 principles in Figure 1.1 on page 6. As you can see, several of these principles require a strong foundation in child and adolescent development.

Schools as a Context for Development

Another very important reason for studying and understanding the development of children and adolescents is the critical role that schools play in their lives (Eccles, 2004; Pianta, 2006; Roeser, Eccles, & Sameroff, 2000; Rutter, Maughan, Mortimore, Ouston, & Smith, 1979). Along with the family and the peer group, schools are one of the most influential contexts for children’s development in our society.

By the time young people graduate from high school they will have spent more than 10,000 hours in school. Figure 1.2 on page 6 indicates that approximately one-third of an adolescent’s waking life is spent in some type of school environment (Csikszentmihalyi & Larson, 1984). Furthermore, students start school earlier and stay in school longer than young people in past generations. Since the early 1900s, there also have been significant increases in the percentage of young children who attend school. Figure 1.3 on page 7 shows that the percentage of 3- and 4-year-olds enrolled in preprimary programs since 1965. An important feature of this trend is the number of young children in full-day programs. In 2003, approximately 56 percent of children between the ages of 3 and 5 attended a preprimary school all day (National Center of Educational Statistics, 2004). Along with the increase in the number of young children attending school, high school completion rates have also steadily increased over the last 20 years, from 80 to 84 percent of young people between the ages of 18 and 24 years (Federal Interagency Forum on Child and Family Statistics, 2005).

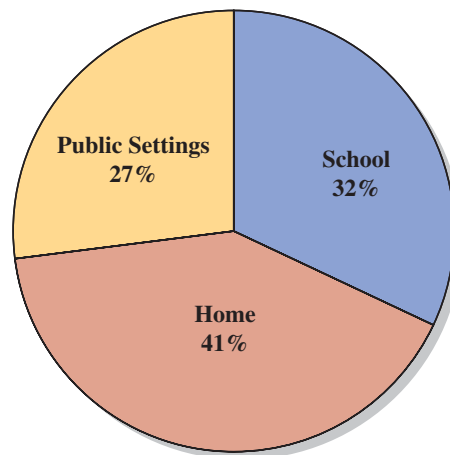
Thus, the fact that children and adolescents spend so much time at school makes this context a potentially powerful influence on their development. Teachers, classmates, and

| INTASC Standards |
|---|
| The teacher understands the central concepts, tools, and structures of the discipline(s) he or she teaches and can create meaningful learning experiences of subject matter. |
| The teacher understands how children learn and develop and can provide for their intellectual, social, and personal development. |
| The teacher understands how students differ in their approaches to learning and creates instructional opportunities that are adapted for diverse learners. |
| The teacher understands and uses a variety of instructional strategies to encourage students' development of critical thinking, problem solving, and performance skills. |
| The teacher uses an understanding of individual and group motivation and behavior to create a learning environment that encourages positive social interactions, active encouragement in learning, and self-motivation. |
| The teacher uses knowledge of effective verbal, nonverbal, and media communication techniques to foster active inquiry, collaboration, and supportive interaction in the classroom. |
| The teacher plans instruction based on knowledge of subject matter, students, and community and curriculum goals. |
| The teacher understands and uses formal and informal assessment strategies to ensure the continuous intellectual, social, and physical development of the learner. |
| The teacher is a reflective practitioner who continually evaluates the effects of his or her choices and actions on others. (students, parents, and other professionals in the learning community) and who actively seeks opportunity to grow professionally. |
| The teacher fosters relationships with school colleagues, parents, and agencies in the larger community to support student's learning and well-being. |

■ FIGURE 1.1
Overview of INTASC Standards

A strong foundation in child and adolescent development is central for meeting professional teaching standards.

Source: www.ccsso.org/intst.html.



■ FIGURE 1.2
Percentage of Time Adolescents Spend in Different Settings

Adolescents spend approximately one-third of their waking hours in school.

Source: Csikszentmihalyi & Larson (1984).

curricula all play an important role in a child's development. When children and youth are not connected with adults or communities who are concerned about their well-being, then school plays an even greater role as a primary socializing influence in the lives of young people (Comer et al., 1996).

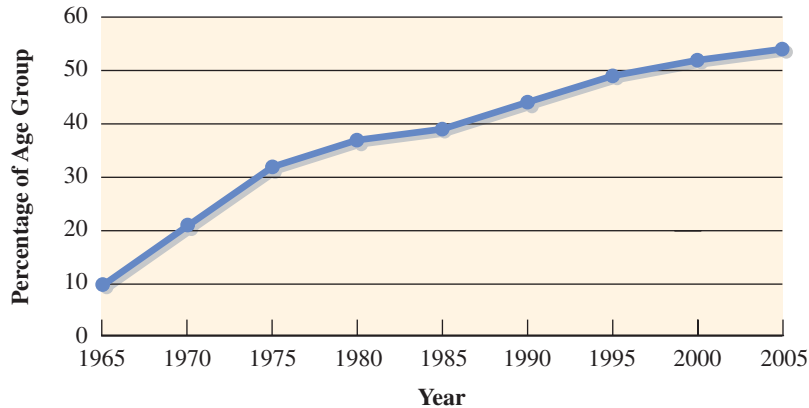


FIGURE 1.3
Percent of 3- and 4-Year-Olds Enrolled in Early Education Programs
 Over the last 40 years there has been a steady increase in the number of young children attending preschool programs. The quality of early education programs can have a lasting effect on the development of children.
 Source: National Center of Educational Statistics (2005a).

Assessing the Effects of Schools on Children's Development

The effects of schools on children's development are not easy to assess. Since schools were first established, there has been no clear consensus concerning what should be the purpose and function of schools in children's lives. Should schools focus exclusively on students' intellectual development? Should schools be concerned about students' social and emotional lives? Should schools teach health, sex education, family life, personal finance, driver's education, and other courses to prepare students for adulthood? Should schools help solve social problems such as poverty, drug abuse, and racism? Ask your classmates and friends these questions, and you will find a wide range of opinions.

For the most part, the debate has focused on whether schools should train basic intellectual skills or provide a more comprehensive training for life that includes both intellectual and emotional development. The school environment changes as one set of goals is emphasized over the other. In the 1960s, for example, educational reformers claimed that schools were not providing learning experiences that were relevant to students' lives. Programs were implemented so that students could receive more "hands-on" and "real world" learning experiences. Since the 1980s, the "back-to-basics" movement has gained momentum because policy makers believe we are losing our competitive edge in the world economic market. Some proposals call for more demanding academic curricula, tougher academic standards, more homework, more tests, longer school days, and the end of social promotion. At times, the school has been viewed as an agent of social reform, as seen in the desegregation and mainstreaming movements of the 1970s, which continue to have an influence on schools today.

It also is difficult to assess the effects of schools on children's development because schools differ greatly with respect to philosophy, resources, learning opportunities, and social climate. Some students have well-equipped classrooms, large libraries, the latest computer technology, small classes, modern school facilities, and access to two or more gymnasiums. Other students are expected to learn in schools with outdated textbooks, overcrowded classrooms, poorly paid teachers, and metal detectors at the front door. Many of these students come from poor families who cannot provide additional resources to support their children's learning at home. Because of tremendous disparities in the way public schools are funded in this country, the poor get a poorer quality of education. In his book *Savage Inequalities*, Jonathan Kozol (1991) speculated that some children have a better chance of learning math and reading on the street than they do in school. For some students, the conditions of schooling have not improved much in the last 10 years.

Effects of Schooling on Development

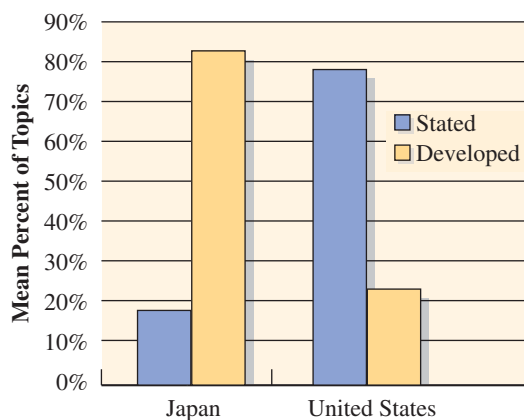
Despite difficulties in assessing the effects of schools on development, a growing body of evidence indicates that schools do have an impact on the achievement, socialization, and psychological well-being of children and adolescents. Consider, for example, the consequences of dropping out of school. High school dropouts generally perform more poorly on standardized tests of achievement than same-age peers with more years of schooling do (Alexander, Natriello, & Pallas, 1985). There is also a strong relation between intelligence test (IQ) scores and highest grade completed in school, although it is quite possible that some other factor such as poverty can explain this relationship (Ceci, 1991). However, even after controlling for differences in social background, the relationship between IQ and years of school is still fairly strong. According to Stephen Ceci (1990), this relationship is partly explained by the fact that schools teach the basic skills and cultural knowledge that are included in standardized tests of achievement and intelligence (e.g., “What is the boiling point of water?” “What is the capital of the United States?”).

A good example of schooling effects on academic development comes from international assessments of mathematics and science achievement. In general, children in the United States do not perform as well as children from Singapore, Hong Kong, or Japan on international assessments. These discrepancies are not simply due to innate differences in cognitive abilities (i.e., Asians do not have better math genes). Researchers have found that American and Japanese students perform equally well on general tests of cognitive functioning (Stevenson & Stigler, 1992). The differences result in part from the instructional practices of teachers in different countries. Japanese teachers, for example, spend more time than American teachers on mathematics instruction (Stevenson & Stigler, 1992). Additionally, U.S. mathematics teachers tend to teach students how to solve a particular problem, then ask the students to solve it on their own. In contrast, Japanese teachers often give students problems that they have not seen before to develop their thinking skills and to prepare them for later instruction (Stigler & Hiebert, 1999). As you can see in Figure 1.4, teachers in Japan also spend more time explaining and developing new concepts in mathematics lessons (Stigler, Gallimore, & Hiebert, 2000). Some important lessons that can be learned from international studies of teaching are described in the Focus on Teaching box on page 10 and 11.

■ **FIGURE 1.4**

Average Percentages of Concepts in Eighth-Grade Mathematics Lessons That Were Stated vs. Developed
International studies show that teachers differ in the amount of time spent developing and explaining. Differences in instructional approaches may explain why Japanese children perform better on international assessments than American children.

Source: National Center of Educational Statistics (1995).



Schools not only affect students' academic achievement but also influence the way they organize their thoughts and cognition. Cross-cultural research has helped psychologists to disentangle the extent to which advances in cognitive functioning are related to formal schooling or to age differences (Cole, 2006). Individuals with more formal schooling are better at remembering disconnected bits of information, and they spontaneously engage in cognitive processes that lead to better recall of information, such as rehearsal and organizational strategies. Additionally, schooled individuals are more likely to sort objects into abstract categories (tools and food items) than into functional groups (e.g., knife with apple, shovel with potato). Schooling also influences the ability of individuals to perceive abstract visual-spatial relations (e.g., mental rotation of objects) and to make figure-ground discriminations (e.g., find hidden objects in puzzles). Taken together, cross-cultural research suggests that formal, Western-style schooling fosters a certain way of thinking, reasoning, and problem solving (Cole, 2006; Rogoff, 1981).

In addition to cognitive development, schools have a strong influence on students' social and emotional development. The quality of children's school experiences influences a wide range of outcomes, including vocational aspirations, feelings of competency and self-worth, academic motivation, identity formation, peer relations, racial attitudes, gender-role beliefs, and even standards of right and wrong. We will discuss many of these influences in later chapters. A few examples include:

- Head Start programs for economically disadvantaged preschool children can help offset some of the effects of poverty, such as truancy, high school dropout, teenage pregnancy, and unemployment.
- Children who are rejected by their peers in school are at greater risk for later psychological disturbance and criminal behavior.
- Children become less intrinsically motivated to learn and less confident of their abilities as they progress in school.
- Cooperative learning programs, if properly implemented, can promote positive race relations and increase acceptance of handicapped students.
- Schools that foster high self-esteem, academic success, and sense of belonging can reduce the likelihood of emotional problems, behavioral disturbance, and delinquency.

At this point in the history of child development research, the question is no longer *whether* schools influence children's development, but rather *what* types of schools or schooling experiences exert a positive influence. Many educational professionals enter education to make a difference in the lives of young people. As we shall see, there is a large knowledge base that can help educators create a learning environment that promotes young people's academic achievement and well-being.

Current Status of Children and Adolescents

Increases in the Population of Schoolchildren

During what was known as the "baby boom" period following World War II (1946 to 1964), there was a dramatic increase in the number of children in the United States. Fluctuations in child population over the last 50 years can be seen in Figure 1.5 on page 12. Enrollment in public schools peaked in the early 1970s. From 1971 to 1984, the school-age population declined by 10 percent, but enrollment in public schools started to increase again and hit record enrollment levels. In 2003, the number of children under the age of 18 was estimated to be about 73 million (Federal Interagency Forum of Child and Family Statistics, 2005).



Focus on Teaching

James Stigler and his colleagues conducted a videotape study of mathematics classrooms as part of the Third International Mathematics and Science Study (TIMSS) (Stigler, Gonzales, Kawanaka, Knoll, & Serrano, 1999). Previous large-scale international studies relied on questionnaires to collect information about teaching practices and student learning. The TIMSS Videotape Study was the first of its kind to videotape national samples of teachers teaching in their classrooms. The study focused on eighth-grade mathematics classrooms in three countries: Germany (50 classrooms), Japan (50 classrooms), and the United States (100 classrooms). The summary that follows focuses on comparisons between American and Japanese classes and presents some important lessons for educators. For a more detailed account of this study, see *The Teaching Gap* (1999) by J. W. Stigler and J. Hiebert. As you read these lessons, it is important to keep in mind that Japan and the United States have very different economic, political, and educational systems that need to be considered when making cross-cultural comparisons. For a critique of cross-national comparisons, see *Manufactured Crisis* (1995) by D. C. Berliner and D. J. Biddle.

Lesson One: A Focus on Teaching Methods Is Essential for Improving Education

Many policy makers and educational reformers in the United States view improvements in the quality and competence of teachers as critical for improving student achievement and learning. Although variability in teacher competence within countries was evident in the TIMSS Videotape Study, cultural differences in *teach-*

Learning from the World's Teachers

ing methods were considerably greater and more influential. Students' daily experiences in the classroom are mainly determined by the quality of the teaching methods used. Many highly trained and competent American teachers of mathematics employ limited methods that, for the most part, focus on a narrow range of *procedural skills*. As a result, American students spend most of their time in mathematics classes acquiring isolated skills through repeated practice. In contrast, teachers in Japan teach mathematics in a deeper way: They teach for *conceptual understanding*. Their students spend as much time solving challenging problems as they do practicing skills.

