

**CASE STUDY****7****Self-Hypnosis**

**Directions:** Read the following case study, then answer the questions that follow.

**Background**

What happens when traditional medicine fails to provide relief from chronic pain? Chronic pain is long-term pain from a known or unknown source that cannot be relieved through surgery or physical therapy. Millions of Americans suffer from chronic pain at some period in their lives. Traditional medicine has treated such pain with medications and selected exercises. Statistics show that 40 percent of the people who are prescribed medication for chronic pain will abuse their medication. Society, including those in the medical profession, is exploring alternative treatments that may prove as effective, and perhaps more effective, than traditional medical treatments.

**Case Report**

A woman in her late 40s was injured in a car accident. Her most serious injury was a compression fracture of her spine. The fracture and accompanying muscle spasms resulted in severe and continuous pain. No type of surgery could relieve her pain, so doctors gave her a series of pain medications, nerve blocks, and anesthetics. These procedures managed the pain, but had unpleasant side effects.

Two years later, the woman was in another car accident. This time, in addition to cuts and bruises, she fractured her breastbone, one rib, and a foot. After this accident, her pain worsened and she had difficulty completing simple tasks such as combing her hair and dressing herself. She was unable to work. She also experienced additional health problems in the next several months.

The pain, frustration over her limitations, and uncertainty about the future left her depressed. Over the next six months, she visited several doctors at several clinics seeking help. Doctors prescribed 13 different medications at various times to either manage her pain or affect her mood. The drugs included Darvocet, a pow-

erful pain reliever, and Valium, a drug commonly prescribed to treat anxiety. None of these drugs proved helpful; the many side effects actually made the problems worse.

When she entered the Behavioral Medicine Clinic, she walked with a cane, had limited movement in her head and neck, and continued to be depressed. Since she had received little relief from traditional medical treatments, she had begun to study the principles of self-hypnosis from library books. She slowly learned how to manage her pain through a self-induced state of hypnosis. While seated, she would close her eyes and visualize her pain as a lake. She became progressively more relaxed by continuing to use mental imagery to reduce the size of the lake. She used these techniques to make the pain more manageable and to deal with her anxiety over the exercises physical therapists asked her to do. The doctors at the Behavioral Medicine Clinic encouraged her to continue with the self-hypnosis on a daily basis, to be as physically active as possible, and to try to live without pain medications.

Within seven months, she:

- was nearly free of all pain
- was not taking any pain medications
- had increased her physical activity and was walking without the cane
- had returned to work part-time
- was no longer suffering from depression

**Conclusions**

Cases such as the one described here are helping to shift the focus of the medical community toward a biopsychosocial approach to the treatment of pain. This approach combines traditional medical treatments with psychological and social approaches to treatment. The most common alternative treatments are group therapy, relaxation therapy, biofeedback, guided imagery, and hypnosis.

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The National Institutes of Health support these alternative treatments, especially relaxation therapy and hypnosis, for chronic pain sufferers. Several studies over the past 30 years indicate that hypnosis is especially effective at controlling both acute and chronic pain and at relieving the accompanying depression.

Self-hypnosis is the technique preferred by many physicians and psychologists. It allows the

patient more control and responsibility. It also lessens the chance that the physician or psychologist will be seen as a manipulator.

Source: Mickelson, C., Brende, J., & Gonzalez, J. (1999). What if your patient prefers an alternative pain control method: Self-hypnosis in the control of pain. *Southern Medical Journal*, 92 (5), 521-23.

## ☐ Understanding the Case Study

Directions: Answer the following questions in the space provided.

1. What is chronic pain?

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2. Why did the woman in the case study learn self-hypnosis?

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3. What imagery did she use for her pain?

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4. How did she use this image to reduce her pain level?

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5. What types of treatment are combined in the biopsychosocial approach to pain management?

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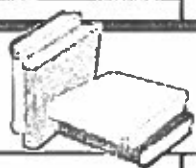
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## ☐ Thinking Critically

Directions: Answer the following questions on a separate sheet of paper.

6. Why do you think self-hypnosis relieved pain when all the other treatments failed in this instance?
7. If given the option of hypnosis or self-hypnosis to manage pain, which would you prefer? Why?

## READING



## 8

**Weightlessness  
and Perception**

**Directions:** Read the following selection, then answer the questions that follow.

In the second half of the 20th century space travel became a reality. Until the first space travelers braved the unknown, scientists and doctors could only speculate on how the human body would react to weightlessness. Some of their speculations proved true, such as space motion sickness that is commonly experienced by space travelers at the beginning of a flight. Others proved false. One thing has become quite clear—the body can adapt to weightlessness and then readjust to gravity. Researchers are attempting to use what has been learned in space to treat people on Earth with problems such as balance disorders.

