Chapter 7

Learning

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PsychSim 5 Tutorials: Classical Conditioning

Worth Video Series:

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  Video Anthology for Introductory Psychology: Learning – Classical Conditioning and the Immune System: Combating Lupus
Video Anthology for Introductory Psychology: Learning – Overcoming Fear

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PsychSim 5 Tutorials:

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Worth Video Series:

Video Anthology for Introductory Psychology: Learning – Driving

Video Anthology for Introductory Psychology: Thinking and Language – Learning through Visualization: A Gymnast Acquires New Skills

Video Anthology for Introductory Psychology: Learning – Bandura’s Bobo Doll Experiment

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Video Anthology for Introductory Psychology: Learning – Classic or Not?

Video Anthology for Introductory Psychology: Thinking and Language – Learning through Visualization: A Gymnast Acquires New Skills

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Multimedia Suggestions

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Video Anthology for Introductory Psychology: Thinking and Language – Learning through Visualization: A Gymnast Acquires New Skills

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HANDOUT 7.4: Punishment and Reinforcement
HANDOUT 7.5: Schedules of Reinforcement

Chapter Objectives

After studying this chapter, students should be able to:

1. List three key ideas in the definition of learning and discuss the relationship between learning and behaviorism.

2. Describe classical conditioning. In doing so, identify the unconditioned stimulus (US), unconditioned response (UR), conditioned stimulus (CS), and conditioned response (CR) in Pavlov’s experiments and other preparations, including drug overdoses.

3. Compare the acquisition, second-order conditioning, extinction, and spontaneous recovery of a classically conditioned response.

4. Discuss how stimulus generalization and stimulus discrimination occur in classical conditioning.

5. Describe the events surrounding the experience of Little Albert, noting in particular how this case appeared to bolster the behaviorist view of conditioned emotional responses.

6. Identify the cognitive elements of classical conditioning, with focus on the principles identified in the Rescorla-Wagner model.

7. Identify the neural elements of classical conditioning, with a focus on the involvement of the cerebellum and the amygdala.

8. Identify the evolutionary elements of classical conditioning, especially conditioned food aversions and preferences and the concept of biological preparedness.

9. Define operant conditioning and distinguish between a classically conditioned response and an operant response.

10. Describe Thorndike’s puzzle box and state the Law of Effect.
11. Discuss the methodological and theoretical contributions of B. F. Skinner to the study of reinforcement and punishment, including how reinforcement can produce superstitious behavior.

12. Define and give an example of positive reinforcement, negative reinforcement, positive punishment, and negative punishment.

13. Describe types of primary and secondary reinforcers and punishers; also discuss the impact of delayed reinforcement and punishment.

14. Discuss the role of context in operant conditioning by describing the three-term contingency and noting the roles of discrimination and generalization in the stimulus control of behavior.

15. Describe how an operant response is extinguished and contrast operant extinction with extinction of a classically conditioned response.

16. Explain how schedules of reinforcement affect learning; include examples of fixed interval, fixed ratio, variable interval, and variable ratio schedules.

17. Explain how the shaping of successive approximations to a desired behavior can eventually produce that behavior.

18. Identify the cognitive elements of operant conditioning, especially the concepts of latent learning and cognitive maps identified by Edward Chace Tolman.

19. Identify the neural elements of operant conditioning, with a focus on the involvement of structures in the “pleasure center” of the brain.

20. Identify the evolutionary elements of operant conditioning, especially the “misbehavior” of organisms that was first identified by Marion and Kellar Breland.

21. Explain how observational learning can occur in humans, noting especially Bandura’s research on learning aggressive responses, and how observational learning can spread via a diffusion chain.

22. Describe several studies demonstrating observational learning in animals.

23. Identify the neural elements of observational learning, with a focus on mirror neurons.

24. Define implicit learning and describe a simple form of implicit learning, habituation.

25. Describe how cognitive and neural approaches to the study of implicit learning have yielded characteristics of implicit learning that distinguish it from explicit learning.

