Learning

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RESOURCES

Introducing Learning
For comparisons of classical and operant conditioning, see the Lecture/Discussion Topic: Discriminative Stimuli, Examples of Operant Conditioning Often Confused with Classical Conditioning on page 20.

Classical Conditioning
Lecture/Discussion Topic: Watson’s Colorful History
In The Story of Psychology, Morton Hunt relates John B. Watson’s colorful life history. “No one did more to sell behaviorism to American psychologists,” writes Hunt, “than Professor John B. Watson of Johns Hopkins University.” As a gifted huckster who sold himself and his ideas to the discipline, he rose quickly to the top of his profession. Following a sexual scandal, he left psychology to pursue a lucrative career as a consultant to a major advertising firm.

Born in 1878 near Greenville, South Carolina, Watson was the son of a farmer who, because of his violence, developed an unsavory reputation. When his father abandoned the family, Watson’s mother, an upright, devout Baptist, sold the farm and moved to Greenville. Here Watson performed poorly in school. “I was lazy,” he later wrote, “somewhat subordinate, and, so far as I know, never made a passing grade.” Even worse, he was arrested twice for brawling and for firing a gun within city limits.

Nonetheless, Watson convinced the president of Furman College to admit him. Although initially following his mother’s wish that he study for the Baptist ministry, Watson later turned against religion. He preferred philosophy courses, especially those that included psychological studies. After graduation, he taught in a one-room school for one year before attending the University of Chicago to pursue advanced study in philosophy. Switching to psychology, he did excellent work and, after graduating, was offered an assistantship in experimental psychology at Chicago. He was repeatedly promoted and, at only 30 years of age, was offered the chair of psychology at Johns Hopkins University. His annual salary was $3500.

Watson’s quick rise through the ranks was due largely to his successful experimental work in animal learning. He taught rats to run through his miniature replica of the maze at Hampton Court, Henry VIII’s royal retreat outside London. Carefully depriving rats of visual, auditory, and olfactory cues, he found that they still learned the maze. He concluded that kinesthetic cues were the key to the rat’s learning.

Beginning in 1908, he began advocating a new psychology based entirely on observable behavior. In 1913, he wrote an article in the Psychological Review, often referred to as “the behaviorist manifesto.” It formally inaugurated the era of behaviorism. In only three sentences he declared three revolutionary principles: first, psychology’s content should be behavior; second, its method should be objective rather than introspective; third, its goal should be the “prediction and control of behavior” rather than the fundamental understanding of mental events. In 1915, Watson was elected president of the American Psychological Association.

In his APA presidential address, he suggested the conditioned reflex method for studying behavior. Although he was barely familiar with Pavlov’s work, he offered it as the strategy for doing research with animals and humans. He himself began to study conditioned reflexes in infants. His famous work with Rosalie Rayner involved classically conditioning an 11-month-old infant.

An affair with Rayner led to his dismissal from Johns Hopkins. Turning to advertising, he conceived some of J. Walter Thompson’s most successful campaigns. These included one for Pond’s Cold and Vanishing Creams using testimonials from the queens of Spain and Romania, another for Johnson & Johnson convincing mothers to use baby powder after every diaper change, and one for Maxwell House that helped make the “coffee break” an American custom.

From 1930 on, Watson had nothing to do with psychological theory or research. Decades later, when he was nearly 80, the APA awarded him its gold medal for his contributions to psychology. Both surprised and pleased, he went to New York to receive the medal. However, at the last minute, fearing that he would burst into tears, he sent one of his sons to stand in for him. Watson died in 1958, just a year after receiving the award. He remained firmly convinced that the revolution he started would be the psychology of the future.


Basic Principles and Processes of Classical Conditioning
PsychSim 6: Classical Conditioning
This computer program reviews Pavlov’s famous experiment on the salivary response in dogs, and clearly explains and illustrates the basic elements of classical conditioning: US, UR, NS, CS, CR, as well as the processes of acquisition, generalization, and discrimination. The last module of the program has the student perform the eyeblink conditioning experiment.
Examples and Demonstrations of Classical Conditioning

**Student Project: Conditioning the Eyeblink**

After students are familiar with the basic terminology (US, UR, NS, CS, CR) and the phenomena (acquisition, extinction, spontaneous recovery, generalization, discrimination) of classical conditioning, have them complete PsychSim’s Classical Conditioning program outside of class. In this program the student performs the classic eyeblink conditioning experiment (see p. 3). You might request a written report of their findings. Discuss in class the terminology and phenomena of classical conditioning as it applies to the PsychSim exercise.

In class, you might also note that Jo Anne Tracy and colleagues at Indiana University have found that under certain conditions, people with obsessive-compulsive disorder (OCD) condition three times faster than people without OCD.

Lonnie Sears and colleagues (1994) found that people with autism spectrum disorder (ASD) also condition much faster than those without the disorder. Those with ASD seemed to overattend to neutral stimuli, which facilitated the conditioning process and caused mistimed learned responses. Together, these findings demonstrate how research on the very basic mechanisms of learning can lead to practical information about the human condition.

More recently, researchers have found that women who are taking oral contraceptives experience faster eyeblink conditioning than both women not taking oral contraceptives and men (Holloway, 2011). Why these hormones would have this effect is still under investigation.


**Classroom Exercise: Classical Conditioning Using Potato Chips and Lemonade Powder**

Classical conditioning is readily demonstrated in the classroom. Lynn Sprott (2008) provides a simple yet memorable exercise that provides a snack for everyone. Bring enough bags of potato chips and napkins to class for all your students to enjoy a decent portion. Include at least one bag of salt and vinegar chips.

First, introduce the process of learning, noting that it sometimes occurs automatically. Then, display the full bag(s) of salt and vinegar chips. You will immediately hear some “yums” and some “yucks” echo through the room. Ask your students to describe their reaction to the sight of the salt and vinegar chips. Some will make a face, others will report a flow of saliva or their tongue puckering. Point out that this reaction shows they have learned and, more specifically, have been classically conditioned. Ask if anyone has never eaten salt and vinegar chips. Did they experience any particular reaction? Finally, pass the bags of chips and napkins around the room, asking each student to shake several onto a napkin to eat. Then review the classical conditioning process using the chips as the example. Eating something salty/vinegary = US, salivating/puckering = UR, sight of chip bag, smell of chips, thinking about chips = NS, then CS, salivating/puckering = CR. Note that the CR is similar to the UR, only the former is less intense.

Dennis and Rosemary Cogan (1984) suggest another simple demonstration of classical conditioning that can be used in virtually any size class. The authors perform the demonstration after classical conditioning principles have been discussed, but it works just as well as an introduction to Pavlov’s work. The only materials needed are a can of sweetened lemonade powder and enough small cups so that each student can have one. Or use Pixy Stix. Two sticks per student is usually sufficient. Pixy Stix can be purchased in bulk from any number of web-based stores, including www.bulkfoods.com and www.candyfavorites.com. Invite each student who is able to eat sugar to take a cup of powder (or a pixy stix), then choose some neutral stimulus to serve as a conditioned stimulus. Although many other neutral stimuli (NS) could be used, the Cogans use the word Pavlov as the NS to become the conditioned stimulus. Instruct your students to moisten the tip of their index finger and to watch for your signal (for example, you will raise your arm) to dip their finger into the powder and then put it into their mouth (or open the tube and take in some of the powder). Also inform them that from time to time you will say the words “test trial” instead of giving the signal; when they hear those words, they should not dip into the powder but close their eyes and concentrate on their experience.

Present the CS and, after a small delay (0.5 to 1.5 seconds), give the signal for your students to dip into the lemonade powder. Repeat trials at 10- to 15-second intervals, with a test trial after every 10 conditioning trials. After each test trial, ask for a show of hands of those who salivated. When all or most of the students have demonstrated conditioning, begin extinction using the same test-trial procedure (in which you state on successive trials, “Pavlov . . . test trial”). Extinction should be completed during the same class period.
During the next class session, you can demonstrate spontaneous recovery, reacquisition, and even stimulus generalization. At each stage of the demonstration, plot the percentage of CRs as a function of test trials (see the graph below from the Cogans’ classes). Virtually all students will eventually report either a strong or moderate salivary response on the test trial. Many will also report a “puckering” feeling or the taste of lemon-flavored crystals. The graphs below show typical class results of the conditioning demonstration.

Before class begins, fully inflate six to eight balloons and tape them to the classroom board or wall. When students have arrived, explain to them that you are going to demonstrate classical conditioning, and that throughout the brief exercise, they should carefully monitor their responses. Take a long needle, and after clearly displaying it to the class, loudly count “One, two, three,” and then quickly pierce a balloon. After a few seconds, repeat the process with a second balloon, and then again with at least two more. (Vary the time a bit between poppings to avoid the possible confound of temporal conditioning.) Students are likely to flinch less with each trial. With the fifth or sixth balloon, say “One, two, three,” aim at the balloon but miss it. Students are likely to sit unmoved, even expressionless. Wait a few seconds, perhaps passing the time by pretending confusion over their lack of response, then without warning pop a balloon. Students are likely to jump more than they have to any of the previous piercings.

Kohn and Kalat suggest plotting a curve on the board, labeling the horizontal axis Trial Numbers and the vertical axis Mean Size Startle Reaction. Asking your class to recall the strength of their startle reaction for each trial will clearly indicate a steady decline, except for the last trial when an unwarned burst elicited the strongest response of all. Finally, ask students to identify the NS, CS, US, CR, and UR in the demonstration. Although the balloon pop will be quickly identified as the US, flinching as the UR, and some combination of your counting and hand movement as the CS, students are likely to have more difficulty identifying the CR. When some identify flinching as the CR, indicate that this cannot be the case since few if any students flinched when the CS was presented alone (that is, when you missed on the fifth trial). Remind students that the CR is the response elicited by the CS. Ask, “How did you respond when you heard me counting?” Most will now recognize that the CR consisted of a tightening of their muscles to avoid flinching. To reinforce this interpretation, point to the curve on the board, noting that flinching decreased across trials as students were better able to respond with a preparatory muscle-clenching, that they did not jump at all to the counting alone on the fifth trial, and that they jumped the highest when they had no chance to emit the preparatory CR. Conclude by reviewing that classical conditioning involves the acquisition of expectancies that help organisms prepare for good or bad events. Thus the function of classical conditioning is not simply to expedite a response so that it occurs before the US begins. Indeed, the US and CS can be quite different responses.

Classroom Exercise: Classical Conditioning With a Watergun

Joel I. Shenker (1999) suggests an exercise that illustrates all of the major classical conditioning phenomena. You will need a large plastic garbage bag, a watergun or spray bottle, and a towel. Bring them to class and ask for a volunteer who does not mind being squirted in the face while wearing a large garbage bag.

Cut a hole in the garbage bag so it can be placed over the volunteer’s head, then have her (or him) sit in a chair facing the class. Tell the volunteer to keep her eyes closed throughout the demonstration for safety reasons. As you begin, tell your students to watch carefully and to be ready to discuss what they observe.

Read each word in the list below loud enough for everyone to hear. Go through the list at a rate of about 2 seconds per word. Squirt the volunteer in the face only after you have read the uppercase CAN, using a delay of about .5 seconds. Responses to the lowercase “can” test the volunteer’s conditioned responses to the target word.

