(e.g., Huesmann et al., 2003). One study found "that childhood exposure to media violence predicts young adult aggressive behavior for both males and females. Identification with aggressive TV characters and perceived realism of TV violence also predict later aggression. These relations persist even when the effects of socioeconomic status, intellectual ability, and a variety of parenting factors are controlled" (p. 201).

CONCLUSION

As children acquire easier access to quickly expanding media formats, concerns over the effects of violence embedded in these media are increasing as well. Blocking children's access to all violent media is probably an impossible task, but research is increasing on strategies for preventing media violence from translating into real-life aggression among children. These efforts have been stepped up considerably in the wake of deadly shootings by students at schools throughout the United States, and they are likely to continue on many research fronts for the foreseeable future. Recently, the California legislature passed a law banning the sale of "ultra-violent" video games to children under the age of 18 without parental permission and imposing a fine of $1,000 on retailers who fail to adhere to the law. What is "ultra-violent," you ask? According to the law, it is defined "as depicting serious injury to human beings in a manner that is especially heinous, atrocious or cruel" (Going after video game violence, 2006). If you find such a definition overly subjective, you would not be alone. The video game industry is suing to overturn this law as unconstitutional, and you can bet that Bandura's research will be part of that battle.

Bandura, A. (1965). Influence of models' reinforcement contingencies on the acquisition of imitative responses. *Journal of Personality and Social Psychology, 1,* 589–595.

Bandura, A., Ross, D., & Ross, S. (1963). Imitation of film mediated aggressive models. *Journal of Abnormal and Social Psychology, 66,* 3–11.

Going after video game violence. (2006). *State Legislatures 32(1),* 9.

Hanratty, M., O'Neil, E., & Sulzer, J. (1972). The effect of frustration on the imitation of aggression. *Journal of Personality and Social Psychology, 21,* 30–34. http://webspace.ship.edu/cgboer/bandura.html.

Huesmann, L. R., Moise, J., Podolski, C. P., & Eron, L. D. (2003). Longitudinal relations between childhood exposure to media violence and adult aggression and violence: 1977–1992. *Developmental Psychology, 39(2),* 201–221.

Pajares, F. (2004). Albert Bandura: Biographical sketch. Retrieved March 10, 2007, from Emory University, Division of Education Studies Web site: http://des.emory.edu/mfp/bandurabio.html

Chapter IV INTELLIGENCE, COGNITION, AND MEMORY

The branch of psychology most concerned with the topics in this section is called *cognitive psychology*. Cognitive psychologists study human mental processes. Our intelligence, our ability to think and reason, and our ability to store and retrieve symbolic representations of our experiences all combine to help make humans different from other animals. And, of course, these mental processes greatly affect our behavior. However, studying these processes is often more difficult than studying outward, observable behaviors, so a great deal of research creativity and ingenuity have been necessary.

The studies included here have changed the way psychologists view our internal mental behavior. The first article discusses the famous "Pygmalion study," which demonstrated that not only performance in school, but actual intelligence scores of children, can be influenced by the expectations of others, such as teachers. The second reading discusses a body of work that has transformed how we define human intelligence. In the early 1980s Howard Gardner proposed that humans do not possess one general intelligence but rather at least seven distinct intelligences. His idea has become widely known as *Multiple Intelligence (MI) Theory*. Third, we encounter an early groundbreaking study in cognitive psychology that examined how animals and humans form *cognitive maps*, which are their mental images of the environment around them. Fourth, you will read about research that revealed how our memories are not nearly as accurate as we think they are, as well as the implications of this for eyewitness testimony in court and in psychotherapy.

Reading 13: WHAT YOU EXPECT IS WHAT YOU GET

Rosenthal, R., & Jacobson, L. (1966). Teachers' expectancies: Determinates of pupils' IQ gains. *Psychological Reports, 19,* 115–118.

