

than under positive reinforcement. In the authors' words: "These findings . . . suggest that, relative to positive reinforcement, negative reinforcement operations may provide a more fertile condition for the development and maintenance of superstitious behaviors" (p. 37). In other words, the study suggested that you are more likely to employ superstitious tactics to prevent bad outcomes than to create good outcomes.

Another thought-provoking article citing Skinner's 1948 study (Sagvolden et al., 1998) examined the role of reinforcement in attention deficit/hyperactivity disorder (ADHD). The researchers asked boys with and without a diagnosis of ADHD to participate in a game in which they would receive rewards of coins or small toys. Although the reinforcement was delivered at fixed 30-second intervals (noncontingent reinforcement), all the boys developed superstitious behaviors that they *believed* were related to the rewards. In the next phase of the study, the reinforcement was discontinued. You would expect this to cause a decrease and cessation of whatever behaviors had been conditioned (extinction). This is exactly what happened with the boys without ADHD. But the boys with ADHD, after a brief pause, became more active and began engaging impulsively in bursts of responses at an even faster pace, *as if* the reinforcement had been reestablished. The authors suggested that this overactivity and impulsiveness implied that the boys with ADHD possessed significantly less ability to cope with delays of reinforcement than did the comparison group of boys. Findings such as these are important additions to our understanding and our ability to treat ADHD effectively.

CONCLUSION

Superstitions are everywhere. You probably have some, and you surely know others who have them. Some superstitions are such a part of a culture that they produce society-wide effects. You may be aware that most high-rise buildings do not have a 13th floor. But that's not exactly true. Obviously, a 13th floor exists, but no floor is *labeled* "13." This is probably not because architects and builders are an overly superstitious bunch, but rather it is due to the difficulty of renting or selling space on the "unlucky" thirteenth floor. Another example is that Americans are so superstitious about the two-dollar bill that the U.S. Treasury prints fewer two-dollar notes than any other denomination (less than 1%).

Are superstitions psychologically unhealthy? Most psychologists believe that even though superstitious behaviors, by definition, do not produce the consequences that you think they do, they can serve useful functions. Often such behaviors can produce a feeling of strength and control when a person is facing a difficult situation. It is interesting to note that people who are employed in dangerous occupations tend to have more superstitions than others. This feeling of increased power and control that is sometimes created by superstitious behavior can lead to reduced anxiety, greater confidence and assurance, and improved performance.

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Reading 12: SEE AGGRESSION . . . DO AGGRESSION!

Bandura, A., Ross, D., & Ross, S. A. (1961). Transmission of aggression through imitation of aggressive models. *Journal of Abnormal and Social Psychology*, 63, 575-582.

Aggression, in its abundance of forms, is arguably the greatest social problem facing this country and the world today. It is also one of the most researched topics in the history of psychology. Over the years, the behavioral scientists who have been in the forefront of this research have been social psychologists, whose focus is on all types of human interaction. One goal of social psychologists has been to define aggression. This may, at first glance, seem like a relatively easy goal, but such a definition turns out to be rather elusive. For example, which of the following behaviors would you define as aggression: a boxing match? a cat killing a mouse? a soldier shooting an enemy? setting rat traps in your basement? a bullfight? The list of behaviors that may or may not be included in a definition of aggression is endless. As a result, if you were to consult 10 different social psychologists, you would probably hear 10 different definitions of aggression.

Many researchers have gone beyond trying to agree on a definition to the more important process of examining the sources of human aggression. The question they often pose is this: Why do people engage in acts of aggression? Throughout the history of psychology, many theoretical approaches have been proposed to explain the causes of aggression. Some of these contend that you are biologically preprogrammed to be aggressive because aggression in certain circumstances has been an evolutionary survival mechanism. Other theories look to situational factors, such as repeated frustration or specific types of provocation, as the determinants of aggressive responses. A third view, and the one this study suggests, is that aggression is learned.

One of the most famous and influential experiments ever conducted in the history of psychology demonstrated how children may learn to be aggressive. This study, by Albert Bandura and his associates Dorothea Ross and Sheila Ross, was carried out in 1961 at Stanford University. Bandura is considered to be one of the founders of a school of psychological thought called *social learning theory*. Social learning theorists propose that human interaction

is the primary factor in the development of human personality. For example, as you are growing up, important people, such as your parents and teachers, reinforce certain behaviors and ignore or punish others. Even beyond direct rewards and punishments, however, Bandura believed that behavior can be shaped in important ways through simply observing and imitating the behavior of others—that is, through modeling.

