AP PSYCHOLOGY

AP Psychology: Summer Assignment 2024 - 2025

Mr. Gunning

Due: Wednesday 9/11/24

Introduction:

Throughout the AP Psychology course you will be introduced to the systematic and scientific study of human behavior and mental processes. You will be exposed to the facts, principles, and phenomena associated with the major subfields of psychology, as well as, the research methods used to obtain the information that is now the foundation of the discipline.

Throughout the school year, you will be required to do additional reading outside of the textbook assignments. Many of these additional assignments will be focused on the research associated with the field of psychology. This summer assignment will introduce you to a few of these research topics. These selected topics will appear at various points throughout the course.

For this assignment you will be reading and analyzing five (5) selected studies from Forty Studies That Changed Psychology by Roger Hock. This book contains original studies, research, and analysis of some of the most famous studies in the history of psychology. The studies I selected continue to be cited, direct new research, and have challenged our understanding of human behavior. These studies will appear at different times throughout the course and will provide you with a glimpse into some of the topics covered in AP Psychology

Assignment: You should complete these 2 steps!!

After you read the attached articles; **(1)** Answer the following 4 questions for each research study. **(2)** After reading all 5 articles, write a summary paragraph identifying the research study you believe to be most significant and the one you feel is least significant. Be sure to explain why you chose those articles as most / least significant.

1. What scientific question was the researcher trying to answer?
2. What were the major findings of the study?
3. What criticisms have been directed towards the study?
4. What are some examples of subsequent research in this area OR recent applications of this study?

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DISCOVERING LOVE

Harlow, H. F. (1958). The nature of love. *American Psychologist, 13,* 673-685.

Sometimes it seems that research psychologists have gone too far. How can something such as love be studied scientifically? Well, however you define love, you'll have to agree that it influences a huge amount of our behavior. If we make that assumption, then it follows that psychologists would have to be interested in what it is, where you get it, and how it works.

Harry Harlow (1906-1981), a developmental psychologist, is considered by many to have made the greatest contribution since Freud in studying how our early life experiences affect adulthood. Most psychologists agree that your experiences as an infant with closeness, touching, and attachment to your mother (or primary caregiver) have an important influence on your abilities to love and be close to others later in life. After all, if you think about it, what was your first experience with love? It was the bond between you and your mother beginning at the moment of your birth. But what exactly was it about that connection that was so crucial? The Freudians believed that it was the focus around the importance of the breast and the instinctive oral tendencies during the first year of life (the famous oral stage). Later, the behaviorists countered that notion with the view that all human behavior is associated with our so-called primary needs, such as hunger, thirst, and avoidance of pain. Since the mother can fill these needs, the infant's closeness to her is constantly reinforced by the fact that she provides food for the infant. Consequently, the mother becomes associated with pleasurable events and, therefore, love develops. In both of these conceptualizations, love was seen as something secondary to other instinctive or survival needs. However, Harlow discovered that love and affection may be primary needs that are just as strong as or even stronger than those of hunger or thirst.

One way to begin to uncover the components of the love between an infant and mother would be to place infants in situations where the mother does not provide for all of the infant's needs and where various components of the environment can be scientifically manipulated. According to previous theories, we should be able to prevent or change the quality and strength of the bond formed between the infant and mother by altering the mother's ability to meet the infant's primary needs. For ethical reasons, however, it is obvious that such research could not be done on humans. Since Harlow had been working with rhesus monkeys for several years in his studies of learning, it was a simple process to begin his studies of love and attachment with these subjects. Biologically, rhesus monkeys are very similar to humans. Harlow also believed that the basic responses of the rhesus monkey relating to bonding and affection in infancy (such as nursing, contact, clinging, etc.) are the same for the two species. Whether such research with nonhuman subjects is ethical is addressed later in this section.

THEORETICAL PROPOSITIONS

In Harlow's previous studies, infant monkeys were raised carefully by humans in the laboratory so that they could be bottle-fed better, receive well-balanced nutritional diets, and be protected from disease more effectively than if they were raised by their monkey mothers. Harlow noticed that these infant monkeys became very attached to the cloth pads (cotton diapers) that were used to cover the bottoms of their cages. They would cling to these pads and would become extremely angry and agitated when the pads were removed for cleaning. This attachment was seen in the baby monkeys as early as one day old and was even stronger over the monkeys' first several months of life. Apparently, as Harlow states, "the baby, human or monkey, if it is to survive, must clutch at more than a straw" (p. 675). If a baby monkey was in a cage without this soft covering, it would thrive very poorly even though it received complete nutritional and medical care. When the cloth was introduced, the infant would become healthier and seemingly content. Therefore, Harlow theorized that there must be some basic need in these infant monkeys for close contact with something soft and comforting in addition to primary biological needs such as hunger and thirst. In order to test this theory, Harlow and his associates decided to "build" different kinds of experimental monkey mothers.

METHOD

The first surrogate mother they built consisted of a smooth wooden body covered in sponge rubber and terry cloth. It was equipped with a breast in the chest area that delivered milk and contained a light bulb inside for warmth. They then constructed a different kind of surrogate mother that was less able to provide soft comfort. This mother was made of wire mesh shaped about the same as the wooden frame, so that an infant monkey could cling to it in a similar way as to the cloth mother. This wire mother also came equipped with a working nursing

breast and also was able to provide heat. In other words, the wire mother was identical to the cloth mother in every way except for the ability to offer what Harlow called *contact comfort*.

These manufactured mothers were then placed in separate cubicles that were attached to the infant monkeys' living cage. Eight infant monkeys were randomly assigned to two groups. For one group, the cloth mother was equipped with the feeder (a nursing bottle) to provide milk, and for the other group, the wire mother was the milk provider. I'm sure you can already see what Harlow was testing here. He was attempting to separate the influence of nursing from the influence of contact comfort on the monkeys' behavior toward the mother. The monkeys were then placed in their cages and the amount of time they spent in direct contact with each mother was recorded for the first five months of their lives. The results were striking, but we'll get to those shortly.

Following these preliminary studies, Harlow wanted to explore the effects of attachment and contact comfort in greater detail. Common knowledge tells us that when children are afraid, they will seek out the comfort of their mothers (or other primary caregivers). To find out how the young monkeys with the wire and cloth mothers would respond in such situations, Harlow placed in their cages various objects that caused a fearful reaction in them, such as a wind-up drum-playing toy bear. (To a baby monkey this bear, which is as big as the monkey itself, is very frightening.) The responses of the monkeys in these situations were observed and recorded carefully.

Another study Harlow developed was called the *open field test* and involved placing young monkeys in a small, unfamiliar room containing various objects (wooden blocks, blankets, containers with lids, a folded piece of paper) that, under normal conditions, monkeys like to play with and manipulate. The monkeys who were raised with both the cloth and wire mothers were placed in the room with either the cloth mother present, no mother present, or the wire mother present. The idea here was to examine the tendency of the young monkeys to adapt to and explore this strange situation with or without the presence of the mother.

Finally, Harlow wanted to find out if the attachments formed between the monkeys and their surrogate mothers would persist after periods of separation. When the monkeys reached 6 months of age and were on solid food diets, they were separated for short periods from the mother, and then reunited in the open-field situation.

RESULTS

In the original experiment, you will remember that all the monkeys had access to both the cloth mother and the wire mother. For half the monkeys the cloth mother provided the milk and for the other half the wire mother did so. By now you've probably guessed that the monkeys preferred the cloth mother (wouldn't you?), but what was so surprising was the extreme strength of this preference even among those monkeys who received their milk from the wire mother. Contrary to the popular theories at the time of this research, the fulfilling of biological needs such as hunger and thirst was of almost no importance in the monkeys' choice of a mother. The huge influence of contact comfort in producing an attachment between infant and mother monkey was clearly demonstrated. Figure 1 graphically illustrates this effect. After the first few days of adjustment, all the monkeys, regardless of which mother had the milk, were spending nearly all their time each day on the cloth mother. Even those monkeys who were fed by the wire mother would only leave the comfort of the cloth mother to nurse briefly and then return to the cloth-covered surrogate immediately.

The two groups of monkeys that were raised with only a cloth or wire mother further demonstrated the importance of contact comfort. While both groups of these infants ate the same amount and gained weight at the same rate, the infants in the wire mother condition did not digest the milk as well and experienced frequent bouts of diarrhea. This suggests that the lack of the soft mother was psychologically stressful to these infants.

The results of the frightening-object tests provided additional evidence of the young monkeys' attachment to the cloth mother. Whenever the monkeys found themselves faced with something frightening they would run to the cloth mother and cling to it for comfort and protection. As the monkeys' age increased, this response became even stronger. Again, it made no difference whether a monkey had received its milk from the wire or the cloth mother; when afraid, they all sought the security of the soft, cloth-covered surrogate.

You may have noticed in humans that when children feel safe and secure because of the presence of a parent, they are more curious and more willing to explore their environment. Often, they will investigate everything around them, provided they are still able to see the parent. Harlow's strange situation or open-field tests were designed to simulate this behavior in the monkeys in relation to the surrogate mothers. When placed into this strange room, all the monkeys immediately rushed to the cloth mother, clutched it, rubbed their bodies against it, and manipulated its body and face. After a while these infants "began to use the mother surrogate as a

source of security, a base of operations .... They would explore and manipulate a stimulus and then return to the mother before adventuring again into the strange new world" (p. 679).

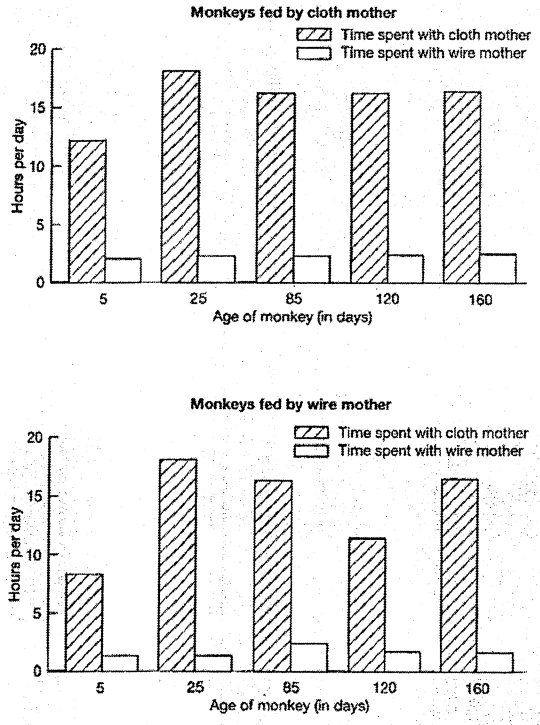

FIGURE 1 Amount of time spent each day on the cloth and wire mothers.

However, when the infant monkeys were placed into the same room without the soft mother, their reactions were completely different. They would freeze with fear and engage in emotional behaviors such as crying, crouching, and thumb sucking. Sometimes they would run to the part of the room where the mother usually was and then run from object to object, screaming and crying. When the wire mother was present, they behaved exactly the same as in the no-mother condition. This was once again true of all the monkeys, regardless of the nursing condition (cloth vs. wire) in which they had been raised.