CAN, dish, CAN, bridge, scale, can, fan, board, CAN, cool, three, horn, disk, CAN, can, cast, test, pen, dime, CAN, dish, van, can, card, stand, meat, pad, can, dish, set, can, tree, ice, plum, can, cost, bird, glass, can, light, can, sword, juice, can, dish, rock, smoke, grease, dish, keep, kid, tan, dice, hole, set, dish, eye, friend, wax, bill, bulb, dish, class, mine, mark, work, can, dish, can, bus, dish, phone, can, smart, first, can, crack, feet, can, tub, bowl, can, van, day, can, rake, dish, CAN, bluff, risk, CAN, salt, dish, CAN, ball, stack, CAN, rain, hat, food, can, van, disk, tree, can, cup, can, lime, CAN, dish, girl, chalk, can, dish, CAN, key, screen, ran, CAN, disk, CAN, knob, bag, tape, CAN, dish, clip, CAN, air, ban, cheese, CAN, door, can, box, dish, hair, CAN, ring, nail, CAN, boat, cap, dish, CAN, crane, wheel, fire, CAN, dish, king, cape, apple, CAN, dog, blue, can, dish, CAN, take, call, brick, pair, CAN, spin, chair, CAN, camp

Give the volunteer a towel and a generous thanks. Begin by simply asking your students to describe and discuss what they observed.

1. The US is the water squirted in the volunteer’s face, the UR is usually a flinch or squint. The NS that becomes the CS is the sound of the word “can” and the CR is the flinch or squint when a word is read without an accompanying squirt. Acquisition is demonstrated as “can” by itself gradually comes to elicit a CR.
2. Stimulus generalization is evident as words that sound like can (ban, ran, cap, cast) come to produce a CR.
3. Stimulus discrimination is evident when different stimulus words elicit differences in the CRs. They are weakest and least likely to occur after stimulus words that do not sound like “can.”
4. Extinction is evident when the CRs disappear after the word “can” is spoken several times without a squirt.
5. Spontaneous recovery occurs if the word “can” again produces a CR after extinction and after a long string of words that does not include the word “can.” (This occurs near the end of the exercise.)
6. Reconditioning savings is demonstrated when the word “can” and a squirt are again associated. Fewer conditioning trials are needed to elicit a reliable CR.

Shenker suggests that you may want to have students write down their observations before you begin a class discussion. Simply ask them to write down the US, UR, NS/CS, and CR and to describe the phenomena associated with the learning they observed. In this way, students are required to do their own thinking and can refer to their written notes when you begin the full class discussion.


Applications of Classical Conditioning
Classroom Exercise: Examples of Classical Conditioning.

Handouts 1a and 1b provide several examples of classical conditioning. Ask students to complete one handout as an in-class, small-group activity and, for additional practice, complete the other as a take-home assignment.

The answers to Handout 1a are as follows:

1. US: drill hitting nerve; UR: cringing; CS: seeing dentist; CR: cringing
2. US: E. coli; UR: vomiting; CS: thought or sight or smell of fried chicken; CR: nausea
3. US: air horn blast; UR: wincing; CS: touchdown; CR: wincing
4. US: being humiliated; UR: shaking; CS: being presented with test; CR: shaking
5. US: tickling nose; UR: sneezing; CS: lying down on pillow; CR: sneezing
6. US: pollen; UR: sneezing; CS: sight of flower; CR: sneezing
7. US: riding a roller coaster; UR: getting sick; CS: being near a roller coaster; CR: queasy
8. US: being yelled at without warning; UR: feeling tense and fearful; CS: being around significant other; CR: feeling tense and fearful
The answers to Handout 1b are as follows:

1. US: being exhausted; UR: falling asleep; CS: watching television; CR: falling asleep
2. US: going for a walk; UR: being excited; CS: going near the leash; CR: being excited
3. US: being pounced on; UR: fear; CS: really big dogs; CR: fear
4. US: phone call from that special person; UR: being excited; CS: hearing the ringtone; CR: being excited
5. US: being angry; UR: heart pounding in anger; CS: ringtone; CR: heart pounding in anger
6. US: eating cookies; UR: salivation; CS: smelling cookies; CR: salivation
7. US: getting pulled over; UR: shaking; CS: siren and lights; CR: shaking
8. US: getting hit by a car; UR: fear; CS: that intersection; CR: fear

Classroom Exercise: Classical Conditioning Examples in the News

To help students understand how classical conditioning occurs in the real world, have them complete Handout 2, which provides examples of classical conditioning from the news. Ask students to complete the handout as an in-class, small-group activity or as a take-home assignment.

Here are the answers, for your reference.

1. US: playing Jeopardy! on the TV show; UR: tensing up; CS: hearing Jeopardy! theme music; CR: tensing up
2. US: feeling like he’s drowning; UR: feeling panicked; CS: being in any water; CR: feeling panicked
3. US: heroin use; UR: tolerance (craving); CS: Vietnam; CR: tolerance (craving)
4. US: massage; UR: relaxed; CS: scent of lavender; CR: relaxed

Lecture/Discussion Topic: Classical Conditioning, Implicit Self-Esteem, and Automatic Racial Prejudice

Associations, even those not consciously noticed, can give rise to attitudes. Jodene R. Baccus and colleagues (2004) have demonstrated how classical conditioning can even increase the automatic, nonconscious aspect of self-esteem.

Implicit self-esteem is conceptualized as a self-evaluation that occurs unintentionally and outside of awareness. Researchers have developed means of assessing implicit self-esteem by examining automatic associations between “self” and “good.” For example, the Implicit Association Test (IAT) requires participants to sort words into categories. In one set of trials, the correct response for self-related words (for example, me) and the correct response for pleasant words (for example, rainbow) require pressing the same key. In other trials, self-related words are assigned the same key as unpleasant words (for example, vomit). Faster reaction times are theorized to reflect stronger associations. Thus, the amount of implicit self-esteem is determined by comparing the amount of time it takes participants to respond to target words when self-related and positive words share the same key with the amount of time it takes to respond when self-related and negative words share the same key. The Name Letter measure provides a second assessment of implicit self-esteem. It simply indexes the extent to which participants prefer the initials of their name to other letters of the alphabet.

In Baccus’ experiment, the participants enter into a computer the answers to six questions about themselves (for example, first name, date of birth). They are then instructed that a word will appear randomly in one of the quadrants on the screen. Their task is to click on the word as quickly as possible. They are also told that doing so will cause an image to be displayed briefly in that quadrant. The procedure is repeated for 240 trials. The words appearing on the screen are chosen from the participant’s answers to the first six questions (self-relevant words), as well as from a preprogrammed list of words that are similar types of words but not relevant to the participant. In the crucial experimental condition, self-relevant words are always paired with an image of a smiling face; while in the control condition, a random selection of smiling, frowning, and neutral faces follows the self-relevant words. As predicted, participants completing the experimental version of the conditioning task exhibited significantly higher implicit self-esteem (as measured by the IAT and the Name Letter measure) than those who completed the control version of the conditioning task.

The authors conclude that a simple conditioning paradigm, originally developed by learning theorists to study animal responses to expectations of food or shock, was effective in modifying people’s unconscious responses to themselves. The finding also fits well, observe the authors, with theories that find the roots of self-acceptance in positive, warm feedback from other people.

A similar conditioning technique successfully reduced automatic racial prejudice. Michael Olson and Russell Fazio (2006) paired photos of Black persons with positive words and images and White persons with negative words and images. Although the White research participants were unaware of the repeated pairings, the procedure was found to be effective in reducing subtle racial prejudice.

Classroom Exercise: “Unpacking” Examples of Extinction and Spontaneous Recovery

To enhance student understanding of extinction and spontaneous recovery, have them consider their physical and emotional reactions to everyday events. You can use the two examples here, or you can make up your own. Ask students to complete this task alone or in small groups. It should take students about 10–15 minutes to respond to each of the following situations.

“I’m Never Eating THAT Again!”
Taste aversion, in which the consumption of a food or drink is associated with the experience of nausea or other symptoms of illness can be used here to illustrate extinction and spontaneous recovery. Ask students, Have you ever experienced taste aversion yourself? If so, describe the situation.

a. Explain what was consumed or tasted and the context in which it was eaten or tasted.
b. Then, explain the aversive experience that followed the eating/tasting.
c. How did you know you had developed taste aversion?
d. Did you experience extinction and/or spontaneous recovery of this conditioned response? If so, explain how/when these happened. If you did not, explain how you know the response was not extinguished or spontaneously recovered.

“Time Heals All Wounds.”
Grief is a highly individual response to loss. Everyone grieves differently, but one common aspect to all grief reactions is that it takes some time for the sadness and feelings of loss to subside. Ask students to consider what happens after the loss of a loved one or a dear friend/companion (human or animal).

a. Immediately after the loss, people report great difficulty being around the “things” associated with the loved one (personal effects, photos, favorite songs, favorite places). Explain why this would occur, using the vocabulary of classical conditioning.
b. After a while, the grieving person finds it easier to tolerate being in the presence of items associated with the lost loved one. Explain why this would occur, again using the vocabulary of classical conditioning.
c. Some time in the future a person will “get over the grief” to the extent that he or she no longer experiences the great sadness and pain of having lost the loved one (a sense of “missing” the person does still remain). Why would this be considered an “extinction” of the grief as a response?
d. Describe a situation in which “spontaneous recovery” of the grief might occur. What might provoke it? How might a therapist help the grieving person again extinguish the response using principles of extinction?

Classroom Activity: Classical Conditioning and Advertising

Classical conditioning has many real-world applications. Advertisers in particular make extensive use of classical conditioning to sell their products. By repeatedly showing their products in association with an emotion experienced by their viewers, they hope that when viewers later see the brand in a store, they will purchase the product. Commercials for caffeinated products such as Red Bull and Mountain Dew tend to shoot for heart-pounding action. Commercials for perfumes try to evoke sensuality.

Then, have students form small groups and identify the unconditioned stimulus, unconditioned response, neutral/conditioned stimulus, and conditioned response.

You may want to note that advertisers often have specific demographics in mind. The emotion a commercial or ad evokes in a 10-year-old boy may be different from the emotion evoked by that same ad in an 80-year-old woman.

As a take-home assignment or class discussion board topic, assign students to find an ad for a product they currently own and identify the classical conditioning they believe the advertiser is trying to achieve.

Classroom Exercise: Extinction and Spontaneous Recovery of Earlier Examples

After discussing extinction and spontaneous recovery, ask students to return to the examples of classical conditioning presented in Handouts 1a, 1b, and/or 2. Ask students, in small groups (or as a take-home assignment), to explain what would need to happen to extinguish the conditioned response in each example. In all cases, the conditioned stimulus needs to be presented without being paired with the unconditioned stimulus. For instance, with Omar’s fear of the dentist (Handout 1a, number 1), he would need to visit the dentist repeatedly without experiencing pain.

Now ask students to consider what spontaneous recovery would look like for each example. For instance, if Omar does experience extinction (he can now visit the dentist without fear) and if it’s been a few years since he’s been to the dentist, he may discover that when he goes again, he feels a little trepidation.

Some students really struggle with the concept of spontaneous recovery. They may say that Omar needs
to have another bad experience with the dentist to feel fear again. Point out that that would be another pairing of the conditioned stimulus with the unconditioned stimulus, not spontaneous recovery. What makes spontaneous recovery *spontaneous* is that it comes back all on its own.

*Classroom Exercise: Little Albert’s Legacy*

Many students express shock and empathy for what Little Albert must have experienced at the hands of Watson and Rayner in their efforts to condition him to fear white rats. You will recall that their work caused a generalization of the fear response to other fuzzy white objects.

You may want to point out that psychological scientists are held to a higher standard when conducting research than the average parent is. If, say, Little Albert’s mother screamed in horror when she happened to see her son reach for a rat scurrying across the kitchen floor, and her screaming caused him to be fearful every time he saw a rat, most people would probably be okay with that. Not so with the Watson-Rayner experiment.

Clearly, such experiments would never be approved by Institutional Review Boards today. Encourage students to consider the current climate for psychological science and the ethical guidelines for psychological research in the context of what they are learning about Little Albert. Ask them to complete the following:

1. Name three principles of the ethical guidelines that guide psychological research that Watson and Raynor violated in their experiments with Little Albert.
2. Come up with two specific recommendations for how Watson and Raynor could have investigated the same principles, but using today’s standards and ethical guidelines. Be sure to explain how these recommendations would improve the ethical nature of their experiments.