Lesson Two: Teaching Is a Cultural Activity

Teaching is influenced by a small and tacit set of cultural beliefs about how students learn, about what role teachers play in the classroom, and about the nature of their subject matter. Although teaching methods may vary within a culture, there is a shared set of cultural beliefs and expectations that underlie teaching. In part, this is explained by the fact that teachers enter their profession with an image of teaching that they have constructed from their many years as a student.

The Videotape Study revealed that mathematics in American classrooms is taught as a set of isolated facts, procedures, or skills to be learned incrementally, piece by piece. The teacher's role is to break down complex tasks into manageable pieces and to provide plenty of opportunities for practice. When students get confused or frustrated, teachers must quickly assist students by providing information to get them back on track. Many teachers

The number of children under the age of 18 in the United States is expected to rise to approximately 80 million by the year 2020.

Increases in the Ethnic Diversity of Schoolchildren

One of the most important demographic trends in the last 25 years is the increased racial and ethnic diversity of America's children. In 1980, nearly 75 percent of all children in this country were non-Hispanic whites. By the year 2010, this group is expected to constitute just over

learned mathematics this way, and many parents expect their children to learn mathematics the same way they did.

By contrast, mathematics teaching in Japan reflects a different set of cultural beliefs. Japanese teachers want their students to see relationships between mathematical ideas and concepts. They believe that students learn best by first struggling to solve mathematics problems, then participating in discussions about different problem solutions. The teacher's role in the classroom is to find challenging problems to begin a lesson and to observe how their students solve problems on their own for follow-up discussions. Frustration and confusion are viewed as a natural part of the learning process, and Japanese teachers encourage students to keep struggling in the face of difficulty. They may offer hints to support students' progress, but they refrain from telling or showing students how to solve the problem.

Lesson Three: There Are No “Quick Fixes” for Improving Education

Perhaps the most important lesson of the TIMMS Videotape Study is that there are no “quick fixes” or “magic bullets” to improve education. Despite decades of educational reform in the United States, research suggests that classroom teaching has changed little during this time. By contrast, teaching practices in Japan have changed markedly over the last 50 years. What accounts for this difference?

Whereas American educators have sought major changes within a short period of time, Japanese educators have instituted a system of educational reform that leads to gradual, incremental improvement over time. In Japan,

teachers are not considered competent because they have graduated from college or have completed a standardized test of teacher competency. Japanese teachers are expected to participate in school-based professional development once they enter the teaching profession. *Kounaikenshuu* is the word used to describe the continuous process of school-based professional development in Japan.

One of the most important components of *Kounaikenshuu* is what is known as “lesson study” (*jugyou kenkyuu*), in which groups of teachers work on improving one or several “research lessons.” Lesson study involves identifying a problem that poses a challenge to students, and planning, with teacher colleagues, a lesson to achieve a particular learning goal. The lesson is taught by one of the teachers in the lesson-study group, after the other teachers have helped to prepare the design and materials for the lesson. The lesson is then observed by other members of the group. On the basis of the group's observations and discussion of the lesson, the lesson may be revised and taught again. Rather than focusing on a particular weakness of a teacher, group discussions focus on lesson design and teaching methods. Once the lesson-study group has successfully designed and implemented a lesson, it is then shared with other educators. Some Japanese schools may host a “lesson fair” at the end of the school year and invite teachers from other schools to observe the research lessons they have produced in different subjects. Compared with teachers in the United States, Japanese teachers who participate in lesson studies view themselves as contributing to the development of knowledge about teaching as well as contributing to their own professional development.

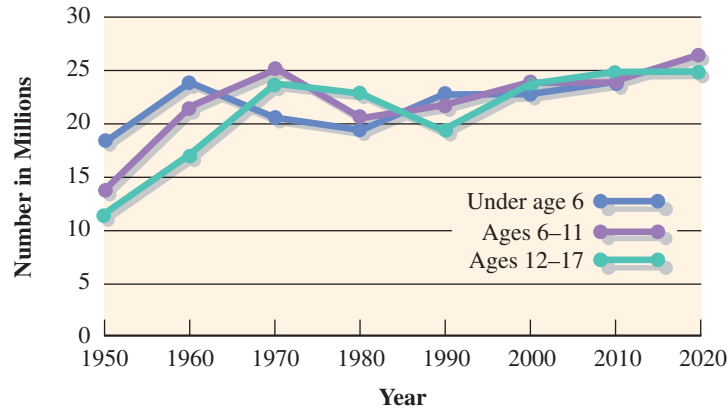
Source: Adapted from Stigler & Hiebert (1999).

half (60 percent) of the U.S. child population. Prior to 1997, African Americans were the largest minority group in the United States. Currently, African Americans and Latinos represent approximately 35 percent of the child population in the United States (Federal Interagency Forum on Child and Family Statistics, 2005). These numbers are followed by Asian Americans at 4 percent and Native Americans at 1 percent. The number of Latino children has increased faster than that of any other racial or ethnic group. Figure 1.6 on page 12 presents a portrait of the kindergarten class of 1998/1999. As you can see, there is considerable diversity in the children coming to school. By the year 2020, more than one

FIGURE 1.5
 Number of Children in the United States: 1950 to 2020 (Projected)

Student enrollments in schools have fluctuated over the last 50 years.

Source: Federal Interagency Forum on Child and Family Statistics (2005).



Portrait of America's Kindergartners: Class of 1998/1999

In the fall of 1998, approximately 4 million children were attending kindergarten in the United States, many for the first time. According to a national study by the U.S. Department of Education, the ethnic backgrounds of the kindergarten class of 1998/1999 were 58 percent white, 19 percent Latino, 15 percent African American, 3 percent Asian, 2 percent American Indian or Alaskan Native, and 1 percent Hawaiian Native or Pacific Islander. A majority of America's kindergartners (75 percent) live with two parents, and nearly half have mothers with some college education or a college degree. Other key findings of this study were:

- Prior to kindergarten, 3 out of 5 children received care on a regular basis from someone other than a parent.
- As children enter kindergarten for the first time, parents report that 92 percent are eager to learn and 75 percent persist at tasks very often.
- Nearly half of parents report that a family member reads or sings to their kindergarten-age child on a regular basis.
- Approximately 66 percent of first-time kindergarten students can recognize their letters, and 94 percent can recognize numbers and count to 10.
- Teachers report that 75 percent of kindergartners are able to make friends, to join others in play, and to form friendships. Fewer than 10 percent have difficulty getting along with others.
- About 12 percent of boys and 11 percent of girls have a body mass index that places them at risk for becoming overweight.

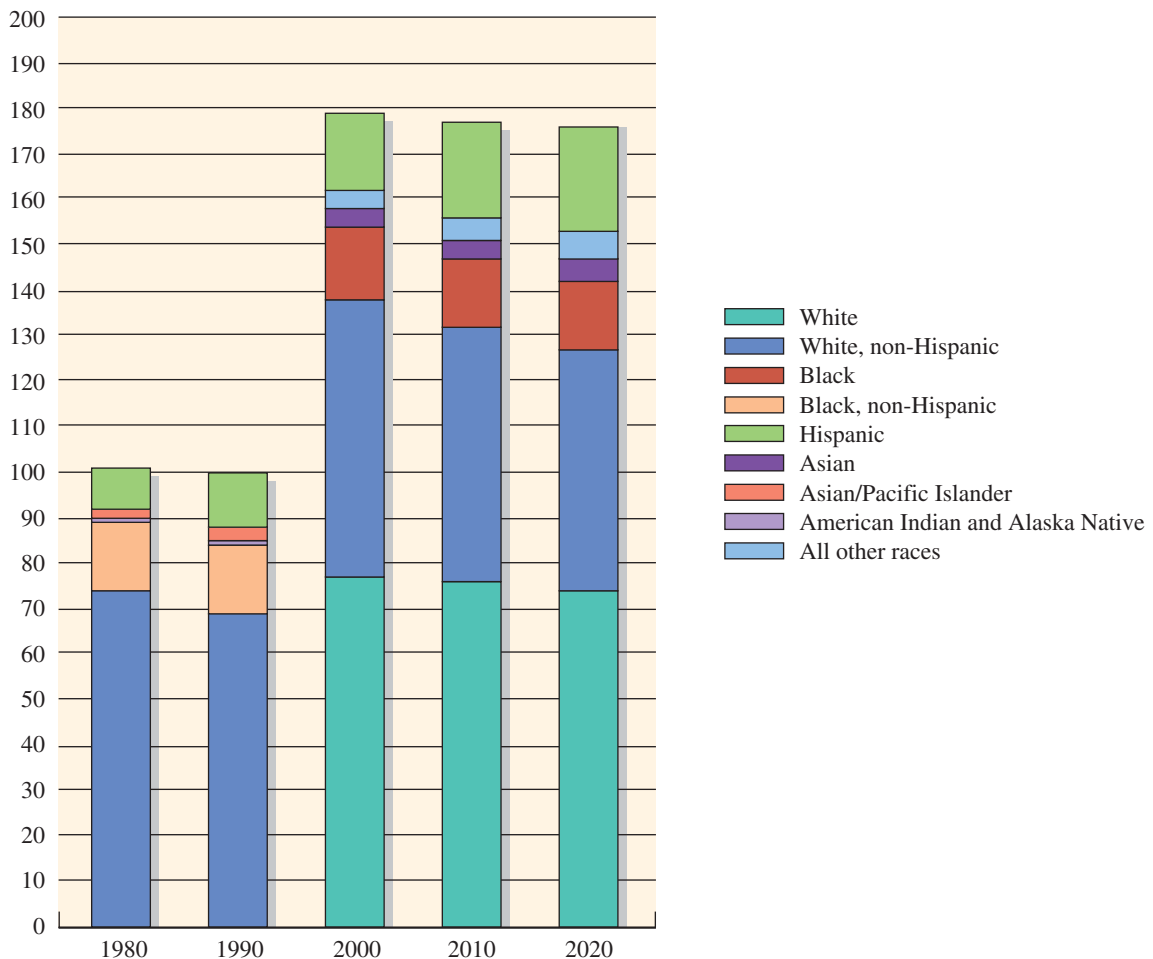
It is important to note that the above characteristics varied by family type, income level, ethnicity, language spoken at home, and maternal education.

FIGURE 1.6
 Portrait of America's Kindergartners: Class of 1998/1999

Source: National Center for Educational Statistics (2000a).

in five children in the United States will be of Hispanic origin. The Asian American child population is also expected to increase from 4 percent to 5 percent by 2010 (Federal Intergovernmental Forum on Child and Family Statistics, 2005). Figure 1.7 shows the growing diversity of the school-age population.

A major contributor to the increased diversity of America's schoolchildren is immigration. The United States is a nation of immigrants, but rates of immigration have varied considerably over different periods of our history. Currently, the United States is experiencing a period of high immigration, which began in the 1960s. By 1995, the number of foreign-born persons residing in the United States reached 25 million, and this figure has now risen to 33.5 million (Larsen, 2004). Before 1965, the majority of legal immigrants came from Canada and Europe. However, Asia and Latin America are now the major sources of immigration into the United States.



■ FIGURE 1.7

Changing Demographics of U.S. School Population

There is a growing diversity in America's school population. By the year 2020, one out of five children will be of Hispanic origin.
Sources: Federal Intergovernmental Forum on Child and Family Statistics (2005).

Immigrants tend to settle in areas where there are people of similar backgrounds and nationalities. In the 1990s, the majority of the immigrants who arrived in the United States settled in only six states: California, New York, Texas, Florida, New Jersey, and Illinois. In addition, according to 1990 census data, more than 90 percent of the foreign-born population resides in metropolitan areas, including Los Angeles, New York, Miami, Anaheim, Chicago, Washington, D.C., Houston, and San Francisco (National Research Council, 1997). However, geographic concentrations of immigrants are not static. One recent study of foreign-born settlement patterns suggests a decline in concentrated immigrant urban enclaves and more integration into native-born communities (Lichter & Johnson, 2006). For example, the 2000 U.S. Census noted that 297 counties across the United States had foreign-born populations exceeding 5 percent for the first time (Lichter & Johnson, 2006).

Due to recent increases in the number of immigrants living in the United States, schools are becoming more culturally and linguistically diverse. The number of children who spoke a language other than English at home or who had difficulty speaking English was 3 million in 2003, an increase from 1.3 million in 1979 (Federal Interagency Forum on Child and Family Statistics, 2005). This number represents approximately 5 percent of school-age children in the United States.

Children with Special Learning Needs

Beginning in 1975, with the Children of All Handicapped Act (PL 94–142), a number of laws have been enacted to ensure that children with disabilities have an equal opportunity, like other children, to a free and appropriate education. The current form of this legislation, the Individual with Disabilities Education Improvement Act (IDEA), includes a zero-reject mandate. That is, no matter the type and severity of the disability, a free public education cannot be denied. Table 1.1 shows the number of children (ages 3 to 21 years) served in federally supported programs for the disabled. From 1976 to 2004, the number of children who qualified for special education services increased from 8 percent to 14 percent of children, 3 to 21 years of age, served by federally supported programs (National Center of Educational Statistics, 2005). It is important for educators to understand that not only children with disabilities are covered under IDEA. As part of the Vocational Rehabilitation Act of 1973, children with medical or health needs are covered under Section 504. The conditions may include students with medical and health conditions, such as diabetes, asthma, sickle-cell anemia, cystic fibrosis, depression, drug addiction, and so on. Students with attention deficit hyperactivity disorders are also served under Section 504, if they are not eligible to receive services under IDEA. Thus, as discussed in the next section, educators today are being called to work with a more diverse population of students.

Changes in Rates of Childhood Poverty

Another significant factor affecting the status of America's children today is child poverty, which has both immediate and long-lasting negative effects on children's development. As you can see in Figure 1.8 on page 16, rates of poverty among children under the age of 18 have fluctuated since the early 1980s, and these poverty levels depend on the racial or ethnic background of the child. Childhood poverty reached a peak in 1993, when more than 22 percent of children under the age of 18 lived in poverty. In 2004, 13 million children (18 percent) were poor. Children continue to represent a large portion (35 percent) of the poor population in the United States. Poverty rates are the highest for children under the age of 18 than for any other age group. Additionally, 8 percent of children in 2003 lived in families

TABLE 1.1 Children with Disabilities, Ages 3 to 21, Served in Federally Supported Programs for the Disabled, 2003–2004

| Disability | Number | Percent of Identified Students |
|-----------------------------------|-----------|--------------------------------|
| Specific learning disability | 2,831,000 | 42.7 |
| Speech or language impairment | 1,441,000 | 21.7 |
| Mental retardation | 593,000 | 8.9 |
| Emotional disturbance | 489,000 | 7.4 |
| Hearing impairments | 79,000 | 1.2 |
| Orthopedic impairments | 77,000 | 1.2 |
| Other health impairments | 464,000 | 7.0 |
| Visual impairments | 28,000 | .4 |
| Multiple disabilities | 140,000 | 2.1 |
| Deaf-blindness | 2,000 | 0.0 |
| Autism and traumatic brain injury | 166,000 | 2.8 |
| Developmental delay | 305,000 | 4.6 |
| All disabilities | 6,633,000 | 100.0 |

Source: National Center of Educational Statistics (2005).