In the last part of this study, the monkeys were separated from the mother for various periods of time after they stopped nursing and were on solid-food diets (about five to six months of age). After the longest separation (30 days), when the monkeys were reunited with the cloth mother in the same open-field situation, the monkeys rushed to the mother, climbed on it, clutched it tightly, and rubbed their heads and faces on its body. They then played with the surrogate mother, which included biting and tearing at the cloth cover. The main difference was that the monkeys did not leave the mother to explore and play with the objects in the room as they had done before. Apparently, according to Harlow, the need for contact comfort was greater than the natural tendency for exploration. It should be pointed out, however, that these reunions only lasted about three minutes and that such exploration may have occurred if the sessions had been extended.

DISCUSSION

As Harlow points out, the studies reported in this article demonstrate the overwhelming importance of contact comfort in the development of attachment between infant monkeys and their mothers. In fact, this factor in bonding appears to be considerably more important than the mother's ability to provide life-sustaining milk to the infant.

One of the many reasons this research changed psychology is that the findings went against the grain of the popular beliefs of the behaviorists at that time, who focused on the reinforcement qualities of feeding as the driving force behind the infant-mother bond. However, as Harlow stated about his findings, "the primary function of nursing as an affectional variable is that of ensuring frequent and intimate body contact of the infant with the mother. Certainly, man cannot live by milk alone" (p. 677).

There is little question that Harlow believed that his results could be applied to humans, a question that is discussed shortly. In fact, he offered the possibility of his findings' practical applications to humans. He contended that as socioeconomic demands on the family increase, women would be entering the workplace with increasing frequency. This was of concern to many at the time of Harlow's research, since it was widely believed that the mother's presence for nursing was necessary for attachment and proper child rearing. He went on to state that, since the key to successful parenting is contact comfort and not the *mammalian capabilities* of women, the American male is able to participate on equal terms in the rearing of infants. This view may be widely accepted today, but when Harlow wrote this in 1958, it was revolutionary.

CRITICISMS AND SIGNIFICANCE OF THE FINDINGS

Harlow's claims notwithstanding, do you think it's appropriate to view humans as having the same attachment (or love) processes as monkeys? There has been some research to support the view that the attachment of human babies to their caregivers does indeed go well beyond simply fulfilling biological needs. It has been shown that greater skin-to-skin contact between a mother and her very young infant enhances attachment (Klaus & Kennell, 1976). However, the attachment process develops much more slowly in humans: over the first six months compared with the first few days for monkeys. In addition, only approximately 70% of children appear to be securely attached to an adult at one year old (Sroufe, 1985).

There are many people, past and present, who would offer criticisms of Harlow's work based on the ethics of performing such experiments on infant monkeys. The question raised is this: Do we as humans have the right to subject monkeys (or any animal) to potentially harmful situations for the sake of research? In the case of Harlow's research, there are sensible arguments on both sides. One of the ways science judges the ethics of such research is by examining the potential benefits to people and society. Whether you feel that this study was ethical or not, the findings have affected humans in several positive ways. Some of these relate to issues of institutionalized children, adoption, and child abuse.

Unfortunately, many children in our culture are forced to spend portions of their lives in institutional settings, either because their parents are unable to keep and care for them (orphanages), or because of their own various illnesses and other physical difficulties (hospital settings). Harlow's research has influenced the kind of care we try to provide for those children. There is now general acceptance that basic biological care in institutional settings is inadequate and that infants need to be in physical contact with other humans. Institutionalized children need to be touched and held by staff members, nurses, and volunteers as much as possible. Also, when not precluded by medical conditions, these children are often placed in situations where they can see and touch each other, thereby gaining additional contact comfort. While such attempts at filling attachment needs will never replace real parental care, they are clearly a vast improvement over simple custodial care.

The work of Harlow offered encouragement and optimism for nonmaternal caregivers to be effective parents. Since it appeared that nursing was secondary to contact comfort in the development and adjustment of infants, the actual mother of a child was no longer seen as the only proper person to provide care. Now fathers could feel more adequate to assume a larger role in the process. But beyond this, other nonparental caregivers, such as babysitters or day care-center workers, when necessary, could be seen as acceptable options. Moreover, these discoveries greatly enhanced the prospect of adoption, since it was recognized that an adoptive parent could offer a child just as much contact comfort as a biological parent could.

Finally, Harlow's early studies shed light on the terrible problem of child abuse. One surprising aspect of such abusive relationships is that in nearly all cases, the abused child seems to love and to be firmly attached to the abusive parent. According to a strict behaviorist interpretation, this is difficult to understand. But if attachment is the strongest basic need, as Harlow suggested, then this would far outweigh the effects of the abusive punishment. Harlow actually tested this in later studies. He designed surrogate mother monkeys that were able to reject their infants. Some emitted strong jets of air, while others had blunt spikes that would pop out and force the baby monkeys away. The way the monkeys would respond to this treatment would be to move a small distance away until the rejection ended. They would then return and cling to the mother as tightly as ever (Rosenblum & Harlow, 1963).

RECENT APPLICATIONS

Harlow's research continues to be cited frequently in studies on the influence of touch, bonding, attachment, and the effects of human contact on emotional and physical health. One such study examined the connection between

social isolation (lack of opportunities for close, meaningful, social contact with others) and physical health among adults who live in life situations marked by loneliness (Cacioppo & Hawkley, 2003). Findings indicated that adults lacking in social contact experienced everyday life events as more stressful, were at greater risk of high blood pressure, healed from injuries more slowly, and slept more poorly than people with healthy social connections.

Another study citing Harlow work demonstrated how skin-to-skin contact (cleverly referred to as *kangaroo care*) is critically important in the survival and development of premature infants and in establishing the infant-mother bond following premature births (Feldman & Eidelman, 1998). This is an important finding, in that hospitals caring for high-risk premature infants must work to balance a baby's need for physical contact and touch with other, equally compelling safeguards against potentially life-threatening infections that a premature baby's undeveloped immune system might be unable to fight.

Harlow's ideas have also been applied to psychotherapeutic settings. As humanistic and holistic approaches to counseling have developed over the past 40 years, the healing qualities of touch have played an increasingly central role (see LaTorre, 2000). As one psychotherapist explains:

> I have found that when touch is focused and intentioned, particularly in touch therapies such as acupressure and therapeutic touch, it becomes an important aspect in the therapeutic interaction. It deepens awareness and supports change. Rather than creating confusion, touch therapies when used appropriately enhance the psychotherapeutic interaction instead of detracting from it. The key word here is appropriate. Touch is a very powerful tool and should not be used lightly. (LaTorre, 2000, p. 105)

CONCLUSION

It would be a mistake to assume that Harlow had a monopoly on the definition of the nature of love. It is unmistakable, however, that his discoveries changed the way we view the connection between infant and mother. Perhaps, if this research has permeated, at least a little, into our culture, some good has come from it. For example, Harlow tells the story of a woman who, after hearing Harlow present his research, came up to him and said, "Now I know what's wrong with me! I'm just a wire mother" (p. 677).

Cacioppo, J., & Hawkley, L. (2003). Social isolation and health with an emphasis on underlying mechanisms. Perspectives in *Biology and Medicine, 46*, S39-S52.

Feldman. R., & Eidelman, A. (1998). Intervention programs for premature infants: How and do they affect development? *Clinics in Perinatology, 25*(3), 613-629.

Klaus, M. H., & Kennell, J. H. (1976). *Maternal infant bonding*. St. Louis MO: Mosby Press.

LaTorre M. (2000). Integrative perspectives. Touch and psychotherapy. *Perspectives in Psychiatric Care 36*, 105-106.

Rosenblum, L. A., & Harlow, H. (1963). Approach-avoidance conflict in the mother surrogate situation. *Psychological Reports, 12*, 83-85.

Sroufe, A. (1985). Attachment classification from the perspective of the infant-caregiver relationships and infant temperament. *Child Development, 56*, 1-14.

IT'S NOT JUST ABOUT SALIVATING DOGS!

Pavlov, I. P. (1927). *Conditioned reflexes*. London: Oxford University Press.

Have you ever walked into a dentist's office where the odor of the disinfectant made your teeth hurt? If you have, it was probably because the odor triggered an association that had been conditioned in your brain between that smell and your past experiences at the dentist. When you hear "The Star Spangled Banner" played at the Olympic Games, does your heart beat a little faster? This happens to most Americans. Does the same thing happen when you hear the Italian national anthem? Unless you were raised in Italy, most likely it does not, because you have been conditioned to respond to one anthem, but not to the other. And why do some people squint and become nervous if you inflate a balloon near them? It is because they have been conditioned to associate the expanding balloon with something fearful (such as a loud pop). These are just a few of countless human behaviors that exist because of a process known as *classical conditioning*.

The classical conditioning theory of learning was developed and articulated nearly 100 years ago in Russia by one of the most familiar names in the history of psychology, Ivan Petrovich Pavlov (1849-1946). Unlike most of the research presented in this book, Pavlov's name and his basic ideas of learning by association are widely recognized in popular culture (there is even a Rolling Stones song that referred to "salivatin' like Pavlov's dogs"). However, how he came to make his landmark discoveries and the true significance of his work are not so widely understood.

While Pavlov's contribution to psychology was one of the most important ever made, he was not a psychologist at all, but rather a prominent Russian physiologist studying digestive processes. For his research on digestion he was awarded the Nobel Prize for science. But the discoveries that dramatically changed his career, and the history of psychology, began virtually by accident. It is important to note that in the late 1800s, psychology was a very young science and considered by many to be less than a true science. Therefore, Pavlov's decision to make such a radical turn from the more solid and respected science of physiology to psychology was a risky career move. He wrote about the dilemma facing a physiologist whose work might involve studying the brain:

> It is logical that in its analysis of the various activities of living matter, physiology should base itself on the more advanced and more exact sciences, physics and chemistry. But if we attempt an approach from this science of psychology ... we shall be building our superstructure on a science that has no claim to exactness . . . . In fact, it is still open to discussion whether psychology is a natural science, or whether it can be regarded as a science at all. (p. 3)

Looking back on Pavlov's discoveries, it was fortunate for the advancement of psychological science and for our understanding of human behavior that he took the risk and made the career change.

Pavlov's physiological research involved the use of dogs as subjects for studying the role of salivation on digestion. He or his assistants would introduce various food or nonfood substances into a dog's mouth and observe the rate and amount of salivation. In order to measure salivation scientifically, minor surgery was performed on the dogs so that a salivary duct was redirected through an incision in the dog's cheek and connected to a tube that would collect the saliva. Throughout this research, Pavlov made many new and interesting discoveries. For example, he found that when a dog received moist food, only a small amount of saliva would be produced, compared with a heavy flow when dry food was presented. The production of saliva under these varying conditions was regarded by Pavlov as a reflex, that is, a response that occurs automatically to a specific stimulus without the need for any learning. If you think about it, salivation is purely reflexive for humans, too. Suppose I ask you, as you read this sentence, to salivate as heavily as you can. You cannot do it. But if you are hungry and find yourself sitting in front of your favorite food, you will salivate whether you want to or not!