We are all familiar with the idea of the self-fulfilling prophecy. One way of describing this concept is that if we *expect* something to happen in a certain way, our expectation will tend to make it so. Whether self-fulfilling prophecies really do occur in a predictable way in everyday life is open to scientific study, but psychological research has demonstrated that in some areas they are a reality.

The question of the self-fulfilling prophecy in scientific research was first brought to the attention of psychologists in 1911 in the famous case of "Clever Hans," a horse owned by Wilhelm von Osten (Pfungst, 1911). Clever Hans was famous for, ostensibly, being able to read, spell, and solve math problems by stomping out answers with his front hoof. Naturally, many people were skeptical, but when Hans's abilities were tested by a committee of experts at the time, they were found to be genuinely performed without prompting from von Osten. But how could any horse (except possibly Mr. Ed of 1960s TV comedy fame) possess such a degree of human intelligence? A psychologist in the early 1900s, Oskar Pfungst, performed a series of careful experiments and found that Hans was actually solving the problems but was receiving subtle, unintentional cues from his questioners. For example, after asking a question, people would look down at the horse's hoof for the answer. As the horse approached the correct number of hoofbeats, the questioners would raise their eyes or head very slightly in anticipation of the horse's completing its answer. The horse had been conditioned to use these subtle movements from the observers as signs to stop stomping, and this usually resulted in the correct answer to the question.

You might ask, how is a trick horse related to psychological research? The Clever Hans findings pointed out the possibility that observers often have specific expectations or biases that may cause them to telegraph unintentional signals to a participant being studied. These signals, then, may cause the participant to respond in ways that are consistent with the observers' bias and, consequently, confirm their expectations. What all this finally boils down to is that an experimenter may *think* a certain behavior results from his or her scientific treatment of one participant or one group of participants compared with another. Sometimes, though, the behavior may result from nothing more than the experimenter's own biased expectations. If this occurs, it renders the experiment invalid. This threat to the validity of a psychological experiment is called the *experimenter expectancy effect.*

Robert Rosenthal, a leading researcher on this methodological issue, demonstrated the experimenter expectancy effect in laboratory psychological experiments. In one study (Rosenthal & Fode, 1963), psychology students in a course about learning and conditioning unknowingly became participants themselves. Some of the students were told they would be working with rats that had been specially bred for high intelligence, as measured by their ability to learn mazes quickly. The rest of the students were told that they would be working with rats bred for dullness in learning mazes. The students then proceeded to condition their rats to perform various skills, including maze learning. The students who had been assigned the maze-bright rats recorded significantly faster learning times than those reported by the students with the maze-dull rats. In reality, the rats given to the students were standard lab rats and were randomly assigned. These students were not cheating or purposefully slanting their results. The influences they exerted on their animals were apparently unintentional and unconscious.

As a result of this and other related research, the threat of experimenter expectancies to scientific research has been well established. Properly trained researchers, using careful procedures (such as the double-blind method, in which the experimenters who come in contact with the participants are unaware of the hypotheses of the study) are usually able to avoid most of these expectancy effects.

Beyond this, however, Rosenthal was concerned about how such biases and expectancies might occur outside the laboratory, such as in school classrooms. Because teachers in public schools may not have had the opportunity to learn about the dangers of expectancies, how great an influence might this tendency have on their students' potential performance? After all, in the past, teachers have been aware of students' IQ scores beginning in first grade. Could this information set up biased expectancies in the teachers' minds and cause them to unintentionally treat "bright" students (as judged by high intelligence scores) differently from those seen as less bright? And if so, is this fair? Those questions formed the basis of Rosenthal and Jacobson's study.

