"Cocoon"
Duval-Rohee Julien
Age 9, France.

The small face looks out from within the protective layers of a cocoon—an apt image for the care and security that children need to develop. Research strategies provide insights into the conditions that enable children to thrive—how best to protect, nourish, and encourage them as they grow.

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One afternoon, my colleague Ron crossed the street between his academic department and our laboratory school, the expression on his face reflecting a deep sense of apprehension. After weeks of planning, Ron was ready to launch his study on the development of children's peer relations. Thinking back to his own school years, he recalled the anguish of several classmates, who were repeatedly taunted and shunned by peers. Ron wanted to help rejected children, many of whom go on to lead troubled lives. In view of the importance of his research, Ron was puzzled by a request from the school’s research committee that he appear before them.

At the meeting, Ron met with teachers and administrators charged with evaluating research proposals for their ethical integrity. A third-grade teacher spoke up: “Ron, I see the value of your work, but frankly, I’m concerned about your asking my students to indicate which classmates they like most and which they like least. I’ve got a couple of kids who are soundly disliked, and I’m doing my best to keep the lid on the situation. There’s also an immigrant West Indian child who’s new to my classroom, and she’s being ostracized because of the way she dresses and speaks. If you come in and start sensitizing my class to whom they like and dislike, the children are going to share these opinions. Unfortunately, I think your study is likely to promote conflict and negative interaction!”

Imagine Ron’s dismay at hearing someone suggest that he might have to abandon his research. This chapter takes a close look at the research process—the many challenges investigators face as they plan and implement studies of children. Ron had already traveled a long and arduous path before he arrived at the door of the laboratory school, prepared to collect his data. First, he had spent many weeks developing a researchable idea, based on theory and prior knowledge of children’s peer relations. Next, he had chosen an appropriate research strategy, which involved two main tasks. First, he had selected from a variety of research methods—the specific activities of participants, such as taking tests, answering questionnaires, responding to interviews, or being observed. Second, he had decided on a research design—an overall plan for his study that would permit the best test of his research idea. Finally, Ron had scrutinized his procedures for any possible harm they might cause to participants.

Still, as Ron approached a committee charged with protecting the welfare of research participants, he faced an ethical dilemma. Research, whether on animals or humans, must meet certain standards that protect participants from stressful treatment. Because of children’s immaturity and vulnerability, extra precautions must be taken to ensure that their rights are not violated. In the final section of this chapter, you will find out how Ron resolved the committee’s earnest challenge to the ethical integrity of his research.
In Chapter 1, we saw how theories structure the research process by identifying important research concerns and, occasionally, preferred methods for collecting data. We also discussed how theories guide the application of findings to real-life circumstances and practices with children. In fact, research usually begins with a prediction drawn from a theory, called a hypothesis. Think back to the various child development theories presented in Chapter 1. Many hypotheses can be drawn from any one of them that, once tested, would reflect on the accuracy of the theory.

Sometimes research pits a hypothesis taken from one theory against a hypothesis taken from another. For example, a theorist emphasizing the role of maturation in development would predict that adult encouragement will have little effect on the age at which children utter their first words, learn to count, or tie their shoes. A sociocultural theorist, in contrast, would speculate that these skills can be promoted through adult teaching.

At other times, research tests predictions drawn from a single theory. For example, ecological systems theory suggests that providing isolated, divorced mothers with social supports will lead them to be more patient with their children. An ethologist might hypothesize that an infant’s cry will stimulate strong physiological arousal in adults who hear it, motivating them to soothe and protect a suffering baby.

Occasionally, little or no theory exists on a topic of interest. In these instances, the investigator may start with a research question, such as, Have recent world events—the U.S. war on Iraq and a global rise in terrorism—heightened children’s fears and anxieties? Which teenagers are heavy users of Internet communication—e-mail, instant messaging, and chat rooms? Are they sociable young people with many friends, or lonely individuals with few in-person social supports? Hypotheses and research questions offer investigators vital guidance as they settle on research methods and research designs.

At this point, you may be wondering, Why learn about research strategies? Why not leave these matters to research specialists and concentrate on what is already known about the child and how that knowledge can be applied? There are two reasons. First, each of us must be a wise and critical consumer of knowledge. Knowing the strengths and limitations of various research strategies is important in separating dependable information from misleading results. Second, individuals who work directly with children may be in a unique position to build bridges between research and practice by conducting studies, either on their own or in partnership with experienced investigators. Currently, community agencies such as schools, mental health facilities, and parks and recreation programs are collaborating with researchers in designing, implementing, and evaluating interventions aimed at enhancing children’s development (Lerner, Fisher, & Weinberg, 2000). To broaden these efforts, a basic understanding of the research process is essential.

**Common Methods Used to Study Children**

How does a researcher choose a basic approach to gathering information about children? Common methods include systematic observation, self-reports, psychophysiological measures, clinical or case studies, and ethnographies of the life circumstances of a specific group of children. As you read about these methods, you may find it helpful to refer to Table 2.1, which summarizes the strengths and limitations of each.

**Systematic Observation**

Observations of the behavior of children, and of the adults who are important in their lives, can be made in different ways. One approach is to go into the field, or the natural environment, and record the behavior of interest, a method called naturalistic observation.

A study of preschoolers’ responses to their peers’ distress provides a good example of this technique (Farver & Branstetter, 1994). Observing 3- and 4-year-olds in child-care centers, the researchers recorded each instance of crying and the reactions of nearby children—whether
**TABLE 2.1 STRENGTHS AND LIMITATIONS OF COMMON INFORMATION-GATHERING METHODS**

<table>
<thead>
<tr>
<th>Method</th>
<th>Description</th>
<th>Strengths</th>
<th>Limitations</th>
</tr>
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<tbody>
<tr>
<td><strong>Systematic Observation</strong></td>
<td>Naturalistic observation: Observation of behavior in natural contexts</td>
<td>Reflects participants’ everyday behaviors.</td>
<td>Cannot control conditions under which participants are observed. Accuracy of observations may be reduced by observer influence and observer bias.</td>
</tr>
<tr>
<td><strong>Structured observation</strong></td>
<td>Observation of behavior in a laboratory, where conditions are the same for all participants</td>
<td>Grants each participant an equal opportunity to display the behavior of interest. Permits study of behaviors rarely seen in everyday life.</td>
<td>May not yield observations typical of participants’ behavior in everyday life. Accuracy of observations may be reduced by observer influence and observer bias.</td>
</tr>
<tr>
<td><strong>Self-Reports</strong></td>
<td><strong>Clinical interview</strong>: Flexible interviewing procedure in which the investigator obtains a complete account of the participant’s thoughts</td>
<td>Comes as close as possible to the way participants think in everyday life. Great breadth and depth of information can be obtained in a short time.</td>
<td>May not result in accurate reporting of information. Flexible procedure makes comparing individuals’ responses difficult.</td>
</tr>
<tr>
<td><strong>Structured interview, questionnaires, and tests</strong></td>
<td>Self-report instruments in which each participant is asked the same questions in the same way</td>
<td>Permits comparisons of participants’ responses and efficient data collection. Researchers can specify answer alternatives that participants might not think of in an open-ended interview.</td>
<td>Does not yield the same depth of information as a clinical interview. Responses are still subject to inaccurate reporting.</td>
</tr>
<tr>
<td><strong>Psychophysiological Methods</strong></td>
<td>Methods that measure the relationship between physiological processes and behavior</td>
<td>Reveals which central nervous system structures contribute to development and individual differences in certain competencies. Helps infer the perceptions, thoughts, and emotions of infants and young children, who cannot report them clearly.</td>
<td>Cannot reveal with certainty the meaning of autonomic or brain activity. Many factors besides those of interest to the researcher can influence a physiological response.</td>
</tr>
<tr>
<td><strong>Clinical, or Case Study, Method</strong></td>
<td>A full picture of one individual’s psychological functioning, obtained by combining interviews, observations, test scores, and sometimes psychophysiological assessments</td>
<td>Provides rich, descriptive insights into factors that affect development.</td>
<td>May be biased by researchers’ theoretical preferences. Findings cannot be applied to individuals other than the participant.</td>
</tr>
<tr>
<td><strong>Ethnography</strong></td>
<td>Participant observation of a culture or distinct social group; by making extensive field notes, the researcher tries to capture the culture’s unique values and social processes</td>
<td>Provides a more complete description than can be derived from a single observational visit, interview, or questionnaire.</td>
<td>May be biased by researchers’ values and theoretical preferences. Findings cannot be applied to individuals and settings other than the ones studied.</td>
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they ignored, watched, or commented on the child’s unhappiness; scolded or teased; or shared, helped, or expressed sympathy. Caregiver behaviors, such as explaining why a child was crying, mediating conflict, or offering comfort, were noted to see if adult sensitivity was related to children’s caring responses. A strong relationship emerged. The great strength of naturalistic observation is that investigators can see directly the everyday behaviors they hope to explain.
Naturalistic observation also has a major limitation: Not all children have the same opportunity to display a particular behavior in everyday life. In the study just mentioned, some children might have witnessed a child crying more often than others or been exposed to more cues for positive social responses from caregivers. For this reason, they might have displayed more compassion.

Researchers commonly deal with this difficulty by making structured observations, in which the investigator sets up a laboratory situation that evokes the behavior of interest so that every participant has an equal opportunity to display the response. In one study, 2-year-olds’ emotional reactions to harm that they thought they had caused were observed by asking them to take care of a rag doll that had been modified so its leg would fall off when the child picked it up. To make the child feel at fault, once the leg detached, an adult “talked for” the doll by saying, “Ow!” Researchers recorded children’s facial expressions of sadness and concern for the injured doll, efforts to help the doll, and body tension—responses that indicated remorse and a desire to make amends for the mishap. In addition, mothers were asked to engage in brief conversations about emotions with their children (Garner, 2003). Mothers who more often explained the causes and consequences of emotions had toddlers who expressed more concern for the injured doll.