So, Pavlov experimented with various stimuli to determine just how "intelligent" these salivary glands were. As the research continued, he began to notice certain events that were totally unexpected. The dogs began to salivate before any food reached their mouths and even before the odor of food was present. After a while, the dogs were salivating at times when no digestive stimulus was present at all. Somehow, the reflexive action of the salivary glands had been altered through the animals' experience in the lab: "Even the vessel from which the food has been given is sufficient to evoke an alimentary reflex [of salivation] complete in all its details; and, further, the secretion may be provoked even by the sight of the person who has brought the vessel, or by the sound of his footsteps" (p. 13).

This was the crossroads for Pavlov. He had observed digestive responses occurring to stimuli seemingly unrelated to digestion, and pure physiology could not provide an explanation for this. The answer had to be found in *psychology*.

THEORETICAL PROPOSITIONS

Pavlov theorized that the dogs had learned from experience in the lab to expect food following the appearance of certain signals. While these *signal stimuli* do not naturally produce salivation, the dogs came to associate them with food, and thus responded to them with salivation. Consequently, Pavlov determined that there must be two kinds of reflexes.

Unconditioned reflexes are inborn and automatic, require no learning, and are generally the same for all members of a species. Salivating when food enters the mouth, jumping at the sound of a loud noise, and the dilation of your pupils in low light are examples of unconditioned reflexes. *Conditioned reflexes*, on the other hand, are acquired through experience or learning and may vary a great deal among individual members of a species. A dog salivating at the sound of footsteps, or you feeling pain in your teeth when you smell dental disinfectant, are conditioned reflexes.

Unconditioned reflexes are formed by an *unconditioned stimulus* (UCS) producing an *unconditioned response* (UCR). In Pavlov's studies, the UCS was food and the UCR was salivation. *Conditioned reflexes* consist of a *conditioned stimulus* (CS), such as the footsteps, producing a *conditioned response* (CR), salivation. You will notice that the response in both of these examples is salivation, but when the salivation results from hearing footsteps, it is conditioning that produced it.

The question Pavlov wanted to answer was this: Since conditioned reflexes are not inborn, exactly how are they acquired? He proposed that if a particular stimulus in the dog's environment was often present when the dog was fed, this stimulus would become associated in the dog's brain with food; it would signal the approaching food. Prior to being paired with the food, the environmental stimulus did not produce any important response. In other words, to the dogs, it was a *neutral stimulus* (NS). When the dogs first arrived at the lab, the assistant's footsteps might have produced a response of curiosity (Pavlov called it the "What is it?" response), but hearing the footsteps certainly would not have caused the dogs to salivate. The footsteps, then, were a neutral stimulus. However, over time, as the dogs heard the same footsteps just prior to being fed every day, they would begin to associate the sound with food. Eventually, according to the theory, the footsteps alone would cause the dogs to salivate. So, Pavlov proposed that the process by which a neutral stimulus becomes a conditioned stimulus could be diagrammed as follows:

Step 1			UCS (food) →	UCR (salivation)
Step 2	NS (footsteps)	+ +	UCS (food) →	UCR (salivation)
Step 3	(Repeat step 2 several times)			
Step 4			CS (footsteps) →	CR (salivation)

Now that he had a theory to explain his observations, Pavlov began a series of experiments to prove that it was correct. It is commonly believed that Pavlov conditioned dogs to salivate at the sound of a bell. But as you will see, his early experiments involved a metronome.

METHOD AND RESULTS

Pavlov was able to build a special laboratory at the Institute of Experimental Medicine in Petrograd (which became Leningrad and has now returned to its original name of St. Petersburg) with funds donated by "a keen and public-spirited Moscow businessman." This soundprooflab allowed for complete isolation of the subjects from the experimenters and from all extraneous stimuli during the experimental procedures. Therefore, a specific

stimulus could be administered and responses could be recorded without any direct contact between the experimenters and the animals.

After Pavlov had established this controlled research environment, the procedure was quite simple. Pavlov chose food as the unconditioned stimulus. As explained previously, food will elicit the unconditioned response of salivation. Then Pavlov needed to find a neutral stimulus that was, for the dogs, completely unrelated to food. For this he used the sound of the metronome. Over several conditioning trials, the dog was exposed to the ticking of the metronome and then was immediately presented with food. "A stimulus which was neutral of itself had been superimposed upon the action of the inborn alimentary reflex. We observed that, after several repetitions of the combined stimulation, the sounds of the metronome had acquired the property of stimulating salivary secretion" (p. 26). In other words, the metronome had become a conditioned stimulus for the conditioned response of salivation.

Pavlov and his associates elaborated on this preliminary finding by using different unconditioned and neutral stimuli. For example, they presented the odor of vanilla (NS) to the subjects prior to placing a lemon juice-like solution in the dog's mouth (the UCS). The juice caused heavy salivation (UCR). After 20 repetitions of the pairing, the vanilla alone produced salivation. For a visual test, the dogs were exposed to an object that began to rotate just prior to the presentation of food. After only five pairings, the rotating object by itself (CS) caused the dogs to salivate (CR).

The importance and application of Pavlov's work extends far beyond salivating dogs. His theories of classical conditioning explained a major portion of human behavior and helped to launch psychology as a true science.

SIGNIFICANCE OF THE FINDINGS

The theory of classical conditioning (also called Pavlovian conditioning) is universally accepted and has remained virtually unchanged since its conception through Pavlov's work. It is used to explain and interpret a wide range of human behavior, including where phobias come from, why you dislike certain foods, the source of your emotions, how advertising works, why you feel anxiety before a job interview or an exam, and what arouses you sexually. Several later studies dealing with some of these applications are discussed here.

Classical conditioning focuses on reflexive behavior: those behaviors that are not under your voluntary control. Any reflex can be conditioned to occur to a previously neutral stimulus. You can be classically conditioned so that your left eye blinks when you hear a doorbell, your heart rate increases at the sight of a flashing blue light, or you experience sexual arousal when you eat strawberries. The doorbell, blue light, and strawberries were all neutral in relation to the conditioned responses until they somehow became associated with unconditioned stimuli for eye blinking (i.e., a puff of air into the eye), heart rate increase (i.e., a sudden loud noise), and sexual arousal (i.e., romantic caresses).

To experience firsthand the process of classical conditioning, here is an experiment you can perform on yourself. All you will need is a bell, a mirror, and a room that becomes completely dark when the light is switched off, to serve as your temporary laboratory. The pupils of your eyes dilate and constrict reflexively according to changes in light intensity. You have no voluntary control over this, and you did not have to learn how to do it. If I say to you, "Please dilate your pupils now," you would be unable to do so. However, when you walk into a dark theater, they dilate immediately. Therefore, a decrease in light would be considered an unconditioned stimulus for pupil dilation, the unconditioned response. In your *lab*, ring the bell and immediately after, turn off the light. Wait in the total darkness about 15 seconds and turn the light back on. Wait another 15 seconds and repeat the procedure: bell ... light off ... wait 15 seconds ... light on .... Repeat this pairing of the neutral stimulus (the bell) with the unconditioned stimulus (the darkness) 10 to 20 times, making sure that the bell *only* rings just prior to the sudden darkness. Now, with the lights on, watch your eyes closely in the mirror, and ring the bell. You will see your pupils dilate slightly even though there is no change in light! The bell has become the conditioned stimulus and pupil dilation the conditioned response.

RELATED RESEARCH AND RECENT APPLICATIONS

Two other studies presented in this book, rest directly on Pavlov's theory of classical conditioning. In the next article, John B. Watson conditioned 11- month-old little Albert to fear a white rat (and other furry things) by employing the same principles Pavlov used to condition salivation in dogs. By doing so, Watson demonstrated how emotions, such as fear, are formed. Later, Joseph Wolpe developed a therapeutic technique for treating intense fears (phobias) by applying the concepts of classical conditioning. His work was based on the idea that

the association between the conditioned stimulus and the unconditioned stimulus must be broken in order to reduce the fearful response.

This line of research on classical conditioning and phobias continues to the present. For example, studies have found that children whose parents have phobias may develop the same phobias to objects such as snakes and spiders through "vicarious" conditioning from mom and dad without any direct exposure to the feared object (Fredrikson, Annas, & Wik, 1997). Moreover, Pavlov's discoveries continue to be used to treat phobias in adults and children alike (e.g., King et al., 2000).

The countless applications of Pavlov's theory in the psychological and medical literature are far too numerous to summarize in any detail here. Instead, a few additional examples of the more notable findings are discussed.

A common problem that plagues ranchers around the world is that of predatory animals, usually wolves and coyotes, killing and eating their livestock. In the early 1970s, studies were conducted that attempted to apply Pavlovian conditioning techniques to solve the problem of the killing of sheep by coyotes and wolves without the need for killing the predators (see Gustafson et al., 1974). Wolves and coyotes were given pieces of mutton containing small amounts of lithium chloride (UCS), a chemical that if ingested makes an animal sick. When the animals ate the meat, they became dizzy, with severe nausea and vomiting (UCR). After recovering, these same hungry predators were placed in a pen with live sheep. The wolves and coyotes began to attack the sheep (CS), but as soon as they smelled their prey, they stopped and stayed as far away from the sheep as possible. When the gate to the pen was opened, the wolves and coyotes actually ran away from the sheep! Based on this and other related research, ranchers commonly use this method of classical conditioning to keep wolves and coyotes away from their herds.

A potentially vital area of research involving classical conditioning is in the field of behavioral medicine. Studies have indicated that the activity of the immune system can be altered using Pavlovian principles. Ader and Cohen (1985) gave mice water flavored with saccharine (mice love this water). They then paired the saccharine water with an injection of a drug that weakened the immune system of the mice. Later, when these conditioned mice were given the saccharine water but no injection, they showed signs of immunosuppression, a weakening of the immune response. Research is underway to study if the reverse is also possible, if immune *enhancing* responses may be classically conditioned. Overall, research is demonstrating that classical conditioning may indeed hold great promise for increasing the effectiveness of immune system responses in humans (Miller & Cohen, 2001). Just imagine: one day soon, you may be able to strengthen your resistance to illness by exposing yourself to a *nonmedical* conditioned stimulus. For example, imagine you feel the beginnings of a cold or the flu, so you slide your special classically conditioned "immune response enhancement music disk" into your CD player. As the music fills the room, your resistance rises as a conditioned response to this stimulus and stops the disease in its tracks.

As a demonstration of the continuing impact of Pavlov's discoveries on today's psychological research, consider the following. Since the previous edition of this book (2000-2003), more than 300 scientific articles cited Pavlov's work that forms the basis for this discussion. One especially fascinating recent study demonstrated how your psychological state at the time of conditioning and extinction may playa part in the treatment of classically conditioned irrational fears, called phobias (Mystkowski et al., 2003). Researchers used desensitization techniques to treat participants who were terrified of spiders. Some received the treatment after ingesting caffeine while others ingested a placebo. A week later, all subjects were retested-some receiving caffeine and others a placebo. Those who were given the placebo during treatment, but received real caffeine at the follow-up, *and* those who had received real caffeine during treatment, but received a placebo at the follow-up, experienced a relapse of the fear response. However, subjects who were in the same drug condition, either caffeine or placebo, at treatment *and* follow-up, displayed a much lower return of their fear. This finding implies that if a classically conditioned behavior is placed on extinction, it may return if the conditioned stimulus is encountered in a different context from where the extinction took place.