... As most doctors can attest, it is difficult to predict what will happen when a brand-new challenge is presented to the human body. Time and again, space travel has revealed its marvelous and sometimes subtle adaptive ability. But only in the past few years have scientists begun to understand the body's responses to weightlessness, as the data—the cumulative experience of nearly 700 people spending a total of 58 person-years in space—have grown in quantity and quality. Pursuit of this knowledge is improving health care not only for those who journey into space but also for those of us stuck on the ground. The unexpected outcome of space medicine has been an enhanced understanding of how the human body works right here on Earth.

**Feeling Gravity's Pull**

Although many factors affect human health during spaceflight, weightlessness is the dominant and single most important one. The direct and indirect effects of weightlessness precipitate a cascade of interrelated responses that begin in three different types of tissue: gravity receptors, fluids and weight-bearing structures. Ultimately, the whole body, from bones to brain, reacts.

When space travelers grasp the wall of their spacecraft and pull and push their bodies back and forth, they say it feels as though they are stationary and the spacecraft is moving. The reason is embedded in our dependence on gravity for perceptual information.

The continuous and pervasive nature of gravity removes it from our daily consciousness. But even though we are only reminded of gravity's invisible hand from time to time by, say, varicose veins or an occasional lightheadedness on standing up, our bodies never forget. Whether we realize it or not, we have evolved a large number of silent, automatic reactions to cope with the constant stress of living in a downward-pulling world. Only when we decrease or increase the

effective force of gravity on our bodies do we consciously perceive it. Otherwise our perception is indirect.

Our senses provide accurate information about the location of our center of mass and the relative positions of our body parts. This capability integrates signals from our eyes and ears with other information from the vestibular organs in our inner ear, from our muscles and joints, and from our senses of touch and pressure. Many of these signals are dependent on the size and direction of the constant terrestrial gravitational force.

The vestibular apparatus in the inner ear has two distinct components: the semicircular canals (three mutually perpendicular, fluid-filled tubes that contain hair cells connected to nerve fibers), which are sensitive to angular acceleration of the head; and the otolith organs (two sacs filled with calcium carbonate crystals embedded in a gel), which respond to linear acceleration. Because movement of the crystals in the otoliths generates the signal of acceleration to the brain and because the laws of physics relate that acceleration to a net force, gravity is always implicit in the signal. Thus, the otoliths have been referred to as gravity receptors. They are not the only ones. Mechanical receptors in the muscles, tendons and joints—as well as pressure receptors in the skin, particularly on the bottom of the feet—respond to the weight of limb segments and other body parts.

Removing gravity transforms these signals. The otoliths no longer perceive a downward bias to head movements. The limbs no longer have weight, so muscles are no longer required to contract and relax in the usual way to maintain posture and bring about movement. Touch and pressure receptors in the feet and ankles no longer signal the direction of down. These and other changes contribute to visual-orientation illusions and feelings of self-inversion, such as the feeling that the body or the spacecraft spontaneously reori-

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ents. In 1961 cosmonaut Gherman Titov reported vivid sensations of being upside down early in a space-flight of only one day. Last year shuttle payload specialist Byron K. Lichtenberg, commenting on his earlier flight experiences, said, "When the main engines cut off, I immediately felt as though we had flipped 180 degrees." Such illusions can recur even after some time in space.

The lack of other critical sensory cues also confuses the brain. Although orbital flight is a perpetual free fall—the only difference from skydiving is that the spacecraft's forward velocity carries it around the curve of the planet—space travelers say they do not feel as if they are falling. The perception of falling probably depends on visual and airflow cues along with information from the direct gravity receptors. . . .

The aggregate of signal changes produces, in half or more of space travelers, a motion sickness that features many of the symptoms of terrestrial motion sickness: headache, impaired concentration, loss of appetite, stomach awareness, vomiting. Space motion sickness usually does not last beyond the first three days or so of weightlessness, but something similar has been reported by cosmonauts at the end of long flights.

At one time, scientists attributed space motion sickness to the unusual pattern of vestibular activity, which conflicts with the brain's expectations. Now it is clear that this explanation was simplistic. The sickness results from the convergence of a variety of factors, including the alteration of the patterns and levels of motor activity necessary to control the head itself. A similar motion sickness can also be elicited by computer systems designed to create virtual environments, through which one can navigate without the forces and sensory patterns present during real motion [Gibbs, W. W. (1994, December). Virtual reality check, *Scientific American*.]

Over time, the brain adapts to the new signals, and for some space travelers, "down" becomes simply where the feet are. The adaptation probably involves physiological changes in both receptors and nerve-cell patterns. Similar changes occur on the ground during our growth and maturation and during periods of major body-weight changes. The way we control our balance and avoid falls is an important and poorly understood part of physiology. Because otherwise healthy people returning from space initially have difficulty maintaining their balance but recover this sense rapidly, post-flight studies may allow doctors to help those non-space travelers who suffer a loss of balance on Earth.