As you can see from the title of this chapter's study, Bandura, Ross, and Ross were able to demonstrate this modeling effect for acts of aggression. This research has come to be known throughout the field of psychology as "the Bobo doll study," for reasons that will become clear shortly. The article began with a reference to earlier research findings demonstrating that children readily observed and imitated the behavior of adult models. One of the issues Bandura wanted to examine in this study was whether such imitative learning would generalize to settings in which the child was separated from the model after observing the model's behavior.

THEORETICAL PROPOSITIONS

The researchers proposed to expose children to adult models who behaved in either aggressive or nonaggressive ways. The children would then be tested in a new situation without the model present to determine to what extent they would imitate the acts of aggression they had observed in the adult. Based on this experimental manipulation, Bandura and his associates offered four predictions:

1. Children who observed adult models performing acts of aggression would imitate the adult and engage in similar aggressive behaviors, even if the model was no longer present. Furthermore, this behavior would differ significantly from those children who observed nonaggressive models or no models at all.
2. Children who were exposed to the nonaggressive models would not only be less aggressive than those who observed the aggression but also significantly less aggressive than a control group of children who were exposed to no model at all. In other words, the nonaggressive models would have an aggression-inhibiting effect.
3. Because children tend to identify with parents and other adults of their same sex, participants would "imitate the behavior of the same-sex model to a greater degree than a model of the opposite sex." (p. 575)
4. "Since aggression is a highly masculine-typed behavior in society, boys should be more predisposed than girls toward imitating aggression, the difference being most marked for subjects exposed to the male model." (p. 575)

METHOD

This article outlined the methods used in the experiment with great organization and clarity. Although somewhat summarized and simplified here, these methodological steps were as follows.

Participants

The researchers enlisted the help of the director and head teacher of the Stanford University Nursery School in order to obtain participants for their study. A total of 36 boys and 36 girls, ranging in age from 3 years to almost 6 years, participated in the study. The average age of the children was 4 years and 4 months.

Experimental Conditions

The control group, consisting of 24 children, would not be exposed to any model. The remaining 48 children were first divided into two groups: one exposed to aggressive models and the other exposed to nonaggressive models. These groups were divided again into males and females. Each of these groups was further divided so that half of the children were exposed to same-sex models and half to opposite-sex models. This created a total of eight experimental groups and one control group. A question you might be asking yourself is this: What if the children in some of the groups are already more aggressive than others? Due to the small number of participants in each group, Bandura guarded against this potential problem by obtaining ratings of each child's level of aggressiveness. The children were rated by an experimenter and a teacher (both of whom knew the children well) on their levels of physical aggression, verbal aggression, and aggression toward objects. These ratings allowed the researchers to match all the groups in terms of average aggression level.

The Experimental Procedure

Each child was exposed individually to the various experimental procedures. First, the experimenter brought the child to the playroom. On the way, they encountered the adult model who was invited by the experimenter to come and *join in the game*. The child was seated in one corner of the playroom at a table containing highly interesting activities. There were potato prints (this was 1961, so for those of you who have grown up in our high-tech age, a potato print is a potato cut in half and carved so that, like a rubber stamp, it will reproduce geometric shapes when inked on a stamp pad) and stickers of brightly colored animals and flowers that could be pasted onto a poster. Next, the adult model was taken to a table in a different corner containing a Tin-kerto set, a mallet, and an inflated 5-foot-tall Bobo doll (one of those large, inflatable clowns, weighted at the bottom so it pops back up when punched or kicked). The experimenter explained that these toys were for the model to play with and then left the room.

For both the aggressive and nonaggressive conditions, the model began assembling the tinkerto toys. However, in the aggressive condition, after a minute the model attacked the Bobo doll with violence. For all the children in the aggressive condition, the sequence of aggressive acts performed by the model was identical:

The model laid Bobo on its side, sat on it, and punched it repeatedly in the nose. The model then raised the Bobo doll, picked up the mallet, and struck the doll on the head. Following the mallet aggression, the model tossed the doll up in

the air aggressively, and kicked it about the room. This sequence of physically aggressive acts was repeated three times, interspersed with verbally aggressive responses such as, "Sock him in the nose.... Hit him down.... Throw him in the air.... Kick him.... Pow...." and two non-aggressive comments, "He keeps coming back for more" and "He sure is a tough fella." (p. 576)

All this took about 10 minutes, after which the experimenter came back into the room, said good-bye to the model, and took the child to another game room.