You can have students work on this in class or as a homework assignment, individually or in small groups.

*Lecture/Discussion Topic: The Association Principle at Work*

Robert Cialdini (2009) provides many examples of the association principle at work in modern life. Students will find them both amusing and informative. Advertisers, of course, apply the principle regularly. By associating a physically attractive model with an automobile, for example, they hope we will also see the product as more desirable. Does it work? In one study, men who saw a car ad that included a seductive young woman rated the car as faster, better-designed, and more appealing than did men who viewed the same ad without the model. When asked, the men refused to believe the model had anything to do with their judgments.

Associating celebrities with products is another technique used by advertisers. Movie stars and professional athletes are paid to endorse products that may be unrelated to their roles (soft drinks, breakfast cereals, toothpaste). As Cialdini points out, the connection does not have to be logical, just positive.

Politicians also attempt to link themselves with positive values, including motherhood and apple pie. For example, the president traditionally tries to sway reluctant legislators over a meal. Similarly, political fund raisers are regularly held as luncheons or dinners (or as coffee hours in the White House). Research suggests that associating people or things with food may be an effective technique. After political slogans were associated with the eating of food, people became more approving of them. Slogans linked with putrid odors were disliked.

The association principle also explains why radio announcers are instructed to mention the station’s call letters just before a hit song is played and why those playing bingo at a Tupperware party must yell the word “Tupperware” rather than “Bingo” in order to receive their prize. As Cialdini observes, “It may be ‘Tupperware’ for the women, but it’s ‘Bingo’ for the company.”

People’s reactions to TV weather forecasters also illustrate the association principle. Cialdini reports being visited by a local weather forecaster who complained of receiving hate mail whenever it rained. Weather forecasters throughout the country have been whacked by old ladies with umbrellas, pelted with snowballs and galoshes, threatened with death, and accused of trying to play God. One reports, “I had one guy call and tell me that if it snowed over Christmas, I wouldn’t live to see New Year’s.” Another reports being approached by a farmer in a bar, “You’re the one that sent that tornado and tore my house up. . . . I’m going to take your head off.” Cialdini recalls that the Persian messenger who reported victory received food, drink, and the woman of his choice; when he reported defeat, he was summarily slain.

We all recognize how the principle works. We associate ourselves with good news but not with bad. Students in an experiment were assigned the task of informing a fellow student that he was wanted for an important phone call. Half the time the call presumably brought good news, half the time the news was bad. When the news was good, the reporter was sure to mention it—“You just got a phone call with great news.” If the news was unfavorable—“You just got a phone call. Better see the experimenter for the details.”

Students will readily identify with another of Cialdini’s examples. We associate ourselves with our favorite sports team when they win but not when they
lose. When the team wins we report, “We beat them, 17 to 14.” When the team loses, we say, “They lost, 24 to 12.” In one study of seven prominent football campuses, researchers counted the number of students wearing school sweatshirts after a Saturday game. The results showed that more school sweatshirts were worn when the football team won than when it lost. In 1980, the fans of the losing New Orleans Saints began wearing paper sacks that concealed their faces, except for the tips of their noses. When it eventually became clear that the Saints were going to win a game, the fans discarded the bags.


Lecture/Discussion Topic: Phobias

If you discuss fear conditioning, you can readily extend your comments to a more general discussion of phobias. The Psychological Disorders unit in these resources contains a fear survey and the accompanying discussion identifies a number of specified fears. In addition to showing how classical conditioning explains the formation of phobias, describe how it is used in treating them. The application of systematic desensitization to the treatment of irrational fear is discussed in the text discussion of therapies.

Operant Conditioning

Basic Principles and Processes of Operant Conditioning

Classroom Exercise/Student Project: A Build-It-Yourself Skinner Box

Commercial Skinner boxes are expensive. Paul Brandon and Kenneth Steele (2001) explain how you or your students can build your own, using a Styrofoam picnic chest.

Begin by drilling a hole in one end near the bottom of the chest to insert an eyedropper for delivering reinforcement (for a rat, sweetened water or milk works). Near the eyedropper hole, cut an oblong slot (drilling two or three holes will do it) to insert a wooden dowel that will serve as the response lever. Drill a hole through the middle of the dowel large enough for a nail to fit through as a pivot. Rub the nail across a piece of soap so it slides and pivots more easily. Now insert the nail in the dowel and put the dowel through the oblong slot (nail pivot should be on the outside of the chest). Duct tape the arrangement in place for your response lever. Also duct tape some weights (pennies will do) to the outside end of the dowel so the inside lever stays upright. You may want to pair the presentation of the reinforcer with some sort of clicker. You can shape many responses with this type of arrangement.

For example, in addition to bar pressing, the rat can be shaped to hold down the lever for a specified period.


PsychSim 6: Operant Conditioning

This module is a description of operant conditioning, focusing on the concept of reinforcement as illustrated with examples from everyday life and the rationale for intermittent or partial reinforcement. This is followed by a simulation of rat bar-pressing behavior under each of the schedules of reinforcement.

PsychSim 6: Shaping

This module reviews the concept of shaping (rewarding successive approximations to the desired behavior), followed by a simulation of the use of shaping to train an animal to perform a novel behavior—such as training a pigeon to turn in a circle.

Classroom Exercise: Distinguishing Among Forms of Reinforcement and Punishment

Have students generate examples of positive and negative reinforcement and positive and negative punishment using the two-by-two table in Handout 3. You can leave the types of examples completely up to the students, or you can frame this exercise in a specific context. For instance, you might provide the following vignette and instructions:

Pauline is the mother of 2-year-old Elliot. Elliot has developed the habit of slapping adults in the face whenever he is picked up. This developed after Elliot’s grandparents came to visit, and he slapped his grandfather in the face. His grandparents laughed, thinking it was cute. They said, “Oh my, this little boy is going to be a prizefighting champion!” They encouraged Elliot to do this several more times during their visit.

Pauline wants to use principles of operant conditioning to stop Elliot’s face slapping. She wants Elliot to learn to kiss someone on the cheek when he is picked up instead of slapping the adult in the face.

How could she design a program to reinforce the kissing and punish the slapping, using both positive and negative procedures (for each process)? Use the table in Handout 3 in generating four strategies she could use to achieve her goal.

Classroom Exercise: Examples of Positive/Negative Reinforcement/Punishment

Handout 4 provides eight operant conditioning examples. Students can work in pairs or small groups to
identify the type of operant conditioning illustrated in each example. If you use a student response system, students can click in with their answers.

Here are the answers for your reference:

1. Positive punishment
2. Positive reinforcement
3. Negative reinforcement
4. Negative punishment
5. Positive reinforcement
6. Negative punishment
7. Negative reinforcement
8. Positive reinforcement

Lecture/Discussion Topic: Skinner’s Last Days

B. F. Skinner was one of the most controversial intellectual figures of the late twentieth century. He stirred a hornet’s nest by repeatedly insisting that external influences (not internal thoughts and feelings) shape behavior. Despite strong opposition, Skinner maintained that position until the very end of his life. Skinner’s daughter, Julie S. Vargas, has provided a moving account of her father’s last days. You may choose to share aspects of her account with your class.

Vargas reports how eight days before his death from leukemia, B. F. Skinner received the first APA Citation for Outstanding Lifetime Contribution to Psychology. It was given at the opening session of the American Psychological Association’s 98th Annual Convention on August 10, 1990, in Boston. Vargas notes the circumstances:

The association officials had assured the family that they would keep my father from crowds—important because of his heightened susceptibility to infection from leukemia—and they kept their word. At 1:00 o’clock on August 10th, a limousine appeared at the Skinner home to drive our party to the convention hotel. There we were met and ushered upstairs in our own elevator to a hotel room, “like movie stars,” my father remarked. A few minutes before the opening session was to begin, we were ushered back downstairs and taken by a back way to the side door of the auditorium. I was holding my father’s arm as we entered. The room was packed. A second room to the side had been opened and it, too, was overflowing. When we had taken two steps into the room everyone stood up and began to applaud. My father made an awkward nod of his head in acknowledgement as he continued walking—I could tell he hadn’t expected such a reception. The applause was thunderous. It continued as my father made his way up the steps. It continued, diminished, as my father was escorted across the stage to his chair. He turned around and made a gracious bow of his head, but there was no sign of the applause letting up.

Finally APA officials interrupted the applause and started the program. After interviews early in the following week, including one for a TV newscast, he entered the hospital for the last time on Wednesday afternoon. The day before he died he worked on the last changes in his paper for American Psychologist. As a member of the Hemlock Society, he believed in the right to take one’s own life. He refused final “heroic” lifesaving effects that could have prolonged the functioning of his organs. Near the end, reports Vargas, his mouth was dry. After taking a sip of cold water, he said his last word, “Marvelous.”


Examples and Demonstrations of Operant Conditioning

Classroom Exercise: Partial Reinforcement Schedules

Students can apply their knowledge of partial reinforcement schedules with Handout 5. After reviewing the four major schedules, you can use the handout for individual review, as a small-group exercise, or for full class discussion. The answers are: 1. VR 2. FR 3. VI 4. VR 5. FI 6. FR 7. VR 8. VI 9. FR 10. FI.

Student Project/Classroom Exercise: Conditioning the Instructor’s Behavior

Fables about students conditioning their instructors’ behaviors are legion. You have perhaps heard and even retold to your class how students shaped their teacher to stand only in one corner of the room or face in one direction. W. Lambert Gardiner tells, tongue in cheek, how one class laughed more uproariously at their
instructor’s jokes as he moved toward the right side of the room until they were able to condition him right out the door. Joan Chisler (1988) has used these conditioning stories as the basis for a student project in her psychology of learning course. It can readily be adapted to introductory psychology.

After your students have had an opportunity to observe you teach, suggest that they choose a specific behavior for conditioning. Ask them to select something that will improve your teaching or be helpful to you, not something obscene or embarrassing. Tell them that they will be given about 30 minutes of class time to prepare their project. Before leaving, appoint a discussion leader and briefly outline what the students are to do. After deciding on the specific behavior to condition, they should take a baseline over a few class periods. (Let them decide precisely how many.) The conditioning process (involving any reinforcer of their choice) should continue over, say, a few weeks. They should carefully assess any change in the frequency of the behavior being conditioned. If you like, they might also include a period during which they stop conditioning, again assessing any behavioral change. They are to end the project by debriefing you, their subject.

Chisler reports that she is always surprised by the results, even when the class has not been successful in conditioning her behavior. Even when unsuccessful, students value the experience, typically realizing themselves what went wrong. Shaping is not always as easy as it seems. The successes include making eye contact with all class members, moving about the classroom more frequently, giving more examples from personal experience to illustrate concepts, and writing on the board more often. Powerful reinforcers include eye contact, smiling, nodding, note taking, and class participation.


### Applications of Operant Conditioning

**Lecture/Discussion Topic: In-Vehicle Monitoring Systems for Teen Drivers**

If we received immediate feedback on the quality of our driving, would we be better drivers? The Insurance Institute for Highway Safety (IIHS) (National Safety Commission, 2011) tested that very notion with teen drivers. The IIHS researchers randomly divided teen volunteers into four groups. Group 1’s monitoring system sounded buzzers for things like rapid acceleration, hard braking, speeding, and an unbuckled seatbelt. The monitoring system immediately sent these driving data to the teen driver’s parents. Group 2 had the same monitoring system, but the parents were not notified if the driver corrected the behavior within 20 seconds. Group 3’s driving behavior was recorded, but the teens received no audible signals while driving. Parents and the teens could later access the data on a website. The driving behavior of group 4, the control group, was monitored, but neither the parents nor the teens could access the data.

After describing these four groups to your students, ask them which group they think were the best drivers.