Structured observation permits greater control over the research situation than does naturalistic observation. In addition, the method is especially useful for studying behaviors—such as parent–child and friendship interactions—that investigators rarely have an opportunity to see in everyday life. For example, to compare friendship quality of aggressive and nonaggressive children, researchers had nearly one hundred 10-year-old boys come with their best friend to a laboratory, where the pairs played a board game and jointly solved scrambled-word puzzles. Aggressive boys and their friends were more likely to violate game rules, to cheat while working on the puzzles by looking at an answer key, and to encourage each other to engage in these dishonest acts. In addition, observers rated these boys’ interactions as less emotionally positive, more intensely angry, and less reciprocal than the interactions of nonaggressive boys and their friends (Bagwell & Coie, 2004). The researchers concluded that instead of being warm and supportive, aggressive boys’ close peer ties provide a context in which they practice hostility and other negative behaviors, which may contribute to increased antisocial behavior.

In this study, antisocial boys’ laboratory interactions were probably similar to their natural behaviors. The boys acted negatively even though they knew they were being observed. Of course, the great disadvantage of structured observations is that most of the time, we cannot be certain that participants behave in the laboratory as they do in their natural environments.

**COLLECTING SYSTEMATIC OBSERVATIONS** • The procedures used to collect systematic observations vary, depending on the research problem posed. Occasionally investigators choose to record the entire stream of behavior—everything the participant says and does. In one of my own studies, I wanted to find out how sensitive, responsive, and verbally stimulating caregivers were when they interacted with children in child-care centers (Berk, 1985). In this case, everything each caregiver said and did—even the amount of time she spent away from the children, taking coffee breaks and talking on the phone—was important.

In other studies, information on only one or a few kinds of behavior is needed, permitting more efficient procedures. In these instances, a common approach is event sampling, in which the observer records all instances of a particular behavior during a specified time period. In the study of preschoolers’ responses to their peers’ distress reported earlier, the researchers used event sampling by recording each instance in which a child cried, followed by other children’s reactions.
Another way to observe efficiently is time sampling. In this procedure, the researcher records whether certain behaviors occur during a sample of short intervals. First, a checklist of the target behaviors is prepared. Then the observation period is divided into a series of brief time segments. For example, a half-hour observation period might be divided into 120 fifteen-second intervals. The observer watches the target person and checks off behaviors during each interval, repeating this process until the observation period is complete. Recently, my collaborators and I used time sampling to find out how parents and children spent time while visiting a community children’s museum. Our observers followed more than one hundred parent–child pairs for 10 minutes each, checking off parent and child behaviors during 20 thirty-second intervals. Findings revealed that, on average, parents and children were jointly engaged in the museum’s exhibits during 45 percent of the intervals. And during an additional 30 percent, parents remained nearby, closely observing their children’s activities (Mann, Braswell, & Berk, 2005). The museum afforded parents many opportunities to interact with and learn about their child.

Researchers have devised ingenious ways of observing children’s difficult-to-capture behaviors. For example, to record instances of bullying, a group of investigators set up video cameras overlooking a classroom and a playground and had fourth to sixth graders wear small, remote microphones and pocket-sized transmitters (Craig, Pepler, & Atlas, 2000). Results revealed that bullying occurred often—at rates of 2.4 episodes per hour in the classroom and 4.5 episodes per hour on the playground. Yet only 15 to 18 percent of the time did teachers take steps to stop the harassment. We will return to the topic of bullying in Chapter 15.

**Limitations of Systematic Observation**

A major problem with systematic observation is *observer influence*—the effects of the observer on the behavior studied. The presence of a watchful, unfamiliar individual may cause children and adults to react in unnatural ways. For children under age 7 or 8, observer influence is generally limited to the first session or two. Young children cannot stop “being themselves” for long, and they quickly get used to the observer’s presence. Older children and adults often engage in more socially desirable behavior when they know that they are being observed. In these instances, researchers can take participants’ responses as an indication of the best behavior they can display under the circumstances.

Researchers can minimize observer influence. Adaptation periods, in which observers visit the research setting so participants can get used to their presence, are helpful. Another approach is to ask individuals who are part of the child’s natural environment to do the observing. For example, in several studies, parents have been trained to record their children’s behavior. Besides reducing the impact of an unfamiliar observer, this method limits the amount of time needed to gather observations, as some information can take a long time to obtain. In one such study, researchers wanted to know how preschool and young school-age children’s TV watching affected their other home activities (Huston et al., 1999). To find out, every other month they telephoned parents for a detailed report of children’s time use during the previous 24 hours. Findings indicated that the more children watched entertainment TV (cartoons and general-audience programs), the less time they spent reading, doing educational activities (such as art, music, and puzzles), and interacting with adults and peers.

In addition to observer influence, *observer bias* is a serious danger. When observers are aware of the purposes of a study, they may see and record what is expected rather than what participants actually do. Therefore, people who have no knowledge of the investigator’s hypotheses—or who at least have little personal investment in them—are best suited to collect the observations.

Finally, although systematic observation provides invaluable information on how children and adults behave, it conveys little about the thinking that underlies behavior. For this kind of information, researchers must turn to self-report techniques.

**Self-Reports: Interviews and Questionnaires**

Self-reports ask research participants to provide information on their perceptions, thoughts, abilities, feelings, attitudes, beliefs, and past experiences. They range from relatively unstructured clinical interviews, the method used by Piaget to study children’s thinking, to highly structured interviews, questionnaires, and tests.
**CLINICAL INTERVIEWS** • In a **clinical interview**, a flexible, conversational style is used to probe for the participant’s point of view. Consider the following example, in which Piaget questioned a 3-year-old child about his understanding of dreams:

*Where does the dream come from?*—I think you sleep so well that you dream.—*Does it come from us or from outside?*—From outside.—*When you are in bed and you dream, where is the dream?*—In my bed, under the blanket. I don’t really know. If it was in my stomach, the bones would be in the way and I shouldn’t see it.—*Is the dream there when you sleep?*—Yes, it is in the bed beside me. (Piaget, 1926/1930, pp. 97–98)

Notice how Piaget used a flexible, conversational style to encourage the child to expand his ideas. Although a researcher interviewing more than one child would typically ask the same first question to ensure a common task, individualized prompts provide a fuller picture of each child’s reasoning (Ginsburg, 1997).

The clinical interview has two major strengths. First, it permits people to display their thoughts in terms that are as close as possible to the way they think in everyday life. Second, the clinical interview can provide a large amount of information in a fairly brief period. For example, in an hour-long session, we can obtain a wide range of child-rearing information from a parent—much more than we could capture by observing parent–child interaction for the same amount of time.

**LIMITATIONS OF CLINICAL INTERVIEWS** • A major limitation of the clinical interview has to do with the accuracy with which people report their thoughts, feelings, and experiences. Some participants, desiring to please the interviewer, may make up answers that do not represent their actual thinking. And because the clinical interview depends on verbal ability and expressiveness, it may underestimate the capacities of individuals who have difficulty putting their thoughts into words. Skillful interviewers minimize these problems by wording questions carefully. They also watch for cues indicating that the participant may not have clearly understood a question or may need extra time to feel comfortable in the interview situation.

Interviews on certain topics are particularly vulnerable to distortion. In a few instances, researchers have been able to compare parents’ and children’s descriptions of events with information gathered years earlier, at the same time the events occurred. Reports of psychological states and family processes obtained on the two occasions showed little or no agreement (Henry et al., 1994). Parents often recall their child’s development in glowing terms, reporting faster progress, fewer childhood problems, and child-rearing practices more in line with current expert advice than with records of behavior (Yarrow, Campbell, & Burton, 1970). Interviews that focus on current rather than past information and on specific characteristics rather than global judgments show a better match with observations and other sources of information. Even so, parents are far from perfect in describing their practices and their children’s personalities, preferences, and cognitive abilities (Miller & Davis, 1992; Rothbart & Bates, 1998; Waschbusch, Daleiden, & Drabman, 2000).

Finally, as mentioned in Chapter 1, the clinical interview has been criticized because of its flexibility. When participants are asked different questions, their varied responses may be due to the manner of interviewing rather than to real differences in the way people think about a topic. A second self-report method, the structured interview, reduces this problem.

**STRUCTURED INTERVIEWS, TESTS, AND QUESTIONNAIRES** • In a **structured interview**, each individual is asked the same set of questions in the same way. This approach eliminates the possibility that an interviewer might press and prompt some participants more than others. In addition, structured interviews are much more efficient than clinical interviews.
Answers are briefer, and researchers can obtain written responses from an entire class of children or group of parents at the same time. Also, by listing answer alternatives, researchers can specify the activities and behaviors they are interested in—ones that participants might not think of in an open-ended clinical interview. For example, when parents were asked what they considered “the most important thing for children to prepare them for life,” 62 percent checked “to think for themselves” when this alternative appeared on a list. Yet only 5 percent thought of it during a clinical interview (Schwarz, 1999).

Nevertheless, structured interviews do not yield the same depth of information as a clinical interview. And they can still be affected by the problem of inaccurate reporting.

**Psychophysiological Methods**

Researchers’ desire to uncover the biological bases of perceptual, cognitive, and emotional responses has led to the use of psychophysiological methods, which measure the relationship between physiological processes and behavior. Investigators who rely on these methods want to find out which central nervous system structures contribute to development and individual differences. Psychophysiological methods also help investigators infer the perceptions, thoughts, and emotions of infants and young children, who cannot report their psychological experiences clearly.

Involuntary activities of the autonomic nervous system—changes in heart rate, blood pressure, respiration, pupil dilation, electrical conductance of the skin, and stress hormone levels—are highly sensitive to psychological state. For example, heart rate can be used to infer whether an infant is staring blankly at a stimulus (heart rate is stable), processing information (heart rate slows during concentration), or experiencing distress (heart rate rises). Heart rate variations are also linked to certain emotions, such as interest, anger, and sadness (Fox & Card, 1998). And as Chapter 10 will reveal, distinct patterns of autonomic activity are related to aspects of temperament, such as shyness and sociability (Kagan & Saudino, 2001).

Autonomic indicators have also been enriched by measures of brain functioning. In an electroencephalogram (EEG), researchers tape electrodes to the scalp to record the electrical activity of the brain. EEG brain waves are linked to different states of arousal, from deep sleep to alert wakefulness, permitting researchers to see how these states change with age. EEG patterns also vary with emotional states—whether children are upbeat and happy or distressed (Jones et al., 1997). At times, investigators study event-related potentials (ERPs), or EEG waves that accompany particular events. For example, different wave patterns appear when 3-month-olds from English-speaking homes hear passages in English, Italian, and Dutch, suggesting that the infants could discriminate the intonation patterns of the three languages and indicating the brain regions involved (Shafer, Shucard, & Jaeger, 1999).