In the nonaggressive condition, the model simply played quietly with the Tinkertoys for the 10-minute period and completely ignored the Bobo doll. Bandura and his collaborators were careful to ensure that all experimental factors were identical for all the groups except for the factors being studied: the aggressive versus nonaggressive model and the sex of the model.

Arousal of Anger or Frustration

Following the 10-minute play period, all children from the various conditions were taken to another room that contained very attractive toys, such as a fire engine; a jet fighter; and a complete doll set including wardrobe, doll carriage, and so on. The researchers believed that in order to test for aggressive responses, the children should be somewhat angered or frustrated, which would make such behaviors more likely to occur. To accomplish this, they allowed them to begin playing with the attractive toys, but after a short time told them that the toys in this room were reserved for other children. They also told the children, however, that they could play with some other toys in the next room.

Test for Imitation of Aggression

The final experimental room was filled with both aggressive and nonaggressive toys. Aggressive toys included a Bobo doll (of course), a mallet, two dart guns, and a tether ball with a face painted on it. The nonaggressive toys included a tea set, crayons and paper, a ball, two dolls, cars and trucks, and plastic farm animals. Each child was allowed to play in this room for 20 minutes. During this period, judges behind a one-way mirror rated the child's behavior on several measures of aggression.

Measures of Aggression

A total of eight different responses were measured in the children's behavior. In the interest of clarity, only the four most revealing measures are summarized here. First, all acts that imitated the physical aggression of the model were recorded. These included sitting on the Bobo doll, punching it in the nose, hitting it with the mallet, kicking it, and throwing it into the air. Second, imitation of the models' verbal aggression was measured by counting the children's repetition of the phrases "Sock him," "Hit him down," "Pow," and so on. Third, other mallet aggression (e.g., hitting objects other than the doll with the mallet) were recorded. Fourth, nonimitative aggression was documented by tabulating all the children's acts of physical and verbal aggression that had not been performed by the adult model.

RESULTS

The findings from these observations are summarized in Table 12-1. If you examine the results carefully, you will discover that three of the four hypotheses presented by Bandura, Ross, and Ross were supported.

The children who were exposed to the violent models tended to imitate the exact violent behaviors they observed. On average were 38.2 instances of imitative physical aggression for each of the boys, as well as 12.7 for the girls who had been exposed to the aggressive models. In addition, the models' verbally aggressive behaviors were imitated an average of 17 times by the boys and 15.7 times by the girls. These specific acts of physical and verbal aggression were virtually never observed in the participants exposed to the nonaggressive models or in the control group that was not exposed to any model.

As you will recall, Bandura and his associates predicted that nonaggressive models would have a violence-inhibiting effect on the children. For this hypothesis to be supported, the results should show that the children in the nonaggressive conditions averaged significantly fewer instances of violence than those in the no-model control group. In Table 12-1, if you compare the nonaggressive model columns with the control group averages, you will see that the findings were mixed. For example, boys and girls who observed the nonaggressive male exhibited far less nonimitative mallet aggression than controls, but boys who observed the nonaggressive female aggressed more with the mallet than did the boys in the control group. As the authors readily admit, these results were so

TABLE 12-1 Average Number of Aggressive Responses from Children in Various Treatment Conditions

TYPE OF AGGRESSION	TYPE OF MODEL				CONTROL GROUP
	AGGRESSIVE MALE	NON-AGGRESSIVE MALE	AGGRESSIVE FEMALE	NON-AGGRESSIVE FEMALE	
<i>Imitative Physical Aggression</i>					
Boys	25.8	1.5	12.4	0.2	1.2
Girls	7.2	0.0	5.5	2.5	2.0
<i>Imitative Verbal Aggression</i>					
Boys	12.7	0.0	4.3	1.1	1.7
Girls	2.0	0.0	13.7	0.3	0.7
<i>Mallet Aggression</i>					
Boys	28.8	6.7	15.5	18.7	13.5
Girls	18.7	0.5	17.2	0.5	13.1
<i>Nonimitative Aggression</i>					
Boys	36.7	22.3	16.2	26.1	24.6
Girls	8.4	1.4	21.3	7.2	6.1

(Adapted from p. 579)

inconsistent in relation to the aggression-inhibiting effect of nonaggressive models that they were inconclusive.