Bernard Cohen of the Mount Sinai School of Medicine and Gilles Clement of the National Center for Scientific Research in Paris undertook just such a study after the Neurolab shuttle mission, which ended on May 3, [1998]. To connect this work with patients

suffering from balance disorders, Barry W. Peterson of Northwestern University and a team of researchers, supported by the National Aeronautics and Space Administration and the National Institutes of Health, are creating the first whole-body computer model of human posture and balance control. . . .

## Down to Earth

When space travelers return to the world of weight, complementary changes occur. If the effects of weightlessness are completely reversible, everything should return to its normal condition at some time after the flight. We now know that most systems in the body do work reversibly, at least over the intervals for which we have data. We do not yet know whether this is a general rule.

Space travelers certainly feel gravitationally challenged during and just after their descent. As one person said after nine days in space: "It's quite a shock. The first time I pushed myself up, I felt like I was lifting three times my weight." Returning space travelers report experiencing a variety of illusions—for example, during head motion it is their surroundings that seem to be moving—and they wobble while trying to stand straight, whether their eyes are open or closed.

Most of the body's systems return to normal within a few days or weeks of landing, with the possible exception of the musculoskeletal system. So far nothing indicates that humans cannot live and work in space for long periods and return to Earth to lead normal lives. This is clearly good news for denizens of the upcoming International Space Station and for any future interplanetary missions. In fact, the station, assembly of which should begin late this year or early next year, will provide researchers with a new opportunity to investigate the effects of space travel on humans. On its completion in five years, the station will have 46,000 cubic feet of work space (nearly five times more than the Mir or Skylab stations) and will include sophisticated laboratory equipment for the next generation of medical studies. Recognizing the need for a comprehensive attack on all the potential human risks of long-duration space travel, NASA has selected and funded a special research body, the National Space Biomedical Research Institute, to assist in defining and responding to those risks.

Many of the "normal" changes that take place in healthy people during or just after spaceflight are outwardly similar to "abnormal" events occurring in ill people on Earth. For example, most space travelers cannot stand quietly for 10 minutes just after landing without feeling faint. This so-called orthostatic intolerance is also experienced by patients who have stayed in bed for a long time and by some elderly people.

Source: White, R.J. (1998). Weightlessness and the human body *Scientific American*, 279 (3), 58–63.

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☐ **Understanding the Reading**

Directions: Answer the following questions in the space provided.

1. What is the primary effect on the human body during spaceflight?

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2. What structures of the inner ear are sensitive to side to side movement of the head?

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3. What structures of the inner ear are sensitive to forward motion of the head?

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4. What is the difference in perception between skydiving and spaceflight?

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5. What Earth-based activity may create motion sickness similar to that experienced during spaceflight?

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6. What immediate effect of gravity do space travelers experience when they return to Earth?

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☐ **Thinking Critically**

Directions: Answer the following questions on a separate sheet of paper.

7. Imagine that a recent editorial published in the leading newspaper in your community stated "We have only limited funds. Research dollars should be spent helping people here on Earth, not sending people into outer space." Write a rebuttal of this statement.
8. What would a typical day be like if you could not distinguish which way was up and which was down?

**CASE STUDY****8****Perfect Pitch**

**Directions:** Read the following case study, then answer the questions that follow.

**Background**

About 1 in 2,000 people have perfect pitch. People with perfect pitch can hear a single note and name it or can sing the exact tone of a note each time without hearing any other tone for a reference. People with perfect pitch know that fluorescent lights hum in B-flat and toilets flush in E-flat. Although more musicians have perfect pitch than the general population, it is still a relatively rare talent. Musicians who do not have perfect pitch develop a keen sense of relative pitch. That is, they can sing a note if given another note as a reference.

**Hypothesis**

Perfect pitch is an inherited trait that must be nurtured and developed in order to survive.

**Method and Results**

Researchers have developed two theories about the influence of heredity. First, researchers at the University of Southern California at San Diego theorized that all infants are born with perfect pitch. They reached this conclusion by studying a sample of native Vietnamese and Chinese speakers. Both of these languages are tonal languages; that is, the same word may have several meanings depending on the tone used when the word is spoken. (Note: Tonal languages are not based on the sounds of an alphabet. There is no relationship between the way a word is written and the way the word is spoken. For example, all Chinese writing uses the same characters, but the two Chinese dialects, Mandarin and Cantonese, are so different that speakers of each language cannot understand one another.) Researchers found that all the people in their sample had perfect pitch. They concluded that perfect pitch is innate, and when nurtured will survive.

The second theory proposed that perfect pitch is an inherited trait; that is some, people inherit perfect pitch while others do not. Although the trait may be inherited, it must be



nurtured in order to develop. Researchers at the University of California at San Francisco have proposed this theory. They sampled people from all walks of life using 40 pure tones. The participants wrote down the note that corresponded to the tone. In order to be classified as having perfect pitch, participants had to get 38 or more notes correct. Once researchers identified people with perfect pitch, they asked for a blood sample and asked if other family members share this trait.