Functional brain-imaging techniques, which yield three-dimensional pictures of brain activity, provide the most precise information on which brain regions are specialized for certain capacities. Functional magnetic resonance imaging (fMRI) is the most promising of these methods because it does not depend on X-ray photography, which requires injection of radioactive substances. Instead, when a child is shown a stimulus, changes in blood flow within the brain are detected magnetically, producing a computerized image of active areas. Currently, fMRI is being used to study age-related changes in brain organization and the brain functioning of children with learning and emotional problems (Gaillard et al., 2004; Pine, 2001; Thomas & Casey, 2003).

Despite their virtues, psychophysiological methods have limitations. First, interpreting physiological responses involves a high degree of inference. Even though a stimulus produces a consistent pattern of autonomic or brain activity, investigators cannot be certain that an infant or child has processed it in a certain way. Second, many factors can influence a physiological response. A researcher who takes a change in heart rate, respiration, or brain activity...
as an indicator of information processing must make sure that the change was not due instead to hunger, boredom, fatigue, or body movements (Fox, Schmidt, & Henderson, 2000). Third, children often do not perform as well while lying in an fMRI scanner as they do outside the scanner. And the enclosed environment sometimes induces them to fall asleep! Finally, a child’s fearful reaction to the equipment affects physiological measures. Preparing children by taking them through a simulated experience eases their apprehension (Rosenberg et al., 1997). Without such efforts, detection of correspondences between physiological and psychological reactions is difficult or impossible.

The Clinical, or Case Study, Method

An outgrowth of psychoanalytic theory, the clinical, or case study, method brings together a wide range of information on one child, including interviews, observations, test scores, and sometimes psychophysiological measures. The aim is to obtain as complete a picture as possible of that child’s psychological functioning and the experiences that led up to it.

The clinical method is well suited to studying the development of certain types of individuals who are few in number but vary widely in characteristics. For example, the method has been used to find out what contributes to the accomplishments of prodigies—extremely gifted children who attain adult competence in a field before age 10 (Gardner, 1998b). Consider Adam, a boy who read, wrote, and composed musical pieces before he was out of diapers. By age 4, Adam was deeply involved in mastering human symbol systems—French, German, Russian, Sanskrit, Greek, the computer programming language BASIC, ancient hieroglyphs, music, and mathematics. Adam’s parents provided a home rich in stimulation and reared him with affection, firmness, and humor. They searched for schools in which he could both develop his abilities and form rewarding social relationships. He graduated from college at age 18 and continued to pursue musical composition. Would Adam have realized his potential without the chance combination of his special gift and nurturing, committed parents? Probably not, researchers concluded (Goldsmith, 2000).

The clinical method yields richly detailed case narratives that offer valuable insights into the many factors that affect development. Nevertheless, like all other methods, it has drawbacks. Information often is collected unsystematically and subjectively, permitting too much leeway for researchers’ theoretical preferences to bias their observations and interpretations. In addition, investigators cannot assume that their conclusions apply, or generalize, to anyone other than the child studied (Stanovich, 2004). Even when patterns emerge across several cases, it is wise to confirm them with other research strategies.

Methods for Studying Culture

To study the impact of culture, researchers adjust the methods just considered or tap procedures specially devised for cross-cultural and multicultural research. Which approach investigators choose depends on their research goals (Triandis, 1998).
Sometimes researchers are interested in characteristics believed to be universal but that vary in degree from one society to the next. These investigators might ask, Are parents warmer or more directive in some cultures than in others? How strong are gender stereotypes in different nations? In each instance, several cultural groups will be compared, and all participants must be questioned or observed in the same way. Therefore, researchers draw on the self-report and observational procedures we have already considered, adapting them through translation so they can be understood in each cultural context. For example, to study cultural variation in parenting practices, the same questionnaire, asking for ratings on such items as “I often hug and kiss my child” or “I scold my child when his/her behavior does not meet my expectations,” is given to all participants (Wu et al., 2002).

At other times, researchers want to uncover the cultural meanings of children’s and adults’ behaviors by becoming as familiar as possible with their way of life. To achieve this goal, researchers rely on a method borrowed from the field of anthropology—ethnography. Like the clinical method, ethnographic research is a descriptive, qualitative technique. But instead of aiming to understand a single individual, it is directed at understanding a culture or a distinct social group through participant observation. Typically, the researcher spends months and sometimes years in the cultural community, participating in its daily life. Extensive field notes are made, consisting of a mix of observations, self-reports from members of the culture, and careful interpretations by the investigator (Miller, Hengst, & Wang, 2003; Shweder, 1996). Later, these notes are put together into a description of the community that tries to capture its unique values and social processes.

The ethnographic method assumes that by entering into close contact with a social group, researchers can understand the beliefs and behaviors of its members in a way not possible with an observational visit, interview, or questionnaire. In some ethnographies, investigators focus on many aspects of children’s experience, as one researcher did in describing what it is like to grow up in a small town. Others focus on one or a few settings, such as home, school, or neighborhood life (LeVine et al., 1994; Peshkin, 1978, 1997; Valdés, 1998). And still others are limited to a particular practice, such as uncovering the cultural and religious influences on children’s make-believe play. For example, ethnographic findings reveal that East Indian Hindu parents encourage preschoolers to communicate with “invisible” characters. They regard this activity as linked to karma (the cycle of birth and death) and believe that the child may be remembering a past life. In contrast, Christian fundamentalist parents often discourage children from pretending to be unreal characters. They believe that such play promotes dangerous spiritual ideas and deceitful behavior (Taylor & Carlson, 2000). Researchers may supplement traditional self-report and observational methods with ethnography if they suspect that unique meanings underlie cultural differences, as the Cultural Influences box on page 50 reveals.

Ethnographers strive to minimize their influence on the culture they are studying by becoming part of it. Nevertheless, as with clinical studies, investigators’ cultural values and theoretical commitments sometimes lead them to observe selectively or misinterpret what they see. Finally, the findings of ethnographic studies cannot be assumed to generalize beyond the people and settings in which the research was originally conducted.

Ask Yourself

**REVIEW** Why might a researcher choose structured observation over naturalistic observation? How about the reverse? What might lead the researcher to opt for clinical interviewing over systematic observation?

**REVIEW** What strengths and limitations do the clinical (or case study) method and ethnography have in common?

**APPLY** A researcher wants to study the thoughts and feelings of children who have a parent serving in the military in Iraq. Which method is best suited for investigating this question?
Immigrant Youths: Amazing Adaptation

During the past quarter century, a rising tide of immigrants has come to North America, fleeing war and persecution in their homelands or otherwise seeking better life chances. Today, one-fifth of the U.S. youth population has foreign-born parents; nearly one-third of these youths are foreign born themselves. Similarly, immigrant youths are the fastest-growing segment of the Canadian population (Fuligni, 2001; Statistics Canada, 2000). They are ethnically diverse. In the United States, most come from Asia and Latin America; in Canada, from Asia, the Middle East, Africa, and Europe. Latin American immigrants to Canada, although fewer in number than other immigrant groups, are increasing rapidly. To find out how well immigrant youths are adapting to their new country, researchers draw on multiple methods, including academic testing, questionnaires assessing psychological adjustment, and in-depth ethnographic research.

Academic Achievement and Adjustment

Although educators and laypeople often assume that the transition to a new country has a negative impact on psychological well-being, recent evidence reveals that children of immigrant parents from diverse countries adapt amazingly well. Students who are first generation (foreign born) and second generation (American or Canadian born, with immigrant parents) achieve in school as well as or better than students of native-born parents (Fuligni, 1997; Rumbaut, 1997; Saucier et al., 2002). Their success is evident in many academic subjects, including language and literature, even though most speak their native language at home.

Findings on psychological adjustment resemble those on achievement. Compared with their agemates, adolescents from immigrant families are less likely to commit delinquent and violent acts, to use drugs and alcohol, or to have early sex. They are also in better health—less likely to be obese or to have missed school because of illness. And in terms of self-esteem, they feel as positively about themselves as young people with native-born parents, and they report less emotional distress. These successes do not depend on having extensive time to adjust to a new way of life. The school performance and psychological well-being of immigrant high school students who recently arrived in North America are as high as—and sometimes higher than—those of students who come at younger ages (Fuligni, 1998; Saucier et al., 2002).

The outcomes just described are strongest for Chinese, Japanese, Korean, and East Indian youths, less dramatic for other ethnicities (Fuligni, 1997; Kao & Tienda, 1995; Louie, 2001). Variations in parental education and income account for these differences. Still, even first- and second-generation youths from ethnic groups that face considerable economic hardship (such as Mexican and Vietnamese) are remarkably successful (Fuligni & Yoshikawa, 2003). Factors other than income are responsible.

Family and Community Influences

Ethnographies provide insight into why most immigrant youths adapt well. Uniformly, immigrant parents express the belief that education is the surest way to improve life chances. Consequently, they place a high value on their children’s academic achievement (Goldenberg et al., 2001; Louie, 2001). Aware of the challenges their children face, immigrant parents underscore the importance of trying hard. They remind their children that educational opportunities were not available in their native countries and, as a result, they themselves are often limited to menial jobs.

Adolescents from immigrant families internalize their parents’ valuing of education, endorsing it more strongly than age-mates with native-born parents (Asakawa, 2001; Fuligni, 1997). Because minority ethnicities usually stress allegiance to family and community over individual goals, first- and second-generation young people spend much time with their families and feel a strong sense of obligation to their parents. They view school success as one of the most important ways they can repay their parents for the hardships they endured in coming to a new land (Fuligni, Yip, & Tseng, 2002; Suárez-Orozco & Suárez-Orozco, 2001). Both family relationships and school achievement protect these youths from risky behaviors, such as delinquency, early pregnancy, and drug use (refer to the Biology and Environment box on resilient children on page 10 of Chapter 1).