THEORETICAL PROPOSITIONS

Rosenthal labeled this expectancy effect, as it occurs in natural interpersonal settings outside the laboratory, the *Pygmalion effect.* In the Greek myth, a sculptor (Pygmalion) falls in love with his sculpted creation of a woman. Most people are more familiar with the modern George Bernard Shaw play *Pygmalion* (*My Fair Lady* is the musical version) about the blossoming of Eliza Doolittle because of the teaching, encouragement, and *expectations* of Henry Higgins. Rosenthal suspected that when an elementary school teacher is provided with information that creates certain expectancies about students' potential (such as intelligence scores), whether strong or weak, the teacher might unknowingly behave in ways that subtly encourage or facilitate the performance of the students seen as more likely to succeed. This, in turn, would create the self-fulfilling prophecy of actually causing those students to excel, perhaps at the expense of the students for whom lower expectations exist. To test these theoretical propositions, Rosenthal and his colleague Jacobson obtained the assistance of an elementary school (called Oak School) in a predominantly lower middle-class neighborhood in a large town.

METHOD

With the cooperation of the Oak School administration, all the students in Grades 1 through 6 were given an intelligence test (the Tests of General Ability, or TOGA) near the beginning of the academic year. This test was chosen because it was a nonverbal test for which a student's score did not depend primarily upon school-learned skills of reading, writing, and arithmetic. Also, it was a test with which the teachers in Oak School probably would not be familiar.

The teachers were told that the students were being given the "Harvard Test of Inflected Acquisition." This deception was important in this case to create expectancies in the minds of the teachers, a necessary ingredient for the experiment to be successful. It was further explained to the teachers that the Harvard Test was designed to serve as a predictor of academic *blooming* or *spurting*. In other words, teachers believed that students who scored high on the test were ready to enter a period of increased learning abilities within the next year. This predictive ability of the test was also, in fact, not true.

Oak School offered three classes each of Grades 1 through 6. All of the 18 teachers (16 women, 2 men) for these classes were given a list of names of students in their classes who had scored in the top 20% on the Harvard Test and were, therefore, identified as potential academic bloomers during the academic year. But here's the key to this study: the children on the teachers' top 10 lists had been assigned to this experimental condition purely at random. The only difference between these children and the others (the controls) was that they had been identified to their teachers as the ones who would show unusual intellectual gains.

Near the end of the school year, all children at the school were measured again with the same test (the TOGA), and the degree of change in IQ was calculated for each child. The differences in IQ changes between the experimental group and the controls could then be examined to see if the expectancy effect had been created in a real-world setting.

RESULTS

Figure 13-1 summarizes the results of the comparisons of the IQ increases for the experimental versus the control groups. For the entire school, the children for whom the teachers had expected greater intellectual growth averaged significantly greater improvement than did the control children (12.2 and

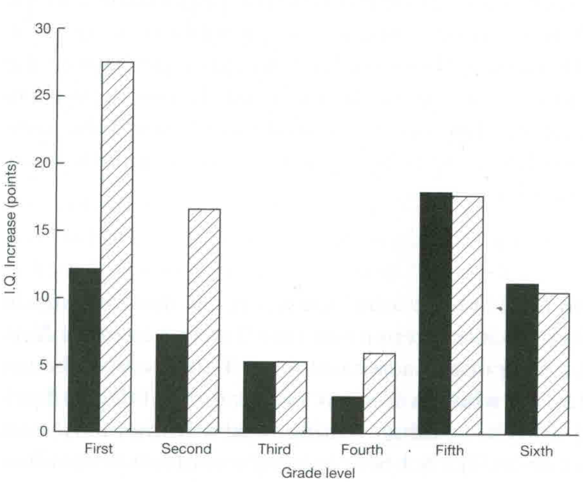

FIGURE 13-1 IQ score gains: Grades 1 through 6.

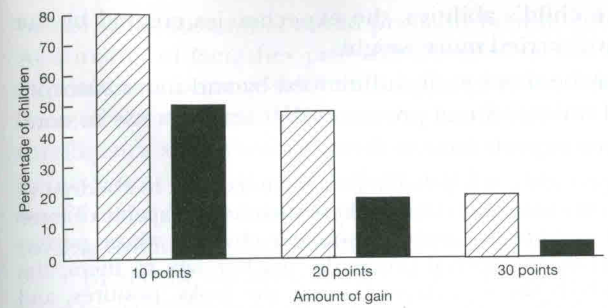

FIGURE 13-2 Percentage of 1st- and 2nd-grade students with major gains in IQ scores.