CONCLUSION

These examples demonstrate how extensive Pavlov's influence has been on many scientific and research disciplines. For psychology in particular, few scientists have had as much impact in any single discipline. Classical conditioning is one of the fundamental theories on which modern psychology rests. Without Pavlov's contributions, behavioral scientists still might have uncovered most of these principles over the decades. It is unlikely, however, that such a cohesive, elegant, and well-articulated theory of the conditioned reflex would ever

have existed if Pavlov had not made the decision to risk his career and venture into the untested, uncharted, and highly questionable science of nineteenth-century psychology.

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Fredrikson, M., Annas, P., & Wik, G. (1997). Parental history, aversive exposure, and the development of snake and spider phobias in women. *Behavior Research and Therapy, 35*(1), 23-28.

Gustafson, C. R., Garcia, J., Hawkins, W., & Rusiniak, K. (1974). Coyote predation control by aversive conditioning. *Science, 184*, 581-583.

King, N., Ollendick, T., Murphy, G., & Muris, P. (2000). Animal phobias in children: Etiology, assessment, and treatment. *Clinical Psychology and Psychotherapy, 7*(1), 11-21.

Miller. G., & Cohen, S. (2001). Psychological interventions and the immune system: A meta-analytic review and critique. *Health Psychology, 20*, 47-63.

Mystkowski, J, Mineka, S., Vernon, L., & Zinbarg, R. (2003). Changes in caffeine states enhance return of fear in spider phobia . *Journal of Consulting and Clinical Psychology, 71*, 243-250.

ARE YOU A "NATURAL"?

Bouchard, T., Lykken, D., McGue, M., Segal, N., & Tellegen,A. (1990). Sources of human psychological differences: The Minnesota study of twins reared apart. *Science, 250,* 223-229.

This study represents a relatively recent and ongoing fundamental change in the way many psychologists view human behavior in its broadest sense. You can relate to this change in a personal way by first taking a moment to answer in your mind the following question: "Who are you?" Think for a moment about some of your individual characteristics: your "personality traits." Are you high strung or "laid back"? Are you shy or outgoing? Are you adventurous or do you seek out comfort and safety? Are you easy to get along with or do you tend toward the disagreeable? Are you usually optimistic or more pessimistic about the outcome of future events? Think about yourself in terms of these or any other questions you feel are relevant. Take your time .... Finished? Now, answer this next, and, for this reading, more important question: "Why are you who you are?" In other words, what factors contributed to "creating" this person you are today?

If you are like most people, you will point to the child-rearing practices of your parents and the values, goals, and priorities they instilled in you. You might also credit the influences of brothers, sisters, grandparents, aunts, uncles, and peers, teachers, and other mentors who played key roles in molding you. Still others of you will focus on key life-changing events such as an illness, the loss of a loved one, or the decision to attend a specific college, choose a major, or take a particular life course that seemed to lead you toward becoming your current self. All of these influences share one characteristic: they are all *environmental* phenomena. Hardly anyone ever replies to the question "Why are you who you are?" with, "I was born to be who I am; it's all in my genes."

Everyone acknowledges that physical attributes, such as height, hair color, eye color, and body type are genetic. More and more people are realizing that tendencies toward many illnesses such as cancer, heart disease, and high blood pressure have significant genetic components. But almost no one thinks of genes as the main force behind who they are *psychologically*. This may strike you as odd when you stop to think about it, but in reality there are very understandable reasons for our "environmental bias."

First of all, psychology during the second half of the twentieth century was dominated by a theory of human nature called behaviorism. Basically, the theory of behaviorism states that all human behavior is controlled by environmental factors, including the stimuli that provoke behaviors and the consequences that follow response choices. Strict behaviorists believed that the internal psychological workings of the human mind were not only impossible to study scientifically, but also that such study was unnecessary and irrelevant to a complete explanation for human behavior. 'Whether the wider culture accepted or even understood formal theories of behaviorism is not as important as the reality of their influence on today's firmly entrenched popular belief that *experience* is the primary or exclusive architect of human nature.

Another understandable reason for the pervasive acceptance of environmental explanations of behavior is that genetic and biological factors do not provide visible evidence of their influence. It's easy for someone to say, "I became a writer because I was deeply inspired and encouraged by my seventh grade composition teacher." You remember those sorts of influences; you see them; they are part of your past and present conscious experiences. You would find it much more difficult to recognize biological influences and say, "I became a writer because my DNA contains a gene that has been expressed in me that predisposes me to write well." You can't see, touch, or remember the influence of your genes, and you don't even know where in our body they might be located!

Finally, many people are uncomfortable with the idea that they might be the product of their genes rather than the choices they have made in their lives. Such ideas smack of determinism and a lack of "free will." Most people have a strong dislike for any theory that might in some way limit their conscious ability to determine the outcomes in their lives. Consequently, genetic causes of behavior and personality tend to be avoided or rejected. In reality, genetic influences interact with experience to mold a complete human, and the only question is, which is more dominant? Or to phrase the question as it frequently appears in the media: *"Is it nature or nurture?"*

This article by Thomas Bouchard, David Lykken, and their associates at the University of Minnesota in Minneapolis, is a review of research began in 1979 to examine the question of how much influence your genes have in determining your personal psychological qualities. This research grew out of a need for a scientific method to separate genetic influences (nature) from environmental forces (nurture) on people's behavior and personality. This is no simple task when you consider that nearly every one of you, assuming you were not adopted, grew and developed under the direct environmental influence of your genetic donors (your parents). You might, for example, have the same sense of humor as your father (no offense!) because you learned it from

him (nurture) or because you inherited his "sense-of-humor" gene (nature). It appears that there is no systematic way to tease those two influences apart, right?

Well, Bouchard and Lykken would say "wrong." They have found a way to determine with a reasonable degree of confidence which psychological characteristics appear to be determined primarily by genetic factors and which are molded more by your environment.

THEORETICAL PROPOSITIONS

It's simple really. All you have to do is take two humans who have exactly the same genes, separate them at birth, and raise them in significantly different environments. Then, you can assume that those behavioral and personality characteristics they have in common as adults must be genetic. But how on earth can researchers possibly find pairs of *identical people* (don't say "cloning"; we're not there yet!)? And even if they could, it would be unethical to force them into diverse environments, wouldn't it? Well, as you've already guessed, the researchers didn't have to do that. Society had already done it for them. Identical twins have virtually the same genetic structure. They are called *monozygotic twins* because they start as one fertilized egg, called a *zygote*, and then split into two identical embryos. Fraternal twins are the result of two separate eggs fertilized by two separate sperm cells and are referred to as *dizygotic twins*. Fraternal twins are only as genetically similar as any two nontwin siblings. As unfortunate as it sounds, twin infants are sometimes given up for adoption and placed in separate homes. Adoption agencies will try to keep siblings, especially twins, together, but the more important goal is to find good homes for them even if it means separation. So, over time, thousands of identical and fraternal twins have been adopted into separate homes and raised, frequently without the knowledge that they were a twin, in different and often contrasting environmental settings.

Bouchard and Lykken began in 1983 to identify, locate, and bring together pairs of these twins. This 1990 article reports on results from 56 pairs of monozygotic reared-apart (MZA) twins from the United States and seven other countries who agreed to participate in weeklong sessions of intensive psychological and physiological tests and measurements (that this research is located in Minneapolis, one half of "the Twin Cities" is an irony that has not, by any means, gone unnoticed). These twins were compared with monozygotic twins reared together (MZT). The surprising findings continue to reverberate throughout the biological and behavioral sciences.

METHOD

Participants

The first challenge for this project was to *find* sets of monozygotic twins who were separated early in life, reared apart for all of most of their lives, and reunited as adults. Most of the participants were found through word-of-mouth as news of the study began to spread. The twins themselves or their friends or family members would contact the research institute, the Minnesota Center for Twin and Adoption Research (MICTAR), various social-services professionals in the adoption arena would serve as contacts, or, in some cases one member of a twin-pair would contact the center for assistance in locating and reuniting with his or her sibling. All twins were tested to assure that they were indeed monozygotic before beginning their participation in the study.

Procedure

The researchers wanted to be sure they obtained as much data as possible during the twins' one-week visit. Each twin completed approximately 50 hours of testing on nearly every human dimension you might imagine. They completed four personality trait scales, three aptitude and occupational interest inventories, and two intelligence tests. In addition the participants filled in checklists of household belongings (such as power tools, telescope, original artwork, unabridged dictionary) to assess the similarity of their family resources, and a family environment scale that measured how they felt about the parenting they received from their adoptive parents. They were also administered a life history interview, a psychiatric interview, and a sexual history interview. All of these assessments were carried out individually so that there was no possibility that one twin might inadvertently influence the answers and responses of the other.

As you might imagine, the hours of testing created a huge database of information. The most important and surprising results are discussed here.

RESULTS

Table 1 summarizes the similarities for some of the characteristics measured in the monozygotic twins reared apart (MZA) and includes the same data for monozygotic twins reared together (MZT). The degree of similarity is expressed in the table as correlations or "R" values. The larger the correlation, the greater the similarity. The logic here is that if environment is responsible for individual differences, the MZT twins who shared the same environment as they grew up *should* be significantly more similar than the MZA twins. As you can see, this is not what the researchers found.

The last column in Table 1 expresses the difference in similarity by dividing the MZA correlation on each characteristic by the MZT correlation. If both correlations were the same, the result would be 1.00; if they were entirely dissimilar, the result could be as slow as 0.00. Examining column 4 in the table carefully, you'll find that the correlations for characteristics were remarkably similar, that is, close to 1.00, and no lower than. 700 for MZA and MZT twin pairs.

DISCUSSION AND IMPLICATIONS OF FINDINGS

These findings indicate that genetic factors (or "the genome") appear to account for most of the variation in a remarkable variety of human characteristics. This finding was demonstrated by the data in two important ways. One is that genetically identical humans (monozygotic twins), who were raised in separate and often very different settings, grew into adults who were extraordinarily similar, not only in appearance but also in basic psychology and personality. The second demonstration in this study of the dominance of genes is the fact that there appeared to be so *little* effect of the environment on identical twins who *were* raised in the same setting. Here's Bouchard and Lykken's take on these discoveries:

> For almost every behavioral trait so far investigated, from reaction time to religiosity, an important fraction of the variation among people turns out to be associated with genetic variation. This fact need no longer be subject to debate; rather, it is time to consider its implications.