Immigrant parents typically develop close ties to an ethnic community. It exerts additional control through a high consensus on values and constant monitoring of young people’s activities. The following comments capture the power of these family and community forces:

A New York City cab driver from Ghana, father of a three teenage boys who later enrolled at prestigious universities: I make sure I know my children’s friends and if they want to come to my house they have to follow my rules . . . And I never let my children work . . . Who knows what influences they will be exposed to? (Suárez-Orozco & Suárez-Orozco, 2001, p. 89)

Thuy Trang, age 14, from Vietnam, middle-school Student of the Year: When my parents first emigrated from Vietnam, they spent every waking hour working hard to support a family. They have sacrificed for me and I am willing to do anything for them.

Elizabeth, age 16, from Vietnam, straight-A student, like her two older sisters: My parents know pretty much all the kids in the neighborhood . . . . Everybody here knows everybody else. It’s hard to get away with much. (Zhou & Bankston, 1998, pp. 93, 130)

Immigrant youths’ experiences are not problem-free. Interviews with adolescents who had arrived in Canada within the previous 5 years revealed that the majority found their first year “very difficult” because they did not yet speak one of the country’s two official languages (English and French) and felt homesick and socially isolated (Hanvey & Kunz, 2000). In addition, tensions between family values and the new culture often create identity conflicts—challenges we will take up in Chapter 11. And many immigrants encounter ethnic prejudices among their native-born peers. But family and community cohesion, supervision, and expectations for academic and social maturity powerfully shape long-term favorable outcomes for these young people.
Reliability and Validity: Keys to Scientifically Sound Research

Once investigators choose their research methods, they must ensure that their procedures provide trustworthy information. To be acceptable to the scientific community, self-reports, observations, and physiological measures must be both reliable and valid—two keys to scientifically sound research.

**Reliability**

Suppose you go into an elementary school classroom and record how attentive and cooperative each child is, but your research partner, in simultaneously rating the same children, comes up with very different judgments. Or you question a group of children about their interests, but a week later, when you ask them again, their answers are very different. Reliability refers to the consistency, or repeatability, of measures of behavior. To be reliable, observations and evaluations of peoples’ actions cannot be unique to a single observer. Instead, observers must agree on what they see. And an interview, test, or questionnaire, when given again within a short time (before participants can reasonably be expected to change their opinions or develop new responses), must yield similar results on both occasions.

Researchers determine the reliability of data in different ways. In observational research, observers are asked to evaluate the same behaviors, and agreement between them—called inter-rater reliability—is obtained. Reliability of self-report and psychophysiological data can be demonstrated by comparing children’s responses to the same measures on separate occasions, an approach called test–retest reliability. In the case of self-reports, researchers can also compare children’s answers on different forms of the same test or questionnaire. And if necessary, reliability can be estimated from a single testing session by comparing children’s answers on different halves of the test.

Because clinical and ethnographic studies do not yield quantitative scores that can be matched with those of another observer or test form, the reliability of these methods must be determined with other procedures. After examining the qualitative records, one or more judges can see if they agree with the researcher that the patterns and themes identified are grounded in evidence and are plausible (McGrath & Johnson, 2003).

**Validity**

For research methods to have high validity, they must accurately measure characteristics that the researcher set out to measure. Think about this idea, and you will see that reliability is essential for valid research. Methods that are implemented carelessly, unevenly, and inconsistently cannot possibly represent what an investigator originally intended to study.

But researchers must go further to guarantee validity. They often examine the contents of observations and self-reports to make sure the behaviors of interest are included. For example, a test intended to measure fifth-grade children’s knowledge of mathematics would not be valid if it contained addition problems but no subtraction, multiplication, or division problems (Miller, 1998). Another approach is to see how effective a method is in predicting behavior we would reasonably expect it to predict. If scores on a math test are valid, they should be related to how well children do on their math assignments in school or even to how quickly and accurately they can make change in a game of Monopoly.

As we turn now to research designs, you will discover that the concept of validity can also be applied more broadly: to the overall accuracy of research findings and conclusions. In setting up an investigation, researchers must safeguard two types of validity. The first, internal validity, is the degree to which conditions internal to the design of the study permit an accurate test of the researcher’s hypothesis or question. If, during any phase of the investigation—selecting participants, choosing research settings and tasks, and implementing procedures—factors unrelated to the hypothesis influence participants’ behavior, then the accuracy of the results is in doubt. Second, researchers must consider...
external validity, the degree to which their findings generalize to settings and participants outside the original study. Ensuring that samples, tasks, and contexts for conducting research represent the real-world people and situations that the investigator aims to understand is key to this type of accuracy.

<table>
<thead>
<tr>
<th>Ask Yourself</th>
<th>REVIEW</th>
<th>Explain why a research method must be reliable to be valid, yet reliability does not guarantee validity.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>APPLY</td>
<td>In studying the development of attention in school-age children, a researcher wonders whether to make naturalistic observations or structured observations. Which approach is best for ensuring internal validity? How about external validity? Why?</td>
</tr>
<tr>
<td></td>
<td>CONNECT</td>
<td>Why is it better for a researcher to use multiple methods rather than just one method to test a hypothesis or answer a research question?</td>
</tr>
</tbody>
</table>

**General Research Designs**

In deciding on a research design, investigators choose a way of setting up a study that permits them to test their hypotheses with the greatest certainty possible. Two main types of designs are used in all research on human behavior: correlational and experimental.

**Correlational Design**

In a correlational design, researchers gather information on individuals, generally in natural life circumstances, without altering their experiences. Then they look at relationships between participants’ characteristics and their behavior or development. Suppose we want to answer such questions as, Do parents’ styles of interacting with their children have any bearing on children’s intelligence? Does spending more time in child care interfere with a secure attachment bond between parent and child? How does children’s self-esteem affect their academic performance and peer relations? In these and many other instances, the conditions of interest are difficult or impossible to arrange and control and must be studied as they currently exist.

The correlational design offers a way of looking at relationships between variables. But correlational studies have one major limitation: We cannot infer cause and effect. For example, if we were to find that parental interaction is related to children’s intelligence, we would not know whether parents’ behavior actually causes intellectual differences among children. In fact, the opposite is possible. The behaviors of highly intelligent children may be so attractive that they cause parents to interact more favorably. Or a third variable that we did not even consider, such as the amount of noise and distraction in the home, may cause changes in both maternal interaction and children’s intelligence.

In correlational studies and in other types of research designs, investigators often examine relationships between variables by using a correlation coefficient, a number that describes how two measures, or variables, are associated with one another. Although other statistical approaches to examining relationships also exist, we will encounter the correlation coefficient in discussing research findings throughout this book. So let’s look at what it is and how it is interpreted. A correlation coefficient can range in value from +1.00 to −1.00. The magnitude, or size, of the number shows the strength of the relationship. A zero correlation indicates no relationship; but the closer the value is to +1.00 or −1.00, the stronger the relationship (see Figure 2.1). For instance, a correlation of −.78 is high, −.52 is moderate, and −.18 is low. Note, however, that correlations of +.52 and −.52 are equally strong. The sign of the number (+ or −) refers to the direction of the relationship. A positive sign (+) means that as one variable increases, the other also increases. A negative sign (−) indicates that as one variable increases, the other decreases.

Let’s look at some examples of how a correlation coefficient works. One researcher reported a +.55 correlation between a measure of maternal language
stimulation and the size of children’s vocabularies at age 2 years (Hoff, 2003b). This is a moderate correlation, which indicates that mothers who verbalized more had children who were more advanced in language development. In two other studies, child-rearing practices were related to toddlers’ compliance in consistent ways. First, the extent to which mothers were warm and sensitive during a play session correlated positively with children’s willingness to follow their mother’s directive to clean up the toys, at +.34 (Feldman & Klein, 2003). And second, the extent to which mothers ignored their 10-month-olds’ bids for attention correlated negatively with children’s compliance 1 year later—at –.46 for boys and –.36 for girls (Martin, 1981). These moderate correlations revealed that the more mothers expressed affection and support, the more their children cooperated. And the more mothers ignored their children, the less the children cooperated (see Figure 2.2 for visual portrayals of these relationships).

All these investigations found correlations between parenting and young children’s behavior. Are you tempted to conclude that the maternal behaviors influenced children’s responses? Although the researchers suspected this was so, in none of the studies could they be sure about cause and effect. But finding a relationship in a correlational study suggests that tracking down its cause—with a more powerful experimental strategy, if possible—would be worthwhile.

**Experimental Design**

An experimental design permits inferences about cause and effect because researchers use an evenhanded procedure to assign people to two or more treatment conditions. In an experiment, the events and behaviors of interest are divided into two types: independent and dependent variables. The **independent variable** is the one the investigator expects to cause changes in another variable. The **dependent variable** is the one the investigator expects to be influenced by the independent variable. Cause-and-effect relationships can be detected because the researcher directly controls or manipulates changes in the independent variable by

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**Figure 2.2**

A positive and a negative correlation. A researcher reported that maternal warmth and sensitivity were positively correlated with children’s willingness to comply with their mother’s directive to clean up toys (a). A second researcher reported that maternal ignoring of their infants was negatively correlated with children’s compliance 1 year later (b). Each dot represents a participant’s score on the two variables—maternal behavior and child compliance. Both correlations are moderate in strength because the pattern of dots deviates from a straight line, which would be a perfect correlation. Notice how in the positive correlation, as maternal warmth increases, child compliance tends to increase. In the negative correlation, as maternal ignoring increases, child compliance tends to decrease. If a pattern of dots shows no upward or downward trend, then the correlation is near zero, indicating little or no relationship between the two variables.
Does the way adults end their angry encounters affect children’s emotional reactions? A laboratory experiment revealed that when adults resolve their disputes by apologizing and compromising, children are more likely to show less distress when witnessing subsequent adult conflicts than when adults leave their arguments unresolved. Note in this graph that only 10 percent of children in the unresolved-anger treatment declined in distress (see bar on left), whereas 42 percent of children in the resolved-anger treatment did so (see bar on right). (Adapted from El-Sheikh, Cummings, & Reiter, 1996.)

Parental conflict and treatment conditions would be confounding variables—so closely associated that their effects on an outcome cannot be distinguished. To protect against this problem, researchers engage in random assignment of participants to treatment conditions. By using an unbiased procedure, such as drawing numbers out of a hat or flipping a coin, investigators increase the chances that participants’ characteristics will be equally distributed across treatment groups.

Sometimes researchers combine random assignment with another technique called matching. In this procedure, participants are measured ahead of time on the factor in question—in our example, parental conflict. Then children high and low on that factor are assigned in equal numbers to each treatment condition. In this way, the experimental groups are deliberately matched, or made equivalent, on characteristics likely to distort the results.