8.2 points, respectively). However, if you examine Figure 13-1, it is clear that this difference was accounted for by the huge differences in Grades 1 and 2. Possible reasons for this are discussed shortly. Rosenthal and Jacobson offered another useful and revealing way to organize the data for these 1st- and 2nd-grade students. Figure 13-2 illustrates the percentage of the children in each group who obtained increases in IQ of at least 10, 20, or 30 points.

Two major findings emerged from this study. First, the expectancy effect previously demonstrated in laboratory settings also appeared to function in less experimental, real-world situations. Second, the effect was very strong in the early grades, yet almost nonexistent for the older children. What does all this mean?

DISCUSSION

As Rosenthal suspected from his past research, the teachers' expectations of their students' behavior became a self-fulfilling prophecy. "When teachers expected that certain children would show greater intellectual development, those children did show greater intellectual development" (Rosenthal & Jacobson, 1968, p. 85). Remember, the data are averages of three classes and three teachers for each grade level. It is difficult to think of explanations for the differences in IQ gains other than the teachers' expectations.

However, Rosenthal felt it was important to try to explain why the self-fulfilling prophecy was not demonstrated in the higher grade levels. Both in this article and in later writings, Rosenthal and Jacobson offered several possible reasons for their findings:

1. Younger children are generally thought of as more malleable or "transformable." If this is true, then the younger children in the study may have experienced greater change simply because they were easier than the older children to change. Related to this is the possibility that even if younger children are not more malleable, teachers may have *believed* that they were. This belief alone may have been enough to create differential treatment and produce the results.
2. Younger students in an elementary school tend to have less well-established reputations. In other words, if the teachers had not yet had a chance to

form an opinion of a child's abilities, the expectancies created by the researchers could have carried more weight.

3. Younger children may be more easily influenced by and more susceptible to the subtle and unintentional processes that teachers use to communicate performance expectations to them:

> Under this interpretation, it is possible that teachers react to children of all grade levels in the same way if they believe them to be capable of intellectual gain. But perhaps it is only the younger children whose performance is affected by the special things the teacher says to them; the special ways in which she says them; the way she looks, postures, and touches the children from whom she expects greater intellectual growth. (p. 83)

4. Teachers in lower grades may differ from upper-grade teachers in ways that produce greater communication of their expectations to the children. Rosenthal and Jacobson did not speculate as to exactly what these differences might be if indeed they exist.

SIGNIFICANCE OF FINDINGS AND SUBSEQUENT RESEARCH

The real importance of Rosenthal and Jacobson's findings at Oak School relates to the potential long-lasting effects of teachers' expectations on the scholastic performance of students. This, in turn, feeds directly into one of the most controversial topics in psychology's recent history: the question of the fairness of intelligence testing. Let's explore some later research that examined the specific ways in which teachers may unconsciously communicate their higher expectations to those students whom they believe possess greater potential.

A study conducted by Chaiken, Sigler, and Derlega (1974) involved videotaping teacher–student interactions in a classroom situation in which the teachers had been informed that certain children were extremely bright (these "bright" students had actually been chosen at random from all the students in the class). Careful examination of the videos indicated that teachers favored the identified "brighter" students in many subtle ways. They smiled at these students more often, made more eye contact, and had more favorable reactions to these students' comments in class. These researchers go on to report that students for whom these high expectations exist are more likely to enjoy school, receive more constructive comments from teachers on their mistakes, and work harder to try to improve. What this and other studies indicate is that teacher expectancies can affect more than just intelligence scores.