TABLE 1 Comparison of Correlations (*r*) of Selected Characteristics for Identical Twins Reared Apart (MZA) and Identical Twins Reared Together (MZT)*

CHARACTERISTIC	*r* (MZA)	*r* (MZT)	SIMILARITY *r* (MZA) ÷ *r* (MZT)**
Physiological	—	—	—
Brain wave activity	.80	.81	.987
Blood pressure	.64	.70	.914
Heart rate	.49	.54	.907
Intelligence	—	—	—
WAIS IQ	.69	.88	.784
Raven intelligence test	.78	.76	1.03
Personality	—	—	—
Multidimensional personality questionnaire (MPQ)	.50	.49	1.02
California personality inventory	.48	.49	.979
Psychological interests	—	—	—
Strong Campbell interest inventory	.39	.48	.813
Minnesota occupational interest scale	.40	.49	.816
Social attitudes	—	—	—
Religiosity	.49	.51	.961
Nonreligious social attitudes	.34	.28	1.21

*Adapted from Table 4, p. 226.
**1.00 would imply that MZA twin pairs were found to be exactly as similar as MZT twin pairs.

There are, of course, those who will argue with Bouchard and Lykken's notion that the time to debate these issues is over. Some varying views are discussed in the next section. However, a discussion of the implications of

this and other similar studies by these same researchers is clearly warranted. In what ways do the genetic findings reported in this study change psychologists' and, for that matter, all of our views of human nature? As mentioned earlier, psychology and Western culture have been dominated for over 50 years by environmental thinking. Many of our basic beliefs about parenting, education, crime and punishment, psychotherapy, skills and abilities, interests, occupational goals, and social behavior, just to name a few, have been interpreted from the perspective that people's experience molds their personalities, not their genes. Very few of us look at someone's behavior and think, "That person was born to behave like that!" We *want* to believe that people *learned* their behavior patterns because that allows us to feel some measure of confidence that parenting makes a difference, that positive life experiences can win out over negative ones, and unhealthy, ineffective behaviors can be *unlearned*. The notion that personality is a done deal the moment we are born leaves us with the temptation to say, "Why bother?" Why bother working hard to be good parents? Why bother trying to help those who are down and out? Why bother trying to offer quality education? And so on. Well, Bouchard and Lykken want to be the first to disagree with such an interpretation of their findings. In this article, they offer three of their own implications of their provocative conclusions:

1. Clearly, intelligence is primarily determined by genetic factors (70% of the variation in intelligence appears to be due to genetic influence). However, as the authors state very clearly,

> [T]hese findings do not imply that traits like IQ cannot be enhanced .... A survey covering 14 countries, has shown that the average IQ test score has increased in recent years. The present findings, therefore, do not define or limit what might be conceivably achieved in an optimal environment. (p. 227)

   Basically, what he is saying is that while 70% of the variation in IQ is due to naturally occurring genetic variation, 30% of the variation remains subject to increases or decreases due to environmental influences. These influences include many that are well known, such as education, family setting, toxic substances, and socioeconomic status.

2. The basic underlying assumption in Bouchard and Lykken's research is that human characteristics are determined by some combination of genetic and environmental influences. So, when the environment exerts less influence, differences must be attributed more to genes. The converse is also true: as environmental forces create a stronger influence on differences in a particular characteristic, genetic influences will be weaker. For example, most children in the United States have the opportunity to learn to ride a bicycle. This implies that the environment's effect on bicycle riding is somewhat similar for all children, so differences in riding ability will be more affected by genetic forces. On the other hand, variation in, say, food preferences in the United States are more likely to be explained by environmental factors because food and taste experiences in childhood and throughout life are very diverse and will, therefore, leave less room for genetic forces to function. Here's the interesting part of the researchers' point: They maintain that personality is more like bicycle riding than food preferences.

   The authors are saying, in essence, that family environments exert less influence over who the kids grow up to be than do the genes they inherit from birth. Understandably, most parents do not want to hear or believe this. They are working hard to be good parents and to raise their children to be happy individuals and good citizens. The only parents who might take some comfort from these findings are those who are nearing their wit's end with out-of-control or incorrigible sons or daughters and would appreciate being able to take less of the blame! However, Bouchard and Lykken are quick to point out that genes are not necessarily destiny and devoted parents can still influence their children in positive ways, even if they are only working on a small percentage of the total variation.

3. The most intriguing implication that Bouchard and Lykken suggest is that it's not the environment influencing people's characteristics, but vice versa. That is, people's genetic tendencies actually mold their environments! Here's an example of the idea behind this theory: The fact that some people are more affectionate than others is usually seen as evidence that some parents were more affectionate with their children than were other parents. In other words, affectionate kids come from affectionate

environments. Then this kind of assumption has been studied, it is usually found to be true. Affectionate people have, indeed, received more affection from their parents. Bouchard and Lykken are proposing, however, that variation in "affectionateness" may be, in reality, genetically determined so that some children are just born more affectionate than others. Their in-born tendency toward affectionate behavior causes them to *respond* to affection from their parents in ways that reinforce the parents' behavior much more than nongenetically affectionate children. This, in turn *produces* the affectionate behavior in the parents, not the other way around. The researchers contend that genes function in this way for many if not most human characteristics. They state it this way:

> The proximal [immediate] cause of most psychological variance probably involves learning through experience, just as radical environmentalists have always believed. The effective experiences, however, to an important extent are self-selected, and that selection is guided by the steady pressure of the genome. (p. 228)

CRITICISMS AND RELATED RESEARCH

As you might imagine, a great deal of related studies have been carried out using the database of twins developed by Bouchard and Lykken. In general, the findings continue to indicate that many human personality characteristics and behaviors are strongly influenced by genes. Many attributes that have been seen as stemming largely or completely from environmental sources are being reevaluated as twin studies reveal that heredity contributes either the majority of the variation or a significantly larger proportion that was previously contemplated.

For example, studies from the University of Minnesota team found that not only is the vocation you choose largely determined by your genes, but also about 30% of the variation in your overall job satisfaction and work ethic appears due to genetic factors (Arvey et al., 1989; Arvey et al., 1994) even when the physical requirements of various professions were held constant. Other studies comparing identical (monozygotic) twins with fraternal (dizygotic) twins, both reared together and reared apart, have focused more directly on specific personality traits that are thought to be influential and stable in humans (Bouchard, 1994; Loehlin, 1992). These and other studies' findings determined that the people's variation on the characteristics of extraversion-introversion (outgoing versus shy), neuroticism (tendency to suffer from high anxiety and extreme emotional reactions), and conscientiousness (degree to which a person is competent, responsible and thorough) is explained more (65%) by genetic differences than by environmental factors.

Of course, not everyone in the scientific community is willing to accept these findings at face value. The criticisms of Bouchard and Lykken's work take several directions (see Billings et al., 1992). Some studies claim that the researchers are not publishing their data as fully and completely as they should, and, therefore, their findings cannot be independently evaluated. These same critics also claim that there are many articles reporting on case studies demonstrating strong environmental influences on twins that Bouchard and Lykken fail to consider.

In addition, some researchers have voiced a major criticism of one aspect of twin research in general, referred to as the "equal environment assumption" (i.e., Joseph, 2002). This argument maintains that many of the conclusions drawn by Bouchard and Lykken about genetic influence assume that MZ and DZ twins raised together develop in identical environments. These critics maintain that such an assumption is not valid and that fraternal twins are treated far more differently than are identical twins. This, they contend, draws the entire method of twin research as a determinate of genetic influences into question. However, several other articles have refuted this criticism and supported the "equal environment assumption" (i.e., Kendler et al., 1993).

Recent Applications

In 1999, Bouchard reviewed the nature-nurture evidence from the Minnesota twin registries (Bouchard, 1999). He concluded that, overall, 40% of the variability in personality and 50% of variation in intelligence appears to be genetically based. He also reiterated his position discussed earlier that your genes drive your selection of environments and your selection or avoidance of specific personality-molding environments and behaviors.

Research at the Minnesota twin centers continues to be very active. Some fascinating research has examined very complex human characteristics and behaviors that few would have even guessed to be genetically driven, such as love, divorce, and even death (see http://www.psych.umn.edu/ psylabs/mtfs/special.htm, 2004). They have studied people's selection of a mate to see if "falling in love" with Mr. or Ms. Right is genetically

predisposed. It turns out that it is not! However, the researchers have found a genetic link to the likelihood of divorce and to people's age at their time of their death.

Finally, Bouchard and Lykken's research has been applied to the larger philosophical discussion of human cloning (see Agar, 2003). If a human being is ever successfully cloned, the question is, as you are probably thinking, to what extent will a person's essence, an individual's personality, be transferred to his or her clone? The fear that human identity might be changed, degraded, or lost has been a common argument of those opposed to cloning. On the other hand, results of twin studies such as those of Bouchard and Lykken suggest that "the cloned person may, under certain circumstances, be seen as surviving, to some degree, in the clone .... However ... rather than warranting concern, the potential for survival by cloning ought to help protect against the misuse of the technology" (Agar, 2003, p. 9). This is much more a philosophical than genetic discussion, but it makes very interesting food for thought.

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Billings, P., Beckwith, J., & Alper, J. (1992). The genetic analysis of human behavior: A new era? *Social Science and Medicine, 35*(3), 227-238.

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Kendler K., Neale M., Kessler R., Heath A., Eaves L. (1993). A test of the equal environment assumption in twin studies of psychiatric illness. *Behavioral Genetics, 23*, 21-27.

Loehlin, J. (1992). *Genes and environment in personality development*. Newbury Park, CA: Sage Publications.

YOU'RE GETTING DEFENSIVE AGAIN!

Freud, A. (1946). *The ego and the mechanisms of defense*. New York: International Universities Press.

In a book about the history of research that changed psychology, one imposing figure would be extremely difficult to omit: Sigmund Freud (1856-1939). It is very unlikely that psychology would exist today as it does, in spite of its varied and complex forms, without Freud's contributions. He was largely responsible for elevating our interpretations of human behavior (especially abnormal behavior) from superstitions of demonic possession and evil spirits to the rational ideas of reason and science. Without an examination of his work, this book would be incomplete. Now, you may be asking yourself, if Sigmund Freud is so important, why does this discussion focus on a book written by his daughter, Anna Freud (1895-1982)? The answer to that question requires a bit of explanation.

Although Sigmund Freud was integral to psychology's history and, therefore, is a necessary part of this book, the task of including his research here along with all the other researchers was a difficult one. The reason for this difficulty was that Freud did not reach his discoveries through a clearly defined scientific methodology. It was not possible to choose a single study or series of experiments to represent his work, as has been done for other researchers in this book. Freud's theories grew out of careful observations of his patients over decades of clinical analysis. Consequently, his writings were abundant, to say the least. The English translation of his collected writings, *The Standard Edition of the Complete Psychological Works of Sigmund Freud* (London: Hogarth Press, 1953 to 1974), totals 24 volumes! Obviously, only a very small piece of his work could be discussed here.

In choosing what to include here, consideration was given to the portions of Freud's theories that have stood the test of time relatively unscathed. Over the past century, a great deal of criticism has been focused on Freud's ideas and, in the last 40 years especially, his work has been drawn into serious question from a scientific perspective. Critics have argued that many of his theories either cannot be tested scientifically; or if they are tested, they prove to be generally unreliable. Therefore, while few would doubt the historical importance of Freud, many of his theories about the structure of personality, the development of personality through the psychosexual stages, and the sources of people's psychological problems have been rejected by most psychologists today. However, some aspects of his work have received more positive reviews through the years and now enjoy relatively wide acceptance. One of these is his concept of the *defense mechanisms*. These are weapons that your ego uses to protect you from your own self-created anxiety. This element from his work has been selected to represent Freud in this book.