Approximately 14 percent of young people between the ages of 3 and 21 years are served by federally supported programs for the disabled. Students with a specific learning disability represent the largest group served by federal programs.

with total incomes of less than half of the poverty line, or \$9,403 a year for a family of four (Federal Interagency Forum on Child and Family Statistics, 2005). Overall, the United States has the highest child poverty rate of any industrialized country. U.S. child poverty rates are two to three times higher than those reported by the United Kingdom, Canada, Germany, Sweden, or France.

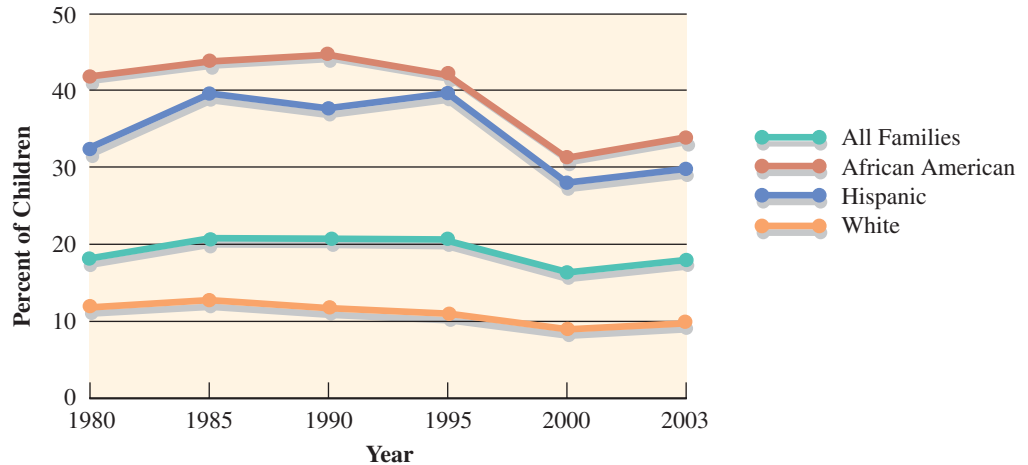
Contrary to cultural stereotypes, a majority of poor children are non-Hispanic whites. In actual numbers, approximately 9 million white children live in poverty. Poverty rates, however, tend to be higher among African American and Hispanic populations. Because African American and Hispanic children make up a smaller proportion of the total child population, the percentage of poor children in these groups is considerably higher than that of non-Hispanic whites, as shown in Figure 1.8 on page 16. Whereas 10 percent of the total population of white children in 2003 were poor, the comparable figures were 34 percent for African American children and 30 percent for Latino children (Federal Interagency Forum on Child and Family Statistics, 2005).

Changes in Family Structures

Another significant change affecting the status of children today is the rise of single-headed households. The number of parents living with a child is generally linked to quality of care and amount of economic resources available to that child. Research indicates that children who live with just one parent are more likely to have family incomes below the poverty line. The percentage of American children living with two parents has declined from 85 percent in 1970 to 68 percent in 2004 (Federal Interagency Forum on Child and Family Statistics, 2005). We will examine some of these changes more closely in Chapter 8.

FIGURE 1.8

Percent of U.S. Children Living in Poverty by Ethnic Group
 Poverty rates for children differ by ethnic group. Poverty rates are 34 percent for African American children and 30 percent for Latino children.
 Source: Federal Interagency Forum on Child and Family Statistics (2005).



Implications for Schools

A summary portrait of America's children today is presented in Figure 1.9. How will the current status of children and youth affect schools? First, as mentioned, there are record numbers of elementary and secondary students enrolling in private and public schools today. Since 1990 school enrollment figures have increased by 19 percent. Between 2002 and 2014, a further increase of 4 percent is expected, with increases projected in both public and private schools (Hussar, 2005). Increases in the school population are placing an added burden on schools that are already dealing with overcrowded classrooms, rundown facilities, and teacher shortages. In addition, statistics indicate that the majority of teachers today are in their mid-forties, and this group of teachers is expected to retire within the next 5 to 10 years (National Governor's Association, 2000).

As described, an increasingly diverse group of schoolchildren is coming to school. One of the challenges for educators will be to provide equal educational opportunities to students from various cultural backgrounds. Despite 30 years of desegregation and bilingual education legislation, national test scores of Hispanic and African American students lag behind those of white and Asian students. For example, the most recent NAEP assessment showed that the average scores of 17-year-old African American students were about the same as those of 13-year-old white students in mathematics and reading (Perie & Moran, 2005). Compared with white and Asian students, African American and Hispanic students are less likely to take advanced courses in mathematics and science (National Center for Educational Statistics, 2000b), and they have lower graduation rates.

The educational progress of some students is complicated by language barriers. As has been mentioned, approximately 5 percent of schoolchildren speak a language other than English at home. The majority of these children speak Spanish at home, and most language-minority children, approximately 3 million, are found in the elementary grades (Kindler, 2002; Federal Interagency Forum on Child and Family Statistics, 2005). As the Latino population expands, more and more teachers will be working with students with limited English proficiency, or English-language learners. However, only 12.5 percent of teachers possess 8 hours of more of recent training to work with this population (Reeves, 2006). At present, teachers and administrators are not sufficiently prepared to teach these language-minority children.

More important, as has been discussed, a disproportionate number of both Hispanic and African American families are poor. Poverty rates also tend to be more persistent

A Portrait of America's Children

- One in two preschoolers has a mother in the labor force.
- One in two will live in a single-parent family at some point in his or her childhood.
- One in two will never complete college.
- One in three is born to unmarried parents.
- One in three will be poor at some point in his or her childhood.
- One in three is behind a year or more in school.
- One in four lives with only one parent.
- One in four was born poor.
- One in five is poor now.
- One in five was born to a mother who did not graduate from high school.
- One in five has a foreign-born mother.
- One in six is born to a mother who did not receive prenatal care in the first 3 months of her pregnancy.
- One in six has no health insurance.
- One in eight will never graduate from high school.
- One in eight was born to a teenage mother.
- One in 12 lives at less than half the poverty level.
- One in 12 has a disability.
- One in 13 was born with low birth weight.
- One in 24 lives with neither parent.

■ FIGURE 1.9

A Portrait of America's Children

Source: Children's Defense Fund (2000).

among ethnic minority families. One study showed that 24 percent of African American children who were under age 4 in 1968 lived in poverty for 10 of 15 years. The comparable figure for white children was less than 1 percent (McLoyd, 1990).

The negative consequences of poverty on children's development are well documented (Bradley & Corwyn, 2002; Duncan & Brooks-Gunn, 1997; Sherman, 1997). Poor children are more likely to be born prematurely or at a low birth weight, and they are at greater risk for malnutrition and health problems during early development. Poor children are twice as likely as other children to have impaired vision, hearing problems, and anemia. Many poor children live in substandard houses where they are exposed daily to structural, electrical, and sanitation hazards.

Poor families also make up a large percentage of homeless people in the United States. It is estimated that 1.35 million school-aged children are homeless (Institute for Children and Poverty, 2005), but only 77 percent attend school regularly (U.S. Department of Education, 2002). The Focus on Teaching box on the next page presents a summary of different school programs for homeless children.

In terms of school performance, poor children are likely to experience many educational setbacks. By the time they enter school, poor children are already behind their



Focus on Teaching

The homeless population, once stereotyped as the fate of unemployed alcoholics or schizophrenic bag ladies, has experienced a demographic shift, leaving an estimated over half a million children sleeping homeless each night (U.S. Department of Education, 2000). Homeless families face a number of barriers upon enrolling their school-age children in school, and if enrollment is in fact allowed, the children may experience difficulties of acceptance, misplacement, and misunderstanding among peers and teachers.

The U.S. Congress passed the Stewart B. McKinney Homeless Assistance Act of 1987 to facilitate the enrollment of homeless children in public schools. The act makes provisions for each state to have an Office for Coordination of Education of Homeless Children and Youth, and to review and revise practices that impede homeless children's access to public school. Each state is also required to have an approved plan for addressing problems associated with the children's enrollment, attendance, and success in school (U.S. Department of Education, 1999). With the increasing prevalence of homeless children in schools today, it is essential that comprehensive support programs are available to help schools address the emotional, social, developmental, educational, or health problems that often afflict homeless children. Some examples of such school programs that can serve as models for further development include:

- **City Park School in Dallas, Texas.** Staff members have been successful in assisting new students in feeling accepted, and they provide support for academic

School Programs for Homeless Children

and psychosocial needs. There is a strong emphasis on basic skills. School supplies are given to the students, and parents are referred to medical and social services.

- **Our House, in Decatur, Georgia.** This agency provides free, quality day care to homeless children between the ages of 2 months and 6 years who live in shelters in the county. Children are cared for on an emergency basis until they can begin school. The program provides a safe space, a healthy diet, health care, cognitive stimulation, and emotional support to young children.
- **Grace Hill Family Center in St. Louis, Missouri.** This program provides shelter-based educational services for homeless parents and children. The program's first priority is to enroll shelter children in school. A peer counselor works with school officials and families to place children in preferred schools, ensuring that records are transferred, transportation is arranged, and teachers are informed of any special needs. Volunteers provide child care for children or parents looking for employment and tutoring for school-aged children.
- **First Place in Seattle, Washington.** This elementary school project is designed to meet the educational and emotional needs of homeless children. Space as well as transportation from shelters is provided by the Seattle public schools. The program operates in two classrooms for children from kindergarten through sixth grade. The program offers nutritious meals, academic work, and a quiet time for reading. Teachers give individual attention, counseling, and extra help with schoolwork when needed.

Source: Stronge & Reed-Victor (2000).

middle-class classmates on scores in standardized tests of achievement and intelligence (Children's Defense Fund, 2005, National Center for Educational Statistics, 2000b). Illness and malnutrition can cause children to be less attentive, less motivated, and more irritable, which can lead to behavioral and learning problems in the classroom. As a result, a disproportionate number of low-income children are placed in special education or are retained in a grade.

The educational problems of poor children are further complicated by schools they attend. A relatively high percent attend poor schools with fewer financial and material resources to help these students. For example, teachers in poor schools are two to four times more likely to report inadequate supplies of books, learning materials, and audiovisual equipment, including computers (Sherman, 1997). By the time they reach adolescence, children from low-income families are more likely to drop out of school early. Rates of school truancy, juvenile delinquency, and teenage pregnancy are also higher among children from poor families.

It is clear that poverty can have negative pervasive effects on children. However, many children are resilient and able to overcome tremendous obstacles. That is, not all poor children grow up to be high school dropouts, juvenile delinquents, or teenage parents. As we shall see later, some children are less vulnerable than others to the effects of poverty. Parents, schools, and resources in the community can protect children from the devastating effects of poverty.

Perspectives on Children's Development

So far we have discussed various reasons why teachers need a working knowledge of children's development and of the status of children today. In this section, we will begin to examine the theories child development experts use to explain children's development. First, we will discuss how theorists define development and what they view as the important issues of debate. Next, we will look at five different perspectives on children's development: biological, psychoanalytic, behavioral, cognitive, and contextual. This section serves as an introduction to the theories that will be discussed in later chapters.

Why so many theories of development? Suppose you have a girl in your classroom who frequently starts fights with classmates. How would you explain her behavior? There are a number of possible explanations. Perhaps she is not getting enough care and affection at home and is therefore acting out to get attention. Perhaps she has not learned how to control her emotions. Perhaps she has not learned more socially acceptable ways of relating to others. Or, it may be that this student is watching too many violent television shows and is simply imitating the behavior of television characters. Each of these explanations suggests a different form of intervention. Developmental theories provide several frameworks for understanding and interpreting children's behavior. Generally, there are multiple explanations for a particular pattern of behavior, and most theorists agree that one theory of development is not sufficient to explain all we know and observe about children. Therefore, it is best to have a repertoire of different child development theories from which to draw.

Definitions and Issues

Development as used in this text refers to changes in the child that occur *over time*. Although there are differences among theorists, most agree that development represents systematic and successive changes that enhance a child's overall adaptation to the environment. Development is not just any change that occurs as the child matures. To be labeled *developmental*,



The school population in the United States is more diverse than ever before.

Source: © O'Brien Productions/CORBIS.



Focus on Research

Two early philosophers, John Locke and Jean-Jacques Rousseau, are considered the philosophical forefathers of developmental psychology. From the eighteenth century until today, these philosophers have greatly influenced our beliefs about the nature of children and how they should be educated. Current debates concerning the role of education in children's lives can be traced back to these early philosophers.

John Locke (1632–1704)

English philosopher John Locke proposed that the child's mind is a blank slate, or *tabula rasa*, on which experience makes its imprint. Children are neither good nor bad; they become that way by virtue of how they are treated. In his book *Some Thoughts Concerning Education*, Locke (1902) compared the formation of the child's mind and attitudes to the "fountains of some rivers, when a gentle application of the hand turns the flexible waters into channels, that make them take quite contrary courses" (pp. 1–2). Locke recognized that children were born with different temperments and propensities, but he believed that a child could be infinitely improved and perfected through experience, humane treatment, and education. Locke further believed that adults could mold children's moral character and intellect by conditioning them to have the right habits. In Locke's conception of children we find the roots of behavioral approaches to education, which emphasize the importance of reward and punishment in shaping children's behavior. Key to this perspective is the assumption that children are mostly a product of their environment.

Jean-Jacques Rousseau (1712–1778)

Jean-Jacques Rousseau, a Swiss-born philosopher, introduced a romantic conception of childhood. For Rousseau, a child is born in a state of natural goodness. Adults should not shape children forcibly but protect them from the pressures of society and allow them to develop naturally. Rousseau (1762/1911) presented his views on education in *Emile*, a story about a boy and his tutor. Emile passes through several stages of development, and the tutor provides experiences that are appropriate to his needs at the time. Rousseau believed that each dimension of development (physical, mental, social, and moral) followed a particular schedule that should be respected and protected. According to Rousseau, children

The Educational Legacy of Locke and Rousseau

are incapable of true reasoning until the age of 12. During the early period of development, children should be permitted to learn through discovery and experience. In Rousseau's conception of the child, we find the roots of child-centered approaches to education. Key to this perspective is the assumption that the curriculum must evolve from the natural capacities and interests of the child, and it must foster the child's progression toward higher stages of development.

Locke, Rousseau, and Education Today

Locke and Rousseau expressed very different views about the role of education in children's lives. The concept of the child as a blank slate allowed early educational reformers to "dream of schools as institutions for creating a perfect society" (Spring, 1994, p. 29). Because Locke's conception of the child stressed the role of the environment in children's development, it continues to have a powerful influence on education. Today, traces of Locke's "malleable child" can be found in educational reforms that call for higher test scores, tougher promotion standards, stricter discipline, more homework, and better-trained workers.