26. Identify the learning strategies that psychologists have found are related to improved classroom performance.
I. Classical Conditioning: One Thing Leads to Another

(Chapter Objectives 1–8)

Learning is some experience that results in a relatively permanent change in the state of the learner. Habituation is a general process in which repeated or prolonged exposure to a stimulus results in a gradual reduction in responding.

Classical conditioning is a kind of learning in which a neutral stimulus, or conditioned stimulus (CS), is paired with a meaningful event, or unconditioned stimulus (US). In his initial work, the founder of classical conditioning, Ivan Pavlov, paired a neutral aural tone with the presentation of food. The pairing of these stimuli repeatedly during the acquisition phase of classical conditioning eventually allowed the presentation of the previously meaningless tone to elicit a response called a conditioned response. Extinction of a learned response will occur if the CS is presented repeatedly without being followed by the US, and spontaneous recovery will occur if an organism is allowed a rest period following extinction. Stimulus generalization occurs if a CS that is similar to the one used in the original training is introduced; however, stimulus discrimination is important for learning how to tell the difference between relatively similar stimuli.

Behaviorists, including John Watson, viewed classical conditioning as an automatic and mechanical process. He believed that there were no higher-level functions, such as thinking and awareness, needed to understand behavior. It turned out that the underlying mechanisms of classical conditioning are more complex than the simple association between a CS and a US. The brain is involved in many types of conditioning, as in the case of fear conditioning and the action of the amygdala. The evolutionary aspects of classical conditioning show that each species possesses biological preparedness, a propensity for learning particular kinds of associations over others.

Lecture Suggestion 7.1

Mind Your Ps and Qs

It’s a shame Steve Graham, Charles Zaner, and Elmer Bloser couldn’t all get together for, oh, maybe a friendly game of basketball. They’d have a lot to talk about and probably a lot in common. You see, Steve Graham is a professor of Special Education and Literacy at Vanderbilt University, where he studies the importance of writing and penmanship in the education process. Zaner unfortunately died in 1918, and Bloser wasn’t far behind (in 1929), but together they formed the Zaner-Bloser Company, specialists in teaching penmanship (and currently providers of all manner of educational materials). Ah, they would have made a lovely team, these three . . .

Graham and his colleagues have found that when children are taught handwriting, they also learn how to learn and how to express themselves. The automaticity of good writing skills should indeed contribute to gains in spelling, organization of thoughts, clarity of expression, and so on—all skills that are valued in the education process. In fact, a recent study demonstrated that primary school teachers believe students with greater facility in
handwriting produced superior written assignments. Both the quality and quantity of this work resulted in higher grades for the students. The keys seem to be fluidity and speed, rather than the exact curl of the curlicue or the exact riff of the serif. Between kindergarten and fourth grade children think as they write; the later skill of mentally composing before physically enacting comes later in the developmental sequence. As such, not having to fumble over one’s uppercase motions or struggle over how to make a W should contribute to better expressive writing and greater immediacy of ideas.

Sounds great. What the schoolmarm recommended —“practice, practice, practice those letters”—seems like an easy way to lubricate the learning process. But the reality is grim. Graham’s research found that only 12% of teachers had taken a course in how to teach penmanship, and surveys by Zaner-Bloser Inc. and other companies suggest handwriting instruction tops off around an hour a week and more typically about 10 minutes a day. That’s down from about 15 minutes daily in the 1980s and way down from the 45 daily minutes recommended by Zaner-Bloser in the 1960s and 1970s. Not surprisingly, the decline in penmanship instruction parallels the rise of computer use in the schools; who cares about Austin Palmer or Donald Thurber when Steve Jobs has so much to offer? (Austin Palmer developed the Palmer Method of handwriting instruction, and Donald Neal Thurber popularized the D’Nealian method.) A little more emphasis on those basics, however, might yield surprising increases in the overall quality of student learning.