The predicted gender differences, however, were strongly supported by the data in Table 12-1. Clearly, boys' violent behavior was influenced more by the aggressive male model than by the aggressive female model. The average total number of aggressive behaviors by boys was 104 when they had observed a male aggressive model, compared with 48.4 when a female model had been observed. Girls, on the other hand, although their scores were less consistent, averaged 57.7 violent behaviors in the aggressive female model condition, compared with 36.3 when they observed the male model. The authors point out that in same-sex aggressive conditions, girls were more likely to imitate verbal aggression, while boys were more inclined to imitate physical violence.

Boys were significantly more physically aggressive than girls in nearly all the conditions. If all the instances of aggression in Table 12-1 are tallied, the boys committed 270 violent acts, compared with 128 committed by the girls.

DISCUSSION

Bandura, Ross, and Ross claimed that they had demonstrated how specific behaviors—in this case, violent ones—could be learned through the process of observation and imitation without any reinforcement provided to either the models or the observers. They concluded that children's observation of adults engaging in these behaviors sends a message to the child that this form of violence is permissible, thus weakening the child's inhibitions against aggression. The consequence of this observed violence, they contended, is an increased probability that a child will respond to future frustrations with aggressive behavior.

The researchers also addressed the issue of why the influence of the male aggressive model on the boys was so much stronger than the female aggressive model was on the girls. They explained that in our culture, as in most, aggression is seen as more typical of males than females. In other words, it is a masculine-typed behavior. So, a man's modeling of aggression carried with it the weight of social acceptability and was, therefore, more powerful in its ability to influence the observer.

SUBSEQUENT RESEARCH

At the time this experiment was conducted, the researchers probably had no idea how influential it would become. By the early 1960s, television had grown into a powerful force in U.S. culture and consumers were becoming concerned about the effect of televised violence on children. This has been and continues to be hotly debated. In the past 30 years, no fewer than three congressional hearings have been held on the subject of television violence, and the work of Bandura and other psychologists has been included in these investigations.

These same three researchers conducted a follow-up study 2 years later that was intended to examine the power of aggressive models who are on film,

or who are not even real people. Using a similar experimental method involving aggression toward a Bobo doll, Bandura, Ross, and Ross designed an experiment to compare the influence of a live adult model with the same model on film and to a cartoon version of the same aggressive modeling. The results demonstrated that the live adult model had a stronger influence than the filmed adult, who, in turn, was more influential than the cartoon. However, all three forms of aggressive models produced significantly more violent behaviors in the children than was observed in children exposed to nonaggressive models or controls (Bandura, Ross, & Ross, 1963).

On an optimistic note, Bandura found in a later study that the effect of modeled violence could be altered under certain conditions. You will recall that in his original study, no rewards were given for aggression to either the models or the children. But what do you suppose would happen if the model behaved violently and was then either reinforced or punished for the behavior while the child was observing? Bandura (1965) tested this idea and found that children imitated the violence more when they saw it rewarded but significantly less when the model was punished for aggressive behavior.

Critics of Bandura's research on aggression have pointed out that aggression toward an inflated doll is not the same as attacking another person, and children know the difference. Building on the foundation laid by Bandura and his colleagues, other researchers have examined the effect of modeled violence on real aggression. In a study using Bandura's Bobo doll method (Hanratty, O'Neil, & Sulzer, 1972), children observed a violent adult model and were then exposed to high levels of frustration. When this occurred, they often aggressed against a live person (dressed like a clown), whether that person was the source of the frustration or not.

RECENT APPLICATIONS

Bandura's research discussed in this chapter made at least two fundamental contributions to psychology. First, it demonstrated dramatically how children can acquire new behaviors simply by observing adults, even when the adults are not physically present. Social learning theorists believe that many, if not most, of the behaviors that comprise human personality are formed through this modeling process. Second, this research formed the foundation for hundreds of studies over the past 45 years on the effects on children of viewing violence in person or in the media. (For a summary of Bandura's life and contributions to psychology, see Pajares, 2004). Less than a decade ago, the U.S. Congress held new hearings on media violence focusing on the potential negative effects of children's exposure to violence on TV, movies, video games, computer games, and the Internet. Broadcasters and multimedia developers, feeling increased pressure to respond to public and legislative attacks, are working to reduce media violence or put in place parental advisory rating systems warning of particularly violent content.

Perhaps of even greater concern is scientific evidence demonstrating that the effects of violent media on children may continue into adulthood

(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.

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Chapter

IV

INTELLIGENCE, COGNITION, AND MEMORY

Reading 13 WHAT YOU EXPECT IS WHAT YOU GET

Reading 14 JUST HOW ARE YOU INTELLIGENT?

Reading 15 MAPS IN YOUR MIND

Reading 16 THANKS FOR THE MEMORIES!

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,