Sigmund Freud's discovery of defense mechanisms occurred gradually over 30 or more years as his experiences in dealing with psychological problems grew. A cohesive, self-contained discussion of this topic does not appear anywhere in Sigmund Freud's many volumes. In fact, he passed that job on to his daughter, who was an important psychoanalyst in her own right, specializing in children. Freud acknowledged this fact in 1936 just before Anna's book, *The Ego and the Mechanisms of Defense*, was originally published in German: "There are an extremely large number of methods (or mechanisms, as we say) used by the ego in the discharge of its defensive functions. My daughter, the child analyst, is writing a book about them" (S. Freud, 1936). Since it was Anna Freud who synthesized her father's theories regarding the defense mechanisms into a single work, her book has been chosen for our discussion of the work of Sigmund Freud.

THEORETICAL PROPOSITIONS

In order to examine Freud's notion of defense mechanisms, it is necessary to explain briefly his theory of the structure of personality. Freud proposed that personality consists of three components: the id, the ego, and the superego.

The id consists of basic biological urges such as hunger, thirst, and sexual impulses. Whenever these needs are not met, the id generates strong motivation for the person to find a way to satisfy them, and do so immediately! The id operates on what Freud called the *pleasure principle* and demands instantaneous gratification of all desires, regardless of reason, logic, safety, or morality. Freud believed that there are dark, antisocial, and dangerous instinctual urges (especially sexual ones) present in everyone's id that constantly seek expression. You are not usually aware of these because the id operates on the unconscious level. However, if you were lacking the other parts of your personality and only had an id, your behavior would be amoral, shockingly deviant, and even fatal to you and others.

The reason you do not behave in these dangerous and deviant ways is that your ego and superego develop to place limits and controls on the impulses of your id. According to Freud, the ego operates on the *reality principle*, which means it is alert to the real world and the consequences of behavior. The ego is conscious

and its job is to satisfy your id's urges, but to do so using means that are rational, socially acceptable, and reasonably safe.

However, the ego also has limits placed upon it by the superego. Your superego, in essence, requires that the solutions the ego finds to the id's needs are moral and ethical, according to your own internalized set of rules about what is good or bad. These rules were instilled in you by your parents, and if you behave in ways that violate them your superego will punish you with its own very effective weapon: guilt. Do you recognize this? It is commonly referred to as your conscience. Freud believed that your superego operates on both conscious and unconscious levels.

So, Freud's conceptualization of your personality was a dynamic one in which the ego is constantly trying to balance the needs and urges of the id with the moral requirements of the superego in determining your behavior. Here is an example of how this might work. Imagine a 16-year-old boy strolling down the street in a small town. It is 10 P.M. and he is on his way home. Suddenly he realizes he is hungry. He passes a grocery store and sees food on the other side of the large windows, but the store is closed. His id might say, "Look! Food! Jump through the glass and get some!" (Remember, the id wants immediate satisfaction, regardless of the consequences.) He would probably not be aware of the id's suggestion because it would be at a level below his consciousness. The ego would "hear" it, though, and since its job is to protect the boy from danger, it might respond, "No, that would be dangerous. Let's go around back, break into the store, and steal some food!" At this, the superego would remark indignantly, "You can't do that! It's immoral, and if you do it I will punish you!" So, his ego reconsiders and makes a new suggestion that is acceptable to both the id and the superego: "You know, there's an all-night fast-food place four blocks over. Let's go there and buy some food." This solution, assuming that the boy is psychologically healthy, is the one that makes it to his consciousness and is reflected in his behavior.

According to Freud, the reason most people do not behave in antisocial or deviant ways is because of this system of checks and balances among the three parts of the personality. But what would happen if the system malfunctioned—if this balance were lost? One way this could happen would be if the demands of the id became too strong to be controlled adequately by the ego. What if the unacceptable urges of the id edged their way into your consciousness (into what Freud called the *preconscious*) and began to overpower the ego? Freud contended that if this happens, you will experience a very unpleasant condition called anxiety. Specifically, he called it *free-floating* anxiety, because although you feel anxious and afraid, the causes are not fully conscious, so you are not sure why you feel this way.

When this state of anxiety exists, it is uncomfortable and we are motivated to change it. To do this the ego will bring on its big guns, called the *defense mechanisms*. The purpose of the defense mechanisms is to prevent the id's forbidden impulse from entering consciousness. If this is successful, the discomfort of the anxiety associated with the impulse is relieved. How do the defense mechanisms ward of anxiety? Well, they do it through self-deception and the distortion of reality so that the id's urges will not have to be acknowledged.

METHOD

Freud discovered the defense mechanisms gradually over many years of clinical interactions with his patients. In the years since Sigmund Freud's death and since the publication of Anna Freud's book, many refinements have been made in the interpretation of the defense mechanisms. The next section summarizes a selection of only those mechanisms identified by Sigmund Freud and elaborated on by his daughter.

RESULTS AND DISCUSSION

Anna Freud identified 10 defense mechanisms that had been described by her father (see p. 44 of her book). Five of the original mechanisms that are ~ commonly used and widely recognized today are discussed here: repression, regression, projection, reaction formation, and sublimation. Keep in mind that the primary function of the defense mechanisms is to alter reality in order to protect against anxiety.

Repression

Repression is the most basic and commonly used mechanism of defense. In his early writings, Freud used the terms repression and defense interchangeably and interpreted repression to be virtually the only defense mechanism. Later, however, he acknowledged that repression was only one of many psychological processes available to protect a person from anxiety (p. 43). Repression does this by forcing disturbing thoughts out of consciousness. If this is accomplished successfully, the anxiety associated with the "forbidden" thoughts is

avoided. In Freud's view, repression is often employed to defend against the anxiety that would be produced by unacceptable sexual desires. For example, a woman who has sexual feelings about her father would probably experience intense anxiety if these impulses were to become conscious. To avoid that anxiety, she might repress her unacceptable desires, forcing them fully into her unconscious. This would not mean that her urges are gone, but since they are repressed, they cannot produce anxiety.

You might be wondering how such thoughts are ever discovered if they remain in the unconscious. According to Freud, these hidden conflicts may be revealed through slips of the tongue, through dreams, or by the various techniques used in psychoanalysis, such as free association or hypnosis. Furthermore, repressed desires can create psychological problems that are expressed in the form of neuroses. For instance, consider again the woman who has repressed sexual desires for her father. She might express these impulses by becoming involved in successive failed relationships with men in an unconscious attempt to resolve her conflicts about her father.

Regression

Regression is a defense used by the ego to guard against anxiety by causing the person to retreat to the behavior of an earlier stage of development that was less demanding and safer. Often when a second child is born into a family, the older sibling will regress to using earlier speech patterns, wanting a bottle, and even bed-wetting. Adults can use regression as well. Consider a man experiencing a *midlife crisis* who is afraid of growing old and dying. To avoid the anxiety associated with these unconscious fears, he might regress to an adolescent stage by becoming irresponsible, cruising around in a sports car, trying to date younger women, and even eating the foods associated with his teenage years. Another example of regression is the married adult who *goes home to mother* whenever there is a problem in the marriage.

Projection

Imagine for a moment that your ego is being attacked by your id. You're not sure why, but you are experiencing a lot of anxiety. If your ego uses the defense mechanism of projection to eliminate the anxiety, you will begin to see your unconscious urges in other people's behavior. That is, you will project your impulses onto others. This externalizes the anxiety-provoking feelings and reduces the anxiety. You will not be aware that you're doing this, and the people onto whom you project may not be guilty of your accusations. An example of this offered by Anna Freud involves a husband who is experiencing impulses to be unfaithful to his wife (p. 120). He may not even be conscious of these urges, but they are creeping up from his id and creating anxiety. To ward off the anxiety, he projects his desires onto his wife, becomes intensely jealous, and accuses her of having affairs, even though there is no evidence to support his claims. Another example is the woman who is afraid of aging and begins to point out how old her friends and acquaintances are looking. The individuals in these examples are not acting or lying, but truly believe their projections. If they did not, the defense against anxiety would fail.

Reaction Formation

The defense identified by Freud as a reaction formation is exemplified by a line from Shakespeare's Hamlet, when Hamlet's mother, after watching a scene in a play, remarks to Hamlet, "The lady doth protest too much, me thinks." When a person is experiencing unacceptable, unconscious *evil* impulses, anxiety over them might be avoided by engaging in behaviors that are the exact opposite of the id's real urges. Anna Freud pointed out that these behaviors are usually exaggerated or even obsessive (p. 9). By adopting attitudes and behaviors that demonstrate outwardly a complete rejection of the id's true desires, anxiety is blocked. Reaction formations tend to appear rapidly and usually become a permanent part of an individual's personality unless the id-ego conflict is somehow resolved. As an example of this, reconsider the husband who unconsciously desires other women. If he employs reaction formation rather than projection to prevent his anxiety, he may become obsessively devoted to his wife and shower her with gifts and pronouncements of his unwavering love. Another example comes from many disturbing news reports of the violent crime referred to as *gay bashing*. In a Freudian interpretation, men who have unconscious homosexual tendencies might engage in this extreme opposite behavior of attacking and beating gay men to avoid their true desires and the anxiety associated with them.

Sublimation

Both Sigmund and Anna Freud considered most of the defense mechanisms, including the four described above, as indicating problems in psychological adjustment (neuroses). Conversely, the defense of sublimation was seen as not only normal, but desirable (p. 44). When people invoke sublimation, they are finding socially acceptable ways of discharging energy that is the result of unconscious forbidden desires. Freud maintained that since

everyone's id contains these desires, sublimation is a necessary part of a productive and healthy life. Furthermore, he believed that most strong desires can be sublimated in various ways. Someone who has intense aggressive impulses might sublimate them by engaging in contact sports or becoming a surgeon. A teenage girl's passion for horseback riding might be interpreted as sublimated unacceptable sexual desires. A man who has an erotic fixation on the human body might sublimate his feelings by becoming a painter or sculptor of nudes.

Freud believed that all of what we call civilization has been possible through the mechanism of sublimation. In his view, humans have been able to sublimate their primitive biological urges and impulses, allowing them to build civilized societies. Sometimes, Freud suggested, our true unconscious forces overpower our *collective ego* and these primitive behaviors burst out in uncivilized expressions such as war. Overall, however, it is only through sublimation that civilization can exist at all (S. Freud, 1936).