Sources:


Lecture Suggestion 7.2

Love Me, Love My Product

What do these scenarios have in common?

- Superstar athlete Michael Jordan has been seen in television commercials selling Rayovac batteries, Hanes underwear, and Ball Park Franks (the ones that plump when you cook ’em).
Superstar athlete Troy Aikman has been seen in print and television ads selling Acme Brick and spicy chicken wings for WingStop.

Superstar athlete George Foreman has fashioned a lucrative second career by pitching a seemingly infinite number of George Foreman grills. (By the way, he has five sons, all of whom are named George.)

These are all cases in which a well-known person is associated with something he probably knows precious little about. Granted, Troy Aikman and George Foreman, like most human beings, probably know how to eat. But what does Michael Jordan know about the inner workings of an alkaline battery? For that matter, if you can remember back far enough, what did Muhammad Ali know about killing roaches when he starred in those D-Con roach trap ads in the 1970s?

Simply put, these celebrities don’t need to know much of anything about the products they’re endorsing. As far as Madison Avenue is concerned, it should be sufficient that the classical conditioning principle of transfer of affect takes place. Viewers (especially those watching sporting events, when these commercials are likely to air) hold a favorable view of the celebrity. That celebrity is seen repeatedly associated with a (presumably neutral) product. Over time, the positive feeling produced by the celebrity ought to be induced by the appearance of the product itself. And once you feel good about a product, why not buy several for your home?

Ask your students if they can think of other examples of endorsement by association. Some clear cases are a beautiful model associated with a new car, or free popcorn and hot dogs associated with buying appliances or sporting goods. Does it matter if the good-feeling-inducing celebrity knows anything about the product? For example, Chuck Norris and Bruce Jenner both pitch for exercise equipment; as athletic types, their endorsement might be more significant. Could advertisers simplify the process any further? For example, suppose a commercial simply flashed a smiley face and a toilet brush repeatedly on the television screen. With enough pairings, would the principles of classical conditioning kick in to make viewers feel as happy about the toilet brush as they do about the smiley face? Frame your discussion within the parameters of conditioning and learning, and encourage your students to share the plentiful examples that are all around them in print, television, and radio ads.

Lecture Suggestion 7.3

Why Does Classical Conditioning Occur?

According to Ivan Pavlov, classical conditioning is the result of stimulus substitution. According to this explanation, the nervous system is structured in such a way that the CS comes to be substituted for the US. Thus, the brain begins to perceive the CS as the US; that is, the bell is now perceived as being meat powder by the dog’s brain. If Pavlov’s theory was correct, then the CS should elicit the exact same response as the US every single time. However, that is not the case. For example, oftentimes the CR is weaker than the UR; for instance, the dog does not produce as much drool to the CS as to the US.
More significantly, there are situations in which the CR is different from the UR. In situations where a light (CS) is paired with electric shock (US), the UR that the subject emits is a jump or flinching response, but when the CS is presented by itself, the CR displayed by the subject is a freezing response. This has led psychologists to develop explanations that include cognitive components. Rescorla and Wagner proposed that the CS provides information about the delivery of the US. In other words, as a result of repeated pairings of the CS with the US, the organism learns that the CS is a reliable predictor of the US and thus displays the CR in anticipation of receiving the US.