Using neurobiology, researchers hoped to identify the specific gene and DNA sequence responsible for perfect pitch. To date, most genetic research has been targeted at identifying hereditary factors for certain diseases. Researchers believe that it is time to use the knowledge gained to identify other traits, such as perfect pitch.

Researchers have already identified that perfect pitch does seem to run in families. About 48 percent of the participants with perfect pitch reported that they had one or more family members with the same talent. One of the scientists involved in the research, Shai Shaham, has perfect pitch. This is an ability he shares with his father, sister, and younger brother.

The researchers are particularly interested in one ethnic group that has a high incidence of

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perfect pitch—the Ashkenazi Jews of Eastern Europe. For several centuries this relatively small group married primarily within their ethnic group. As a result their gene pool is considered homogeneous. Ashkenazi Jews who have or had perfect pitch are the late pianist Vladimir Horowitz, Metropolitan Opera’s artistic director James Levine, and the San Francisco Symphony’s music director, Michael Tilson Thomas. By concentrating on one ethnic group, researchers hoped to quickly narrow the search for the tell-tale DNA.

Researchers also asked participants a second question: Did you study music as a young child? The findings indicated that early music training is essential to maintaining one’s perfect pitch ability. Most participants who have perfect pitch began music lessons by the age of 6. Researchers found that only 2 percent of those with perfect pitch began music training after the age of 12. These findings led researchers to conclude that the ability to perceive pitch perfectly is inherit-

ed, but the ability must be nurtured through exposure to music and music education.

## Conclusions

Researchers still do not fully understand how we perceive the world. As science and technology develop, they hope to be able to clearly identify which perceptual traits and abilities are inherited and which are learned. The most conclusive research to date indicates that perfect pitch does have an inherited component. The sample of tonal language speakers was too small to conclude that perfect pitch is an innate ability.

Even if perfect pitch is inherited, it seems apparent that the ability must be nurtured and developed. Most educators would not recommend forcing children to take music lessons at a very young age, but they do recommend exposing children to music, especially classical music.

Sources: Dickinson, A. (1999). Little musicians. *Time*, 154 (24), 114; Krieger, L. (1997). Perfect pitch: Nature or nurture. *San Francisco Examiner*, A15.

## ☐ Understanding the Case Study

Directions: Answer the following questions on a separate sheet of paper.

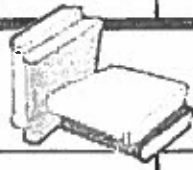
1. What is perfect pitch?
2. What was the researchers’ hypothesis?
3. Who did the researchers in San Diego use as participants? Why were these participants used?
4. What did the researchers find with the sample of people who spoke a tonal language?
5. What did the researchers at the University of San Francisco use to test for perfect pitch?
6. What did the San Francisco researchers conclude about nature versus nurture as it relates to perfect pitch?

## ☐ Thinking Critically

Directions: Answer the following questions on a separate sheet of paper.

7. Do you think that all speakers of tonal languages have perfect pitch? How would you test your hypothesis?
8. What other perceptual abilities may have an inherited and a learned component?

## READING



## 9

## Different Outlooks

Directions: Read the following selection, then answer the questions that follow.

Cognitive learning theorists have identified that optimists and pessimists process information differently. Many studies have shown that optimists are healthier, get better jobs, advance more quickly in their careers, are better athletes, and may live longer. Optimists are less likely to succumb to helplessness, even when encountering numerous bad events beyond their control.

*Learned helplessness* is the giving-up reaction, the quitting response that follows from the belief that whatever you do doesn't matter. *Explanatory style* is the manner in which you habitually explain to yourself why events happen. It is the great modulator of learned helplessness. An optimistic explanatory style stops helplessness, whereas a pessimistic explanatory style spreads helplessness. Your way of explaining events to yourself determines how helpless you can become, or how energized, when you encounter the everyday setbacks as well as momentous defeats. . . .

How do *you* think about the causes of the misfortunes, small and large, that befall you? Some people, the ones who give up easily, habitually say of their misfortune: "It's me, it's going to last forever, it's going to undermine everything I do." Others, those who resist giving in to misfortune, say: "It was just circumstances, it's going away quickly anyway, and, besides, there's much more in life."

Your habitual way of explaining bad events, your explanatory style, is more than just the words you mouth when you fail. It is a habit of thought, learned in childhood and adolescence. Your explanatory style stems directly from your view of your place in the world—whether you think you are valuable and deserving, or worthless and hopeless. It is the hallmark of whether you are an optimist or a pessimist.

There are three crucial dimensions to your explanatory style: permanence, pervasiveness, and personalization.

### Permanence

People who give up easily believe the causes of bad events that happen to them are permanent: the bad events will persist, will always be there to affect their lives. People who resist helplessness believe the causes of bad events are temporary.

#### PERMANENT (*Pessimistic*)

"I'm all washed up."