Rousseau's romantic view of children had the most influence on educational reformers of the twentieth century who rejected the emphasis on passivity, conformity, and authority in schools (Spring, 1994). Elements of Rousseau can be found in the writing of John Dewey (1859–1952), one of the most influential educational reformers of this century. In *The Child and Curriculum*, Dewey expressed the basic principles of child-centered education:

The child is the starting point, the center, and the end. His development, his growth, is the ideal. It alone furnishes the standard. (Archambault, 1964, pp. 342–343)

Dewey's approach to education emphasized student interest, student activity, group work, real-life learning experiences, and cooperation. Dewey's philosophy influenced educational reforms in the progressive period of the early 1900s and in the mid-1960s to early 1970s, when open classrooms, discovery learning, and other activity-based curricula were introduced. In recent years, the view that education should be appropriate to a child's stage of development has influenced efforts to reform public school programs for young children (Bredekamp & Copple, 1997) and young adolescents (Carnegie Council on Adolescent Development, 1989).

the changes must follow a logical or orderly pattern that moves toward greater complexity and enhances survival. Developmental changes in language, for example, involve more complex forms of speech and language that enable children to better communicate with people in their environment.

For the purposes of this discussion, we define a **theory** as a set of general statements (rules, assumptions, propositions, or principles) used to explain facts. When applied to child development, a theory provides a framework for observing, interpreting, and explaining changes in the child over time. More specifically stated, the three purposes of a developmental theory are to describe how children differ from one age to the next, describe how different aspects of development are interrelated (e.g., influence of cognitive development on peer relations), and explain why development proceeds in a certain direction.

It would be easy to understand children's development if there were just one overarching theory. But, as suggested earlier, there are several different theories of development. Each theory gives the "facts" of development a different meaning by organizing them differently, focusing on different aspects of development, and emphasizing different causal factors. For example, some theories focus on intellectual development, whereas other theories focus on physical or social development. Theories of development also differ with respect to the position they take on certain basic core issues. Among the issues most relevant to educators are the following:

Nature versus nurture. To what extent is development a function of innate biological processes, environmental conditions, or some interaction of the two?

Stability versus plasticity. Are there critical periods in which a child must have certain social or cognitive experiences in order to develop normally? Are developmental processes highly malleable and open to change at any point in the course of development?

Continuity versus discontinuity. Is development a continuous process that occurs gradually in small increments? Is development a series of discrete stages that represent major and abrupt transformations in functioning?

Passive versus active child. What is a child's role in the developmental process? Is the child a passive organism that is simply shaped by genetic or environmental influences? Are children active agents who shape, control, and direct their own development?

Endpoint versus no endpoint. What is it that develops? Is there an endpoint to development? Do all children follow a universal sequence of development?

As a general introduction to the theories that will be discussed in later chapters, we will compare different theoretical perspectives on development with regard to their positions on the basic issues just described. An understanding of these issues is important for two reasons. First, debates about children's development often play a major role in educational reform movements. As described in the Focus on Research box on the previous page, educational reformers often share different beliefs about the nature of children and how they should be educated. Second, we have seen that teachers use different theories to explain children's behavior and to make instructional decisions. These theories, in turn, involve different assumptions about the nature of the child, the sources of development, the nature of development, and so forth. In adopting one or the other view, teachers need to be cognizant of the assumptions they are making about children's development.

Biological Theories

Early pioneers in developmental psychology explained children's development in terms of innate biological processes. Human characteristics "bloom" like a flower according to a predetermined biological timetable. A child goes through invariant, predictable stages of growth and development. According to this perspective, the environment provides the basic nutrients for growth, but it plays little or no role in determining the sequence of development. Moreover, children passively respond and adjust to the changes that occur with age.

Biological theories have been used to explain changes in height, weight, language, mental abilities, motor skills, and many other characteristics. One of the most influential maturational theorists in education is Arnold Gesell (1880–1961) who, along with his colleagues at the Yale Child Development Clinic, established age norms for growth and behavioral change in 10 major areas of development (Gesell & Ilg, 1946; Gesell, Ilg, & Ames, 1956). Gesell and his colleagues also introduced the concept of *readiness*. Learning could occur only if a child was biologically "ready." If a child is unable to perform the activities predicted to be achievable at a specific age, he or she simply needs more time to mature. This view comes closest to the *nativist* theory of development described previously in the section on teachers' beliefs.

A more contemporary version of this biological perspective on development can be found in the study of **behavioral genetics**. Geneticists tell us that many of our physical characteristics (e.g., body type, eye and hair color, skin color) are inherited. Moreover, many of the traits that make us uniquely human (e.g., ability to stand on two legs, speak, think abstractly) are also inherited. We also know that some forms of mental retardation, such as Down syndrome, are caused by chromosomal abnormalities. Behavioral geneticists study the degree to which psychological traits (sociability, aggression, criminality, affective disorders) and mental abilities (intelligence or creative talents) are inherited. Just as many of our physical characteristics are determined by heredity, behavioral geneticists argue that many of our psychological attributes also have a genetic component. For example, as we will discuss in Chapter 4, some researchers have argued that as much as 60 percent of the variation in intelligence within a given population is due to genetic differences (Herrnstein & Murray, 1994). The comparable statistic for personality traits can range from 5 to 40 percent. In reviewing research on behavioral genetics, one researcher concluded: "Genetic influence is so ubiquitous and pervasive that a shift in emphasis is warranted: Ask not what is heritable, ask what is not heritable" (Plomin, 1989, p. 108).

Although research on behavioral genetics suggests that many of a child's traits and abilities may be influenced by biological factors, most theorists today recognize the important roles of the environment and experience in this developmental process. A child born with a genetic predisposition, such as shyness, may not necessarily grow up to be a shy adult. The actual emergence or appearance of this genetic trait will depend on the child's environment. However, a child's genetic traits can shape that environment in several interesting ways. Shy children, for example, may elicit different reactions from others or choose to engage in more solitary activities than highly sociable children. Therefore, the child's genotype and environment are often strongly related (Plomin, DeFries, & Loehlin, 1977; Scarr & McCartney, 1983). In Chapter 2, we will discuss in more detail how genetic and environmental factors can work together to influence children's development. Current research on behavioral genetics suggests that development is a complex interplay between genes and the environment (Plomin, 1990).

Psychoanalytic Theories

Psychoanalytic theories focus on developmental changes in the self and personality. Psychoanalytic theorists such as Sigmund Freud (1856–1939) and Erik Erikson (1902–1994) saw development as a *discontinuous process* that follows a series of discrete stages. At each stage of maturation, certain drives, needs, or conflicts emerge that influence the way a child relates to the environment. These stages are summarized in Table 1.2. Each stage builds on the previous one and represents *qualitative changes* in the child’s personality structures or sense of self.

According to psychoanalytic theories, the ways in which children deal with their needs at different ages set the patterns for personality development. For example, toddlers who are harshly punished for accidents during toilet training could develop feelings of shame and self-doubt that affect later development. Erikson, more than Freud, recognized that societies have agreed-upon ways of meeting a child’s needs, but maturation still determines when certain personality dimensions emerge. In addition, Erikson believed that development is a lifelong process, whereas Freud maintained that the basic structures of the child’s personality are laid down within the first 5 years of life. In other words, there is a **critical period** for personality development.

Behavioral Theories

At the opposite end of the nature–nurture continuum are behaviorist perspectives on development. Behaviorists maintain that developmental changes in behavior are influenced by the environment, and the major mechanisms of development are principles of learning. A child’s level of maturation was of little importance to early theorists, but most behaviorists today take a more moderate position, which recognizes certain biological constraints on development (P. Miller, 1993).

Behavioral theories have been used to explain children’s development in several areas. John Watson (1878–1958), known as the father of behaviorism, examined the role of **classical conditioning** in the development of children’s emotions. Watson conditioned a young boy, Albert, to be afraid of a white rat by making a loud noise whenever the rat appeared. The child’s innate fear of loud noises (unconditioned response) became associated with the rat (conditioned response). After several learning trials, Albert showed the same fearful reaction when the rat alone appeared.

B. F. Skinner (1904–1990) argued that parents influence their child’s language development through the principles of **instrumental or operant conditioning**. When babies

TABLE 1.2 Stage Views of Development

| Age | Freud | Erikson | Piaget |
|------------------|---------|-----------------------------|---------------------|
| Infancy | Oral | Trust vs. mistrust | Sensorimotor |
| | Anal | Autonomy vs. shame | |
| Early childhood | Phallic | Initiative vs. guilt | Preoperations |
| Middle childhood | Latency | Industry vs. inferiority | Concrete operations |
| Adolescence | Genital | Identity vs. role confusion | Formal operations |
| | | Intimacy vs. isolation | |

begin to babble, parents react positively, repeat sounds, and reinforce the child for attempting to communicate. Parents respond more positively to sounds that resemble words than to sounds they cannot recognize as words. According to Skinner, this differential reinforcement increases the likelihood that certain sounds will be made again by the child. Behaviorists argue that the meaning of words and rules of grammar are acquired through the same principles of reinforcement.

Behaviorists also believe that children acquire new behaviors through the processes of *observation* and *imitation*. That is, children do not have to be explicitly reinforced for a behavior; they can simply observe a model, remember the behavior, and repeat it later. Observational or social learning theories have been used to explain developmental changes in aggression, social skills, sex-role behavior, attitudes, moral judgments, and standards of conduct (Bandura, 1989).

Behaviorists believe development is a gradual, *continuous* process. It represents small, *quantitative changes*, as the child acquires new skills and behaviors. Similar to maturational theories, children have a *passive role* in this developmental process. They simply respond to environmental inputs and store them away for later use. In addition, there is *no critical stage* for developing various cognitive, language, or social skills. If children are deprived of certain experiences early in development, they can acquire these skills later on. According to this view, there is a good deal of plasticity in development. Furthermore, there are no universal patterns of development because inputs are provided by the environment, which can vary from child to child.

Cognitive Theories

Cognitive theorists focus on the ways children construct their own understandings of their environment. Development occurs through the interplay between a child's emerging mental capabilities and his or her environmental experiences. These theories support the belief that both nature and nurture explain children's development. For this reason, the cognitive theories that we will examine represent an *interactional perspective*. That is, development takes place through the interaction of innate and environmental theories. In subsequent chapters, we will study three different cognitive theories of development: cognitive developmental theory, information processing theory, and social learning theory. Each of these theoretical perspectives is introduced here.

Cognitive Developmental Theory

Jean Piaget (1896–1980) is probably the best-known developmental psychologist in education. Piaget proposed that children pass through an invariant sequence of stages, each characterized by qualitatively different ways of organizing information and learning about the world. He divided cognitive development into four distinct stages, which were presented in Table 1.2. Key to this sequence is the development of symbolic thought, which begins in infancy and continues until thought processes are governed by principles of formal logic.

Piaget believed development represented *qualitative changes* in children's cognitive processes and structures. He also believed that all children pass through these cognitive stages in the same order, but not necessarily at the same age. That is, there is a *universal pattern* to children's cognitive development. In keeping with an interactional perspective, Piaget proposed that development takes place through the interaction of innate

and environmental factors. As a child matures, new possibilities become available that stimulate further development. These experiences, in turn, are interpreted in terms of what the child already knows. In this way, children play an *active role* in their own development.

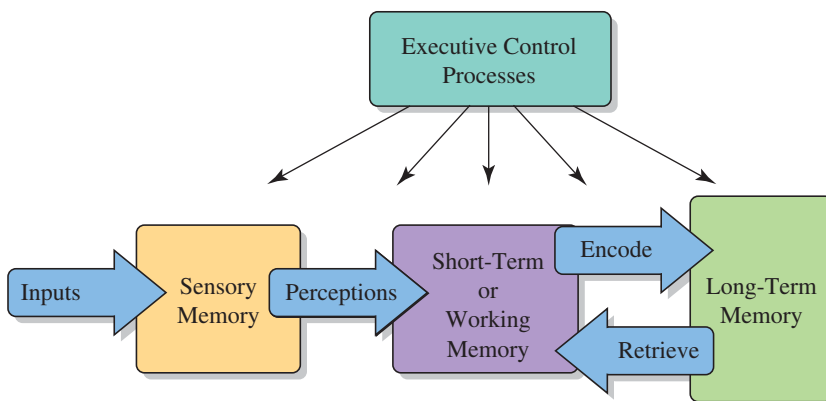
Information Processing Theory

Information processing theories provide another interactional view of development. Rather than focusing on how knowledge is organized at various stages of development, these theories focus on the precise steps involved in performing mental tasks. Information processing theorists use the computer as a model of human thinking. As with the computer, data must be entered, processed, and stored in a child's memory. The components of this information processing system are shown in Figure 1.10. The sense organs receive and pass along information, which is then transformed and recorded into memory by the child for later retrieval. According to this perspective, cognitive advances in thinking result from gradual improvements in children's attention, memory, and strategies for acquiring and using information. Therefore, development involves both *quantitative* (increases in amount of information stored) and *qualitative* (new strategies for information storage and retrieval) changes.

In a view similar to Piaget's, information processing theorists maintain that development results from an interplay between information from the environment and the state of a child's information processing system. The child's existing knowledge and cognitive skills influence his or her ability to acquire new understandings. Although information processing theorists recognize the importance of neurological development, they assume that the development of some cognitive skills can be accelerated with training. Numerous investigations have examined how children can be taught to use more sophisticated memory and learning strategies, but the positive effects of this training for young children are often short lived.

Social Learning Theories

Social learning theories help explain how children learn social behaviors, such as acts of helping and caring for others, aggressive tendencies, and behaviors appropriate for their



■ **FIGURE 1.10**
Model of Human
Information
Processing System

gender. Early social learning theories proposed that children learn new behaviors through observation and imitation. In a reformulation of this theory, referred to as *social-cognitive theory*, Albert Bandura (b. 1925) specified a number of cognitive factors that influence the process of social learning. In order to imitate models, children must be able to process and store information about social behaviors, to anticipate consequences for certain actions, and to regulate their own behavior. As these cognitive processes change with age, children become better able to learn from their social environments.

Similar to Piagetian and information processing approaches, social-cognitive theory maintains that children form mental representations of their social world. For this reason, a child has as much influence on the environment as the environment has on the child. This interplay between the child and the environment is captured in Bandura's concept of **reciprocal determinism** (Bandura, 1986). Children's mental representations of a situation or event influence the way they act and feel, which determines how others perceive and respond to them. These reactions, in turn, influence children's thinking and behavior in subsequent situations. Because social cognitive theory stresses reciprocal relations between a child's internal states (mental representations, perceptions, and emotions) and the environment, it represents an interactional perspective.

Contextual Theories

This last group of theories focuses on the influence of the social and cultural context on children's development. We know from cross-cultural research that there is considerable variability from culture to culture in what children are expected to learn, how they are expected to acquire information and skills, what types of activities children participate in, when children are allowed to participate in those activities, and so on. Contextual theories help to explain these social influences on children's development.