It was Group 2, the group that received immediate feedback on their driving behavior, but could immediately correct it so their parents would not be notified. Ask students what type of operant conditioning this is. (It is negative reinforcement. Good driving behavior increases because the aversive stimulus—parents being notified—is removed.)

If you would like to continue the discussion, ask students what they would have thought about having such a monitoring system when they were new to driving. Would your students use such a system with their own teenagers? Why or why not?


**Lecture/Discussion Topic: Social Disapproval or Fines?**

Blogger Christian Jarrett wrote about a 2013 study in which the researchers wondered which type of punisher would have a longer-lasting impact on behavior: social disapproval or fines? Participants played a game requiring that they cooperate with the other players. In one condition, the other players could fine a player for not cooperating. In another condition, the other players could express their disapproval. Players in the control condition played without any consequences for not cooperating. As expected, both conditions with consequences increased cooperation. What was interesting, though, is what happened at the end of the game when the players were told that there was a “computer malfunction,” and the final rounds would be played without consequences. Can your students guess what happened?

Those who were fined for uncooperative play, began playing more selfishly when consequences were removed. In fact, their play mirrored the play of the control group. Those who received social disapproval for uncooperative play, largely continued to play cooperatively when consequences were removed.

Ask students to consider this with their own family members. Which would make them feel worse, having a parent make them pay a fine for each letter grade below a B they earned in their courses or having a parent say “I’m disappointed in you”?

Lecture/Discussion Topic: Rewarding Good Driving

In general, reinforcement is more effective than punishment. So, would it be better if police traffic enforcement changed from fining people for poor driving to reinforcing people for good driving?

While police departments haven’t abandoned fines altogether, a number have implemented programs in which they do reward good driving. In 2002, the Toledo, Ohio, police department gave out coupons to a local pizza shop to drivers they spotted driving well (Williams, 2002). In 2011, the Prosper, Texas, police department gave out $10 gift cards for good driving behavior (Story, 2011). Both departments were careful not to use lights and sirens to pull someone over because they didn’t want to frighten anyone. It would be easy to see how the punishment of being pulled over would outweigh reinforcement of a coupon or a gift card. Instead, they waited until someone was pulling into a parking lot, or they would walk up to someone at a stop sign.

Hundreds of police departments have participated in “Operation Chill,” sponsored by the 7-Eleven convenience store, since its inception in 1995 (7-Eleven Franchising, 2013). In Operation Chill, police officers give children and teenagers coupons for free Slurpees (flavored syrup poured over crushed ice). What behaviors an officer rewards is entirely up to the officer. It could be for wearing a helmet while skateboarding or biking. It could be for using a crosswalk to cross the street. It could be for picking up litter.

In addition to reinforcing good behavior, officers also hope for some classical conditioning. By fostering positive interactions between officers and kids, officers hope that kids have more positive feelings toward them.

Ask your students if any of them have been recipients of a police-mediated positive reinforcement program. What was their experience? What was their reaction to it?

This 5-minute video may be a good way to end this class session: www.break.com/video/prank-bank/good-cop-pull-over-prank-2594163. The website Break partnered with a police department to pull over people who were driving well and give them a $100 bill.


Lecture/Discussion Topic: Shaping HeroRATS to Detect Land Mines and Tuberculosis

In discussing shaping, you can describe the work of APOPO (a Flemish acronym for “Anti-Personnel Landmines Detection Product Development”) in response to the global land mine problem (Crew, 2014). From his experience with rats as childhood pets, the founder, Bart Weetjens, knew that, with their terrific sense of smell and trainability, the animals could provide a cheap, efficient, and often locally available means to detect land mines. Called HeroRATS, these sniffer rats are used to detect explosives and diagnose tuberculosis.

Training starts when they are 4 weeks old, and it takes about 9 months to fully train a rat for mine-sniffing. The rats are clicker-trained, meaning they associate a reinforcer (bananas are their favorite) with a click. When the rats detect TNT, they scratch at the ground to signal their trainers. The trainers use a device that emits a click to tell the rat that it is right, and then the trainer gives the rat some banana. This 3-minute YouTube video shows the training process in action: www.youtube.com/watch?v=3IxU-MZ12VE.

In the last 14 years, the rats have found 1500 landmines in Tanzania and almost 8000 landmines and bombs in Mozambique. HeroRATS have been deployed in Thailand, Angola, Vietnam, Cambodia, and Laos. And in the last 12 years, HeroRATS have detected 5594 cases of tuberculosis in a Tanzanian city, the only place they are currently in use.

Or, we can bypass the bananas as Sanjir Talwar and colleagues at the State University of New York, Downstate Medical Center, Brooklyn, did. They implanted tiny stimulating electrodes into the brains of five rats and then used a laptop computer to guide them over obstacles and through mazes. “Our rats,” report the research team, “were easily guided through pipes and across elevated runways and ledges, and could be instructed to climb or jump.” They were even able to lead the rats over piles of rubble and through bright, open fields—an environment rats normally avoid. Such remote-controlled rats may eventually serve as “living robots” for land-mine detection and search-and-rescue missions after a disaster or terrorist attack. For example, a rat fitted with a microphone and video camera could be directed to where people are believed to be buried alive.

How does this all work? The researchers planted electrodes in two regions of the rat’s brain: the somato-
sensory cortex, which receives signals when the rat’s whiskers brush against something, and the medial forebrain bundle, whose activation produces reward signals. A tiny electronic backpack on top of each rat took signals from the laptop that was up to 500 feet away. When the left somatosensory cortex was stimulated, the rat interpreted it as a signal that something had brushed its right whiskers and it immediately turned right. Similarly, activating the right somatosensory cortex made the rat turn left. After the rat made the correct turn, the researchers activated the electrode in the rat’s reward center, thereby delivering positive reinforcement.

Linda Hermor-Vazquez has shown that exposing rats to an odor while stimulating the medial forebrain (in effect, delivering a reward) also causes them to act like sniffer dogs. Eventually, they seek out the smell of an explosive or drug because of its prior association with reward. Equally important, the studies have demonstrated that the two behaviors (specifically, controlling the rat’s movements and its sniffing out a specific target odor) are compatible. Interestingly, the experiments also show that rats trained through direct electrode stimulation of the brain are better at locating an object by smell than those trained using food. The rats remained highly motivated to seek out the odors even six weeks after electrode training.


Friend, T. (2002, May 2). Brain-wired rats are at our command. USA Today, p. 9D.


Lecture/Discussion Topic: Dolphins Clear Mines in Persian Gulf

The U.S. Navy has deployed dolphins (called “marine mammal systems”) to hunt down mines. Such mine clearance has been necessary to ensure the safety of U.S. ships. The Navy program has as many as 75 Pacific bottlenose dolphins and 35 California sea lions in the Marine Mammal Program since it began. They were first used in the Vietnam War, when dolphins were brought in to help protect an Army ammunition pier in Cam Ranh Bay that had been repeatedly blown up during the Vietnam War. The dolphins “were in Vietnam for six months. The pier was never blown up while they were there,” Tom LaPuzza, spokesman for the program, said. “As soon as they left, it was.” They have also been used in Operation Desert Storm for “swimmer defense,” in Bahrain in 1987 to protect a U.S. flagship, and at the 1996 Republican National Convention in San Diego. The dolphins were trained to search for scuba divers who were trying to plant explosives on Navy vessels. The animals have always been positively reinforced with fish. Remarkably, one of the animals has worked in the program for more than 30 years.

The dolphin’s sonar is so sensitive that it can detect a metal disc the size of a quarter 100 feet away. In the Persian Gulf, a Navy handler in an inflatable boat signals the dolphin to dive. The dolphin then begins using its echolocating sonar to search for mines and, on locating one, returns to the boat and touches a rubber disc at the bow. The handler places a nose cup that is attached to a plastic cylinder over the dolphin’s snout. The dolphin swims to the mine and removes the nose cup, which is spring-loaded. The cylinder opens, an anchor falls to the bottom, and a float attached to a rope rises to the surface, marking the location of the mine. Navy divers then retrieve it. The dolphins are trained to avoid touching the mines.

Although animal rights groups have criticized the Navy’s use of dolphins since its Marine Mammal Program began with a single female Pacific white-sided dolphin, survival rates over the past decade have been 95 to 97 percent, higher than that of any other group holding captive dolphins, including academic centers and Sea World.

More recently, the program has been testing whether these sea mammals can be used to help thwart a terrorist attack. In May 2010, the team simulated a terrorist attack at ports throughout California. The drills included a fake attack on a container ship at the Port of Oakland, a bomb explosion at the Port of Redwood City, and terrorist attacks in waters off Los Angeles, Long Beach, Sacramento, and San Diego. A dolphin quickly located a terrorist lurking in the black water before a sea lion, using a device carried in its mouth, cuffed the pretend saboteur’s ankle so authorities could reel him in. The Navy will not officially announce whether the dolphins have thwarted a real terrorist attack.

Friend, T. (March 27, 2003). A wartime first: Dolphins called to clear mines. USA Today, p. 8D.


percent of their games. The difference between hero and goat is slim.

While a number of professional ball players engage in superstitious behavior, most do not feel like their behavior has much impact on the game (Burger & Lynn, 2005). In a convenience sample of 50 MLB players and 27 professional Japanese baseball players, 74.3 percent reported at least one superstitious behavior, such as using a lucky toothbrush, retying shoes during a particular inning, and drawing lines in the batter box. Lucky articles of clothing or equipment is more common.

Burger & Lynn (2005) did find an interesting cultural difference. American ball players were more likely to perceive their superstitious behaviors as affecting their own personal outcomes. Japanese ball players were more likely to perceive their superstitious behaviors as affecting the outcome for the team. This is an opportunity to briefly revisit individualistic and collectivist cultural differences.

Like baseball players, trial lawyers also feel that the fate of their client is out of their control. While they can prepare like baseball players can practice, ultimately the fate of the defendant is in the hands of the jury (or a judge for bench trials) that decides whether their client (the defendant) is found guilty.

Also like baseball players, trial lawyers engage in many different superstitious behaviors—although only when they are currently involved in a trial. Some examples are eating the same lunch in the same restaurant, using the same pen throughout the trial, exiting by the same courthouse door, and not getting a haircut until the trial is over. And, they tend to wear what they perceive that an outcome is due to luck rather than skill? What might this suggest about students who use “lucky” items when studying or taking a test?


Classroom Exercise: Sensitivity to Punishment and Sensitivity to Reward

Are some of us more sensitive than others to punishment? Is the same true for rewards? Jeffrey Gray’s reinforcement sensitivity theory (1972) hypothesizes...
the existence of two biological systems in the brain: the behavioral activation system (BAS), which responds to rewards and regulates approach behavior, and the behavioral inhibition system (BIS), which responds to punishments and regulates avoidance behavior. As Randy Larsen and David Buss (2008) suggest, the BAS is much like an accelerator that motivates approach behavior and the BIS is like brakes that stop behavior. They report recent research in which participants were either rewarded for correct responses or punished for incorrect responses on a challenging reaction time task. As hypothesized, BAS scores predicted performance in the reward condition, while BIS scores predicted performance in the punishment condition.

According to Gray, people vary in the relative sensitivity of their BIS and BAS systems. A person with a highly reactive BIS is especially sensitive to threat and punishment and thus is vulnerable to anxiety. On the other hand, a person with a highly reactive BAS is especially sensitive to incentive and reward and thus is vulnerable to impulsivity.

For example, differences in BIS sensitivity may lead students to react differently to poor performance on a test. A person with high sensitivity may be in a panic, while a person with low sensitivity may be hardly bothered at all. Similarly, differences in BAS sensitivity may lead two individuals to react differently in anticipating an enjoyable event such as attending a concert. One with high sensitivity may get euphoric in thinking about the prospect of going, while one with low sensitivity may know she’ll enjoy the event but remains relatively calm in anticipating it.