"Diets never work."

"You will always nag."

#### TEMPORARY (*Optimistic*)

"I'm exhausted."

"Diets don't work when you eat out."

"You nag when I don't clean my room."

. . . If you think about bad things in *always's* and *never's* and abiding traits, you have a permanent, pessimistic style. If you think in *sometimes's* and *lately's*, if you use qualifiers and blame bad events on transient conditions, you have an optimistic style. . . .

The *optimistic style of explaining good events is just the opposite of the optimistic style of explaining bad events*. People who believe good events have permanent causes are more optimistic than people who believe they have temporary causes.

#### TEMPORARY (*Pessimistic*)

"It's my lucky day."

"I try hard."

"My rival got tired."

#### PERMANENT (*Optimistic*)

"I'm always lucky."

"I'm talented."

"My rival is no good."

Optimistic people explain good events to themselves in terms of permanent causes: traits, abilities, *always's*. Pessimists name transient causes: moods, effort, *sometimes's*. . . .

People who believe good events have permanent causes try even harder after they succeed. People who see temporary reasons for good events may give up even when they succeed, believing success was a fluke.



### **Pervasiveness: Specific vs. Universal**

Permanence is about time. Pervasiveness is about space. . . .

It comes down to this: people who make universal explanations for their failures give up on everything when a failure strikes in one area. People who make specific explanations may become hopeless in that one part of their lives yet march stalwartly on in the others.

Here are some universal and some specific explanations of bad events:

#### **UNIVERSAL (*Pessimistic*)**

"All teachers are unfair."  
"I'm repulsive."  
"Books are useless."

#### **SPECIFIC (*Optimistic*)**

"Professor Seligman is unfair."  
"I'm repulsive to him."  
"This book is useless."

. . . Now for the converse. The *optimistic explanatory style for good events is opposite that for bad events*. The optimist believes that events have specific causes, while good events will enhance everything he does; the pessimist believes that bad events have universal causes and that good events are caused by specific factors. . . .

#### **SPECIFIC (*Pessimistic*)**

"I'm smart at math."  
"My broker knows oil stocks."  
"I was charming to her."

#### **UNIVERSAL (*Optimistic*)**

"I'm smart."  
"My broker knows Wall Street."  
"I was charming."

### **Personalization: Internal vs. External**

When bad things happen, we can blame ourselves (internalize) or we can blame other people or circumstances (externalize). People who blame themselves when they fail have no self-esteem as a consequence. They think they are worthless, talentless, and unlovable. People who blame external events do not lose self-esteem when bad events strike. On the whole, they like

themselves better than people who blame themselves do.

Low self-esteem usually comes from internal style for bad events.

#### **INTERNAL (*Low self-esteem*)**

"I'm stupid."  
"I have no talent at poker."  
"I'm insecure."

#### **EXTERNAL (*High self-esteem*)**

"You're stupid."  
"I have no luck at poker."  
"I grew up in poverty."

. . . Of the three dimensions of explanatory style, personalization is the easiest to understand. After all, one of the first things a child learns to say is "He did it, not me!"

Personalization is also the easiest dimension to overrate. It controls only how you *feel* about yourself, but pervasiveness and permanence—the more important dimensions—control what you *do*: how long you are helpless and across how many situations.

Personalization is the only dimension simple to fake. If I tell you to talk about your troubles in an external way now, you will be able to do it—even if you are a chronic internalizer. You can chatter along, pretending to blame your troubles on others. However, if you are a pessimist and I tell you to talk about your troubles as having temporary and specific causes, you will not be able to do it. . . .

The *optimistic style of explaining good events is the opposite of that used for bad events. It's internal rather than external*. People who believe they cause good things tend to like themselves better than people who believe good things come from other people or circumstances.

#### **EXTERNAL (*Low self-esteem*)**

"A stroke of luck. . ."  
"My teammates' skill. . ."

#### **INTERNAL (*High self-esteem*)**

"I can take advantage of luck."  
"My skill. . ."

Source: Seligman, M.E.P. (1991). *Learned Optimism*. New York: Alfred A. Knopf, 15–16, 43–50.

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☐ **Understanding the Reading**

Directions: Answer the following questions in the space provided.

1. What are the two explanatory styles?

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2. When do you develop your explanatory style?

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3. What are the three dimensions of the explanatory style?

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4. Which of the dimensions controls what you do?

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☐ **Thinking Critically**

Directions: Answer the following questions in the space provided.

5. List three good events and three bad events that have occurred in your life in the past month. Describe your reactions to the events. Classify each description using the three dimensions listed in the reading. From these results, do you tend to be an optimist or a pessimist?

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6. Does being an optimist mean that you always blame others for your troubles? Explain your reasoning.

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**CASE STUDY****9****Conditioning Aggression**

**Directions:** Read the following case study, then answer the questions that follow.

Male blue gourami fish establish territories that contain good nesting sites. Once established, males defend their sites by biting and tail beating rivals who enter their territory. The loser of the fight displays recognizable submission. The submissive posture includes folded fins, faded color, and a more horizontal body angle.