Modified Experimental Designs

Most experiments are conducted in laboratories, where researchers can achieve the maximum possible control over treatment conditions. But, as we have already indicated, findings obtained in laboratories often have limited external validity: They may not apply to everyday situations. In field experiments, researchers capitalize on opportunities to randomly assign participants to treatment conditions in natural settings. In the experiment we just considered, we can conclude that the emotional climate established by adults affects children’s behavior in the laboratory. But does it also do so in daily life?

Another study helps answer this question (Yarrow, Scott, & Waxler, 1973). This time, the research was carried out in a child-care center. A caregiver deliberately interacted differently with two groups of preschoolers. In one condition (the nurturant treatment), she modeled many instances of warmth and helpfulness. In the second condition (the control, since it involved no treatment), she behaved as usual, with no special emphasis on concern for others. Two weeks later, the researchers created several situations that called for helpfulness. For example, a visiting mother asked each child to watch her baby for a few moments, but the baby’s toys had fallen out of the playpen. Children exposed to the nurturant treatment were much more likely than those in the control condition to return toys to the baby.

See the Biology and Environment box on the following page for an additional example of field research, with important implications for how best to foster children’s intelligence. Often researchers cannot randomly assign participants and manipulate conditions in the real world, as these investigators were able to do. Sometimes they can compromise by conducting natural, or quasi-, experiments. Treatments that already exist, such as different family environments, schools, child-care centers, and preschool programs, are compared. These studies differ from correlational research only in that groups of people are carefully chosen to ensure exposing participants to treatment conditions. Then the researcher compares their performance on measures of the dependent variable.

In one laboratory experiment, researchers explored the impact of adults’ angry interactions on children’s adjustment (El-Sheikh, Cummings, & Reiter, 1996). They hypothesized that the way angry encounters end (independent variable) affects children’s emotional reactions (dependent variable). Four- and 5-year-olds were brought one at a time to a laboratory, accompanied by their mothers. One group was exposed to an unresolved-anger treatment, in which two adult actors entered the room and argued but did not work out their disagreements. The other group witnessed a resolved-anger treatment, in which the adults ended their disputes by apologizing and compromising. As Figure 2.3 shows, while witnessing a follow-up adult conflict, more children in the resolved-anger treatment showed a decline in distress, as measured by fewer anxious facial expressions, less freezing in place, and less seeking of closeness to their mothers. The experiment revealed that anger resolution can reduce the stressful impact of adult conflict on children.

In experimental studies, investigators must take special precautions to control for participants’ characteristics that could reduce the internal validity of their findings. For example, in the study just described, if a greater number of children from homes high in parental conflict ended up in the unresolved-anger treatment, we could not tell whether the independent variable or the children’s backgrounds produced the results.

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In a 1993 experiment, researchers reported that college students who listened to a Mozart sonata for a few minutes just before taking a test of spatial reasoning abilities did better on the test than students who took the test after listening to relaxation instructions or sitting in silence (Rauscher, Shaw, & Ky, 1993). Strains of Mozart, the investigators concluded, seem to induce changes in the brain that “warm up” neural connections, thereby improving thinking. But the gain in performance—widely publicized as the “Mozart effect”—lasted only 15 minutes and proved difficult to replicate. Rather than involving a real change in ability, Mozart seemed to improve arousal and mood, yielding better concentration on the test (Husain, Thompson, & Schellenberg, 2002; Thompson, Schellenberg, & Husain, 2001).

Despite mounting evidence that the Mozart effect was uncertain at best, the media and politicians were enthralled with the idea that a brief exposure of the brain to classical music in infancy, when neural connections are forming rapidly, might foster cognitive processing, particularly during childhood, when regions of the brain are taking on specialized functions and are highly sensitive to environmental influences.

Schellenberg conducted a field experiment involving 132 6-year-olds—children just old enough for formal lessons. First, the children took an intelligence test and were rated for social maturity, allowing researchers to see whether music lessons affect some aspects of development but not others. Next, the children were randomly assigned to one of four treatments. Two were music groups: one received piano lessons and the other voice lessons. The third group took drama lessons—a condition that shed light on whether musical gains were unique to musical experiences. The fourth group—a no-lessons control—was offered music lessons the following year. Music and drama instruction took place at the prestigious Royal Conservatory of Music in Toronto, where highly trained, experienced teachers taught the children in small groups. After 36 weeks of lessons, the children’s intelligence and social maturity were assessed again.

In sum, active, sustained musical experiences can lead to small increases in intelligence among 6-year-olds that do not arise from comparable drama lessons. But other enrichment activities with similar properties, such as reading, science, math, and chess programs, may confer similar benefits. All demand that children invest far more time and effort than they would in listening to a Mozart sonata. Nevertheless, music companies persist in selling CDs entitled “Tune Your Brain with Mozart” and “Mozart for Newborns: A Bright Beginning.”
that their characteristics are as much alike as possible. Occasionally, the same participants experience both treatments. In this way, investigators do their best to avoid confounding variables and alternative explanations for treatment effects.

Natural experiments permit researchers to examine the impact of many conditions that cannot be experimentally manipulated for ethical reasons—for example, the influence of premature birth, grade retention, or child maltreatment on development (Sameroff & MacKenzie, 2003). In one such study, maltreated and nonmaltreated 8- to 12-year-olds were enrolled in the same summer camp and, therefore, were observed and questioned under similar social conditions. When asked to complete stories about parenting that tapped themes of conflict, discipline, autonomy, and affection, maltreated children gave responses that were less elaborate and more negative than those of their nonmaltreated counterparts. Furthermore, peers rated maltreated children as more disruptive, more aggressive, and less cooperative (see Figure 2.5). Not surprisingly, peers strongly disliked these youngsters. Finally, children who represented their parents negatively in stories were especially likely to display maladaptive social behaviors (Shields, Ryan, & Cicchetti, 2001). The investigators concluded that maltreated children's internalized, unfavorable parenting images probably contribute to their poor social adjustment. And their poor adjustment reduces their access to the healing effects of warm, enjoyable relationships with peers. Despite intriguing findings like these, natural experiments cannot achieve the precision and rigor of true experimental research.

To help you compare the correlational and experimental designs we have discussed, Table 2.2 summarizes their strengths and limitations. Now let’s take a close look at designs for studying development.

### Table 2.2 Strengths and Limitations of General Research Designs

<table>
<thead>
<tr>
<th>Design</th>
<th>Description</th>
<th>Strengths</th>
<th>Limitations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Correlational design</td>
<td>The investigator obtains information on participants without altering their experiences.</td>
<td>Permits study of relationships between variables.</td>
<td>Does not permit inferences about cause-and-effect relationships.</td>
</tr>
<tr>
<td>Laboratory experiment</td>
<td>Under controlled laboratory conditions, the investigator manipulates an independent variable and looks at its effect on a dependent variable; requires random assignment of participants to treatment conditions.</td>
<td>Permits inferences about cause-and-effect relationships.</td>
<td>Findings may not generalize to the real world.</td>
</tr>
<tr>
<td>Field experiment</td>
<td>The investigator randomly assigns participants to treatment conditions in natural settings.</td>
<td>Permits generalization of experimental findings to the real world.</td>
<td>Control over the treatment is generally weaker than in a laboratory experiment.</td>
</tr>
<tr>
<td>Natural, or quasi-, experiment</td>
<td>The investigator compares already existing treatments in the real world, carefully selecting groups of participants to ensure that their characteristics are as much alike as possible.</td>
<td>Permits study of many real-world conditions that cannot be experimentally manipulated.</td>
<td>Findings may be due to variables other than the treatment.</td>
</tr>
</tbody>
</table>
Designs for Studying Development

Scientists interested in child development require information about the way research participants change over time. To answer questions about development, they must extend correlational and experimental approaches to include measurements at different ages. Longitudinal and cross-sectional designs are special developmental research strategies. In each, age comparisons form the basis of the research plan.

The Longitudinal Design

In a longitudinal design, participants are studied repeatedly, and changes are noted as they get older. The time spanned may be relatively short (a few months to several years) or very long (a decade or even a lifetime).

- **ADVANTAGES OF THE LONGITUDINAL DESIGN**
  - The longitudinal approach has two major strengths. First, since it tracks the performance of each person over time, researchers can identify common patterns as well as individual differences in development. Second, longitudinal studies permit investigators to examine relationships between early and later events and behaviors. Let’s illustrate these ideas.

  A group of researchers wondered whether children who display extreme personality styles—either angry and explosive or shy and withdrawn—retain the same dispositions when they become adults. In addition, the researchers wanted to know what kinds of experiences promote stability or change in personality and what consequences explosiveness and shyness have for long-term adjustment. To answer these questions, the researchers delved into the archives of the Guidance Study, a well-known longitudinal investigation initiated in 1928 at the University of California, Berkeley, and continued over several decades (Caspi, Elder, & Bem, 1987, 1988).

  Results revealed that the two personality styles were moderately stable. Between ages 8 and 30, a good number of individuals remained the same, whereas others changed substantially. When stability did occur, it appeared to be due to a “snowballing effect,” in which children evoked responses from adults and peers that acted to maintain their dispositions. Explosive youngsters were likely to be treated with anger, whereas shy children were apt to be ignored. As a result, the two types of children came to view their social worlds differently. Explosive children regarded others as hostile; shy children regarded them as unfriendly (Caspi & Roberts, 2001). Together, these factors led explosive children to sustain or increase their unruliness and shy children to continue to withdraw.

  Persistence of extreme personality styles affected many areas of adult adjustment. For men, the results of early explosiveness were most apparent in their work lives, in the form of conflicts with supervisors, frequent job changes, and unemployment. Since few women in this sample of an earlier generation worked after marriage, their family lives were most affected. Explosive girls grew up to be hotheaded wives and mothers who were especially prone to divorce. Sex differences in the long-term consequences of shyness were even greater. Men who had been withdrawn in childhood were delayed in marrying, becoming fathers, and developing careers. However, because a withdrawn, unassertive style was socially acceptable for females, women who had shy personalities showed no special adjustment problems.
Despite their strengths, longitudinal investigations pose a number of problems that can compromise both internal and external validity. **Biased sampling**—the failure to enlist participants who represent the population of interest—is a common problem. People who willingly participate in research that requires them to be observed and tested over many years are likely to have unique characteristics—at the very least, a special appreciation for the scientific value of research. As a result, we cannot easily generalize from them to the rest of the population. Furthermore, longitudinal samples generally become more biased as the investigation proceeds because of **selective attrition**. Participants may move away or drop out for other reasons, and the ones who remain are likely to differ in important ways from the ones who do not continue.