Contextual theorists assume a child has an *active role* in shaping his or her own development. As children mature, they actively seek different social and physical contexts. Activities within these contexts, in turn, change the children, which subsequently changes how they select and respond to activities in the future. However, in contrast to the interactional theories discussed earlier, contextualists emphasize that both the child and the environment are constantly changing, and changes in one often lead to changes in the other. Therefore, there can be *no universal patterns or endpoints* for development. Contextual theories offer a more complex view of development than other developmental theories. According to this perspective, development cannot be separated from the context in which it takes place. A brief description of two theories that fit the contextual framework—social-cultural theory and ecological theory—are presented here.

Social-Cultural Theory

Lev Vygotsky (1896–1934) was one of the first developmentalists to consider the influence of a child's social and cultural context. In his social-cultural theory of language and cognitive development, knowledge is not individually constructed; rather, it is co-constructed between people. Vygotsky believed that children are endowed with certain "elementary functions" (perception, memory, attention, and language) that are transformed into higher mental functions through interactions with others. Vygotsky proposed that talking, thinking, remembering, and problem solving occur first on a social plane between two people. As a child gains new skills and knowledge, the other person involved

in an interaction adjusts his or her level of guidance and assistance, which allows the child to assume more and more responsibility for the activity. These social exchanges are subsequently transformed and organized by the child into internal actions and thoughts the child uses to regulate his or her own behavior. Vygotsky believed that development involved *qualitative changes* as the child moves from elementary to higher forms of mental functioning, but he did not specify a set of developmental stages. There are no universal patterns of development in Vygotsky's theory, because cultures differ with respect to goals for children's development.

Vygotsky believed that people structure a child's environment and provide the tools (e.g., language, mathematical symbols, art, writing) for making sense of it. Observe some mothers talking with their 3-year-olds, and you can see Vygotsky's ideas in action. The mothers' speech is slow, simple, and repetitive so that the children can understand what they are saying. Such children are fortunate, because not all mothers talk "baby talk" to their children. When one does, the mother and child are trying to negotiate a shared understanding of language. The child can understand simple sentences under these conditions, but this understanding may not generalize to other language contexts. A key assumption of Vygotsky's theory is that children may be able to demonstrate a higher level of cognitive competence under the guidance of more capable peers and adults.

Ecological Theories

Urie Bronfenbrenner (1917–2005) offers another contextual model of development. He envisions development as embedded in multiple contexts. In his view, "a child's world is organized as a set of nested structures, each inside the next, like a set of Russian dolls" (Bronfenbrenner, 1979, p. 22). As shown in Figure 1.11 on page 28 the child is at the center of this model; the child is born with certain temperamental, mental, and physical characteristics that create the biological context for his or her development. The child, however, does not develop in a vacuum. The next circle represents the child's immediate physical and social environment. It includes physical objects (toys, books, television, computer, etc.), as well as the family, school, peer group, and neighborhood. These settings are all embedded in a broader social and economic context. The outermost circle is the cultural context. It represents the shared beliefs, values, and customs of a culture, as well as subgroups within the culture. This larger context also includes major historical events, such as wars and natural disasters, that affect other ecological contexts.

A major assumption of Bronfenbrenner's bioecological model is that various subsystems (family, school, economic conditions) of this ecological scheme change over the course of development. Change can originate from within the child, as when the child enters puberty or suffers from a severe accident, or it can originate outside the child, as when there is a change in family status or a major historical event such as the Great Depression. Bronfenbrenner (1979) stated, "Whatever the origin, the critical feature of such events is that they alter the existing relation between the person and environment, thus creating a dynamic that may instigate developmental change" (p. 201).

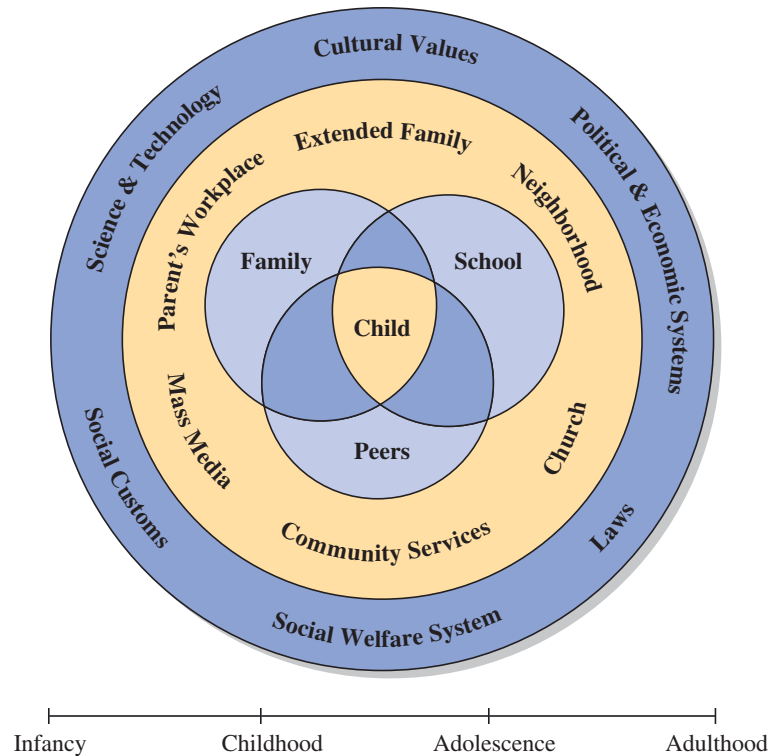
Another major assumption of Bronfenbrenner's ecological model is that changes at one level of the context can influence what occurs at other levels. For example, physical changes at puberty can lead to changes in the child's social relationships with peers, parents, and teachers, but these changes are also influenced by social conditions and by cultural expectations. We mentioned how in different cultures children are expected to assume adult responsibilities when they reach puberty. However, the specific nature of those expectations

■ **FIGURE 1.11**

Bronfenbrenner's

Bioecological Model

Source: After Bronfenbrenner (1979).



varies depending on the child's gender and economic situation within a particular culture as well. Bronfenbrenner's theory is useful for understanding complex interactions between biological and environmental effects, as well as relations between different environmental contexts (e.g., home and school). It also helps us understand that the environment in which children live is so complex and intertwined that development cannot be reduced to any one single source.

Importance of Multiple Theories

We have just described some of the theoretical assumptions underlying the various developmental theories that will be discussed in subsequent chapters. The specifics of each theory will be described in more detail later. For now, it is enough to recognize the importance of examining children's development from different theoretical perspectives. Some theories may provide a more adequate explanation than others, but all have a place in a teacher's repertoire. In combination they provide a better explanation of children's behavior than any single theory alone can.

Think back to Stanley's teacher. Most of the approaches she tried involved rewards and punishments, which are based on behavioral views of development. Although these approaches work for some students, they tend to be short lived because they do little to create a community of learning in the classroom. In subsequent chapters, we will draw on other child development theories to promote students' learning and engagement in the classroom.

Before moving to the next section, it is important to recognize that the theories presented in this chapter are themselves human constructions that reflect a certain situation,

time, and place. Because theories are human constructions, many of the “facts” of development discussed in subsequent chapters are open to question and further interpretation. It is helpful to think of these theories not as statements of “essential truths,” but as ways of thinking and talking about children’s and adolescents’ development in the classroom.



Studying Children’s Development

We have just discussed some different theoretical frameworks for understanding children’s development. Now let’s examine how researchers actually study various aspects of children’s development. An understanding of research methods is important for prospective teachers for two reasons. First, as a professional teacher you will attend conferences and read articles that focus on different aspects of children’s development. To be a critical consumer of this research, you must be able to judge the quality and validity of different studies. Some methods of study are thought to be more valid and reliable when compared to other methods. Second, as a teacher you will function as a researcher in your own classroom. For example, a teacher might be interested in the following sorts of questions: Are students more involved in learning when I give them a choice of activities? Does concept mapping help students to organize and retain information? Does peer tutoring have a negative or positive effect on children’s learning and confidence? Does peer tutoring have the same effect on both low- and high-achieving students?

Observations, interviews, experiments, and surveys can help teachers understand how best to facilitate children’s learning and development in their own classrooms. In this last section, we will examine the various research designs and methods researchers use to describe and to explain children’s development. After reading this section, you will better understand the research findings discussed in later chapters. We will also discuss how to judge the quality of a study. And, finally, we will consider ethical issues in child development research.

UNDERSTANDING
CHILDREN
*Observation Guide,
Chapter 2*

Research Designs

A **research design** is the plan or structure of an investigation. The type of design selected depends, in part, on the investigator’s research question. The first step in any scientific study is to define the question to be studied. For example, a researcher may want to know, Does aggression increase or decrease with age? The researcher then reads existing research on this topic and formulates a hypothesis. A **hypothesis** is a statement derived from theory that has not yet been validated. With the exception of case studies or other descriptive types of studies (observations and interviews), the researcher is examining associations between sets of variables. An **independent variable** is defined as the behavior or characteristic believed to influence a particular outcome or result, which is called the **dependent variable**. In the example here, the researcher may hypothesize that children become more aggressive as they get older. Age is the independent variable, and aggression is the dependent variable. Having formulated a research hypothesis based on previous studies, the next step is to choose an appropriate design for testing the hypothesis.

The six most commonly used research designs in developmental research are single-subject cases, correlational studies, longitudinal designs, cross-sectional designs, cross-sequential designs, and experimental interventions. These research designs for describing and explaining children’s development differ with respect to complexity, efficiency, and the

TABLE 1.3 Advantages and Disadvantages of Different Research Designs

| Type of Design | Advantages | Disadvantages |
|----------------------------|--|--|
| Case study | Provides detailed information of one person's behavior. Can be used as starting place for future investigations. | May reflect observer bias. May not generalize to other situations. |
| Correlational studies | Can be used with large samples for testing associations between different variables. (e.g., age and self-esteem). | Cannot be used to test cause-and-effect relations. |
| Longitudinal studies | Provides information on changes in individual behavior over time. Can be used to test the stability of behaviors and cause-and-effect relations. | Very costly and take years to complete. If study spans several years, participants can become test-wise or drop out of the study, biasing results. |
| Cross-sectional studies | Can be used with large samples to examine developmental changes. May be completed within a few months. Useful for establishing age norms. | Cannot establish cause-and-effect relations. Do not provide information on the stability of behavior. |
| Cross-sequential studies | Combine the advantages of longitudinal and cross-sectional designs. | Not frequently used or well understood. |
| Experimental studies | Conditions of study are well controlled. Degree of control is highest in laboratory studies; study participants are randomly assigned to treatment and control groups. | Involve small samples and if conducted in the laboratory may not generalize to other settings. |
| Quasi-experimental studies | Utilize comparison groups without random assignment. | Difficult to control for all possible differences between groups. |

kinds of questions they can answer. As summarized in Table 1.3, each has its own advantages and disadvantages.

Case Studies

A **case study** is an in-depth investigation of one person or a small group of individuals (e.g., a family, a peer group). Some of the earliest discoveries about children's development have been based on case studies. In the 1800s, for example, Charles Darwin kept a detailed diary of his son's emotional expressions. This diary became the basis for his theory of emotional development in infants and children. Freud kept detailed notes of individual patients that he and other psychoanalysts relied on heavily in their research. Piaget recorded the developmental progress of his children and incorporated his findings into his theory of children's cognitive development.

A case study that has helped researchers understand language development is the story of Genie (Curtiss, 1977). Genie (not her real name) was confined to a small room where no one spoke to her from the age of 20 months until a caseworker found her when she was 13½ years old. When she was discovered, she weighed only 59 pounds and could not speak. During the next 9 years, Genie received intensive therapy to help her learn to speak. However, her language development never approached that of a normal adult. At last report, Genie, in her 30s, was living in a group home for retarded adults, and her language was still not normal.

Case studies provide useful, in-depth information about an aspect of development, such as language or cognition. From studies on subjects such as Genie, we have learned

much about the effects of social isolation on language acquisition. This case study also suggests that there may be a critical period for language development, because Genie was never able to acquire normal language taught to her as an adolescent and adult. The chief limitation of a case study is that it is difficult to make general statements about development from a single case: The results may be unique to the individual being studied. In Genie's case, for example, it may be that poor nutrition and physical abuse, both of which can cause brain damage, prevented her from acquiring a language. It is not possible to make conclusions about cause-and-effect relationships. Furthermore, case studies are vulnerable to "observer bias." That is, the researcher may emphasize one aspect of development and ignore other areas. Thus, case studies may provide valuable information about an individual child, but their results may not tell us much about children in general.

Correlational Studies

Correlational studies are perhaps the most widely used design in developmental research. These studies tell us what factors influence or are associated in a positive or negative way. For example, it is commonly believed that school achievement is positively related to self-esteem; students who do well in school feel good about themselves. A researcher could test this hypothesis by administering a measure of self-esteem to a large sample of children and collecting information on their school achievement (grades, tests scores, teacher ratings, etc.). In this example, self-esteem is the independent variable, and achievement is the dependent variable. After collecting these data, the researcher would then examine relations between the measures of self-esteem and school achievement.

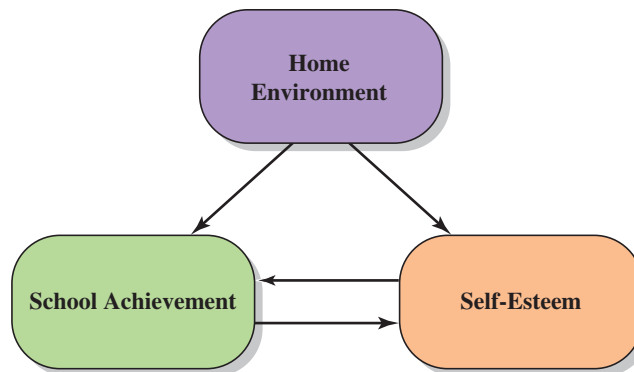
The strength of relations between measures is expressed by a statistic called a **correlation coefficient**. Correlations can vary from -1.0 to $+1.0$. If two measures are unrelated, then the correlation would be near zero. This finding would be interpreted to mean that higher or lower scores on one measure did not correspond with higher or lower scores on the other. If higher scores on the self-esteem measure corresponded with higher achievement test scores, then the correlation would be positive, somewhere between 0 and 1.0. If, however, higher scores on one measure were associated with lower scores on the second measure, then the correlation would be negative, somewhere between 0 and -1.0 . This finding means that as one score goes up, the second score goes down. A correlation is *statistically significant* when the relation between the two measures is stronger than would be predicted by chance alone.