Karen Hollis and a group of researchers set out to answer the question: Are conditioned fish more likely to continue winning even when the conditioned stimulus is not present?

Thirty-six adult male blue gouramis were used. The researchers divided the aquariums into three sections (left, right, and center) using two acrylic panels, one opaque and one transparent, that could be raised and lowered (see diagram below). Researchers placed 36 fish in the left and right compartments. Throughout the study, they remained either on the left or the right, even when moved to other aquariums.

The center compartments contained stimulus fish during the training phase. The stimulus

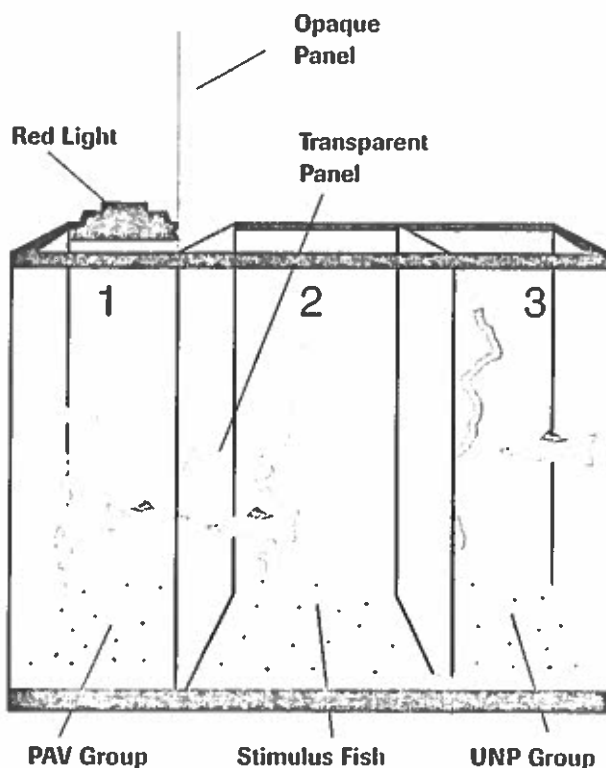
fish served as the unconditioned stimulus since the sight of another male fish causes the blue gourami to defend his territory. Training occurred over 24 days. The researchers divided the 36 fish into two groups. Each fish in the Pavlovian-conditioned group (PAV) was conditioned using a red light (conditioned stimulus) paired with the presentation of a stimulus fish (unconditioned stimulus).

Although the fish in the unconditioned group (UNP) saw both the red light and the stimulus fish during training, the light and stimulus fish were never presented together. Therefore, no conditioning occurred.

After training, researchers conducted a two-part contest. In the first part of the contest, researchers paired some of the PAV with UNP. The PAV were presented with the red light immediately before the contest. They won 80 percent of the contests against their UNP counterparts. In the second part of the contest, Pavlovian-conditioned fish encountered each other; however, researchers presented some with the red light (PAV-L) immediately before the contest and others with no light (PAV-NL). PAV-L won all of the contests against the PAV-NL.

After two days of rest, the winners and losers faced another contest, this time with a different male fish. All of the Pavlovian-conditioned fish that won their first encounter also won their second contest.

The findings indicate that conditioned males were better able to vigorously defend their territories. While the exact physiological mechanism is unknown, it appears that Pavlovian-conditioned males had a competitive advantage. The long-term consequences of conditioning seem also to be positive since it appears that winning previous contests sets the stage for winning future contests. The results seem to indicate that the winners continue to win.



Source: Hollis, Karen, et al. (1995). Pavlovian conditioning of aggressive behavior in blue gourami fish (*Trichogaster trichopterus*). Winners become winners and losers stay losers. *Journal of Comparative Psychology*, 109 (2), 123-33.

☐ **Understanding the Case Study**

**Directions:** Answer the following questions in the space provided.

1. For what purpose do male blue gourami fish establish territories?

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2. What was the unconditioned stimulus and conditioned stimulus in this study?

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3. In the first contest, how were the contest pairings set up?

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4. In the second contest, what percentage of losers from Contest 1 defeated a winner from Contest 1?

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☐ **Thinking Critically**

**Directions:** Answer the following questions in the space provided.

5. Why do you think that Pavlovian-conditioned fish that were not shown the light (PAV-NL) performed more poorly than the unconditioned fish (UNP) when facing PAV-L fish?

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6. Would conditioning aggressiveness in other types of animals or humans show similar results? Explain your answer.

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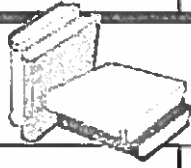
7. In addition to conditioning, what other explanations are possible for the finding that winners keep winning?