Imagine for a moment that you are an elementary school teacher with a class of 20 students. On the first day of class, you receive a class roster on which is printed the IQ scores for all your students. You notice that five of your pupils have IQ scores over 145, well into the genius range. Do you think that your treatment and expectations of those children during the school year would be the same as of your other students? What about your expectations of those students compared with another five students with IQ scores in the low-to-normal range? If you answered that your treatment and expectations would be the same, Rosenthal would probably be willing to bet that you'd be wrong. As a matter of fact, they probably *shouldn't* be the same! The point is, if your expectations became self-fulfilling prophecies, then that could be unfair to some of the students. Now consider another, more crucial point. Suppose the intelligence scores you received on your class roster were *wrong*. If these erroneous scores created expectations that benefited some students over others, it would clearly be unfair and probably unethical. This is one of the major issues fueling the intelligence testing controversy.

In recent decades, researchers have charged that many standard tests used to assess the intelligence of children contain a racial or cultural bias. The argument is that because the tests were originally designed primarily by white, upper-middle-class males, they contain ideas and information to which other ethnic groups are less exposed. Children from some ethnic minority groups in the United States have traditionally scored lower on these tests than white children. It would be ridiculous to assume that these nonwhite children possess less overall basic intelligence than white children, so the reason for these differences in scores must lie in the tests themselves. Traditionally, however, teachers in Grades K through 12 were given this intelligence information on all their students. If you stop and think about this fact in relation to the research by Rosenthal and Jacobson, you'll see what a potentially precarious situation may have been created. In addition to the fact that children have been categorized and stratified in schools according to their test scores, teachers' unintended expectations, based on this possibly biased information, may have been creating systemic, unfair self-fulfilling prophecies. The arguments supporting this idea are convincing enough that many school districts have instituted a moratorium on routine intelligence testing and the use of intelligence test scores until new tests are developed (or old ones updated) to be valid and bias free. At the core of these arguments is the research addressed in this chapter.

RECENT APPLICATIONS

Due in large part to Rosenthal and Jacobson's research, the power of teachers' expectations on students' performance has become an integral part of our understanding of the educational process. Furthermore, Rosenthal's theory of interpersonal expectancies has exerted its influence in numerous areas other than education. In 2002, Rosenthal himself reviewed the literature on expectancy effects using meta-analysis techniques (explained in the reading on Smith and Glass in Chapter IX). He demonstrated how "the expectations of psychological researchers, classroom teachers, judges in the courtroom, business executives, and health care providers can unintentionally affect the responses of their research participants, pupils, jurors, employees, and patients" (Rosenthal, 2002, p. 839).

An uncomfortably revealing article incorporating Rosenthal's expectancy research examined the criteria school teachers use to refer their students to school psychologists for assessment and counseling (Andrews, et al, 1997). The researchers found that teachers referred African American children for developmental handicap assessment at rates significantly higher than the rates of Caucasian students in their classrooms. In addition, boys were referred in equally disproportionate numbers over girls for problems of classroom and playground behavior problems. The researchers suggested that the differences among the various student groups may have revealed more about teachers' expectancies than real individual differences.

It should be noted that researchers in the fields of psychology and education are actively studying new ways of conceptualizing and measuring children's intellectual abilities. Several leading researchers have proposed methods of testing that focus on current theories of how the human brain works, and that go far beyond the old, limited idea of a single, general intelligence score expressed as IQ (see Benson, 2003). One of these modern approaches is Robert Sternberg's Triarchic Abilities Test (1993), which is designed to measure three distinct aspects of intellectual ability: analytic intelligence, practical intelligence, and creative intelligence. Another leading researcher in the field of intelligence is Howard Gardner, who, in the early 1980s, developed his theory of multiple intelligences, which continues today to exert a powerful influence over the study and measurement of intelligence. As you will discover in the next reading, Gardner's theory contends that we have not one, or three, but eight (and, perhaps nine or more!) *separate* intelligences, and each of us has differing amounts of each one (Gardner, 2006).

Andrews, T., Wisniewski, J., & Mulick, J. (1997). Variables influencing teachers' decisions to refer children for school psychological assessment services. *Psychology in Schools, 34*(3), 239–244.

Benson, E. (2003). Intelligent intelligence testing: Psychologists are broadening the concept of intelligence and how to test it [Electronic version]. *Monitor on Psychology, 34*(2), 48.