As an example, most studies report a significant positive correlation between self-esteem and school achievement. However, a positive correlation does not mean that there is a **causal relationship** between the two factors (i.e., changes in one factor *cause* changes in the other). The results merely tell us the two factors are related in some systematic manner. We cannot tell whether higher self-esteem contributes to better school achievement or whether better school achievement contributes to higher self-esteem. That is, the direction of causality is unclear. In fact, both statements of causality could be correct. Moreover, a third variable, the home environment, could have a causal effect on both self-esteem and school achievement (see Figure 1.12 on page 32). *Therefore, correlational studies cannot be used to establish cause-and-effect relationships.* They are simply used to establish relations or associations among different measures.

Longitudinal, Cross-Sectional, and Cross-Sequential Studies

Recall that development involves changes in behavior over time. We discussed how correlational studies can be used to examine relations between age and various behaviors, such as aggression or self-esteem. Two other research designs are widely used to study changes in behavior over time: longitudinal and cross-sectional designs.

■ **FIGURE 1.12**
*Model of Positive
 Correlation Between
 School Achievement
 and Self-Esteem*



A positive correlation does not mean that positive achievement *causes* children to have self-esteem. It is possible that positive self-esteem can lead to higher school achievement. In addition, a positive or negative home environment can affect both self-esteem and school achievement and explain their positive correlation.

In a **longitudinal study**, the development of one group of children is tracked over several years. Data of different aspects of development are collected on a regular basis. One well-known longitudinal study is Lewis Terman’s *Genetic Studies of Genius* (Terman, 1925; Terman & Oden, 1959), which began in 1922 and followed the lives of 1,500 individuals for 70 years. The initial selection criteria for this study was a superior score (top 1 percent of range) on an intelligence test at age 11. During the next 70 years, researchers collected data on the child’s early childhood experiences, education, personality characteristics, careers, families, physical and mental health, and adjustment to retirement.

Longitudinal studies can provide valuable information about individual development over time, so it is possible to examine the impact of early events on later development. For example, many working parents want to know how infant day care may affect their child’s development in the long run. Longitudinal studies also allow researchers to identify differences in behavior at different points of development (e.g., increases or decreases in aggression with age). In addition, it is possible to examine the stability of a behavior for individual children. For example, do shy children become lonely adults? In Chapter 4, we will discuss the stability of intelligence from childhood to adulthood. This information is drawn from longitudinal studies.

Although longitudinal studies have several advantages, there are several disadvantages that must be considered as well. First, longitudinal studies are costly and take years to complete. A researcher would need to wait 5 years or more, for example, to determine whether aggression increases or decreases during childhood. It is often difficult to keep the sample group intact, especially in our mobile society. There is also the danger that individuals become very “test-wise” if they are repeatedly assessed. And finally, the conclusions drawn from longitudinal studies must be considered in relation to when the study was completed. For example, the Great Depression and World War II probably had a strong influence on the lives of both men and women in the Terman study. Also, gender roles have changed a great deal since the 1940s, when most of the participants probably raised their families. The experiences of children and adults today are likely to be very different from those of children in the 1920s.

Another well-known design for studying developmental changes in children is a **cross-sectional study**. In a cross-sectional study, researchers select children of different ages and measure the factor under study. To use our familiar example, a researcher could study whether the nature and frequency of aggressive acts differ with age by measuring aggression in children of different ages (e.g., 5, 7, 9, and 11 years). Each age group should have a similar profile with regard to ethnic and gender ratios, socioeconomic background, schooling experiences, and so forth. The researcher would then compare groups in terms of their scores on some measure of aggression, such as frequency of fights at school as reported by peers and teachers. If the results showed a greater incidence of fighting among 9- and 11-year-olds than younger children, then the researcher would have evidence to suggest that aggression increases with age. Before drawing this conclusion, the researcher might check to make sure the finding was consistent for boys and girls and for different ethnic groups.

Cross-sectional studies are certainly faster and less costly than longitudinal studies. They can involve a wide age range of subjects and be completed within a couple of months. Cross-sectional studies are therefore useful for establishing **age norms**—the age at which certain characteristics emerge. Because the participants are sampled only once, there is less chance that the assessments will affect their behavior.

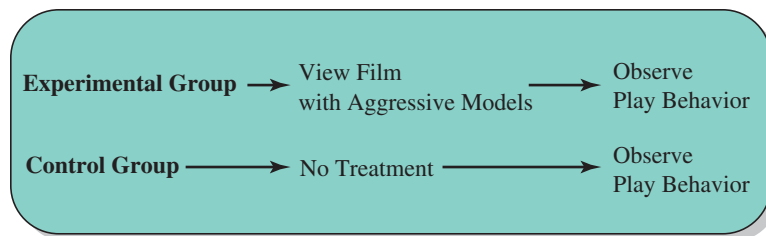
As with correlational and longitudinal studies, cross-sectional studies have some disadvantages that must be considered. First, this design does not actually study changes in behavior over time; it provides only an estimate of those changes. In addition, cross-sectional studies cannot provide information on early determinants of behavior. For example, it would not be possible to establish the effects of early cognitive stimulation on later intellectual development. Furthermore, as suggested, the participants for each age group must be carefully selected in order to rule out differences, other than age, that could bias the results. Last, a cross-sectional study cannot provide information about the stability of behaviors over time, because the same children are not followed over time. If you recall, one of the issues of debate in developmental research is the continuity versus discontinuity of development. To answer this question, longitudinal assessments of the same children are needed.

A compromise between longitudinal and cross-sectional studies is the **cross-sequential study**. In a cross-sequential study, children of different ages are selected and then followed for 2 to 3 years. Because there is a wide range of ages to begin with, this design is more efficient than a longitudinal study. By studying the same group of children over time, it is also possible to identify antecedents of behavior, as well as to assess the stability of behavioral patterns. Although sequential designs blend the best features of cross-sectional and longitudinal designs, they are not widely used. Most of the findings related to children's development over time come from either longitudinal or cross-sectional studies.

Experimental Studies

For testing cause-and-effect relations, most researchers rely on experimental designs. These studies are believed to yield the most conclusive cause-effect evidence. For this type of study, participants may be randomly or carefully selected and matched on a number of variables that could potentially affect the results (gender, ethnicity, family background, school achievement, etc.). In an **experimental study**, participants are randomly selected and randomly assigned to either of two conditions: an experimental or a control group. In the experimental condition, the children receive a treatment or intervention of some type. This condition is presumed to cause a certain behavior or outcome. In the control condition, the children do not receive the treatment. After the experiment, children are measured on some

■ **FIGURE 1.13**
*Model of the Bobo
 Doll Experiment*



outcome measure. If there is a significant difference between the two groups on this outcome measure, then the results support the hypothesis that the treatment *caused* a change in behavior.

Returning to our question about what causes childhood aggression, let's look at an example of an experimental study. In a classic study, a group of researchers examined the effects of adult models on children's aggression (Bandura, Ross, & Ross, 1963). The research design is outlined in Figure 1.13. Children who were assigned to the experimental condition observed a film in which adults showed aggressive behaviors toward a plastic "Bobo doll" or clown. After watching the film, the children played in a room that contained the doll and some other toys. Children in the control condition did not observe the film but were allowed to play in the room with the Bobo doll. The researchers observed the behavior of each child for 20 minutes through a one-way mirror. They used a behavioral checklist to assess children's aggressive and nonaggressive behaviors. The researchers hypothesized that children who viewed the aggressive model would act more aggressively afterward. In this example, the treatment, viewing a film with an aggressive model, is the independent variable, and aggressive play behavior is the dependent variable. The results confirmed the researchers' hypothesis that children can become more aggressive when they are exposed to aggressive models.

Experiments with randomized control trials are considered to be the "gold standard" in educational and psychological research today (National Research Council [NRC], 2002). However, in school settings random selection and assignment of students to different groups for research purposes is sometimes not possible, practical, or desirable. Under these conditions, researchers employ what is called **quasi-experimental**, or *causal-comparative design*, which involves comparing groups of interest without random assignment to different conditions. To make comparisons between groups possible, participants are matched on key characteristics (gender, ethnicity, socioeconomic status, and so on.) or statistical procedures are used to adjust for differences between groups (NRC, 2002).

As an example, let's consider a school district that is in the process of evaluating the effectiveness of an after-school tutoring program for struggling adolescent readers. The program is implemented in one middle school, and students are drawn from other middle schools in the district to serve as the comparison group. The schools selected do not offer the tutoring program, and the evaluation team is careful to create comparison groups of the same ages, gender, ability levels, and ethnicity. So far, so good! However, other factors such as the amount of time students read at home, their motivation to participate in the program, or some other unmeasured factor could explain differences found between the intervention and comparison groups. In quasi-experimental studies, it is necessary to control and rule out other possible explanations for the differences found between comparison groups. Otherwise, results from these studies can be misleading (NRC, 2002, p. 114). An example of a well-regarded quasi-experimental study examining the effects of age and education is described in the Focus on Research box on the next page.

Age and Education Effects on Cognitive Development: A Natural Experiment

Frederick Morrison and his colleagues (1995) have conducted a “natural experiment” to assess the effects of age and education on children’s cognitive development. The study uses what is known as the *school cut-off method*. Each school system specifies a certain cut-off date to determine when children can enter kindergarten or first grade. A child’s birthday must precede this date. For some schools, this cut-off date is December 31, whereas for other schools the date can be as early as March 1.

In Morrison’s research, “old kindergarten” children, who just missed the March school-entry date, were compared with “young first-grade” children, who just made the cut-off date. On average, this second group of children were 41 days older than the first group, but they had received an additional year of schooling. The two groups were carefully matched in terms of IQ, parental and occupational similarities, and day care experience at the time of school entry. Morrison’s cut-off method provides a way to separate the effects of age (maturation) and experience (education) on cognitive development. If the two groups are equal on cognitive measures, then age is assumed to be the primary driving force. On the other hand, if the young first graders outperform the old kindergartners, then educational experiences can be assumed to play a primary role in cognitive development.

Focus on Research



The results of Morrison’s natural experiment suggested that school-related experiences rather than age alone have a major impact on cognitive development. The young first graders showed better recall on a memory task than did the old kindergartners. The young first graders also showed greater improvement in their memory skills and performance during the school year than did the old kindergartners. In addition, the young first graders demonstrated greater phonemic awareness (i.e., ability to divide words into syllables or to differentiate sounds within one-syllable words) than did the old kindergartners. Both groups showed improvements in this area during the school year, but the young first graders made greater gains.

Because the two groups of children were about the same age, the development of memory and reading skills is not simply due to growing older. Rather, the results of this natural experiment clearly suggest that experience is an important factor in this developmental process. The young first graders performed better on memory and reading tasks than old kindergartners because they had more formal schooling. That is, their performance on these cognitive tasks was directly enhanced by schooling experiences that emphasized memorization and beginning reading skills. This research supports the conclusion that schools can have a powerful influence on children’s cognitive development.

Action Research

Before we turn to data collection methods, it is important to discuss another form of inquiry found in schools today. **Action research** is carried out by teachers, administrators, and other change agents in the school to improve the educational environment for their students. The goal of action research is not to understand general principles of children’s development and learning but to understand a specific problem or to improve teaching practices within a specific classroom or school setting. The Japanese “lesson study,” discussed earlier, is a form of action research.

Action research has many benefits for teachers. It empowers them to think critically about their own teaching practices, to identify areas in need of change, to find effective solutions, and to improve learning conditions for children under their care. Rather than to function as the recipients of research and knowledge, action research encourages teachers to be problem solvers and continuous learners.

Although there are a number of different models of action research, the basic process involves four steps. These are (1) selecting an area of focus and inquiry, (2) collecting data

and information, (3) analyzing and interpreting the data, and (4) developing and implementing a plan for action.

The first step of the process involves *selecting an area of focus or inquiry*. It is recommended that educators choose areas that involve a topic or problem related to teaching and learning they can change or improve, and then state a specific purpose or objective for their investigation. This statement should include the specific research questions that will be addressed, a definitions of variables, and the types of data to be collected (Mills, 2000). For example, a middle school teacher might want to study the social networks of her classroom to determine if students are interacting across ethnic or gender lines. She would need to define the type of interactions of interest and to identify some ways to collect information on interactions in her classroom.

The second step is to *collect data and information* that is appropriate and accessible. Several different data collection methods are described below and may be used in an action research plan. Generally, the nature of research problem or question determines the types of data collected, but sources may include archival records, interviews, focus groups, performance assessments, classroom observations, classroom maps or videos, surveys, journals, and other artifacts. It is best not to rely on one single source of data but to use multiple sources of information to identify common themes across data sources. The use of multiple data collect methods to compare findings across sources is known as **triangulation**.

Having collected relevant data and information, the next step is to *analyze and interpret* those data. The goal of analysis and interpretation is to summarize the data in a reliable and accurate manner. It is important to use the research questions to guide this analysis process, but new questions may emerge during data analysis that require additional data collection. Figure 1.14 portrays the spiral nature of action research. In interpreting the data, it is important to relate the results to findings in the literature or to theories of teaching and learning. The Focus on Teaching box on page 38 describes an action research study in which learning theories were used to interpret the influence of technology on mathematics learning.

The final step of action research is to articulate a *plan for action*. In developing an action plan, the teacher-researcher specifies what needs to be done related to the findings, who is responsible for carrying out the actions, who needs to be consulted or informed about these recommended actions, and how the effects of the actions will be monitored or evaluated. As we suggested in Figure 1.14, the implementation of an action plan can lead to additional research and data collection. Throughout the action research process it is important to keep in mind that the overall goal is to change or improve the educational environment for children.

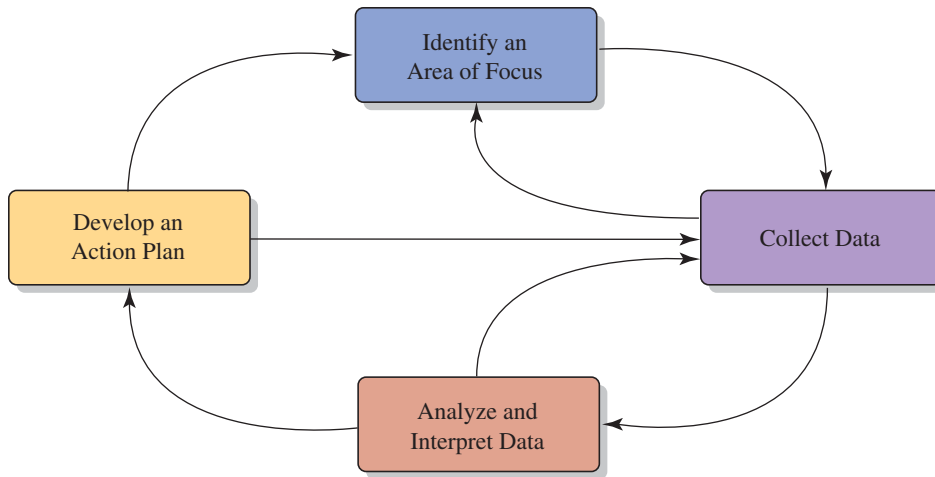
Data Collection Methods

We have just discussed different designs for describing and explaining children's development. In this discussion, several methods for collecting data on children were mentioned (e.g., standardized performance measures,



This teacher is sharing her classroom with an educational researcher. Classroom observations provide valuable and rich information about how children learn.