IMPLICATIONS AND RECENT APPLICATIONS

Although Anna Freud made it clear in her book that the use of defense mechanisms is often associated with neurotic behavior, it should be pointed out that this is not always the case. Nearly everyone uses various defense mechanisms occasionally in their lives, especially to help them deal with periods of increased stress. They help us reduce our anxiety and maintain a positive self-image. Use of certain defense mechanisms has even been shown to reduce unhealthy physiological activity. For example, use of projection has been found to be associated with lower blood pressure (Cramer, 2003). Nevertheless, defense mechanisms involve self-deception and distortions of reality that can produce negative consequences if they are overused. For example, a person who uses regression every time life's problems become overwhelming might never develop the strategies necessary to deal with the problems and solve them. Consequently, the person's life will not become as effective as it could be. Moreover, Freud and many other psychologists have contended that when anxiety over specific conflicts is repressed, it is sometimes manifested in other ways, such as phobias, anxiety attacks, or obsessive-compulsive disorders.

Freud's theories have always been extremely controversial. Do the defense mechanisms really exist? Do they actually function unconsciously to block the anxiety created by the forbidden impulses of the id trying to enter the conscious? Probably the most often cited criticism of all of Freud's work is that to test it scientifically is difficult at best, impossible at worst. Many studies have tried to demonstrate the existence of various Freudian concepts. The results have been mixed. Some of his ideas have found scientific support (see Cramer, 2000), while others have been disproven, and still others simply cannot be studied (see Fisher & Greenberg, 1977, 1995).

One fascinating study may have found scientific evidence that *homophobia*, an irrational fear, avoidance, and prejudice toward gay and lesbian individuals, may be a *reaction formation* used to ward off the extreme anxiety caused by their own repressed homosexual tendencies (Adams, Wright, & Lohr, 1996). A group of men were given a test to determine their level of homophobia and divided into two groups: homophobic and nonhomophobic. Then, subjects were exposed to videos depicting heterosexual, gay, or lesbian explicit sexual scenes and, while they viewed these videos, monitored for physiological signs of sexual arousal. The only difference found between the groups was when they viewed the videos of gay males. In this condition, "the results indicate that the homophobic men showed a significant increase in [arousal], but that the [nonhomophobic] men did not" (p. 443). In fact, 66% of the nonhomophobic group showed no significant signs of arousal while viewing the homosexual video, but only 20% of the homophobic group showed little or no evidence of arousal. Furthermore, when asked to rate their level of arousal, the homophobic men *underestimated* their degree of arousal in response to the homosexual video. This study's results are clearly consistent with Anna Freud's description of the defense mechanism of reaction formation and lend support for the explanation of violence against gay individuals discussed earlier in this section.

CONCLUSION

As evidenced by studies discussed earlier, scientific interest in the defense mechanisms appears to be on the upswing among psychologists in various subfields, including cognitive, developmental, personality, and social psychology (Cramer, 2000). Through an awareness and understanding of the defense mechanisms, your ability to obtain important insights into the causes of people's actions is clearly enhanced. If you keep a list of the defense mechanisms handy in your "brain's back pocket," you may begin to notice them in others or even in yourself. By the way, if you think someone is using a defense mechanism, remember, he or she is doing so to avoid unpleasant anxiety. Therefore, it is probably not a great idea to bring it to his or her attention. Knowledge

of the defense mechanisms can be a powerful tool in your interactions with others, but it must be used carefully and responsibly.

You can easily experience for yourself the continuing influence of Anna Freud's synthesis and analysis of her father's concept of the defense mechanism by picking up virtually any recent academic or scholarly work that discusses psychoanalytic theory in detail. Most of the Freud citations you will encounter will be referring to Sigmund, and rightly so. But, when the discussion turns to the defense mechanisms, it is Anna Freud's 1946 book and its various revisions that serve as the authoritative work on the topic (see Couch, 1995).

Adams, H., Wright, L., & Lohr, B. (1996). Is homophobia associated with homosexual arousal? Journal of *Abnormal Psychology, 105*(3), 440-445.

Couch, A. (1995, February). Anna Freud's adult psychoanalytic technique: A defense of classical analysis. *International Journal of Psychoanalysis, 76*, 153-171.

Cramer, P. (2003). Defense mechanisms and physiological reactivity to stress. *Journal of Personality, 71*, 221-244.

Cramer, P. (2000). Defense mechanisms in psychology today: Further processes for adaptation. *American Psychologist, 55*(6), 637-646.

Fisher, S., & Greenberg, R. (1977). *The scientific credibility of Freud's theories and therapy*. New York: Basic Books.

Fisher, S., & Greenberg, R. (1995). *Freud scientifically reappraised: Testing the theories and therapy*. New York: Wiley.

Freud, S. (1936). *A disturbance of memory on the Acropolis*. London: Hogarth Press.

Freud, S. (1961). *Civilisation and its discontents*. London: Hogarth Press. (Original publication in German, 1930.)

Reading 37: A PRISON BY ANY OTHER NAME . . .

Zimbardo, P. G. (1972). The pathology of imprisonment. *Society, 9*(6), 4–8.
Haney, C., Banks, W. C., & Zimbardo, P. G. (1973). Interpersonal dynamics in a simulated prison. *International Journal of Criminology & Penology,* 1, 69–97.

Have you ever been imprisoned? Let's assume your answer (and mine) is "no." Do you know anyone who has spent time incarcerated? Maybe. Regardless, most of us know very little about the psychological effects of spending time in prison. You may have read articles, stories, or novels about prisons, and almost certainly you've seen prison life portrayed in movies and on TV. From this exposure, most people's only certainty is that prison is not a place we ever want to wind up! We know it is a horrific experience and it surely must produce strong reactions and even pathological behaviors among inmates. Most of us also believe that those who choose to be prison employees, such as guards and wardens, probably possess certain unique, personal characteristics. But how can behavioral scientists study systematically the psychological and emotional effects of the prison experience, for either the inmates or the employees?

As for most complex real-life situations, studying the psychology of prison life is at best a difficult challenge for researchers because the methods used must be correlational—that is, we can observe the prison environment, interview inmates and guards, gather information about prisoners after they are released, and then try to make assumptions based on these accounts. But we cannot scientifically control the prison environment to draw clear, valid conclusions about the real causes of the behaviors that we observe. Does prison change people, or were the people in the prison system already "different" going in? One way around this research dilemma might be to create a simulated "research prison" and place people into it either as "prisoners" or "guards." Sound impossible? Perhaps this would be a difficult study to do today, but one famous psychologist, Philip Zimbardo, and his associates Craig Haney, Curtis Banks, and Dave Jaffe did just that over 30 years ago at Stanford University (the two articles listed at the beginning of this reading are the earliest discussions of their study). They wanted to create a simulated prison with randomly assigned, typical college students in the roles of "guards" and "prisoners." Their "prison" (which will be described in greater detail) was constructed in the basement of the psychology building on the Stanford campus.

THEORETICAL PROPOSITIONS

Zimbardo was testing his belief that the environment around you, the situation, often determines how you behave more strongly than who you are—that is, your internal, dispositional nature. He contends that, although we may have certain inherent or internal behavioral *tendencies,* powerful situations can overcome those tendencies and lead us to engage in behaviors that are very

different from our usual selves. Zimbardo and his associates set out to discover what happens to normal people who are placed into a situation that exerts great power over individuals: prison.

Except for their initial belief that the situation exerts strong effects over our behavior, the researchers did not formulate any specific hypotheses. To test the impact of situational forces, they randomly assigned each participant to be either a "guard" or a "prisoner." The believed that random assignment to either the role of guard or prisoner would result in significantly different reactions in the mock prison environment on behavioral measures of interaction, emotional measures of mood and pathology, attitudes toward self, as well as other indices of coping and adaptation to this novel situation (Haney, Banks, & Zimbardo, 1973).

METHOD

Setting

Zimbardo's goal was to create a situation that would resemble a prison or jail as closely as possible; he brought in a consultant: an ex-convict who had been incarcerated for 17 years. Although for this study the prison would not be real and participants in the study would know this, Zimbardo wanted to be sure to *simulate* a real prison experience.

Using space in the basement of the psychology building at Stanford University, Zimbardo supervised a crew as it transformed various rooms and hallways into a "prison." The prison had to be well-built because the study was planned to last for 2 weeks. Each end of a corridor was boarded up and the laboratory rooms became prison cells. To enhance realism, special cell doors were constructed with vertical bars for door windows and individual jail-cell numbers (see Figure 37-1). The enclosed hallway that ran along the cell

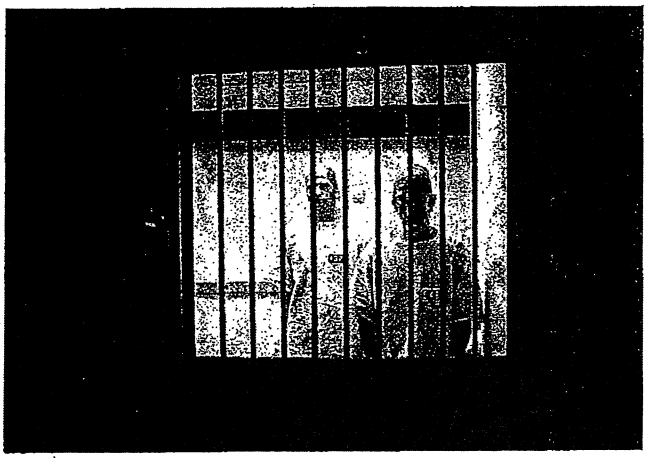

FIGURE 37-1 A typical "cell" at the "Stanford Prison." (Chuck Painter / Stanford News Service)

rooms was the "prison yard" where prisoner-participants would be allowed out of their cells to eat and move around. At the end of the hall was a small closet that would eventually be designated as solitary confinement for prisoners who were troublemakers, rebellious, disrespectful to the guards, or otherwise uncooperative. The bathroom was down the hall, but the guards would lead prisoners there blindfolded so they would not become aware of their location (Zimbardo, 2007b). The "prison" was equipped with a hidden observation camera and an intercom system that allowed the experimenters to maintain supervision of the guards' and prisoners' behavior.

Participants

If you are not already familiar with this famous study, what you are about to read may surprise or even shock you. As you read on, try to put yourselves into the mind-set of the participants. First, the researchers placed ads in local papers near Stanford University in Palo Alto, California, offering $15 per day (that would be about $75 today) for individuals to volunteer to participate in a research study about prison life. To ensure participants gave informed consent, volunteers were told about the general nature of the study and that during the study they might experience some violations of their personal privacy and civil rights and that the food they would receive might be minimal, although it would meet their basic nutritional needs. They all agreed to these provisions.

After extensive testing to screen out anyone with psychological problems or criminal backgrounds, 24 normal college-age men were selected from a group of nearly a hundred volunteers. Then, at random (by the flip of a coin), the men were divided into two groups of "prisoners" and "guards." Remember, Zimbardo's goal here was to separate internal, personality factors from the influence of the situation in determining behavior. Therefore, it was imperative for each group of participants, at the outset, to be as identical, on average, as possible (Zimbardo, 2005). Then all the participants went home, having received no instructions, no training, no preparation at all for what lay ahead.

Procedure

The goal of the study was to observe, record, and analyze the behavior of the prisoners and the guards. As mentioned, Zimbardo and his associates were looking for signs that the situations and roles into which these young men were placed would be strong enough to overcome their personal characteristics and behavioral tendencies as individuals.