The very experience of being repeatedly observed, interviewed, and tested can also interfere with a study’s validity. Children and adults may gradually be alerted to their own thoughts, feelings, and actions, think about them, and revise them in ways that have little to do with age-related change. In addition, with repeated testing, participants may become “test-wise.” Their performance may improve because of **practice effects**—better test-taking skills and increased familiarity with the test—not because of factors commonly associated with development.

The most widely discussed threat to the validity of longitudinal findings is cultural-historical change, or what are commonly called **cohort effects**. Longitudinal studies examine the development of cohorts—children developing in the same time period who are influenced by particular cultural and historical conditions. Results based on one cohort may not apply to children developing at other times. For example, unlike the findings on female shyness described in the previous section, which were gathered more than a half-century ago, today’s shy young women tend to be poorly adjusted—a difference that may be due to changes in gender roles in Western societies. Shy adults, whether male or female, feel more depressed, have fewer social supports, and may do less well in educational and career attainment than their agemates (Caspi, 2000; Caspi et al., 2003). Similarly, a longitudinal study of social development would probably result in quite different findings, depending on whether it was carried out in the first decade of the twenty-first century, around the time of World War II, or during the Great Depression of the 1930s (see the Cultural Influences box on the following page).

Cohort effects don’t just operate broadly on an entire generation. They also occur when specific experiences influence some children but not others in the same generation. For example, children who witnessed the terrorist attacks of September 11, 2001, either because they were near Ground Zero or because they saw injury and death on TV, were far more likely than other children to display persistent emotional problems, including intense fear, anxiety, and depression (Saylor et al., 2003). A study of one New York City sample suggested that as many as one-fourth of the city’s children were affected (Hoven, Mandell, & Duarte, 2003).

Finally, changes occurring within the field of child development may create problems for longitudinal research covering an extended time period. Theories and methods constantly change, and those that first inspired a longitudinal study may become outdated. For this reason, as well as the others just mentioned, many recent longitudinal studies span only a few months or years. Although short-term longitudinal research does not yield the same breadth of information as long-term studies, researchers are spared at least some formidable obstacles.

### The Cross-Sectional Design

The length of time it takes for many behaviors to change, even in limited longitudinal studies, has led researchers to turn to a more convenient strategy for studying development. In the **cross-sectional design**, groups of people differing in age are studied at the same time.
Cultural Influences

Impact of Historical Times on Development: The Great Depression and World War II

Cataclysmic events, such as economic disaster, war, and rapid social change, shake the foundations of life, inducing shared adaptations among people born at the same time (Rogler, 2002). Glen Elder (1999) capitalized on the hardships that families experienced during the Great Depression of the 1930s to study its influence on development. He delved into the vast archives of two major longitudinal studies: (1) the Oakland Growth Study, an investigation of individuals born in the early 1920s, who were adolescents when the Depression took its toll; and (2) the Guidance Study, whose participants were born in the late 1920s and were young children when their families faced severe financial losses.

In both cohorts, relationships changed when economic deprivation struck. As unemployed fathers lost status, mothers took greater control over family affairs. This reversal of traditional gender roles often sparked conflict. Fathers sometimes became explosive and punitive toward their children. At other times, they withdrew into passivity and depression. Mothers often became frantic with worry over their family's well-being and sought work to make ends meet (Elder, Liker, & Cross, 1984).

Outcomes for Adolescents

Although unusual burdens were placed on them as family lives changed, the Oakland Growth Study cohort—especially the boys—weathered economic hardship quite well. As adolescents, they were too old to be wholly dependent on their highly stressed parents. Boys spent less time at home as they searched for part-time jobs, and many turned toward adults and peers outside the family for emotional support. Girls took over responsibility for household chores and caring for younger siblings. Their greater involvement in family affairs exposed them to more parental conflict and unhappiness. Consequently, adolescent girls' adjustment in economically deprived homes was somewhat less favorable than that of adolescent boys (Elder, Van Nguyen, & Caspi, 1985).

These changes had major consequences for adolescents' future aspirations and adult lives. As girls focused on home and family, they were less likely to think about college and careers and more likely to marry early. Boys learned that economic resources could not be taken for granted, and they tended to make an early commitment to an occupational choice. And the chance to become a parent was especially important to men whose lives had been disrupted by the Depression. Perhaps because they believed that a rewarding career could not be guaranteed, they viewed children as the most enduring benefit of their adult lives.

Outcomes for Children

Unlike the Oakland Growth Study cohort, the Guidance Study participants were within the years of intense family dependency when the Depression struck. For young boys (who, as you will see in later chapters, are especially prone to adjustment problems in the face of family stress), the impact of economic strain was severe. They showed emotional difficulties and poor attitudes toward school and work that persisted through the teenage years (Elder & Caspi, 1988).

But as the Guidance Study sample became adolescents, another major historical event occurred: World War II. As a result, thousands of men left their communities for military bases, leading to dramatic life changes. Some combat veterans came away with symptoms of emotional trauma that persisted for decades. Yet for most young soldiers, war mobilization broadened their range of knowledge and experience. It also granted time out from civilian responsibilities, giving many soldiers a chance to consider where their lives were going. And the GI Bill of Rights, which provided government subsidies for college education, enabled veterans to acquire new knowledge and experience. It also granted time out from civilian responsibilities, giving many soldiers a chance to consider where their lives were going. And the GI Bill of Rights, which provided government subsidies for college education, enabled veterans to acquire new knowledge and experience.

Clearly, cultural-historical change does not have a uniform impact on development. Outcomes can vary considerably, depending on the pattern of historical events and the age at which people experience them.
children become more competent and independent, they no longer need, and are probably less willing to accept, direction from older siblings. In addition, as adolescents move from psychological dependence on the family to greater involvement with peers, they may have less time and emotional need to invest in siblings. These intriguing ideas about the development of sibling relationships, as we will see in Chapter 14, have been confirmed in subsequent research.

### Problems in Conducting Cross-Sectional Research

Despite its convenience, cross-sectional research does not provide evidence about development at the level at which it actually occurs: the individual (Kraemer et al., 2000). For example, in the cross-sectional study of sibling relationships just discussed, comparisons are limited to age-group averages. We cannot tell if important individual differences exist. Indeed, longitudinal findings reveal that adolescents vary considerably in the changing quality of their sibling relationships. Although many become more distant, others become more supportive and intimate, and still others become more rivalrous and antagonistic (Branje et al., 2004; Dunn, Slomkowski, & Beardsall, 1994).

Cross-sectional studies—especially those that cover a wide age span—have another problem. Like longitudinal research, they can be threatened by cohort effects. For example, comparisons of 5-year-old cohorts and 15-year-old cohorts—groups born and reared in different years—may not really represent age-related changes. Instead, they may reflect unique experiences associated with the time period in which the age groups were growing up.

### Improving Developmental Designs

Researchers have devised ways of building on the strengths and minimizing the weaknesses of longitudinal and cross-sectional approaches. Several modified developmental designs have resulted.

#### Combining Longitudinal and Cross-Sectional Approaches

In the sequential design, researchers merge longitudinal and cross-sectional strategies by following a sequence of samples (two or more age groups), collecting data on them at the same points in time. For example, suppose we select three samples—sixth, seventh, and eighth graders—and track them for 2 years. That is, we observe each sample this year and next year, as follows: Sample 1 from grades 6 to 7; Sample 2 from grades 7 to 8; and Sample 3 from grades 8 to 9.

The design has three advantages: (1) We can find out whether cohort effects are operating by comparing children of the same age (or grade in school) who were born in different years. Using our example, we can compare children from different samples at grades 7 and 8. If they do not differ, then we can rule out cohort effects. (2) We can make both longitudinal and cross-sectional comparisons. If outcomes are similar, then we can be especially confident about the accuracy of our findings. (3) The design is efficient. In our example, we can find out about change over a 4-year period by following each cohort for just 2 years.

A study of adolescents’ gender-stereotyped beliefs included the sequential features just described (Alfieri, Ruble, & Higgins, 1996). The researchers focused on stereotype flexibility—young people’s willingness to say that “masculine” traits (such as strong) and “feminine” traits (such as gentle) characterize both males and females. As Figure 2.6 reveals, Samples 2 and 3 showed a sharp longitudinal decline in stereotype flexibility and had similar scores when measured at grade 8. But Sample 1, on reaching seventh grade, scored much lower than seventh graders in Sample 2.

The reason, the researchers discovered, was that Sample 1 remained in the same school from sixth to seventh grade, whereas Samples 2 and 3 had transitioned from elementary to junior high school. Entry into junior high sparked a temporary rise in gender-stereotype flexibility, perhaps because of exposure to a wide range of older peers, some of whom challenged stereotypes. Over time, stereotype flexibility decreased in Samples 2 and 3. The researchers speculated that these young junior high students were responding to social pressures to conform to traditional gender roles—a topic we will take up in Chapter 13.

Notice how the developmental trend shown in Figure 2.6—high gender-stereotype flexibility at grade 7 that drops off steeply—characterizes only adolescents who moved to a self-contained junior high school. Researchers have become increasingly interested in identifying such cohort effects because they help explain diversity in development.

#### Examining Microwcosms of Development

In all the examples of developmental research we have discussed, observations of children are fairly widely spaced. When we observe
once a year or every few years, we can describe change, but we have little opportunity to capture the processes that produce it. The microgenetic design, an adaptation of the longitudinal approach, presents children with a novel task and follows their mastery over a series of closely spaced sessions. Within this “microcosm” of development, researchers observe how change occurs (Kuhn, 1995; Siegler & Crowley, 1991). The microgenetic design is especially useful for studying cognitive development. For example, researchers can examine the strategies children use to acquire new knowledge in reading, mathematics, and science (Siegler, 1996, 2002). As you will see in Chapter 4, the microgenetic design has also been used to trace infants’ mastery of motor skills.