In one study, Scott Pickett of Oakland University and his colleagues (2011) recruited volunteers who had experienced at least one traumatic event. The volunteers who were high in BIS sensitivity and high in experiential avoidance (EA) were the ones most likely to exhibit symptoms of posttraumatic stress. (People who are high in EA work very hard to avoid negative thoughts and feelings; EA is thought to be part of normal development, not a fixed trait.) In other words, being sensitive to threat and punishment in combination with avoidance thinking about threat and punishment is more likely to lead to difficulties in coping with traumatic events.

Threat sensitivity and incentive sensitivity are thought to be separate systems. As a result, all combinations of high and low BAS and BIS sensitivity exist.


**Classroom Exercise: Assessing Self-Reinforcement**

Self-management typically involves the identification and application of positive reinforcers to some specific behavior such as exercise or losing weight. Elaine M. Heiby’s Frequency of Self-Reinforcement Questionnaire (FSRQ), used to assess self-reinforcement as a generalized response set, is discussed in the Therapy unit in these resources. You may prefer to discuss it in relation to the application of operant conditioning techniques. Heiby defines self-reinforcement as “the process of establishing and controlling overt and covert positive consequences of one’s own behavior.”

**Lecture/Discussion Topic: Beyond Freedom and Dignity**

Few issues will stimulate a more lively classroom debate than B. F. Skinner’s statements regarding human freedom and dignity. Ask your students whether our beliefs in human freedom and dignity are illusions. Also ask whether beliefs are obstacles to the development of a better society.

Skinner argued that denial of the fact that we are controlled by our environment leaves us vulnerable to control by subtle and malignant circumstances and by malicious people. Governments and political leaders, he contended, may seek to control us for their own benefit rather than serve our best interest. Recognizing that behavior is shaped by its consequences is the first step in taking control of the environment and ensuring that it delivers consequences promoting desirable behavior. When we demand freedom, argued Skinner, what we really mean is freedom from aversive consequences and not freedom to make choices. In the final analysis, we can have “freedom” but only by arranging our own consequences and not by leaving it to “fate” or the “government.”
Lecture/Discussion Topic: Transforming Couch Potatoes With Operant Conditioning

Psychologist David Allison of Columbia University College of Physicians and Surgeons reported a nifty application of operant conditioning principles to both weight control and leisure management in children. Presenting at the Experimental Biology meeting in Washington, DC, in April 1999, Allison described how his team successfully got overweight, sedentary children moving while watching TV.

The researchers wondered what would happen if kids had to ride a stationary bicycle to keep the television on. So they created TV-cycles and randomly assigned overweight 8- to 12-year-olds to two conditions. In one condition, children had to pedal to keep the TV on. In the second condition, a bicycle was present but not necessary for the TV’s operation. Results? Children who had to pedal to watch TV biked an average of an hour a week, while the others biked an average of only eight minutes. The treatment group watched one hour of TV per week, while the controls watched 20 hours. Equally significant was the finding that the treatment group significantly decreased overall body fat.

Lecture/Discussion Topic: Financial Incentives to Quit Smoking

You can extend your description of the applications of operant conditioning to a study that showed financial incentives help smokers quit the habit. Kevin Volpp, director of the Center for Health Incentives at the University of Pennsylvania, and colleagues (2009) worked with nearly 900 smokers employed by General Electric in the United States to help them quit the habit. All the research participants received information about local smoking-cessation classes and the company’s coverage of drugs designed to help them quit smoking. Half were also offered financial incentives. The financial incentives were $100 for completion of a smoking-cessation program, $250 for being smoke-free after six months (as confirmed by a biochemical test), and $400 for being smoke-free after a year (again, as confirmed by a biochemical test). Careful assessment indicated that each group had about the same number of heavily addicted smokers.

Results indicated that after a year, 15 percent of those provided incentives were smoke-free, whereas only 5 percent of those in the information-only group were smoke-free. Lead researcher Volpp notes that “People are drawn to tangible things. It makes it easier for you to do in the short term what you know is in your best interest.” Volpp also noted that smokers need all the help they can get. Although 70 percent of smokers indicate that they want to quit, only 3 percent succeed each year. The low cessation rates in the current study, even with incentives, emphasize how hard it is to quit. Given that the incentives paid for themselves in about three years, GE plans to continue the smoking-cessation program in the coming years.

Tom Glynn, Senior Director of the American Cancer Society who was not involved in the study, observed that tobacco taxes also provide strong incentives to quit. Research suggests that each 10 percent increase in the cost of cigarettes reduces the teen smoking rate by 7 percent and the adult rate by 4 percent.

More recently, CVS has changed its official name to CVSHealth and has removed all tobacco products from its stores. Minute Clinic has joined CVS in providing help for smokers who want to quit.


Szabo, L. (2009, February 12). Financial incentives can help smokers quit. USA Today, p. 6D.


For Skinner, “dignity” was also an illusion. “We recognize a person’s dignity or worth,” he argued, “when we give him credit for what he has done.” We tend to do this when we are unable to readily identify the environmental factors that control another’s behavior. When a person makes an anonymous charitable donation, for example, we may attribute it to something inside the person, to his or her “altruism.” To credit people for doing good is to ignore the environmental factors that give rise to “good” behavior. Something in the person’s formative years has obviously shaped the desirable behavior. Only by identifying the external factors that gave rise to “doing good” can we bring them under control so that more people will do good more often. This movement toward a better society demands giving up the belief in “dignity.” Did Skinner practice what he preached? Yes, as you can see here:

And now my labor is over. I have had my lecture. I have no sense of fatherhood. If my genetic personal histories had been different, I should have come into possession of a different lecture. If I deserve any credit at all, it is simply for having served as a place in which certain processes could take place. I shall interpret your polite applause in that light.


“This was a non-nagging approach to get kids to exercise,” claimed Allison. “We told parents just to let the bicycle do the work.” One problem, however, was that it was difficult on parents themselves not to be able to watch TV. They had to find ways to occupy their kids!


Classroom Exercise: A Token Economy
You can extend the text discussion of operant conditioning at school by replicating Kurt Boniecki and Stacy Moore’s (2003) use of a token economy to reinforce classroom participation in an introductory psychology course. Although you can simply describe Boniecki and Moore’s study to show how operant conditioning has been used at the college or university level, you might also choose to implement their token economy in your own classroom. The researchers conducted their study over the final 11 class meetings of the term. A research assistant counted how many times students raised their hands and how long it took for the first student to raise his or her hand. For the first four class sessions, the assistant recorded class participation to establish a baseline. The token economy was employed during the next four class sessions and removed for the last three class sessions.

For the token economy, the instructor would ask a question and call on the first student to raise his or her hand. If the student answered correctly, he or she would get a token (a wooden coin from a local crafts store). If the student answered incorrectly, the next student to raise his or her hand got a shot at answering the question, and so it would continue until someone gave the right answer. If no one answered correctly, the instructor gave the answer, and then continued on with the lecture. Later, the instructor would ask another question, and the process would repeat. Students turned in their tokens at the end of class in exchange for extra credit points.

Ask your students to guess the outcomes of the dependent measures before revealing the results.

During the token economy, more students raised their hands and they took less time to do so as compared to both the initial baseline and after the removal of the token economy.

As another example, one mother decided to do away with money rewards and implement a token economy for her daughter. Doing chores earns the daughter a token good for 15 minutes, 30 minutes, or 60 minutes of computer game time; each chore has a dedicated value (Little Mom on the Prairie, 2014).

If time allows, you may ask students, in pairs or small groups, to discuss the pros and cons of using a token economy, to share their experiences with token economies (perhaps in school), and to identify places where token economies may be used, such as prisons and group homes.

If you cover this item in class, you may want to follow up with the next item: Modifying Children’s Behavior.


Boniecki and Moore’s (2003) use of a token economy to modify children’s behavior at school by replicating Kurt Boniecki and Stacy Moore’s (2003) use of a token economy to reinforce classroom participation in an introductory psychology course. Although you can simply describe Boniecki and Moore’s study to show how operant conditioning has been used at the college or university level, you might also choose to implement their token economy in your own classroom. The researchers conducted their study over the final 11 class meetings of the term. A research assistant counted how many times students raised their hands and how long it took for the first student to raise his or her hand. For the first four class sessions, the assistant recorded class participation to establish a baseline. The token economy was employed during the next four class sessions and removed for the last three class sessions.

For the token economy, the instructor would ask a question and call on the first student to raise his or her hand. If the student answered correctly, he or she would get a token (a wooden coin from a local crafts store). If the student answered incorrectly, the next student to raise his or her hand got a shot at answering the question, and so it would continue until someone gave the right answer. If no one answered correctly, the instructor gave the answer, and then continued on with the lecture. Later, the instructor would ask another question, and the process would repeat. Students turned in their tokens at the end of class in exchange for extra credit points.

Ask your students to guess the outcomes of the dependent measures before revealing the results.

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If you cover this item in class, you may want to follow up with the next item: Modifying Children’s Behavior.


Lecture/Discussion Topic: Modifying Children’s Behavior
As illustrated in the classroom token economy just discussed, the behavior returned to baseline levels when reinforcement was removed.

In changing children’s behavior, parents use rewards because in the short-term they work. In other words, parents are immediately rewarded for using rewards. For example, to get a child to clean his or her room, parents can offer some sort of tangible reward. But remove the reward, and the behavior stops.

If parents aren’t going to use tangible rewards, how can they change a child’s behavior? Child psychologists offer a number of suggestions (Feiler, 2013). For example, parents could explain that this particular behavior is important and why it is important. Listen to the child’s reasons for not wanting to do it, acknowledge those reasons and the feelings that go with the reasons, and reiterate why the behavior is important. When communicating the importance of the behavior, avoid words like “should” and “have to.” These words are about power, and the child may react against them by exerting his or her own power and not behave as the parent wants.

If time allows, ask students, in pairs or small groups, to consider the following situation. They are the parents of a 9-year-old, and the child is not interested in doing her math homework. How can the parents encourage doing math homework without using tangible rewards or “power” words? After discussion, ask students to report out their solutions.

While child psychologists frown on using tangible rewards to encourage behavior, they acknowledge that tangible rewards after the fact are fine occasionally. If parents aren’t going to use tangible rewards, how can they change a child’s behavior? Child psychologists offer a number of suggestions (Feiler, 2013). For example, parents could explain that this particular behavior is important and why it is important. Listen to the child’s reasons for not wanting to do it, acknowledge those reasons and the feelings that go with the reasons, and reiterate why the behavior is important. When communicating the importance of the behavior, avoid words like “should” and “have to.” These words are about power, and the child may react against them by exerting his or her own power and not behave as the parent wants.

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While child psychologists frown on using tangible rewards to encourage behavior, they acknowledge that tangible rewards after the fact are fine occasionally. When the 9-year-old has finished her math homework, the parent may say something like, “I see that you worked really hard on that, let’s go for a bike ride to celebrate!” And tangible rewards when you are time-crunches are also okay as long as there is discussion about the event later.

Praise for behavior is a welcome and often powerful reinforcer, such as “I really appreciated that you
...,” “Thank you so much for...,” and “I liked how you...” Of course praise isn’t just for children. Teachers conveying praise to students or managers conveying praise to employees, if genuine, will result in both behavioral change and good feelings. In fact, one characteristic of great bosses is that they say “Thank you” (Sahadi, 2014).


**Student Project: Modifying an Existing Behavior**

Ask students if they would like to change one of their behaviors. Perhaps they want to get more exercise, lose weight, or improve their study habits. To use operant conditioning principles to establish and strengthen the desired behavior, they should follow the steps suggested below by Anthony Grasha (1995).

1. Identify a target behavior that is important to you. Don’t attempt to do too much at once but be specific. Instead of “I want to get more exercise,” state “I need to start jogging one mile every day.”