Source: David Young-Wolff/PhotoEdit.



■ FIGURE 1.14
*The Action
 Research Spiral*

behavioral checklists, self-ratings). The choice of a specific collection method will depend on the hypotheses being tested by the investigator. As we have seen with different research designs, each method of data collection has advantages and disadvantages.

Observations

Information on the development of young children is often collected through *direct observation*, a technique that is very important for teachers to master. When a child is observed in a controlled environment, such as a laboratory, this method is called a **structured observation**. Bandura's experiment with the Bobo doll involved a structured observation of children in a carefully controlled setting. When children are observed in their own environments, these data are called **naturalistic observations**. Regardless of which method of observation is used, observers must record their observations in some way. In some cases, the observer writes down everything the child is doing. In other cases, the observer may only be interested in, and therefore record, certain behaviors, such as acts of aggression. This technique is known as **event sampling**. Alternatively, the observer may use an observation coding sheet that contains a list of behaviors. The observer then checks off the behaviors that occurred within a predetermined time frame (e.g., every 5 minutes). This technique is known as **time sampling**. One disadvantage of this observation method is that the behavior of interest (e.g., fighting) may be so infrequent that the observer may have to wait a long time before seeing it. For this reason, some researchers may try to structure the situation so that the behavior is more likely to occur. For example, the researcher may place a very attractive toy in the toddler unit of a day care center as a way to increase the chances that children may fight over the toy. But as suggested earlier, this modification could make the observation situation more contrived.

In general, some type of time sampling is generally used in most observational studies. The main advantage is that it provides a systematic way of collecting observational data, making it possible to compare different children's behavior. The main disadvantage is that the coding procedure may not pick up infrequent behaviors. In addition, most time-sampling coding procedures provide only counts of behaviors. In some cases, researchers may want to know what preceded or followed a particular behavior. Figure 1.15 on page 39 presents a very simple set of procedures that teachers can use to observe their students' behavior in the classroom.



Focus on Teaching

Billabong Elementary School is a large K–7 school that has embraced the use of technology as a key component of its mathematics curriculum reform efforts. The principal of this school is described by his teachers as a visionary leader, and the school has a large collection of computer hardware and software because of the principal’s grant-writing efforts. The principal is committed to the use of technology at Billabong because he believes that it is necessary to prepare children for the twenty-first century.

A team of teachers at Billabong decided to conduct an action research project focusing on the impact of technology on student achievement. They decided to observe each others’ classrooms, interview teachers and children, analyze test data, and compare the mathematics curriculum taught with the teaching and learning standards proposed by the National Council of Teachers of Mathematics (NCTM). When the team presented its project to the rest of the faculty, all the teachers and the principal indicated that they would cooperate with the research team’s request for access to classrooms, curriculum materials, and so on.

The team’s initial visits to classrooms revealed that students had good access to computers, scanners, and printers. Most classrooms had at least six computers, and all children in one classroom had laptop computers to use for the year. The students were observed using the computers for their class assignments, creating hypercard stacks for creative writing, playing math games, and so on. Math centers featured different math manipulatives: base-10 blocks, place-value charts, colored chips, tangrams, geo-boards, and so on.

However, a closer look at the classrooms revealed a different story. In many of the classrooms, for example, children busily engaged with computers were playing math mazes. For the most part, the children were engaged in low-level activities, and the purpose of the learning activity was lost. Many children were also engaged in “drill-and-kill” activities that had little relevance to their math learning. In these classrooms, the

Using Technology to Enhance Mathematics Learning

computers seemed to function as an electronic worksheet to keep the students busy once they had completed their math assignments.

Interviews with children were equally revealing. When conducting the interviews, the research team asked the children to be honest and assured them that their responses would be strictly confidential. As it turns out, some children were brutally honest, telling in great detail the kinds of math activities their teachers used on the computers. Some activities were singled out by the children as a “waste of time,” and some children described teachers as “not having a clue” about how the computers were really being used.

Interviews with teachers revealed other problems. Many of the teachers knew very little about the NCTM standards and continued to use their “tried and proven” curriculum in spite of a new textbook adoption by the principal. In fact, some of the teachers were very unhappy about the textbook adoption because no teachers had been consulted in the process.

Compared to those at other schools in the district, Billabong’s students performed below average on statewide assessments. This information surprised teachers, who thought that their pupils were doing well in most math strands, with the exception of open-ended problem solving and algebraic relationships. These teachers thought the problem was with the appropriateness of the tests, not the use of technology to enhance teaching and learning.

Before the research team could share its results with the rest of the faculty, a number of issues needed to be considered. The team wanted to share its results without hurting individual teachers and without alienating the teachers from the principal. They decided to adopt a “hold harmless” approach. The team shared the general findings at a faculty meeting and then invited teachers, on a voluntary basis, to meet with team members to discuss the data for their classrooms. Similarly, they invited the principal to meet with them to discuss the implications of the findings for future professional development opportunities.

Source: Adapted from Mills (2001).

Suggestions for Collecting Observations in the Classroom

| Time | Activity | Observation | Interpretations/Questions |
|------|----------|-------------|---------------------------|
|------|----------|-------------|---------------------------|

1. When collecting observations of students, be sure to note the time and setting of the observation. Record facts about what is happening. Try to write down as much as you can about what the student(s) is/are saying and doing. Look for behaviors that precede or follow a particular event. Do not try to interpret what the student(s) is/are doing; pretend you are a video camera recording the event. Many teachers and researchers find the above format useful for collecting observational records. Note that there is space in the right margin for interpretations and questions.
2. After completing a set of observations, begin to interpret what might be going on in the situation and what the actions might mean to the people involved. Also, record any questions this observation might provoke for further investigation. Begin to look for patterns and consistencies in behavior and record them in the interpretation section. Begin to formulate hypotheses to explain the events you are observing.
3. In drawing conclusions from your observations, look for consistencies in behavior across situations. Identify events that preceded and followed the behavior of interest. Formulate a theory to explain the students' behavior. What type of evidence do you have to support your theory? Finally, consider alternative explanations and interpretations for what you are observing. What type of information might you need to either confirm or reject this explanation?
4. In collecting and analyzing observational records, be careful to avoid some common pitfalls. First, we have a tendency to see "what we want to see." If, for example, we assume teachers treat high and low achievers differently, then we are likely to bias our observations in this way. That is, our own beliefs, expectations, and past experiences can lead us to select and interpret our observations according to prior assumptions. It is important to remove these "perceptual blinders" as much as possible. Be objective. When observing, be sure to collect information that might counter preexisting assumptions and expectations. Second, avoid premature conclusions or interpretations. As suggested earlier, look for patterns of behavior across time and situations. In making a conclusion or interpretation, be sure to cite concrete examples that support your statements. Conclusions are more trustworthy if you can cite several instances of a behavior to support them. Last, be aware of how the situation can influence a student's behavior. In observing other people, we have a tendency to attribute behavior to stable dispositions (i.e., she is shy), rather than to the situation (i.e., she is quiet in class). For this reason, it is important to collect information about a student across situations. If a behavior pattern (i.e., shyness) appears in several settings with different people, then it is appropriate to make inferences about underlying dispositions.

■ FIGURE 1.15

Suggestions for Collecting Observations in the Classroom

Source: After Brophy & Good (1974) and Florio-Ruane (1985)

Self-Reports

Another method of collecting information on children is **self-reports**. Children can report on their own behavior, their parents' and teachers' behavior, or their peers' behavior. Parents, teachers, and friends can also report on the child's behavior. Self-reports can take several different forms. The individuals being studied can complete a *questionnaire* that contains a number of carefully structured questions that they must answer. Another type of self-report measure is the *rating scale*. Here individuals are given a set of behaviors or attributes to rate. For example, teachers may be asked to rate a child's effort, persistence, or ability to work independently in the classroom. An example of a rating scale is shown in Figure 1.16 on page 41. Clearly these two self-report measures—questionnaires and rating scales—can be used only with children and adults who can read. These measures are generally less reliable for children under the age of 8 or 9. For younger children, an *interview* may be more appropriate. Using this method, children or adults are asked a set of questions. Some interviews are highly structured and standardized, whereas others are more loosely organized. Interviews are useful for understanding why a person is acting or feeling a certain way.

Because questionnaires and rating scales are efficient ways of collecting information about children, they are widely used in research on children's development, especially if the researcher is collecting information on a large sample of children. However, these data collection methods have some serious disadvantages. First, it's not clear that all children and adults interpret rating scale and questionnaire items in the same way. For example, "works independently" may be interpreted as working alone by one teacher and as completing independent assignments by another teacher. Second, children and adults may not be motivated to complete questionnaires, particularly if they are time-consuming. They may leave answers blank or respond to questions randomly. In addition, children and adults may not be good reporters of their own behaviors. They sometimes answer questions according to how they think you want them to respond. This problem is most likely to occur if children are asked to report on undesirable behaviors, such as fighting, cheating, stealing, and so forth. Similarly, adults are not likely to provide accurate reports of behaviors that are inappropriate or undesirable, such as hitting a child. In general, individuals have a tendency to overestimate desirable behaviors and to underestimate undesirable behaviors. This problem is known as **social desirability**.

Interview questions are less likely to be misinterpreted than questionnaire questions. The interviewer can also probe an individual's responses. Interviews can provide more elaborate and richer data about different events. However, interviews are very time-consuming. Children are more difficult to interview than adults because they are less attentive, slower to respond, and have difficulty understanding questions. In addition, the interview must be transcribed and analyzed according to a coding scheme. Also, the problem of social desirability may be more likely to occur in face-to-face interviews, in which individuals are not likely to divulge feelings, attitudes, or behaviors that others may view as undesirable or inappropriate.

When self-report measures are used, it is best to gather additional information. For example, researchers often collect information about a child's behavior from multiple sources, such as teachers, parents, and peers. If there is a convergence in the information collected from these various sources (e.g., a child is rated as popular by two or more sources), then results are more likely to be accurate. In addition, self-report measures are often used in conjunction with other data collection strategies, such as observations and performance assessments.

Examples of Rating Scale Items

Directions: Rate how often each student exhibits the following behaviors in class. Rate each behavior on a 1 to 4 scale. Circle 1 if the student *never* shows the behavior, 2 if the student *sometimes* shows the behavior, 3 if the student usually shows the behavior, 4 if the student *frequently* shows the behavior.

| | Never | Sometimes | Usually | Frequently |
|-------------------------------|-------|-----------|---------|------------|
| Gets along with others | 1 | 2 | 3 | 4 |
| Enjoys challenging activities | 1 | 2 | 3 | 4 |
| Works independently | 1 | 2 | 3 | 4 |
| Helps others | 1 | 2 | 3 | 4 |
| Gives up easily | 1 | 2 | 3 | 4 |

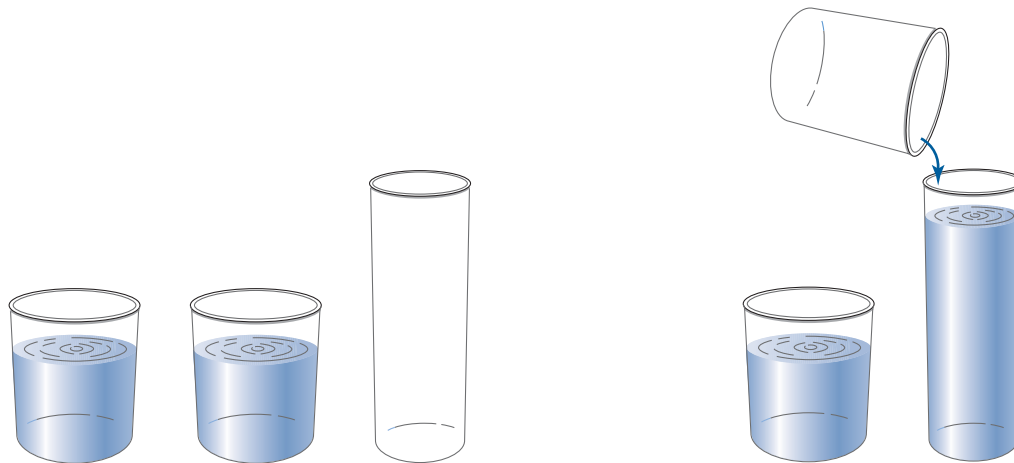
■ FIGURE 1.16
Examples of Rating Scale Items

Performance Assessments

Sometimes the best way to collect information about children’s development is through **performance assessments**, which seek to measure children’s ability to perform specific tasks correctly. These methods are generally used to assess children’s physical and cognitive development. For example, asking a group of preschool children to skip around the gym is one way to assess their large motor skills. Intelligence and achievement tests are also performance assessments in which individuals are given a set of cognitive tasks to perform. For example, a subtest of the *Wechsler Scale of Intelligence for Children* (Wechsler, 1991) asks children to make designs with blocks that match a model. Achievement tests also include a standard set of problems for students to solve. In recent years, however, educators have moved away from multiple-choice tests of achievement toward performance assessments in which students are given authentic tasks to perform. Asking fifth-grade students to use their mathematical knowledge to design and to furnish a “dream house” is an example of a performance assessment.

In Chapter 3, we will learn that Piaget used performance assessments in much of his research on children’s cognitive development. One of his most famous tasks involved the conservation of water. As shown in Figure 1.17 on page 42, children are first shown two glasses of water and asked if the two glasses contain the same amount of water. Next, the water from one glass is poured into a taller, thinner glass, and the children are again asked if the two glasses contain the same amount of water. A child who does not understand the concept of conservation would say, “No, the taller glass has more.” In Piaget’s research, children were then asked to explain their answers. This technique of probing children’s reasoning processes was known as the **clinical interview method**. It is a good example of how performance assessments can be combined with interviews to assess children’s cognitive functioning.

Performance assessments have several advantages. First, they provide a behavioral measure of a child’s level of development in a certain area. These assessments are likely to be more accurate than self-reports. Second, performance assessments can show which tasks and problems children can solve at specific ages. Because the tasks, procedures, and conditions can be standardized across situations, the child’s performance can be compared with previously established norms. For example, standardized achievement tests have national or state norms, which allow teachers to compare their students’ performance with other students of the same age. The



1. Do both glasses have the same amount of water?

2. Now do the glasses have the same amount of water?

■ **FIGURE 1.17**

Conservation of Liquid Problem

disadvantage of performance assessments, particularly standardized tests, is that they do not provide information on the cognitive processes children use to solve problems. This information must be inferred from the child's performance. However, Piaget's method of combining performance assessments and clinical interviews may be a way of overcoming this problem.

Judging the Quality of a Study

You have just read about different approaches for studying children's development and their various strengths and limitations. The next question is, How do you know whether research findings can be trusted? To answer this question, several important criteria should be considered.