Chaiken, A., Sigler, E., & Derlega, V. (1974). Nonverbal mediators of teacher expectancy effects. *Journal of Personality and Social Psychology, 30,* 144–149.

Gardner, H. (2006). *Multiple intelligences: New horizons.* Jackson, TN: Perseus Books Group.

Pfungst, O. (1911). *Clever Hans (the horse of Mr. von Osten): A contribution to experimental, animal, and human psychology.* New York: Holt, Rinehart and Winston.

Rosenthal, R. (2002). Covert communication in classrooms, clinics, courtrooms, and cubicles. *American Psychologist, 57,* 839–849.

Rosenthal, R., & Fode, K. (1963). The effect of experimenter bias on the performance of the albino rat. *Behavioral Science, 8,* 183–189.

Rosenthal, R., & Jacobson, L. (1968). *Pygmalion in the classroom: Teacher expectations and pupils' intellectual development.* New York: Holt, Rinehart and Winston.

Sternberg, R. J. (1993). *Sternberg Triarchic Abilities Test.* Unpublished test, Yale University.

Reading 14: JUST *HOW* ARE YOU INTELLIGENT?

Gardner, H. (1983) *Frames of mind: The theory of multiple intelligences.* New York: Basic Books.

The heading for this chapter is an intentional play on words. The usual form of the question "Just how intelligent *are* you?" implies that you have a certain amount of intelligence. The question here, "Just *how* are you intelligent?" is unrelated to *amount* of overall intelligence and asks instead about the nature

of your particular *type* of intelligence. This implies, of course that people are not simply more or less intelligent but that each of us possesses a unique combination of various forms of intellectual abilities.

Many, if not most, of you probably have taken at least one intelligence test in your life (even if you don't remember it), and some of you may have taken several. For the most part, intelligence tests developed over the past hundred years have been designed to produce a single score. That score was called your *Intelligence Quotient* (IQ). If tests of intelligence are designed to produce a single score, a person's intelligence must also be conceptualized as a single, *general* mental ability. That is exactly how intelligence was interpreted throughout most of the 20th century. In fact, intelligence was often referred to as *g* for this general mental ability. People's IQ score, their *g*, was used widely to place, judge, categorize, and describe people in various life settings, including school, the workplace, and the military.

In the 1970s and 1980s, researchers began to question the validity of the unitary, g-theory approach to human intelligence. Many of the IQ tests themselves were shown to be biased toward certain economic classes and cultural groups. Moreover, children's educational opportunities were often dictated by their scores on these biased and potentially invalid scores (see the work of Robert Rosenthal in Reading 13 for an example of the dangers of this bias).

As criticisms of the early conceptualization of intelligence grew in number and influence, IQ tests began fade. At the same time, a new, and at the time radically different, view of intelligence was making its way into scientific and popular thinking about how our minds work. In stark contrast to the notion of a single, generalized intelligence, this emerging approach expanded the notion of intelligence into many *different* mental abilities, each possessing in itself the characteristics of a complete, "free-standing" intelligence. Howard Gardner, at Harvard University, introduced to the world this new view of *multiple intelligences* in his 1983 book *Frames of Mind,* which forms the basis of this chapter.

THEORETICAL PROPOSITIONS

Gardner's theory of multiple intelligences (*MI Theory*) was based on much more than simply observing the various, diverse mental skills people can demonstrate. His ideas stem from his research on the structure of the brain itself. Prior to launching his work on intelligence per se, Gardner had spent most of his career studying the biology and functioning of the brain. Gardner expanded on previous research that demonstrated that the human brain is not only diverse in its abilities but also extremely specialized in its functioning. In other words, different regions of your brain have evolved to carry out specific tasks related to thinking and knowing. This brain specialization may be demonstrated by observing, as Gardner has done, exactly what abilities are lost or diminished when a person experiences damage to a particular region of the brain. For example, language abilities reside in most people primarily in one section of the brain's left hemisphere, vision is centered in the occipital cortex at the rear of the brain, and one specific brain structure located at