2. If a desirable behavior such as exercise is presently nonexistent, go to step 4. However, if it is present in limited form, or is a behavior you want to eliminate, monitor it for about a week to establish a baseline of occurrence. Behaviors can be recorded by frequency or by duration. For example, if smoking is to be decreased, count the number of cigarettes presently smoked per day. If studying is to be increased, record the number of hours presently invested daily. Also keep track of the situations in which it occurs as well as the favorable or unfavorable consequences. (Sometimes, monitoring an action will cause a change. This project can be simplified by having students merely observe their behavior and record any change.)

3. Gain control over the behavior by controlling discriminative stimuli. Some people may smoke while drinking coffee, or snack only while watching television. Giving up coffee or limiting time in front of the TV may help in changing the target behavior.

4. Identify positive reinforcers (reading a favorite magazine, telephoning a friend, taking a hot shower). Select one that is likely to influence the behavior you want to change, then use it to change your behavior. Establish a schedule of reinforcement. For example, you get to make a phone call only after you have read one chapter in the textbook, or after you have gone three hours without a cigarette.

5. If possible, enlist social support. Modifying behavior can be difficult, and so it often helps to have someone to talk with to keep you honest and committed to your plan. Grasha writes that one graduate student put $200 into a jar and instructed her husband that for every week she failed to reach her goal in working on her dissertation, he was to send $25 to her least favorite charity.

6. Monitor and record your progress toward changing the behavior. Remember that behavioral change takes time. Shift from continuous to partial reinforcement once a target behavior is acquired. Your goal should be to wean yourself from the control of external reinforcers.


**Classroom Exercise: Behavioral Change Mobile Apps**

Ask students if they have ever used a mobile app designed to elicit behavioral change of some kind, such as better eating or more exercise. Ask how many are currently using one. Invite students to share what app or apps they are using, their experience with them, how long they have used them, and whether their behavior has changed as a result.

A common experience is that a person will download an app and use it for a while because it is novel. And then when the newness wears off and using the app becomes a chore, the person stops using it. Ask students in pairs or small groups to identify, based on what they have learned about operant conditioning, the features of a smart phone app that would encourage long-term use.

Charles Abraham (University of Sussex) and Susan Michie (University College London) (2008) identified 26 behavioral change techniques. Of those 26, they identified five that are particularly important for behavioral change in eating and exercise (2009):

1. Intention formation. Stating what behavior is to be changed.

2. Specific goal-setting. Creating a detailed plan on what will need to happen to change the behavior.

3. Self-monitoring. Keeping a record of the behavior to be changed.

4. Feedback on performance. How the behavioral change is coming along as compared to others or a defined standard.

5. Review of behavioral goals. Periodically revisit the goals that were set and revise as necessary.

Artur Direito and his colleagues at the University of Auckland (2014) evaluated the top 40 behavioral change smart phone (iOS) apps available in November, 2012, to see which, if any, of the 26 techniques they included. How many of the apps incorporated each of the top 5 behavioral change techniques for changing eating or
exercising behavior? The percentage reflects the apps that included each technique.

1. Intention formation: 50%
2. Specific goal-setting: 36%
3. Self-monitoring: 60%
4. Feedback on performance: 52%
5. Review of behavioral goals: 23%

Invite students to review the behavioral change apps they may currently have installed on their smartphones. Which of these 5 behavioral change techniques do the apps employ?


**Contrasting Classical and Operant Conditioning**

Lecture/Discussion Topic: Discriminative Stimuli, Examples of Operant Conditioning Often Confused with Classical Conditioning

In helping students learn the difference between classical and operant conditioning, point out that classical conditioning results in an involuntary response and operant conditioning results in a voluntary response.

In operant conditioning, a discriminative stimulus tells you when your behavior is likely to be reinforced. Rats in an operant chamber can be taught that a bar press will produce food only when a light is on. If the light is off, bar pressing does nothing. Once the rat learns this, it will only press the bar when the light is on. Children learn to ask for something they want when their parents are in a good mood, because they know they are more likely to get a Yes answer. The parental good mood is a discriminative stimulus.

Here are some examples of the difference between classical and operant conditioning.

1. The cat runs into the kitchen upon hearing the can opener. Running is a voluntary behavior, so this is operant conditioning, not classical conditioning. The sound of the can opener is a discriminative stimulus, a stimulus that tells the cat that if it runs into the kitchen right now, it will likely receive a reinforcer. If the cat salivates upon hearing the can opener, then that is classical conditioning; the sound of the can opener has been paired with eating food to produce the involuntary salivation.

2. In this clip from *The Office* (youtu.be/nE8pFW-P5QDM), Jim dings his computer and then asks Dwight if he’d like a mint. After repeated pairings, Jim’s computer dings, and Dwight holds out his hand. Holding out his hand is a voluntary behavior, so this is operant conditioning, not classical conditioning. The ding is a discriminative stimulus that tells Dwight that if he holds out his hand now, he will likely receive a reinforcer in this case, a mint. If Dwight salivates upon hearing the ding, then that is classical conditioning; the ding has been paired with eating a mint to produce the involuntary salivation.

**Classroom Exercise: Conditioning Honeybees, Wasps, and Fish**

You can conclude the consideration of conditioning by providing a few fascinating examples of how the principles are currently being used to shape animal behavior. These examples will also challenge students’ understanding of associative learning and specifically the difference between classical and operant conditioning. Present the examples and ask students to analyze the learning process. (Media reports may not always have it right. For example, ask your class: Is it accurate to call the fish trained to swim into nets “Pavlovian?” Why or why not? The answer is No. The tone is a discriminative stimulus that signals the fish that if they swim to a particular spot, they will be reinforced with food.)

Researchers at Los Alamos National Laboratory in New Mexico and at the University of Georgia-Tifton campus report that honeybees and wasps may be useful in detecting bomb scents. Much cheaper to train and use than dogs, the insects also work well for assessing food quality and in detecting drug smuggling. In training, the insects learn to associate a specific scent with sugar water and thus with being fed. When the trained bees pick up the scent, they flick their proboscis—a tubular feeding organ that extends from the mouth. This movement is picked up by a camera and pattern-recognition software. The wasps are placed in a “Wasp Hound,” which is a small cylindrical container with a vent and a camera. When they detect the scent, they crowd by the vent, and the camera records their behavior. In a real-world application, small boxes with a few air holes containing the insects might be placed outside an airplane entrance ramp or train platform. The insects’ behaviors would be carefully monitored. Bees are currently being trained to detect the TNT that was used in the landmines that abound in Croatian minefields (Stojanovic & Bandic, 2013).

Researchers at the Marine Biological Laboratory at Wood’s Hole, Massachusetts, are also developing farm-bred fish that are trained to swim back home after
feeding and growing in the open sea. Black sea bass
hear an underwater tone every time they are fed, con-
ditioning them to swim toward the tone whenever it
is sounded. After a few weeks of this training, claims
researcher Simon Miner, “you have remote-controlled
fish.” The notion is to train the bass long enough that
they will recall the tone after weeks or even months of
feeding in the open sea. When the tone is set off, they
will swim back to an underwater cage and be caught.
Even in the open sea, the fish are territorial and thus
tend not to swim that far from home. If the plan is suc-
cessful, aquaculturalists could raise better-tasting fish,
the researchers suggest, inexpensively and with less
food and waste. The popular press applied the term
“Pavlovian fish” to the project.

for war on terror. USA Today, p. 2A.

trained in Croatia to find land mines. Retrieved October
honeybees-trained-in-croatia-to-find-land-mines.

Training a fish to come home. (2008, April 11). The
Week, p. 22.

Vergano, D. (2006, November 26). Honeybees join the
bomb squad. USA Today, p. 7D.

Biology, Cognition, and Learning

Lecture/Discussion Topic: Biological Predispositions

In 1924, John D. Watson stated: “The importance of
stimulus substitution or stimulus conditioning cannot be
over-rated . . . so far as we now know . . . we can take
any stimulus calling out a standard reaction and substi-
tute another stimulus for it.” Richard Nisbett and Lee
Ross note that few hypotheses in psychology have ever
been so amply disconfirmed, although it took nearly
four decades of research for investigators to realize it.

Watson himself was among the first to find refuting
evidence. Although he and Rosalie Rayner successful-
ly conditioned Little Albert to fear a rat by pairing the
rat with a loud noise, other experiments in their lab
were not so successful. One of Watson’s students tried
pairing a block of wood, as well as a cloth curtain, with
noise, but conditioning failed to occur.

John Garcia was the person most responsible for
challenging the prevailing behaviorist view. In addition
to the results of the taste-aversion studies cited in
the text (in which rats, sickened as late as several hours
after tasting a distinctive flavor, learned to avoid that
flavor), Garcia found that if rats were made ill several
hours after eating a food of familiar taste but unfami-
lar shape, they did not show subsequent avoidance of
the differently shaped food. If, however, the rats were
shocked immediately after eating the differently shaped

food, they learned to avoid eating food of that shape. If
they were shocked immediately after eating food having
a new taste, they did not learn to avoid that food. The
rats were obviously predisposed to learn that distinctive
taste cues when followed by delayed gastric distress
should be considered suspect, and that distinctive spa-
tial cues when followed by immediate somatic pain
should be considered suspect. To summarize:

1. unfamiliar taste — delayed illness — avoidance
2. familiar taste and unfamiliar shape — delayed
   illness — no avoidance
3. unfamiliar shape and immediate shock —
   avoidance
4. unfamiliar taste and immediate shock —
   no avoidance

Additional research replicated and extended
Garcia’s findings, providing many examples of dif-
fferential preparedness to learn certain associations. For
example, rats show more fear of a gradual light onset
followed by a gradual shock onset than of a gradual
light onset followed by a sudden shock onset. Similarly,
they show more fear of a sudden light onset followed
by a sudden shock onset than of a sudden light onset
followed by a gradual shock onset. Rats seemed primed
to learn that sudden things are signaled by sudden
things and gradual things by gradual things. Finally, a
rat can be taught in a single trial to avoid shock from
a grid floor if it can escape to a smooth black floor.
However, if the compartment to which it must escape
has a grid floor continuous with that of the shock com-
partment, it takes approximately 10 trials for the rat
to learn the avoidance response. As Nisbett and Ross
observe, the rat is predisposed to assume (and quite rea-
sonably) that the grid floor is the cause of its pain and
does not readily form the hypothesis that merely chang-
ing compartments will eliminate the pain.

Rinehart and Winston.

Nisbett, R., & Ross, L. (1980). Human inference:
Strategies and shortcomings of social judgment. Upper
Saddle River, NJ: Prentice Hall.

Classroom Exercise: Human Taste Aversions

Taste aversions are particularly good for illustrating
classical conditioning. Perhaps you can share one of
your own and explain it in terms of conditioning prin-
ciples. For example, I (MB) tell my students of my
aversion to commercially produced frozen chicken din-
ers. Some years ago, I stored a dinner in the freezer
compartment of our department’s refrigerator. When I
went to retrieve it, I found it in the company of a fro-
en laboratory rat. I learned that a student assistant, not
knowing how to dispose of the deceased animal, had
carefully packaged it in plastic and temporarily placed it in the freezer, but I now find all such dinners repulsive. If asked, students are sure to volunteer aversions of their own.

Psychologist Paul Rozin states, “Many people find slimy foods upsetting or anything with mucoid texture.” This is an example of what he calls “secondary disgust,” disgust for something that looks or feels similar to something disgusting in its own right. Rozin notes how research participants in one of his experiments were presented with two pieces of chocolate fudge, one shaped to look like a muffin, the other a replica of dog droppings. Guess which one participants avoided.

Ask your students to react to the following tasteful situations described by Rozin. Then, compare their responses with those of Rozin’s 143 participants. Students should respond on a 9-point scale from 1 = dislike extremely through 5 = neutral to 9 = like extremely.

For the first four questions, dream up a bowl of your favorite soup, one that would score an unqualified 9 on our scale.