Generalizability

In judging the quality of a study, it is important to examine how the sample was selected. If the sample is limited in some way (e.g., all white males), then the findings should not be generalized to other groups of children. The **generalizability** of research findings has to do with how well the findings apply to another sample or to the general population. Case studies, for example, have limited generalizability because they involve one individual or a small group of individuals. In addition, many developmental studies have been criticized because they are based on white, middle-class samples. Results from these investigations cannot be applied to poor or ethnic minority children. Because a child's social and cultural context can influence behavior, care must be taken to select a representative group of children who vary with respect to ethnicity, social class, and sex. When findings are consistent across different samples of children, then we can be more confident that the results apply to a broad range of children.

Reliability and Validity

In judging the quality of a study, it is also important to examine the reliability and validity of the measures used. **Reliability** refers to the consistency or precision of a measurement

when repeated under similar circumstances. For example, there are numerous measures of self-esteem. In choosing a scale, the researcher wants one that provides a reliable estimate. One method for assessing the reliability of a measure is to administer it several times within a short interval of time (a few weeks is acceptable) and to examine the consistency of scores across time. Of course, the same group of individuals should complete the measure each time. Reliable measures yield more consistent scores within a short interval of time. This measure of consistency is called *test-retest* reliability. Studies that use a test, performance measure, or questionnaire should report this information.

A different reliability estimate is used in interview and observation studies. When analyzing observation or interview data, researchers typically identify different categories or patterns of behavior. This analysis process involves subjective interpretations and judgments. To establish the reliability of coding procedures, researchers generally ask two or more people to observe or code the same events. The researcher then computes the degree of agreement between the observers or the raters. Whereas one observer may interpret an intense look as a threat, another observer may not interpret it that way. This estimate of agreement is called *interobserver* or *interrater* reliability. When observers agree in their assessments, the resulting measures are more reliable.

Along with providing a reliable measure of a behavior, a research instrument must provide a valid measure. The **validity** of a measure refers to whether or not it provides an accurate measure of the phenomenon being studied. That is, does the instrument really measure what it purports to measure? It is possible to get a reliable estimate of a behavior, but the instrument used to obtain this assessment may not really assess what it is supposed to. This point is often confusing to many readers. Suppose a researcher thinks, as early researchers did, that the size of a person's head was a measure of intelligence. It is possible to obtain a reliable estimate of an individual's head size, but who today believes that head size is a valid measure of intelligence? This simple example should help clarify the difference between the reliability and validity of a measure.

Many factors can threaten the validity of a measure. In Chapter 4, we will discuss the validity of contemporary tests of intelligence. Although there are many different definitions of intelligence, IQ tests are currently based on a narrow definition of intelligence. If a child does not perform well on these tests, is it correct for the researcher to conclude that the child has low intelligence? Perhaps, as some critics argue, these tests are really a measure of a child's familiarity with white, middle-class American culture since this is the cultural background of most testmakers. Given that children's abilities to focus and concentrate for long periods of time can affect how well they perform on IQ tests, perhaps these tests are really measuring attention span. To establish the validity of a measure such as an IQ test, a researcher must relate it to other valid and reliable measures of the same attribute or behavior. In the case of IQ tests, the scores could be related to other valid tests of intelligence, cognitive abilities, or academic achievement. If a measure is valid, it should show strong relations with these other measures.

Replication

Ultimately in the scientific community, the quality of a research study is judged in terms of its ability to be replicated. Replication involves testing a hypothesis with multiple samples and with different but parallel methods. If the findings replicate, then it is unlikely that the results are due to a particular group of individuals or to a certain research method. Research findings are more trustworthy when they are found across studies that use different samples and methods of collecting data, as well as conducted by different researchers.

Research Ethics

As a prospective teacher or parent, you and your children may at some point be asked to participate in a study. It is important, therefore, that you understand **research ethics**, the ethical standards that researchers must follow when conducting research on human subjects. The guidelines shown in Figure 1.18 have been developed to protect you and your children from dangerous procedures. Because children are often too young to understand

Guidelines for Conducting Research with Children

1. In most cases, researchers must have their study reviewed by a school or institutional review board. Researchers must reveal all relevant information about the study.
2. Researchers must not use any methods or procedures that would cause physical or psychological harm to the child. The benefits of the study must outweigh its possible risks.
3. If participants are under the age of 18, researchers must inform the parents, guardians, or others responsible for the child's care about the research procedures and obtain their written consent before beginning the study.
4. If participants are old enough to understand the research procedures, they must be informed and asked for their verbal consent before participating in the study. Participants must be informed that they can withdraw from the study at any time.
5. Researchers must keep all information about the participants confidential. In all reports of the investigation and in casual conversations about the study, the identities of the participants cannot be revealed.
6. Researchers must inform parents, guardians, or other responsible adults if they obtain information that threatens the child's well-being. For example, if during the study, the researcher discovers that a child is seriously depressed, the researcher must contact a person who can help the child obtain psychological treatment.
7. Each participant has a right to the results of the study. Researchers are obligated to share their research findings with interested parties (e.g., participants, parents, guardians, school officials, and staff). As stated previously, the identities of the participants must be protected in research summaries.
8. Each child participant has the right to the benefits of a treatment provided to other participants. For example, if the experimental treatment is shown to be beneficial, then participants in the control group who did not receive the treatment have a right to beneficial treatments at some later time.

■ **FIGURE 1.18**
*Guidelines for Conducting
Research with Children*
Source: Society for Research in
Child Development (1990).

the issues involved in a study, parents must provide informed consent for their child to participate. Even when children have parental consent to participate in a study, the child can still refuse to participate or can withdraw from the study at any point without penalty. More important, the participants and their parents have a right to information about the results of the study. If you participate in a study, do not hesitate to ask for its results. The information should be presented in a way that protects the identities of the individual participants.

Teachers and parents are often reluctant to participate in a study because of the amount of time involved. However, it is important to keep in mind that researchers continue to make new discoveries about children's development. They are turning more and more to natural environments, such as the classroom or home, as the setting for their studies to ensure their research is a valid description of children's development. All research projects conducted by individuals from institutions who receive federal funds must be reviewed by an ethics review board. In order for a research project to be approved, the perceived benefits of the study for children must outweigh the costs of their time and effort. In any research study, the needs of children and their families should come first.

■ Chapter Summary

Why Study Child and Adolescent Development?

- Child development research can help teachers understand how children change over time and what explains the observed changes.
- Several recent studies have raised questions about teachers' understanding of child and adolescent development. Teachers with a solid foundation of knowledge of children's development are more effective teachers.
- Schools play an important role in children's intellectual, social, and emotional development. Schooling not only affects children's level of intellectual development, but also influences their ways of thinking, problem solving, and reasoning. Schooling experiences shape children's feelings of competency, sense of self, peer relations, and social attitudes, as well as many other aspects of social development.

Perspectives on Children's Development

- Most theorists believe that development involves systematic and orderly changes that enhance a child's overall adaptation to his or her environment. Theories of development provide a coherent framework for interpreting, explaining, and understanding those changes. Developmental theories make different assumptions concerning the nature of child, the nature of development, and the sources of development.
- Biological theories assume that human characteristics unfold according to a biological timetable. The environment plays little role in shaping the course of development. Development is viewed as either continuous or discontinuous, depending on the theorist. Two early maturational theorists were Hall and Gesell.
- Psychoanalytic theories focus on changes in the self and personality. At different stages of physical development, new drives, needs, and conflicts emerge that influence the way children relate to the environment. Key psychoanalytic theorists are Freud and Erikson.
- Behavioral theories emphasize the role of the environment in determining the course of development. Development is gradual and continuous, as a child acquires new skills and behavior through various principles of learning (conditioning, reinforcement, imitation). Some well-known behavioral theorists who have studied children's development are Watson and Skinner.

- In Piagetian, information processing, and social-cognitive theories, development results from an interplay between a child's developing mental abilities and environmental experiences. Children actively seek out information about their environment and attempt to make sense of it using existing knowledge and cognitive processes. Piaget's theory emphasizes qualitative changes in how children organize information, whereas information processing and social-cognitive approaches emphasize developmental changes in the efficiency of children's cognitive processes.
- Contextual theories emphasize relations between a developing child and a changing environment. In Vygotsky's theory, people structure the environment in ways that facilitate children's cognitive development. Bronfenbrenner proposed that children's development is embedded in multiple environments. Changes in one system (e.g., parents' divorce) can influence changes that occur in other systems (e.g., child loses interest in schoolwork).
- There are multiple perspectives on children's development. Because no single theory alone can explain all that we know and observe about children, it is important to acquire a repertoire of different theories.

Studying Children's Development

- Studies of children can take several different forms. The most commonly used research designs in child development are case studies, correlational studies, longitudinal and cross-sectional studies, and experimental studies. Correlational and cross-sectional studies can be conducted with large samples. Longitudinal studies are the most useful for identifying antecedents of developmental changes and for establishing the stability of individual behavior. Experiments are used to test cause-and-effect relations, but their findings may not generalize to other settings.
- There are numerous methods for collecting data on children's development. Children can be observed in a structured or unstructured environment, and various behaviors can be recorded and analyzed for frequency of occurrence.
- Information on children can also be collected through rating scales, questionnaires, and interviews. These methods are efficient, but participants may not be accurate or truthful in their reporting. Like observations, performance assessments provide behavioral data.
- There are several criteria for judging the quality of a study. The reliability (precision) and validity (accuracy) of a measure or instrument are also important for judging the quality of a study. Most theorists, however, judge a study in terms of its ability to be replicated and quality of sampling procedures. Research findings are more trustworthy when they are found across studies that use different samples and methods.
- Research studies involving children and adults must follow a set of ethical guidelines. The perceived benefits of a study must outweigh its potential risks and costs in terms of time and effort. Informed consent must be obtained before the study is conducted, and the identities of all participants must remain confidential.

■ Key Terms

action research (*p. 35*)

age norms (*p. 33*)

behavioral genetics (*p. 22*)

case study (*p. 30*)

causal relationship (*p. 31*)

classical conditioning (*p. 23*)

clinical interview method (*p. 41*)

correlation coefficient (*p. 31*)

correlation study (*p. 31*)

critical period (*p. 23*)

cross-sectional study (*p. 33*)

cross-sequential study (*p. 33*)

dependent variable (*p. 29*)

development (*p. 19*)

event sampling (*p. 37*)

experimental study (*p. 33*)

generalizability (*p. 42*)

hypothesis (*p. 29*)

independent variable (*p. 29*)

instrumental conditioning (*p. 23*)

longitudinal study (*p. 32*)

naturalistic observation (*p. 37*)

operant conditioning (*p. 23*)

performance assessment (*p. 41*)

quasi-experimental design (*p. 34*)

reciprocal determinism (*p. 26*)

reliability (*p. 42*)

research design (*p. 29*)

research ethics (*p. 44*)

self-reports (*p. 40*)

social desirability (*p. 40*)

structured observation (*p. 37*)

theory (*p. 21*)

time sampling (*p. 37*)

triangulation (*p. 36*)

validity (*p. 43*)

■ Activities

1. Interview two to five teachers of different grade levels about their knowledge of child or adolescent development. Were they required to take a child or adolescent psychology course as part of their teacher preparation program? What type of issues or concerns do they have about children's development? How do they use information about children's development in planning learning activities, organizing the classroom, identifying students with special learning needs, and disciplining a child? Try to determine the extent to which the teachers' instructional decisions are based on child development research or their own experiences and intuitions. Summarize your findings in a paper you can share with your classmates.
2. Following are questions about children's development (adapted from Martin & Johnson, 1992). Read each item and mark the item you think provides the best answer.
 - a. When do children follow rules?
 - They reach a stage when they can do things alone.
 - Parents praise them for doing things on their own.
 - They have a desire to experiment with new ideas and actions.
 - b. How do children come to understand differences between plants and animals?
 - The distinction is obvious when children reach a certain stage.
 - They formulate the concept by observing and analyzing differences between the two groups.
 - They are taught the important characteristics of each group.
 - c. Why do children's misconceptions about the world eventually change?
 - Adults present the correct information.
 - As they get older they outgrow immature ideas.
 - Their curiosity motivates them to find out more about their ideas.
 - d. Why do children make up imaginative stories?
 - Make-believe is a natural part of childhood.
 - Adults encourage the child's imagination.
 - The child's imagination develops from playing with others and thinking about objects.
 - e. How do children know that a candy bar broken into pieces is still the same amount of candy?
 - While playing with objects, children discover the relationship between parts and wholes.
 - Adults tell them the amounts are the same.
 - Children naturally know this when they reach a certain age.
 - f. How do children learn to resolve conflicts with their friends?
 - Some children are naturally more agreeable or cooperative than others.
 - Through interacting with others, they discover that cooperation reduces conflicts.
 - They are encouraged by adults to get along.
 - g. How do young children come to understand that cartoon characters are not real?
 - Adults tell them that the stories are make-believe.
 - The difference is obvious to children when they reach a certain stage.
 - Their everyday experiences help them to figure out that cartoon characters cannot be real.
 - h. How do children acquire a desire to learn?
 - Children have a natural curiosity about things.
 - They imitate parents who like to learn.
 - As children learn ideas and skills, they seek out new learning experiences.
 - i. How do children come to realize the consequences of their actions?
 - Children gradually become more aware of how things happen as they grow older.

- _____ They discover through interactions with others that it is important to consider the possible outcomes of different actions.
- _____ Adults praise their good behavior or ignore their bad behavior.

After answering the questions, decide with a classmate which of the statements for each item represent the following points of view discussed in this chapter (see pages 22–26):

Biological. Characteristics of the child naturally unfold as the child matures; changes in development are independent of training or experience.

Behavioral. Changes in the child are determined by the environment. The mechanisms that lead to change are direct instruction, reward, punishment, imitation, and so forth.

Cognitive. Changes in the child are due to a dynamic interaction between the child's existing knowledge and the environment. The child plays an active role in his or her own development through the construction of knowledge.

Review your answers to examine which of these points of views you used most frequently to explain children's behavior. Discuss with your

classmates how your beliefs might influence the way you teach.

3. For the last century, two major approaches have dominated children's educational programs. Some teachers favor a child-oriented approach in which knowledge is "discovered" or "constructed," and others favor a teacher-oriented approach in which knowledge is "transmitted" or "presented." These approaches can be traced back to the views of Locke and Rousseau on children's development and education. Observe at least two classrooms, focusing on the types of materials used, instructional and discipline practices, and classroom organization. Make a list of characteristics that would be associated with a child-oriented or teacher-oriented approach. How would you characterize the classrooms you observed? Compare your findings with the rest of the class.
4. If you have access to a classroom, you can do your own action research project. Consult with the teacher to find a problem or issue of mutual interest. Review pages 35 and 36 to develop a plan for your project. Be sure to define the problem and identify appropriate data collection methods. After collecting and analyzing the information, develop an action plan and share it with your teacher and classmates.