Nevertheless, microgenetic studies are difficult to carry out. Researchers must pore over hours of recorded information, analyzing each participant’s behavior many times. In addition, the time required for children to change is hard to anticipate. It depends on a careful match between the child’s capabilities and the demands of the task. Finally, as in other longitudinal research, practice effects can distort microgenetic findings. As a check, researchers can compare microgenetic with cross-sectional observations. If new behaviors that emerge microgenetically reflect typical development, they should match the behaviors displayed by more advanced participants in cross-sectional studies, who are observed only once (Kuhn, 1995). When researchers overcome the challenges of microgenetic research, they reap the benefits of seeing development as it takes place.

### COMBINING EXPERIMENTAL AND DEVELOPMENTAL DESIGNS

Perhaps you noticed that all the examples of longitudinal and cross-sectional research we have considered permit only correlational, and not causal, inferences. Yet causal information is desirable, both for testing theories and for finding ways to improve children’s lives. If a developmental design indicates that children’s experiences and behavior are related, in some instances we can explore the causal link by experimentally manipulating the experiences. If, as a result, development is enhanced, then we have strong evidence for a causal association between experiences and behavior. Today, research that combines an experimental strategy with either a longitudinal or a cross-sectional approach appears with increasing frequency. These designs help investigators move beyond correlated variables to a causal account of development. For a summary of the strengths and limitations of developmental research designs, refer to Table 2.3 on page 62.
Ethics in Research on Children

Research into human behavior creates ethical issues because, unfortunately, the quest for scientific knowledge can sometimes exploit people. When children take part in research, the ethical concerns are especially complex. Children are more vulnerable than adults to physical and psychological harm. In addition, immaturity makes it difficult or impossible for children to evaluate for themselves what participation in research will mean. For these reasons, special ethical guidelines for research on children have been developed by the federal government, by funding agencies, and by research-oriented associations such as the American Psychological Association (2002), the Canadian Psychological Association (2000), and the Society for Research in Child Development (1993).

---

### Ask Yourself

**REVIEW**

Explain how cohort effects can distort the findings of both longitudinal and cross-sectional studies. How does the sequential design reveal cohort effects?

**REVIEW**

What design is best suited to studying processes of change, and why? When researchers use this design, what factors can threaten the internal validity of their findings?

**APPLY**

A researcher wants to know whether children enrolled in child-care centers in the first few years of life do as well in school as those who are not in child care. Which developmental design is appropriate for answering this question? Explain.

**REFLECT**

Suppose a researcher asks you to enroll your baby in a 10-year longitudinal study. What factors would lead you to agree and stay involved? Do your answers shed light on why longitudinal studies often have biased samples? Explain.

---

**Ethics in Research on Children**

Table 2.3: Strengths and Limitations of Developmental Research Designs

<table>
<thead>
<tr>
<th>Design</th>
<th>Description</th>
<th>Strengths</th>
<th>Limitations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Longitudinal</td>
<td>The investigator studies the same group of participants repeatedly at different ages.</td>
<td>Permits study of common patterns and individual differences in development and relationships between early and later events and behaviors.</td>
<td>Age-related changes may be distorted because of biased sampling, selective attrition, practice effects, and cohort effects. Theoretical and methodological changes in the field can make findings obsolete.</td>
</tr>
<tr>
<td>Cross-sectional</td>
<td>The investigator studies groups of participants differing in age at the same time.</td>
<td>More efficient than the longitudinal design. Not plagued by selective attrition, practice effects, or theoretical and methodological changes in the field.</td>
<td>Does not permit study of individual developmental trends. Age differences may be distorted because of cohort effects.</td>
</tr>
<tr>
<td>Sequential</td>
<td>The investigator follows a sequence of samples (two or more age groups), collecting data on them at the same points in time.</td>
<td>Permits both longitudinal and cross-sectional comparisons. Reveals cohort effects. Permits tracking of age-related changes more efficiently than the longitudinal design.</td>
<td>May have the same problems as longitudinal and cross-sectional strategies, but the design itself helps identify difficulties.</td>
</tr>
<tr>
<td>Microgenetic</td>
<td>The investigator presents children with a novel task and follows their mastery over a series of closely spaced sessions.</td>
<td>Offers insights into processes of development.</td>
<td>Requires intensive study of participants’ moment-by-moment behaviors; the time required for participants to change is difficult to anticipate; practice effects may distort developmental trends.</td>
</tr>
</tbody>
</table>
Table 2.4 presents a summary of children's basic research rights. Once you have examined them, think back to the ethical controversy faced by my colleague Ron, described at the beginning of this chapter. Then read the following research situations, each of which poses an additional ethical dilemma. What precautions do you think should be taken in each instance? Is either so threatening to children's well-being that it should not be carried out?

- In a study of moral development, a researcher wants to assess children's ability to resist temptation by videotaping their behavior without their knowledge. She promises 7-year-olds a prize for solving difficult puzzles but tells them not to look at a classmate's correct solutions, which are deliberately placed at the back of the room. Informing children ahead of time that cheating is being studied or that their behavior is being monitored will destroy the purpose of the study.

- A researcher is interviewing fifth graders about their experiences with bullying. A girl describes being victimized by an older sibling, but the behavior is not severe enough to warrant a report of abuse to child welfare authorities. Although the girl is unhappy, she wants to handle the problem on her own. If the researcher alerts the girl's parents to provide protection and help, he will violate his promise to keep participants' responses private.

Did you find it difficult to evaluate these examples? Virtually every organization that has devised ethical principles for research has concluded that conflicts arising in research situations cannot be resolved with simple right-or-wrong answers. The ultimate responsibility for the ethical integrity of research lies with the investigator. However, researchers are advised—and often required—to seek advice from others. Committees for this purpose (like the one that evaluated Ron's research) exist in colleges, universities, and other institutions. These institutional review boards (IRBs) assess proposed studies on the basis of a risks-versus-benefits ratio. This involves weighing the costs to participants in terms of inconvenience and possible psychological or physical injury against the study’s value for advancing knowledge and improving conditions of life.

Ron's procedures, the school's research committee claimed, might not offer children sufficient protection from harm. If there are any risks to the safety and welfare of participants that the research does not justify, then preference is always given to the research participants. Vulnerability to harm, as the From Research to Practice box on page 64 reveals, varies with children's age and characteristics. Occasionally, further inquiry can help resolve perplexing ethical dilemmas. In Ron's case, he provided the research committee with findings showing that asking

<table>
<thead>
<tr>
<th>TABLE 2.4</th>
<th>CHILDREN'S RESEARCH RIGHTS</th>
</tr>
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<tbody>
<tr>
<td>Research Right</td>
<td>Description</td>
</tr>
<tr>
<td>Protection from harm</td>
<td>Children have the right to be protected from physical or psychological harm in research. If in doubt about the harmful effects of research, investigators should seek the opinion of others. When harm seems possible, investigators should find other means for obtaining the desired information or abandon the research.</td>
</tr>
<tr>
<td>Informed consent</td>
<td>All research participants, including children, have the right to have explained to them, in language appropriate to their level of understanding, all aspects of the research that may affect their willingness to participate. When children are participants, informed consent of parents as well as others who act on the child’s behalf (such as school officials) should be obtained, preferably in writing. Children, and the adults responsible for them, have the right to discontinue participation in the research at any time.</td>
</tr>
<tr>
<td>Privacy</td>
<td>Children have the right to concealment of their identity on all information collected in the course of research. They also have this right with respect to written reports and any informal discussions about the research.</td>
</tr>
<tr>
<td>Knowledge of results</td>
<td>Children have the right to be informed of the results of research in language that is appropriate to their level of understanding.</td>
</tr>
<tr>
<td>Beneficial treatments</td>
<td>If experimental treatments believed to be beneficial are under investigation, children in control groups have the right to alternative beneficial treatments if they are available.</td>
</tr>
</tbody>
</table>

Children's Research Risks: Developmental and Individual Differences

Researchers interested in children face formidable challenges in defining their ethical responsibilities. Compared with adults, children are less capable of benefiting from research experiences. Furthermore, most risks children encounter are psychological rather than physical (as in medical research) and therefore difficult to anticipate and even detect (Thompson, 1992). Consider, for example, 7-year-old Henry, who did not want to answer a researcher's questions about how he feels about his younger brother, who has physical disabilities. Since Henry's parents told him they had given permission for his participation, he did not feel free to say no. Or take 11-year-old Isabelle, who tried to solve a problem unsuccessfully. Despite the researcher's assurances that the task was set up to be impossible, Isabelle ended up doubting her own competence.

How can we make sure that children are subjected to the least research risk possible? One valuable resource is our expanding knowledge of age-related capacities and individual differences. Research risks vary with development in complex ways. Some risks decrease with age. Others increase, and still others occur at many or all ages (Thompson, 1990b). And because of their personal characteristics and life circumstances, some children are more vulnerable to harm than others.

Age Differences
Research plans for younger children typically receive the most scrutiny because their limited cognitive competencies restrict their ability to make reasoned decisions and resist violations of their rights. In addition, as Henry's predicament illustrates, young children's limited social power can make it hard to refuse participation. In research that examined children's understanding of research procedures, 9-year-olds had great difficulty identifying their research rights and recognizing violations of those rights. Even 12-year-olds struggled to grasp their rights to decline participation, be protected from harm, and be given the study's results (Bruzese & Fisher, 2003). And regardless of age, most children and adolescents thought that withdrawing from a study would have negative consequences and felt external pressure to continue. For example, they believed the researcher would be unhappy if they stopped (Ondursek et al., 1998). But if researchers briefly name and explain each research right, comprehension improves, especially among adolescents.

Whereas young children often fail to comprehend the research process, older children are more susceptible to procedures that threaten the way they view themselves. As middle childhood brings greater sensitivity to others' evaluations, giving false feedback or inducing failure (as happened to Isabelle) is more stressful. In adolescence, when questioning of authority is common, young people may be better at sizing up the researcher's requests, he may not know why he was asked to participate, or realize that he may withdraw at any time without negative consequences. Because children have difficulty understanding the research process, extra steps must be taken to ensure their research rights.

Although this 9-year-old boy cooperates with a researcher's requests, he may not know why he was asked to participate, or realize that he may withdraw at any time without negative consequences. Because children have difficulty understanding the research process, extra steps must be taken to ensure their research rights.