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## READING



## 10

Remembering  
Details

**Directions:** Read the following selection, then answer the questions that follow.

Have you ever been surprised to find that you have completely forgotten an event that someone else remembers vividly? Some theories of memory assume that our brain keeps a record of everything that we have encountered. Other theories propose that the brain does not keep a permanent record of everything. Some things are completely erased, while others are stored in such a way that some effort is required to retrieve them.

"What do you mean, you don't remember?  
That was the party where John made such a fool  
of himself; he actually tried to eat the artificial ivy."  
"Was that the same party where he tried to  
put the poodle in the punch bowl?"  
"No, No. Not that one. That was years ago.  
You mean you really don't remember?"

A fascinating article on remembering by a University of Utah psychologist, Marigold Litton, begins with these "memories." Litton had always been interested in studying people's ability to remember events that had occurred in their lives. When she began this work, her first question was "Where can I find some people who will be available for long periods of time, who are reliable, who won't move away, who won't get bored with the study, and whom I could conveniently follow on a regular basis?" The only person she could find who satisfied all of these criteria was herself. She would be the sole subject.

Every day for the six-year period from 1972 until 1977, she wrote down what happened to her. Each memory was recorded on a separate card in the form of a brief description, such as "I have dinner at the Canton Kitchen; delicious lobster dish," or "I land at Orly Airport in Paris." On the back of each card she wrote the date for each event, and then gave it a rating in terms of how important, emotional, or surprising the event was. By 1977 she had written down descriptions of more than five thousand items.

Every month she tested her memory. She picked about 15 cards at random from the file and read the descriptions. Each item could be anywhere from one day to six years old, and for each she tried to remember as quickly as possible when the event had occurred. Linton reasoned that the more information she had about an event and its context, the more accurately it could be dated. Each month she spent from eight to twelve hours testing her memory in this way.

Linton learned some interesting things about her own memory. After about six months of studying herself, she found she would typically be quite depressed after each test session. The reason was that her general procedure was to "warm up" before each test by simply thinking over the highlights of her life over the previous year. During these warm-up exercises, she usually thought of happy times—friends, successes, a good life. But when she started pulling the individual events from her file box, she discovered that the cards contained not only happy memories but also numerous irritations: Her car breaks down and she can't find anyone to help; she fights with a lover; she gets a paper rejected by a scientific journal. Once she realized the source of stress, it seemed to help reduce it.

After six years of studying her memory, she transferred all the information to special computer cards and fed them to a computer. The computer analyses revealed that by the end of any one year, she had forgotten 1 percent of the items written during that year. By the time those items were about two years old, she had forgotten about 5 percent more. Forgetting continued so that by the time the study ended, she had forgotten over 400 items of the 1,350 she wrote down for 1972, or about 30 percent. In general she seemed to forget things at a low, fairly steady rate, with the numbers of forgotten items usually increasing slightly from year to year.

What kinds of things did she remember? Most of the memories were fairly unique, nonrepeated events, like a traffic accident, or surprising events, like a tennis game in which one of the players was injured. It was pretty easy to supply a date for "the tennis game in which Ed got hit in the eye." However, she could not remember the names of the other players in the game. Assuming that Linton's memory processes are like most of ours, this suggests that people remember general information for some time, but that many details drop out.

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Overall, Linton's results suggest that specific memories are regularly dropping out. They are not locked in memory for all time, unless they are repeated or relived or unless they are unusually significant. Despite these apparent losses, all is not gloomy. After several phone calls from the same person, it may not be possible to remember any one conversation or even when it took place. But it becomes easier and easier to

identify and remember the person's voice. This means that even though specific events are forgotten, considerable knowledge is retained. The mind, Linton thought, undergoes a spring cleaning.

Source: Loftus, E. (1980). *Memory*. Reading, MA: Addison-Wesley, 121-123.

### ☐ Understanding the Reading

Directions: Answer the following questions in the space provided.

1. Initially what happened to Marigold Litton after each test session?

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2. Why did the memory tests have this effect?

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3. At the end of the test in 1977, how much of 1972's memories had she forgotten?

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4. What types of memories tended to be long-lasting?

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5. Why do routine events tend to fade from memory over time?

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### ☐ Thinking Critically

Directions: Answer the following questions on a separate sheet of paper.

6. Complete the sentence below with a routine response and with a surprising response. If each event occurred, which would you be more likely to remember two years from now?

"I was riding the bus with a friend who suddenly..."

7. If you were to conduct a study of your own memory, would you use Litton's method? Why or why not?
8. What potential problem could mar the accuracy of Litton's study?