**Lecture Suggestion 7.4**

Counterconditioning

Many students are curious to know if Watson and Rayner ever removed the conditioned fear that they had created in Little Albert. Did Little Albert go through the rest of his life with an irrational fear of white rats and other furry objects? While it had been Watson’s intention to remove the conditioned fear, Albert’s mother left Johns Hopkins for another job and took Albert with her. Not long after that, Watson left Johns Hopkins himself because of his affair with one of his students, Rosalie Raynor. In the end, it was a friend of Raynor’s, Mary Cover Jones, at Columbia University who did the experiment that Watson was unable to do. Jones was treating a young boy she identified as Peter. For some reason, Peter had a fear of white rabbits. Mary Cover Jones was able to successfully remove this fear by conditioning an opposing emotional reaction. She presented Peter with a favorite food, graham crackers, while he sat in a high chair. As Peter was eating the graham crackers, a rabbit was brought into the room and kept at a distance from Peter. Although he was initially wary of the animal, he continued to eat his food. Over a number of days, the rabbit was brought closer and closer to Peter while he ate his graham crackers. Peter was eventually able to have the rabbit in his lap; the relaxation and pleasure associated with the food had now replaced the fear he had originally.

Source:


**Classroom Exercise 7.1**

Applying Classical Conditioning, Part I

**Handout 7.1** presents several common examples of classical conditioning. Distribute the handout to your students, and either as an in-class exercise or short take-home assignment, ask them to comment on each scenario. Here are some suggested answers:

1. Dogs are sometimes disciplined by being swatted (US) with rolled up newspapers or magazines or by a squirt from a water bottle (CS). Fear is a natural response to being hit or squirted (UR) and a conditioned response (CR) to the sight of such objects.
2. Arturo has been attacked (US) by monkeys (CS) in the past. Fear of monkeys (CR) is an acquired response, and fear of attacks (UR) is more reflexive. Extinction is occurring as contact continues without further incident—that is, presenting the CS (monkeys) without the US (pain from the attack). Moreover, a bit of counterconditioning is also taking place as the cuddly, affectionate movie-star monkeys elicit feelings incompatible with fear.

3. Screeching tires (CS) often cause people to tense and flinch (CR). The lack of this response during a car race suggests that stimulus discrimination may be present. Because neither Fred nor Bob has had an accident, higher-order conditioning may account for their learning. Specifically, screeching tires (CS) often give rise to mental images of accidents. These mental images are already established conditioned stimuli, providing the basis for the CS-CS pairing.

4. The sight of Clementine (CS) elicits romantic excitement (CR) in Joel. The response was extinguished when Clementine failed to stimulate her partner (US). The reaction one year later suggests spontaneous recovery—the reappearance of the conditioned response after an apparent extinction.

5. The turkey—its appearance, smell, and taste—is the source of the CS and also the US: the contamination. The nausea pattern is naturally elicited by contaminated foodstuffs (UR) and is an acquired response to specific foods (CR). In the example, stimulus generalization is taking place as Bill generalizes across fowls.

**Classroom Exercise 7.2**

**Applying Classical Conditioning, Part II**

**Handout 7.2** provides more examples of classical conditioning in daily life for your students to consider. Here are some suggested answers:

1. Kathleen’s accident

   **US:** The accident.

   **UR:** Autonomic responses that accompany a traumatic or fearful event. These responses include changes in heart rate and respiration, dilation and constriction of blood vessels, perspiration, dilation of pupils, inhibition of digestive processes, and release of energy to skeletal muscles.

   **CS:** Any neutral stimuli that were available at or near the scene of the accident could have become conditioned stimuli.

   **CR:** Activation of the autonomic nervous system, producing bodily changes similar to those that occurred at the time of the accident.
2. Calvin and the rooster

US: Being chased and assaulted.

UR: Autonomic responses that accompany fear and pain. These responses include changes in heart rate and respiration, dilation and constriction of blood vessels, perspiration, dilation of pupils, inhibition of digestive processes, and release of energy to skeletal muscles.

CS: The rooster. Before the attack, the rooster was a neutral stimulus.

CR: Autonomic responses similar to those that occurred when he was chased and assaulted. The responses are, of course, less intense than they were originally.

3. Jackie and Judy

US: Being fed, held, and caressed as an infant or child.

UR: Autonomic responses that accompany positive emotions like happiness, security, contentment, or comfort.

CS: Characteristics of a mother, or the person who was associated with feeding, holding, and caressing.