1. Now imagine that the soup was served to you in an ordinary bowl, but had been stirred by a thoroughly washed, used flyswatter. How much would you like to eat that soup?
2. If that flyswatter were brand new, how much would you like to eat the soup?
3. If the soup was first stirred with a thoroughly washed but used comb, how much would you like to eat it?
4. If the soup was served in a thoroughly washed, used dog bowl, how much would you like to eat it?

Now fantasize about your favorite cookie, again one that would rate a 9.

5. How much would you like to eat this cookie if you’d dropped it on the grass first?
6. How much would you like to eat it if a waiter had taken a bite first? an acquaintance? a good friend?

Clearly, the association principle is everything when it comes to food. The idea that something disgust the week of Seligman’s illness, the first of Garcia’s reports was published.


Classroom Exercise: Explaining Taste Aversions

Although much of the discussion of learning clearly focuses on the behaviorist perspective, you can take this opportunity to reinforce (pun fully intended here!) what your students have learned about the other theoretical perspectives in psychology. Ask your students to imagine how a cognitive psychologist, a biologically oriented psychologist, and an evolutionary psychologist might differently explain the phenomenon of taste aversion. You can have them role-play a debate between these psychologists. Or, have them design a hypothetical experiment to pit two different theoretical perspectives against each other in predicting the behavior of a learner in a taste-aversion scenario. Alternatively, you
could ask them to evaluate the adequacy of the different theoretical perspectives in explaining

- instinctual drift (the tendency for a learner’s behavior to revert back to instinctual behaviors and away from conditioned responses)
- placebo effects (Wikipedia has a well-written page about the concept of “placebo.” It includes a brief review of the literature on placebo effects and a short paragraph on the “nocebo effect” (when expectations lead to a worsening of symptoms in a placebo condition); see http://en.wikipedia.org/wiki/Placebo).
- second-language learning (Why is it easier to learn a second, third, or fourth language in childhood than in adulthood?

Have your students generate a list of other phenomena they’d like to try to explain!

Lecture/Discussion Topic: Mindful Learning

Ellen Langer’s (2000) distinction between mindful and mindless learning highlights the importance of cognitive processes in education.

Langer argues that learning requires mindful engagement with the material in question. Mindfulness, she writes, is a “flexible state of mind in which we are actively engaged in the present, noticing new things, and sensitive to context.” Being mindful involves drawing novel distinctions and thereby avoiding mind sets that limit us. When we are in a state of mindlessness, “we act like automatons who have been programmed to act according to the sense our behavior made in the past, rather than the present.” Past research findings, notes Langer, suggest that mindfulness leads to increased competence, fewer accidents, and improved memory, creativity, and positive affect. (See Handout 2 in the Consciousness and the Two-Track Mind unit, for Brown and Ryan’s Mindful Attention Awareness Scale and a discussion of related research.)

Mindlessness, Langer argues, comes about through both repetition and single exposure. For example, if we repeat some task many times, we may come to establish a mind-set for performing it. We may drive a familiar route so often that finally the car seems to arrive at the destination by itself. Similarly, if we process information without questioning it, that is, without considering the alternative ways it could be understood, we take it in mindlessly. It will not occur to us to reconsider it. Our commitment to “one” understanding may later be to our disadvantage. Langer identifies three myths or mind-sets that detract from our ability to learn.

Myth 1 is that “the basics should be learned so well that they become second nature.” The problem is that if we learn the basics so well it will not occur to us to change them when we need to. In one study, Langer and her colleagues taught research participants a new sport, “smack-it ball,” in which the players wear a glovelike racket. Some were taught “this is how you play the game”; others were told, “here is how it could be played.” After all were well practiced, the researchers substituted a much heavier ball. Those who learned the game mindfully were better able to accommodate than those who took the basics for granted.

Myth 2 is that “to pay attention to something, we should hold it still and focus on it.” Attending to a still image is difficult; it fades from view. However, attending to an image mindfully, noticing different things about it, is easy. In several studies, Langer’s research team asked participants to pay attention to a stimulus or to notice new things about it. Whether the participants were elderly or children with attention problems, instructions to vary the target of attention improved performance. Not only is the task easier, but people remember more about the target of their attention and like it better.

Myth 3 is that “it is important to learn how to delay gratification.” The problem with this idea is that it suggests tasks are inherently good or bad. Evaluation resides in our minds, not in the tasks. Work and study are not negative. However, we often make them appear to be so. Langer and Sofia Snow asked a group of people to evaluate the humor in cartoons, in some cases calling the task “work” and in other cases “play.” When they called it work, people tended to enjoy it less and their minds were more likely to wander. In other studies, people engaged in activities they did not like (viewing art, watching football). Some were led to engage the task the way they typically did, while others were asked to notice new things about it. The more the people noticed, the more they liked the task. Mindful learning engages people and the experience tends to be positive.


Learning by Observation

Applications of Observational Learning

Student Project: Acquiring a Skill Through Observation

Bem Allen (2003) offers practical advice for mastering valuable everyday skills: Be highly conscious and thoughtful in observing a model who possesses some ability you lack. In addition to finding a model who will allow you to watch, you would benefit from obtaining the active cooperation and support of the model.

Allen illustrates how you might use this advice in learning to speak well in public. The model might be a member of student government or an officer in your fraternity or sorority. Personally knowing the model will likely help in gaining his or her cooperation. Begin by identifying your own problem areas—for example,
beginning a speech, typically a critical and often frightening part of public speaking. Observe how your model begins a speech. He or she may “tell a funny story,” or talk “off-the-cuff,” without notes, about reasons that the topic is important. When you have seen enough to feel ready to try it on your own, begin a speech in a nonthreatening setting with your model in attendance for later consultation. Repeat this process for ending a speech, keeping an audience interested, and other aspects of speech making that you find important and difficult. By repeating this cycle of asking pertinent questions of your model, having him or her demonstrate the answer, and then practicing in the presence of the model, you gradually gain confidence with regard to your own performance. Eventually, you will be able to perform regularly and effectively on your own.

Finally, Allen suggests some everyday skills that lend themselves well to mastery through this kind of observational learning: Gaining the confidence of a child, asking a person for a date, selling a product, keeping an argument civil, breaking off a conversation, asking a favor of a friend, and starting a conversation with a stranger.


**Lecture/Discussion Topic: Germans Who Helped Jews Escape**

The Social Psychology unit in these resources includes the results of Perry London’s study of European Christians who helped Jews flee Nazi Germany. London found, among other things, that those who risked their lives to rescue Jews from the Nazis tended to have had a close relationship with at least one parent who modeled a strong moral or humanitarian concern. The study could provide a good introduction to the significance of observational learning.

**Lecture/Discussion Topic: Observational Learning**

Robert Cialdini’s discussion of “Social Proof: Truths Are Us” (2009) provides a rich resource for a lecture on or discussion of observational learning. For example, Albert Bandura has shown how modeling can eliminate undesirable behaviors. In one study, nursery school children, chosen because they were terrified of dogs, merely watched a little boy playing happily with a dog for 20 minutes. As a result of this experience, 67 percent were willing to climb into a playpen with a dog and remain confined there petting and scratching the dog while everyone else left the room. Their observations seemed to have a lasting positive effect. One month later, the children were more willing than ever to approach dogs. Subsequent research has indicated that filmed models have the same effect. The greatest reduction in fear occurred when the film clips depicted a variety of other children interacting with their dogs. Observational learning may be strongest when we perceive many performing the same action.

Filmed models have been used in therapy for diverse problems. Socially withdrawn children watched a variety of scenes in which a clearly shy child is treated positively when he interacts in a social activity. The impact was obvious. After watching the film, the shy children began to interact with their peers at a level equal to that of other children in the school.

Cialdini suggests that our tendency to imitate the behavior of others is exploited in a variety of settings. For example, television executives seem to know what they are doing when they use canned laughter. Experiments indicate that the technique causes an audience to laugh louder and more often when humorous material is presented. Advertisers love to tell us that their product is the “fastest growing” or “largest selling.” The fact that many others are using it prompts us to buy it. Bartenders salt their tip jars with a few dollar bills to demonstrate appropriate customer behavior. The producers of charity telethons devote a great deal of time to listing the viewers who have already pledged contributions on the premise that others will follow suit.

Research indicates that imitative behavior is more likely to occur in ambiguous situations. For example, bystanders’ decisions to help are much more influenced by the actions of other bystanders when the situation is unclear. We are also more likely to imitate the behavior of those who are similar to ourselves. The effects of similarity may be seen in the suicide statistics compiled by sociologist David Phillips. His studies indicate that highly publicized suicides tend to prompt other troubled individuals who are similar to the suicide-story victim to kill themselves. Cialdini sees the factors of uncertainty and similarity coming together to induce the herdlike suicide of the members of People’s Temple cult at Jonestown, Guyana, in November 1978. His analysis also helps us to understand the 39 suicides of the Heaven’s Gate cult in spring 1997.


**Classroom Exercise: Contagious Yawning**

Whether you are a human, a chimpanzee (Bartholomew & Cirulli, 2014), or a wolf (Romera, et al., 2014), when you see others yawn, you may find yourself yawning as well. But not everybody has this experience; about 40 to 60 percent of people do. Researchers have posited that the behavior may be tied to empathy. Ivan Norscia and Elisabetta Palagi (2011), for example, found that people were more likely to experience contagious yawning if they caught the yawns from family. Alex Bartholomew and Elizabeth Cirulli (2014) found no connection to empathy. Instead they found age to be
negatively correlated with contagious yawning; the older the participants were, the less likely they were to yaw in response to seeing others yawn.

Try this with your students. Researcher Alex Bartholomew has created a 3-minute video of people yawning (youtu.be/pToyPkrju1o). As you show the video, ask students to raise their hands after they yawn, and keep their hands up until the end of the video. After the video, with hands still up, ask students who felt the urge to yawn but suppressed it to also raise their hands. What percentage of the class yawned or suppressed the urge to yawn?


**Class Activity: Contagious Sniffing**

Anat Arzi and colleagues at the Weizmann Institute of Science (2014) have found that humans experience contagious sniffing. They had volunteers watch the movie *Perfume* in which the characters sniff about once every two minutes during the first hour. Sniffing was measured using a meter that measures nasal airflow. Because they didn’t want participants to artificially increase their sniffing, participants were given a cover story that falsely explained that the researchers were calibrating equipment and that the movie was just to keep them from getting bored. In helping to sell the cover story, participants were hooked up to other sensors that measured muscle contractions and galvanic skin response, for example.

Not only did the volunteers sniff when they saw someone in the film sniff, they sniffed even longer when they just heard someone in the film sniff without seeing the object the person was sniffing.

The following video shows four clips of a woman sniffing and the sniffing data from volunteers, showing that the volunteers sniff when the woman in the clip sniffs: http://chemse.oxfordjournals.org/content/suppl/2014/01/23/bjt113.DC1/ArziFilm1___mov. Show the video to students and ask them to notice if they inhale more deeply through the nose when the woman in the video sniffs. Acknowledge that there are demand characteristics in this demonstration that were not there for the research participants.

Invite students to try this with their friends. At an opportune time, start sniffing, and notice if those around you begin sniffing as well.

The researchers suggest that mirror sniffing is about identifying a source of odor that someone else is smelling, much like how we look in a particular direction when we see others looking in that direction. Sniffing is more prominent when we can’t see the object the other person is sniffing; they argue, because we have to rely completely on smell to tell us what it is and where it is.


**Lecture/Discussion Topic: Parents and Television Watching**

In a review of the research literature, Craig Anderson and colleagues (2003) highlight the important role of parental monitoring and guidance in reducing the harmful effects of media violence. They conclude that the impact of media violence can be reduced “if parents guide their children’s media exposure and discuss their interpretation of media violence with their children.” Research suggests that when parents speak negatively about violent TV or restrict viewing of violent television content, children show less aggressive attitudes. On the other hand, if parents watch TV with their children and say nothing about the violent content, children demonstrate stronger aggressive attitudes.