**CASE STUDY****10****Eyewitness  
Testimony**

**Directions:** Read the following case study, then answer the questions that follow.

**Background**

Hypnosis has been used with traumatized crime victims to help them reconstruct crime scenes. Defense attorneys, however, have questioned both the techniques used and the results of the hypnosis. Some studies suggest that hypnosis can be used, either inadvertently or deliberately, to alter memory. Other studies have concluded that little memory enhancement occurs through hypnosis. As a result of these studies and defense attorney objections, some states limit the admissibility of evidence discovered through hypnosis. Psychologists, therefore, have researched other ways to enhance the memory of eyewitnesses without using hypnosis. Funded by a grant from the National Institute of Justice, two researchers, Ronald Fisher and R. Edward Geiselman, developed a nonhypnotic interview process that helps the eyewitnesses reconstruct the events.

Using crime scene training tapes designed to train police officers, the researchers developed the Cognitive Interview. The interview is based on four principles:

1. **Event-Interview Similarity** Based on the theory that we remember things better when placed in a similar situation, the Cognitive Interview seeks to reconstruct as accurately

as possible the external, emotional, and cognitive conditions that existed at the time of the event. Even small details, such as weather, are not ignored.

2. **Focused Retrieval** Every effort is made during the interview process to keep the witness focused on the events. The interviewer prevents outside distractions and interruptions.
3. **Extensive Retrieval** Although the process seems tedious to many eyewitnesses, the Cognitive Interview encourages the witness to repeatedly attempt to retrieve the event's details. Research has shown that the more attempts someone makes to remember particular details, the more likely he or she is to successfully retrieve the details from memory.
4. **Witness-Compatible Questioning** Individuals organize and store memories differently. The Cognitive Interview, therefore, is not a set series of questions. The interviewer must determine the general way in which an individual witness stores memories and tailor the questions to help the witness reconstruct the event in as much detail as possible.

The interview itself is divided into several phases. At first the interviewer asks the witness to recount the event in as much detail as possible. Although a record is made of the account, the interviewer uses this phase to plan for the more detailed interview to follow. The interviewer seeks to understand the way in which the witness stores and processes memories. In the second phase, the interviewer guides the witness through a detailed reconstruction of the events using the information learned during the first phase. Finally, the interviewer uses various mental representations to learn more details about the events. For example, if a witness cannot remember a name, he or she will be asked to recall any information about the name, such as number of syllables, first letter, or ethnicity.

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Often these bits of information will help the witness remember additional details.

## Hypothesis

The Cognitive Interview yields more information from eyewitnesses of real-life crimes than the standard police interview.

## Method

Sixteen robbery detectives from the Metro-Dade Police Department were included in the study. Initially, the police officers were asked to tape-record selected interviews with eyewitnesses to robberies. The criteria for recording the interviews was as follows:

“(a) Each case was to be serious enough so that ample time and resources were available, if necessary, to conduct a thorough interview; (b) at least one victim or witness had a decent chance to observe the suspect or suspects and the event; and (c) each interviewed victim or witness had to be reasonably fluent in English and cooperative.”

During the initial phase, the 16 detectives conducted 88 interviews. These were used as the pretraining interviews.

Next, the detectives were divided into two groups. One group was trained in the Cognitive Interview technique. The other group was not trained and became the control group. After training, the Cognitive Interview group practiced the technique and received feedback from the trainers.

The post-training phase consisted of 24 interviews using the Cognitive Interview tech-

nique and 23 interviews from the untrained group. These interviews were analyzed for the number of relevant facts discovered. Statements of opinion or unrelated facts were ignored.

## Results

Two types of results were analyzed:

1. Interviews before and after training from the same detective were assessed.
2. Interviews from the trained group were compared to interviews from the untrained group.

Detectives who were trained in the Cognitive Interview process obtained on average 47 percent more useful information after training compared to their pretraining interviews. In fact, for one detective the amount of useful information obtained increased 115 percent.

When comparison was made between the trained and untrained group, the trained group obtained 63 percent more information than the untrained group.

## Conclusions

Training in the Cognitive Interview process, which uses psychologists' knowledge of how memories are stored, can significantly increase the amount of information obtained from eyewitnesses. The Cognitive Interview process can replace hypnosis and other speculative forms of memory enhancement as a means of obtaining accurate, detailed eyewitness accounts.

Source: Fisher, R., Geiselman, R., & Amador, M. (1989). Field test of the cognitive interview: Enhancing the recollection of actual victims and witnesses of crime. *Journal of Applied Psychology*, 74 (5), 722-27.

## ☐ Understanding the Case Study

Directions: Answer the following questions in the space provided.

1. Why has hypnosis been questioned as a means of helping eyewitnesses remember crime scene events?

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2. What are the four principles of the Cognitive Interview?

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3. What people made up the control group in this study?

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4. Describe the two ways in which the data from the study were analyzed.

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### ☐ **Thinking Critically**

Directions: Answer the following questions in the space provided.

5. In the Cognitive Interview, the interviewer seeks to reconstruct the external, emotional, and cognitive conditions surrounding the event. Why are each of these important in remembering events?

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6. The Cognitive Interview process yields more facts about events than standard police interview techniques. Further research has examined whether recall using the Cognitive Interview technique results in more incorrect facts. What would you expect the findings to be?

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