CR: Autonomic responses that accompany positive emotions.

Classroom Exercise 7.3

Squirt—A Single Student Demonstration

This is an engaging demonstration that you can use with your class to demonstrate the principals of classical conditioning. For this exercise, you will need a volunteer, a squirt bottle, something to keep the participant from getting soaked (towel, trash bag, raincoat, or poncho), and the list of words below.

As you read this list of words to your participant, you will squirt them each time you read the capitalized word “CAT.” When “cat” is not capitalized, you do not squirt your participant.

You should tell your participant that you will read them a list of words and spray them with water at certain intervals. Make sure that this is okay with them (informed consent). Do not tell them that your spraying is going to be linked to any particular word. They will learn this as they become conditioned. Ask the rest of the class to watch the demonstration and note the participant’s behavior.

See if the participant flinches the second time you read the word “CAT.” If they do, you have demonstrated one trial learning. Pay attention to how many times you have to say the word “cat” without spraying them before they stop showing the CR (extinction).
At the end of the list when you read the word “CAT” for the first time in 30 words, does the participant flinch (spontaneous recovery)?

Cop, stop, CAT, cow, limp, cat, wish, girl, vat, chocolate, CAT, key, screen, fair, cheese, CAT, ran, can, tape, CAT, desk, CAT, knob, rat, tape, CAT, dish, clip, tan, air, CAT, hat, case, cow, ban, CAT, tour, CAT, box, dish, care, CAT, ring, catch, CAT, vote, dish, CAT, crane, well, fire, CAT, dish, team, cape, apple, CAT, dog, blue, car, CAT, dish, cake, call, cat, vase, break, pair, cat, spin, share, cat, cat, camp, dish, bridge, scale, dog, cat, van, board, cat, hat, three, warn, disk, cast, past, pen, car, far, dime, dog, blue, can, wish, girl, chocolate, cow, stop, lime, crane, well, fire, cat, care

Questions for students to consider:

- Did you see conditioning in just one trial? In other words, after one pairing of CS and UCS, did the CS produce the CR when presented by itself?
- How quickly or slowly did the CR become extinguished? In other words, how many presentations of the CS in the absence of the UCS were required before extinction occurred?
- Did you see spontaneous recovery? In other words, after the CR extinguished, did it appear again without the presence of the UCS?
- Did you see any generalization? In other words, did your participant exhibit the CR to words that sounded like “cat?” To what sort of words did the participant exhibit generalization?
- Ask your students to speculate on whether there might be individual differences in responding and ask them to identify what factors might play a role in these differences.

Classroom Exercise 7.4

Drool Time—A Whole Class Demonstration

Here’s a simple, quick, but powerful demonstration of classical conditioning.

- Bring a can of sweetened lemonade powder and a large package of small drinking cups to class.
- After discussing Pavlov’s work (or, if you’d prefer, as an introduction to his work), give each student a cup half-filled with lemonade powder.
- Choose a word as a neutral stimulus to serve as the conditioned stimulus (‘Pavlov’ would work just fine, but you can pretty much use any word you’d like).
- Instruct students to moisten the tip of their index finger, dip it into the powder, and then place it on their tongues whenever you give a prearranged signal (such as raising
Tell students that you will occasionally say the words “test trial” instead of giving the signal. When this happens, students should refrain from tasting the powder and instead close their eyes and concentrate on their own experience.

Present the CS (i.e., say “Pavlov”), and then after a delay of 1 second, give the signal for students to taste the lemonade powder (i.e., raise your arm).

These learning trials should be repeated every 10 to 15 seconds, with test trials (in which you say, “Pavlov . . . test trial”) occurring after every 10 learning trials.

After each test trial, ask your students to indicate who is salivating during the test trials by a show of hands (the majority of students should be salivating by the 7th or 8th trial).