The "Prisoners" Several days after the initial screening and selection, the participants assigned to the prisoner group were surprised at their homes on a Sunday morning by a knock on their door from an officer from the (real) Palo Alto Police Department. Each participant was "arrested" for armed robbery, searched, handcuffed, and whisked off to the station, sirens, lights, and all. Each prisoner was booked, fingerprinted, and thrown blindfolded into a

holding cell. Later, they were told that they were to be transported, still blindfolded, to the "Stanford County Jail" (this was the mock prison built in the psychology building basement).

When the prisoners arrived at the jail, the participants who were assigned to be guards proceeded to search (see Figure 37-2), strip, delouse (using an aerosol spray), and give each "inmate" a prison uniform consisting of a dress-like smock, each with a different four-digit number (these numbers would become the prisoners' names for the duration of the study), rubber sandals, a nylon stocking to wear over his hair at all times (to simulate head shaving, which occurs in most real prisons), and a chain wrapped around his ankle and padlocked (this was not attached to anything but was intended to serve as a reminder of prisoner status). Zimbardo pointed out that although these procedures varied from actual, real-life prison procedures, the idea behind them was to *simulate* the humiliation, repression, and entrapment inmates experience routinely in real prisons. The prisoners were assigned three to each small cell; each inmate had a cot with a thin mattress and one blanket. The three cots filled the space and there was virtually no extra room in the small cells.

The "Guards" Unlike the prisoners who were required to be in the prison 24/7 (they were incarcerated, after all), the guards worked 8-hour shifts, three men to a shift, and lived their normal lives when not on duty. They were given identical prison guard–style uniforms, nightsticks (although they were not allowed to strike prisoners), and reflective sunglasses designed to give them a menacing and anonymous appearance. Zimbardo explained that his idea for the mirrored sunglasses came from the 1967 film *Cool Hand Luke*, starring Paul Newman (Zimbardo, 2007). The guards received no

FIGURE 37-2 Stanford Prison "Guard" frisking new "Prisoner." (Zimbardo's Stanford prison experiment)

specific training for their roles, and were merely charged with the responsibility of keeping the prisoners in line and maintaining order in the prison.

RESULTS

This is one of the most researched, discussed, and analyzed studies in the history of psychology. The personality and behavioral changes that occurred in the guards and the prisoners were profound and alarming. To summarize the complex findings in the limited space available here, specific, representative behaviors of the participants are condensed in Table 37-1. More generally, however, here is what happened over the next several days in the "Stanford Prison."

Faster than anyone would have predicted, the true identities and personalities of the prisoners and guards seemed to vanish, and the roles they were being asked to play took over. Within a day the line between "play" and real life became disturbingly blurred. As Zimbardo wrote of the participants in his original study (1972):

> The majority had indeed become "prisoners" and "guards," no longer able to clearly differentiate between role playing and self. . . . In less than a week, the experience of imprisonment undid (temporarily) a lifetime of learning; human values were suspended, self-concepts were challenged and the ugliest, most base, pathological side of human nature surfaced. We were horrified because we saw some boys (guards) treat others as if they were despicable animals, taking pleasure in cruelty, while other boys (prisoners) became servile, dehumanized robots who thought only of escape, of their own individual survival and of their mounting hatred for the guards (p. 4).

Remember, this was a scientific study conducted by highly qualified, professional researchers, and it was rapidly taking on a life of its own. The participants, especially those given the role of prisoners, seemed to forget that they were college students with free will; they could have simply quit the study at any time, but they did not. After several days, many were pleading to be paroled, to be released, but when release was denied, they simply returned to their cells, dejected but obedient. The emotional breakdown and stress reactions of 5 of the prisoner-participants were so extreme that they became depressed, were unable to think clearly, and stopped eating, They had to be released from the study (or perhaps, more appropriately, from *the prison*) within the study's first several days.

Some of the guards took to tormenting the prisoners, apparently enjoying the power of their positions. Some of the guards were less strict and tried to be fair, but they never interfered with the more tyrannical guards and, more importantly, never went to the experimenters to suggest that the other guards might be "over the top" in their roles. Even Zimbardo himself forgot, at times, that he was in charge of a scientific study and found himself slipping into the role of "prison superintendent."

TABLE 37-1 "Prisoner" and "Guard" Behaviors and Reactions During the "Stanford Prison" Study

THE "GUARDS"	THE "PRISONERS"
Used demeaning, degrading language with prisoners; harassed and intimidated them	Quickly became docile, subservient, and conformed to the rules set by the guards
Made humiliating comments to prisoners (e.g., "Prisoner 2354, go over and tell prisoner 2578 that you love him.")	Showed clear and early signs of trauma and depression, including crying and profound depression
Raucously awakened all prisoners in the middle of the night (every night) for "inmate counts"	Begged to be paroled
Frequently used push-ups as punishment for minor offenses (One guard stepped on a prisoner's back as he was attempting to carry out the push-up punishment.) Appeared to enjoy their sadistic control over the prisoners	Agreed to forfeit all payment in exchange for release
Shot a fire extinguisher (ice-cold CO_2) at prisoners to quell a rebellion	Experienced uncontrollable crying and rage and disorganized thinking
Placed prisoners in solitary confinement for entire nights Made visiting the bathroom a privilege, at times denying visits and placing a waste bucket in their cell	Planned and staged a "rebellion" that involved removing stocking caps, tearing off uniform numbers, barricading the cells with beds, and cursing and taunting the guards
Positioned an informant (a confederate of the experimenters) in the cells to spy on prisoners for signs of escape or rebellion plans	Designed an elaborate escape plan that never materialized
Stripped prisoners naked to achieve order following exposed escape plan; removed prisoners' beds and forced prisoners to give up blankets	Eventually gave up all attempts at rebellion and solidarity.
Allowed "privileges" (better food, teeth brushing, washing, etc.) to prisoners at random in an effort to divide and conquer and to break prisoner camaraderie, trust, and solidarity	Assumed an every-man-for-himself attitude, abandoning solidarity with other prisoners
Forced prisoners to clean toilets with their bare hands, extended "night counts" to several hours long, increased number of push-ups: all as punishment for the attempted escape	Docilely accepted with increasing hopelessness the guards' degrading and sadistic treatment of them as the study progressed
Were creative and inventive in finding ways of breaking the prisoners' spirit	After 6 days, all became completely passive and dehumanized, robotlike

(Haney et al., 1973; Zimbardo, 1972; Zimbardo, 2005; Zimbardo, 2007b.)

RECENT APPLICATIONS

As is true of Milgram's study of obedience (see Reading 40) Zimbardo's prison study has generated sweeping social and political effects over the 30-plus intervening years. It is difficult if not impossible to discuss Zimbardo's findings without

acknowledging the political nature of the research. One of the most controversial and heated issues facing the United States, and most countries worldwide, is prison reform. Throughout history, the systematic abuse of prisoners has been well documented and continues to this day. The headline history in the United States of prison riots, uprisings, rebellions, kidnappings, and murders from the time of Zimbardo's study to the present is filled with parallels, on a larger scale, to the events in that basement at Stanford. To aggravate further the potential for prisoner abuse, the number of inmates in U.S. prisons and jails grew from approximately 500,000 in 1980 to over 2.2 million in 2006 (Bureau of Justice Statistics, 2007). This is the highest prisoner population of any country in the world. Moreover, since the mid-1970s the goal of rehabilitation in prisons has been generally abandoned (although the phrase *correctional facilities* is still in wide use) and replaced with the goals of punishment and removing offenders from the public (referred to as *incapacitation*). In 1998, Zimbardo and Haney analyzed how the prison system had changed since their study at Stanford. Here, in Zimbardo's words are their conclusion at that time:

> Prisons continue to be failed social experiments using a dispositional [internal] model of punishment, and isolation of offenders rather than any basic rehabilitation practices that might reduce persistently high rates of recidivism. What our analysis revealed was that prison conditions had significantly worsened in the decades since our study as a consequence of the politicization of prisons, with politicians, prosecutors, DAs, and other officials taking a hard line on crime as a means of currying favor of an electorate made fearful of crime by media exaggerations. (Zimbardo, 2005)

As you have been reading this, you may have been thinking about the possible links between Zimbardo's prison study and the events that have occurred, and are occurring, in the war in Iraq and the subsequent U.S. occupation of that country. Several highly publicized events, especially the prisoner abuse scandals at Abu Ghraib Prison in Iraq and the reports of detainee abuse at the Guantanamo detention camp in Cuba (see Hooks & Mosher, 2005; Keller, 200), have brought the "Stanford Prison Study" back into the spotlight. Zimbardo, in his recent book *The Lucifer Effect: Understanding How Good People Turn Evil* (2007a), has revisited the prison study and expanded his research and commentary on prisoner abuse beyond prisons to the larger concept of human evil. We are disbelieving that events such as Abu Ghraib could ever truly happen—that anyone, especially citizens of a free, democratic society, could have engaged in such sadistic treatment of other humans. How could this be? Psychologists, such as Zimbardo, and other social scientists, have tried to help us understand; as the authors of one study about these abuses stated:

> Journalists have looked to social scientific research to understand the abuse in Iraq, Afghanistan and around the world. These accounts move away from an emphasis on a few "bad apples" and call into question an emphasis on punishing the lowest ranking soldiers. Zimbardo's (1972) research figures prominently in these accounts. He rejects out of hand the "bad apple" thesis, suggesting instead that the barrel is bad. Zimbardo faulted the Bush administration with a

> "failure of leadership" and emphasized that the abusive interrogation techniques and harsh treatment of prisoners were "authorized from the top down" by military commanders and by the highest-ranking officials in the Bush administration. (Hooks & Mosher, 2005, pp. 1632–1633)

In report after report from Iraq, Afghanistan, and Guantanamo, we have heard about and seen in graphic detail the horrendous abuses and torture of prisoners carried out by guards and interrogators, who, like Zimbardo's prison participants are not, by all accounts, sadistic, brutal people. They are essentially normal people, perhaps not so different from you and me, who are drastically transformed by what may ultimately be the most powerful situational force of all for evil: war.

CONCLUSION

As mentioned, Zimbardo had planned for a 2-week study, yet he decided to call it off after only 6 days because the mock prison situation was so powerful that it had morphed, in alarming ways, into reality. These were no longer randomly assigned university students and experimenters; they had become their roles, had transformed into prisoners, guards, and wardens. These roles were so powerful that individual identities dissolved to the point that the participants, and even the experimenters, had difficulty realizing just how dangerous the behaviors in the "Stanford Prison" had become. Zimbardo wrote about his decision to halt the study as follows:

> I terminated the experiment not only because of the escalating level of violence and degradation by the "guards" against the "prisoners" . . . but also because I was made aware of the personal transformation that I was undergoing personally. . . . I had become a Prison Superintendent, the second role I played in addition to that of Principal Investigator. I began to talk, walk and act like a rigid institutional authority figure more concerned about the security of "my prison" than the needs of the young men entrusted to my care as a psychological researcher. In a sense, I consider that the most profound measure of the power of this situation was the extent to which it transformed me. (Zimbardo, 2005, p. 40; see also, Zimbardo, Maslach, & Haney, 1999).

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