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elementary school children to identify disliked peers does not cause them to interact less frequently or more negatively with those children (Bell-Dolan, Foster, & Sikora, 1989). At the same time, Ron agreed to take special precautions when requesting such information. He promised to ask all the children to keep their comments confidential. He also arranged to conduct the study at a time when classmates have limited opportunity to interact with one another—just before a school vacation (Bell-Dolan & Wessler, 1994). With these safeguards in place, the committee approved Ron’s research.

The ethical principle of informed consent—people’s right to have all aspects of a study explained to them that might affect their willingness to participate—requires special interpretation when individuals cannot fully appreciate the research goals and activities. Parental consent is meant to protect the safety of children whose ability to decide is not yet fully mature. Besides obtaining parental consent, researchers should seek agreement of others who act on children’s behalf, such as institutional officials when research is conducted in schools, child-care centers, or hospitals. This is especially important when studies include special groups whose parents may not represent their best interests (refer again to the From Research to Practice box on the preceding page).

As soon as children are old enough to appreciate the purpose of the research, and certainly by 7 years of age, their own informed consent should be obtained in addition to parental consent. Around age 7, changes in children’s thinking permit them to better understand simple scientific principles and the needs of others. Researchers should respect and enhance these new capacities by providing school-age children with a full explanation of research activities in language they can understand (Fisher, 1993). Careful attention to informed consent helps resolve dilemmas about revealing children’s responses to parents, teachers, or other authorities because those responses suggest that the child’s welfare is in danger. Children can be told in advance that if they report that someone is harming them, then the researcher will tell an appropriate adult to take action to ensure the child’s safety (Mishna, Antle, & Regehr, 2004).

Finally, young children rely on a basic faith in adults to feel secure in unfamiliar situations. For this reason, some types of research may be particularly disturbing to them. All ethical guidelines advise that special precautions be taken in the use of deception and concealment, as occurs when researchers observe children from behind one-way mirrors, give them false feedback about their performance, or do not tell them the truth regarding what the research is about. When these kinds of procedures are used with adult participants, debriefing, in which the researcher provides a full account and justification of the activities, occurs after the research session is over. Debriefing should also be done with children, but it rarely works as well. Despite explanations, children may leave the research situation with their belief in the honesty of adults undermined. Ethical standards permit deception in research with children if investigators satisfy institutional committees that such practices are necessary. Nevertheless, because deception may have serious emotional consequences for some youngsters, many child development specialists believe that researchers should come up with other research strategies when children are involved.

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**Ask Yourself**

**REVIEW**
Explain why researchers must consider children’s age-related capacities to ensure that they are protected from harm and have freely consented to research.

**APPLY**
When a researcher engaged in naturalistic observation of preschoolers’ play, a child said, “Stop watching me!” Using the research rights in Table 2.4, indicate how the researcher should respond, and why.

**CONNECT**
Review the experiment on music lessons and intelligence reported in the Biology and Environment box on page 55. Why was it ethically important for the researchers to offer music lessons to the no-lessons control group during the year after completion of the study?

**REFLECT**
Suppose you want to conduct clinical interviews with school-age children, each of whom has a parent with AIDS, to elicit their thoughts and feelings about living with a parent who has a chronic, stigmatizing illness. After obtaining parental consent to ask about this sensitive, private topic, what steps would you take throughout the interview to ensure that you have the children’s informed consent?
Summary

From Theory to Hypothesis

Describe the role of theories, hypotheses, and research questions in the research process.

- Research usually begins with a hypothesis, or prediction about behavior drawn from a theory. When little or no theory exists on a topic of interest, investigators begin with a research question. On the basis of the hypothesis or question, the investigator selects research methods (specific activities of participants) and a research design (overall plan for the study).

Common Methods Used to Study Children

Describe research methods commonly used to study children, noting strengths and limitations of each.

- Naturalistic observations, gathered in children’s everyday environments, permit researchers to see directly the everyday behaviors they hope to explain. In contrast, structured observations take place in laboratories, where every participant has an equal opportunity to display the behaviors of interest.

- Depending on the researcher’s purpose, observations can preserve participants’ entire stream of behavior, or they can be limited to one or a few behaviors, as in event sampling and time sampling. Observer influence and observer bias can reduce the accuracy of observational findings.

- Self-report methods can be flexible and open-ended like the clinical interview, which permits participants to express their thoughts in ways similar to their thinking in everyday life. Alternatively, structured interviews, tests, and questionnaires are more efficient and permit researchers to specify activities and behaviors that participants might not think of in an open-ended interview. Both approaches depend on participants’ ability and willingness to engage in accurate reporting.

- Psychophysiological methods measure the relation between physiological processes and behavior. They help researchers uncover the biological bases of children’s perceptual, cognitive, and emotional responses. Nevertheless, these methods involve a high degree of inference; researchers cannot be sure that certain patterns of autonomic or brain activity signal particular cognitive processes.

- Investigators rely on the clinical, or case study, method to obtain an in-depth understanding of a single child. In this approach, interviews, observations, test scores, and sometimes psychophysiological assessments are synthesized into a complete description of the participant’s development and psychological functioning. But the method risks unsystematic and subjective collection of information, and researchers cannot generalize to anyone other than the child studied.

Reliability and Validity: Keys to Scientifically Sound Research

Explain how reliability and validity apply to research methods and to the overall accuracy of research findings and conclusions.

- To be acceptable to the scientific community, research methods must be both reliable and valid. Reliability refers to the consistency, or repeatability, of observational, self-report, and psychophysiological measures. In the case of clinical and ethnographic research, reliability involves assessing whether the patterns and themes identified by the researcher are grounded in evidence and are plausible.

- A method has high validity if, after examining its content and relationships with other measures of behavior, the researcher finds that it reflects what it was intended to measure. The concept of validity can also be applied more broadly, to the overall accuracy of research findings and conclusions. In designing a study, investigators must take special precautions to ensure internal validity—that conditions internal to the study’s design permit an accurate test of the hypothesis or question. They must also consider external validity—the degree to which findings generalize to settings and participants outside the original study.

General Research Designs

Distinguish correlational and experimental research designs, noting strengths and limitations of each.

- The correlational design examines relationships between variables as they happen to occur, without altering people’s experiences. The correlation coefficient often is used to measure the association between variables. Correlational studies do not permit infer-
ences about cause and effect. However, their use is justified when it is difficult or impossible to control the variables of interest.

- An experimental design permits inferences about cause and effect. Researchers manipulate an independent variable by exposing groups of participants to two or more treatment conditions. Then they determine what effect this variable has on a dependent variable. Random assignment and matching ensure that characteristics of participants and treatment conditions do not operate as confounding variables that reduce the internal validity of experimental findings.

- Laboratory experiments usually achieve high degrees of control, but their findings may not apply to everyday life. To overcome this problem, researchers sometimes conduct field experiments, in which they randomly assign participants to treatment conditions in the real world. When this is impossible, investigators may compromise and conduct natural, or quasi-, experiments, in which already existing treatments, involving groups of people whose characteristics are as much alike as possible, are compared. This approach, however, is less precise and rigorous than a true experimental design.

**Designs for Studying Development**

Describe designs for studying development, noting strengths and limitations of each.

- The longitudinal design permits study of common patterns as well as individual differences in development and the relationship between early and later events and behaviors.

- Researchers face a variety of problems in conducting longitudinal research, including biased sampling, selective attrition, practice effects, and changes in accepted theories and methods over long-term studies. But the most widely discussed threat to the validity of longitudinal findings is cohort effects—difficulty generalizing to children growing up during different time periods.

- The cross-sectional design, in which groups of participants differing in age are studied at the same time, offers an efficient approach to studying development. Although not plagued by such problems as selective attrition, practice effects, or theoretical and methodological changes in the field, it is limited to comparisons of age-group averages. Like longitudinal research, cross-sectional studies can be threatened by cohort effects, especially when they cover a wide age span.

- Modified developmental designs overcome some of the limitations of longitudinal and cross-sectional research. By combining the two approaches in the sequential design, researchers can test for cohort effects, make longitudinal and cross-sectional comparisons, and gather information about development efficiently. In the microgenetic design, researchers track change as it occurs to gain insights into the processes of development. However, the time required for children to change is hard to anticipate, and practice effects can bias findings. When researchers combine experimental and developmental designs, they can examine causal influences on development.

**Ethics in Research on Children**

What special ethical issues arise in doing research on children?

- Because of their immaturity, children are especially vulnerable to harm and often cannot evaluate the risks and benefits of research. Ethical principles and institutional review boards (IRBs) that weigh research in terms of a risks-versus-benefits ratio help ensure that children’s rights are safeguarded and that they are afforded protection from harm. In addition to parental consent and agreement of others who act on children’s behalf, researchers should seek the informed consent of children age 7 and older by explaining, in language the child can understand, all aspects of the research procedures and the child’s rights. The use of deception in research with children is especially risky, since debriefing can undermine their basic faith in the trustworthiness of adults.

**Important Terms and Concepts**

- biased sampling (p. 58)
- clinical interview (p. 46)
- clinical, or case study, method (p. 48)
- cohort effects (p. 58)
- confounding variables (p. 54)
- correlation coefficient (p. 52)
- correlational design (p. 52)
- cross-sectional design (p. 58)
- debriefing (p. 65)
- dependent variable (p. 53)
- ethnography (p. 49)
- event sampling (p. 44)
- experimental design (p. 54)
- external validity (p. 52)
- field experiment (p. 54)
- hypothesis (p. 42)
- independent variable (p. 53)
- informed consent (p. 65)
- internal validity (p. 52)
- laboratory experiment (p. 54)
- longitudinal design (p. 57)
- matching (p. 54)
- microgenetic design (p. 61)
- natural, or quasi-, experiment (p. 54)
- naturalistic observation (p. 42)
- observer bias (p. 45)
- observer influence (p. 45)
- practice effects (p. 58)
- protection from harm (p. 63)
- psychophysiological methods (p. 47)
- random assignment (p. 54)
- reliability (p. 51)
- risks-versus-benefits ratio (p. 63)
- selective attrition (p. 58)
- sequential design (p. 60)
- structured interview (p. 46)
- structured observation (p. 44)
- time sampling (p. 45)
- validity (p. 51)