This analysis clearly reaffirms the importance of the following guidelines for parents that an American Psychological Association task force on television issued in 1992:

- Maintain an activities time chart, including TV viewing, playing with friends, and homework. Discuss what to eliminate as well as its substitute.
- Establish a weekly viewing limit. Have children select programs from television schedules at the beginning of the week. Assign points to specific programs and set a point total for the week. Less desirable programs may cost more to watch.
- Rule out TV at certain times, say, at mealtimes or on school nights.
- Encourage the entire family to make a program choice before turning on the TV.
- Remember that you provide a model. If you watch a lot of TV, chances are that your children will, too.

In monitoring the violence children see, the task force suggests that caregivers:
• watch at least one episode of the programs their children watch to know the frequency and degree of violence.
• when viewing violence with children, discuss why it occurs and how painful it is. Ask how conflict might be resolved without aggression.
• explain how violence on programs is faked.
• encourage children to view programs with characters who cooperate and care for one another.


*Lecture/Discussion Topic: Children Can Learn Violence from Parents*

For a wealth of resources on raising children in a non-violent way, visit actagainstviolence.org. This website, based on psychological science, is geared toward parents and professionals who work with parents. Their fact sheets, available in English and Spanish, cover 26 different topics, including information on what kinds of cognitive and social skills children have at different ages, how to handle tantrums and bullying, and how to manage anger, both felt as a parent and expressed by a child.

ACT’s media campaign includes one video, four radio spots, and six posters (actagainstviolence.apa.org/resources/psa/index.html). Any of these would be appropriate as discussion launchers on what children learn about violence through observing their parents.

Invite students to share their own stories on what they learned about violence from watching their parents. For an easier discussion, ask students who have young people in their lives what they believe those young people have learned about violence by watching older children and adults.
For each example, identify the unconditioned stimulus, unconditioned response, conditioned stimulus, and conditioned response.

1. While Omar was having a cavity filled by his dentist, a few times the drill hit a nerve that had not been dulled by anesthetic. Each time he cringed in pain. Omar now gets anxious each time he sees the dentist.

   Unconditioned Stimulus
   Unconditioned Response
   Conditioned Stimulus
   Conditioned Response

2. Maria eats fried chicken that has E. coli in it and ends up vomiting for hours that night. Luckily, she recovers within a day, but now just the thought (or the sight or the smell) of fried chicken makes her nauseated.

   Unconditioned Stimulus
   Unconditioned Response
   Conditioned Stimulus
   Conditioned Response

3. At a football game, every time the home team scores a touchdown, the person behind you blasts an air horn near your ears causing you to wince. Unfortunately for you, the home team scores frequently. As the end of the game nears, the home team scores a touchdown, and even though the inconsiderate fan behind you has left, you still wince.

   Unconditioned Stimulus
   Unconditioned Response
   Conditioned Stimulus
   Conditioned Response

4. Duy has been humiliated in the past for doing poorly on tests. When that has happened, he would get so upset he would shake. Now when presented with a test, he begins to shake.

   Unconditioned Stimulus
   Unconditioned Response
   Conditioned Stimulus
   Conditioned Response

5. Joseph has a fluffy down pillow with some of the down sticking out of the fabric. When he first tries out the pillow, a piece of down tickles his nose and he sneezes. He now sneezes every time he lays down on any kind of pillow.

   Unconditioned Stimulus
   Unconditioned Response
   Conditioned Stimulus
   Conditioned Response
HANDOUT 1a (continued)

6. It is springtime and the pollen from the flowers causes you to sneeze. Soon you are sneezing at the mere sight of a flower, real or fake.
   - Unconditioned Stimulus
   - Unconditioned Response
   - Conditioned Stimulus
   - Conditioned Response

7. You ride a roller coaster and get sick afterward. Now, whenever you are near a roller coaster, you feel queasy.
   - Unconditioned Stimulus
   - Unconditioned Response
   - Conditioned Stimulus
   - Conditioned Response

8. Your relationship is going badly and your significant other has yelled at you without warning several times. You now feel tense and fearful any time that you are around him or her.
   - Unconditioned Stimulus
   - Unconditioned Response
   - Conditioned Stimulus
   - Conditioned Response
For each example, identify the unconditioned stimulus, unconditioned response, conditioned stimulus, and conditioned response.

1. Every night Jasmine comes home from an exhausting day at work, sits down in front of the television, and falls asleep. One Friday night she invites a friend over to watch a movie. Just a few minutes into it, Jasmine is asleep.

   Unconditioned Stimulus
   Unconditioned Response
   Conditioned Stimulus
   Conditioned Response

2. Carlos just got a new puppy, Bowser. Every morning, Carlos walks to the back door, takes Bowser’s leash off the hook, and says, “Want to go for a walk?” After leashing Bowser, they take a 30-minute stroll around the neighborhood. After just a couple weeks, any time Carlos goes near the leash, Bowser gets excited.

   Unconditioned Stimulus
   Unconditioned Response
   Conditioned Stimulus
   Conditioned Response

3. One day at the off-leash dog park, a Great Dane, just wanting to play, pounces on Bowser a little too hard, causing Bowser to yelp in fear. Now any time Bowser spots a really big dog, he crouches in fear.

   Unconditioned Stimulus
   Unconditioned Response
   Conditioned Stimulus
   Conditioned Response

4. Carmelia is newly in love. She programs a specific ringtone into her phone for this special person. Whenever that person calls, her heart pounds with excitement. Now all it takes is hearing that ringtone, on her phone or someone else’s phone, for her to quiver with excitement.

   Unconditioned Stimulus
   Unconditioned Response
   Conditioned Stimulus
   Conditioned Response

5. Carmelia is no longer in love. In fact, she and that special person have just gone through a horrific break-up, which has left her feeling very angry. Even though she has deleted the ringtone from her phone, she occasionally hears it on others’ phones. Whenever she does, her heart pounds in anger.

   Unconditioned Stimulus
   Unconditioned Response
   Conditioned Stimulus
   Conditioned Response
6. Jamal’s grandmother bakes the best chocolate chip cookies. Ever since he was a young child, he would smell the baking cookies, be given one that had been out of the oven for just a few minutes, producing the expected saliva. Now whenever Jamal smells chocolate chip cookies, he salivates.

Unconditioned Stimulus

Unconditioned Response

Conditioned Stimulus

Conditioned Response

7. Svetlana hears a siren, looks in her rearview mirror at the flashing lights of a police car, and pulls over. This is the first time she has ever been pulled over, and she is shaking with nervousness. She was going just a little over the speed limit and gets a warning to slow down. Now whenever Svetlana is driving and she hears a siren and sees flashing lights behind her, she begins shaking.

Unconditioned Stimulus

Unconditioned Response

Conditioned Stimulus

Conditioned Response

8. Unfortunately Svetlana’s driving woes continued. One day another driver ran a stop sign and crunched into the side of her car. Fortunately she wasn’t injured, but the accident badly scared her. Now whenever she approaches that particular intersection, she feels a little scared.

Unconditioned Stimulus

Unconditioned Response

Conditioned Stimulus

Conditioned Response
HANDBOOK 2

For each example, identify the unconditioned stimulus, unconditioned response, conditioned stimulus, and conditioned response.

1. In 2004 Ken Jennings won $2.5 million from a 74-game Jeopardy! winning streak. When he hears the theme music from the show, he tenses up.

   Unconditioned Stimulus
   Unconditioned Response
   Conditioned Stimulus
   Conditioned Response


2. When he was 5-years-old, Attis Clopton fell into a creek, went under water, and was rescued by his cousin. Four years later, he brashly jumped into a pool. Unfortunately, he didn’t know how to swim. He thought he was drowning, but then discovered he was in the shallow end and could stand up. With that, his fear of water was complete. He couldn’t even put his face under the shower spray without feeling panicked.

   Unconditioned Stimulus
   Unconditioned Response
   Conditioned Stimulus
   Conditioned Response


3. In 1971, an estimated 20 percent of American military personnel fighting in Vietnam was addicted to heroin. Those who were addicted stayed in Vietnam for treatment until their heroin dependence was gone. Once they returned to the States, how many would stay away from heroin in that first year? About 95 percent. How were so many able to stay clean? Vietnam is a very different environment from the United States. The soldiers associated the environment of Vietnam with heroin use so that Vietnam created a craving for the drug. Back home, the cues for heroin weren’t there, so there was no craving.

   Unconditioned Stimulus
   Unconditioned Response
   Conditioned Stimulus
   Conditioned Response


4. If you get several relaxing massages with a lavender-scented oil, eventually just the smell of lavender will be enough to make you relaxed.

   Unconditioned Stimulus
   Unconditioned Response
   Conditioned Stimulus
   Conditioned Response

<table>
<thead>
<tr>
<th>Positive: Results in receiving something</th>
<th>Reinforcement: Behavior increases or strengthens over time</th>
<th>Punishment: Behavior decreases or weakens over time</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(Reinforcer is something given and desired)</td>
<td>(Punisher is something given and aversive)</td>
</tr>
</tbody>
</table>

| Negative: Results in having something taken away, removed | (Reinforcer is something taken away and aversive) | (Punisher is something taken away and desired) |
Reinforcement and Punishment

Identify the type of operant conditioning illustrated in each example. Consider these questions for each.

a. What behavior is changing?
b. Is the behavior increasing (reinforcement) or decreasing (punishment)?
c. Is something being added to the person’s experience (positive) or being subtracted (negative)?

PR = Positive reinforcement  P = Positive punishment
NR = Negative reinforcement  NP = Negative punishment

1. When Olivia makes rude noises at the dinner table, she gets her mouth washed out with soap. She doesn’t make rude noises that often anymore.
2. Little Joey gets yelled at when he acts up in class. Now he’s acting up even more.
3. Because Tameka earned an A in each of her classes, she doesn’t have to do her usual chore of vacuuming this month. She’s studying even more now.
4. Ray came home past his curfew, so he was not allowed to drive for the following week. He hasn’t missed a curfew since.
5. Maria put in extra hours at work helping her boss finish a major project. She received a big bonus for her contributions. She’s now looking for other ways to contribute at work.
6. When Thuy and Gurpreet were running around the living room, they crashed into the Xbox, breaking it. They no longer run through the living room.
7. Chandler’s girlfriend, Monica, keeps bugging him to take her dancing. He finally agrees, and she quits bugging him. The next time she starts bugging him, he quickly agrees to do whatever it is. (Chandler’s behavior is changing.)
8. Monica’s boyfriend, Chandler, gives in when she starts bugging him about something. Now whenever she wants something, she just starts bugging him. (Monica’s behavior is changing.)
In real life, continuous reinforcement is rare. Sometimes responses are reinforced, sometimes not. Among the most important schedules of partial reinforcement are the fixed ratio (FR), variable ratio (VR), fixed interval (FI), and variable interval (VI). Identify the schedule in the examples below by writing your answer—FR, VR, FI, or VI—in the spaces on the left.

1. Buying state lottery tickets and sometimes winning.
2. A hotel maid may take a 15-minute break only after having cleaned three rooms.
3. Checking your cell phone to see if you have a new text message when your phone is on silent.
4. A baseball player gets a hit approximately every third time at bat.
5. Checking the oven to see if chocolate chip cookies are done, when baking time is known.
6. A blueberry picker receives $1 after filling 3 pint boxes.
7. A charitable organization makes an average of 10 phone calls for every donation it receives.
8. Repeatedly calling a garage mechanic to see if your car is fixed yet. (Assume that the calls have no impact on your mechanic’s behavior.)
9. A student’s final grade improves one level for every three book reviews submitted.
10. A dog watches out the window to bark at the postal carrier who arrives every morning promptly at 10:05.