After most students show reliable evidence of conditioning, you can demonstrate extinction by continuously giving test trials (i.e., saying “Pavlov . . . test trial” over and over) until students no longer salivate. During the next class session, demonstrate spontaneous recovery by saying the word “Pavlov” and asking for a show of hands for those who salivate!

Sources:


**Classroom Exercise 7.5**

Pupils’ Pupils

Here’s a simple classical conditioning experiment that students can perform on themselves at home. Students will need a bell, a handheld mirror, and a room that becomes completely dark when the light is turned off (e.g., a small bathroom or a closet).

Tell students to hold the bell while standing in the room near the light switch.

After they’re in position, they should ring the bell and then immediately turn off the light.

After waiting in total darkness for about 15 seconds, they should turn the light back on.

They should wait another 15 seconds with the light on, and then ring the bell and immediately turn the light back off (for another 15 seconds in the dark).
Students should repeat this procedure 20 to 30 times, making sure that in each case the bell is rung immediately before the light is turned off.

After numerous trials, students are ready to see the results. With the light on, they should watch their eyes closely in the mirror and then ring the bell. Students’ pupils should dilate slightly even without a change in light!

What’s going on here? Because pupils naturally dilate and constrict according to the amount of light intensity, the darkness in this study is an unconditioned stimulus (US) that leads to the unconditioned response (UR) of pupil dilation. By repeatedly pairing a neutral stimulus (e.g., the sound of the bell) with the unconditioned stimulus (i.e., darkness), the bell has become a conditioned stimulus (CS) that elicits the conditioned response (CR) of pupil dilation.

Source:

**Classroom Exercise 7.6**

Rescuing Rescorla

The Rescorla-Wagner model introduced an important cognitive element to classical conditioning. It depends on the fact that organisms set up an expectation of events in their environment, an observation that accounts for why some US-CS pairings lead to behavior whereas others don’t. More technically, the Rescorla-Wagner model allows quantitative predictions about the amount of learning that will take place on a trial-by-trial basis, given the parameters of an organism’s prior knowledge of the CS-US association and the salience of both conditioned and unconditioned stimuli.

To help your students understand the predictions of the Rescorla-Wagner model, Michael J. Renner developed an Excel spreadsheet program that illustrates how behavior changes over 500 learning trials. Students can set the parameters and see the changes in outcomes for themselves. In this way, the more abstract predictions of the theory can become tangible for your students, thereby lending themselves to greater comprehension of the theory’s properties.

Michael Renner is now teaching at Drake University. If you contact him he might have the Excel file available. If not, try visiting this site: http://pirate.shu.edu/~vigorimi/Learning/Downloads/Excel/EX_dwnlds.htm.

Sources:
Michael J. Renner, Departments of Biology and Psychology, Drake University, 122 Olin Hall, Des Moines, IA 50311: http://artsci.drake.edu/biology/node/48


**Multimedia Suggestions**

**Feature Film:** *A Clockwork Orange* (1971, 136 min, originally rated X, re-rated R)
Stanley Kubrick’s classic film tells the story of little Alex and his band of droogs as they commit mayhem on the general populace. Several scenes (which have pretty much entered the public’s general consciousness) illustrate behaviorist principles, especially counterconditioning.

See the Preface for product information on the following items:

*Interactive Presentation Slides for Introductory Psychology*: 7.1 Classical Conditioning

*PsychInvestigator* Classical Conditioning

*PsychSim 5 Tutorials* Classical Conditioning

*Worth Video Series*

Video Anthology for Introductory Psychology: Learning – Pavlov’s Discovery of Classical Conditioning

Video Anthology for Introductory Psychology: Learning – Classical Conditioning and the Immune System: Combating Lupus

Video Anthology for Introductory Psychology: Learning – Overcoming Fear

Video Anthology for Introductory Psychology: Learning – Watson’s Little Albert

*Scientific American Introductory Psychology Videos*: Pavlov and His Legacy

**II. Operant Conditioning: Reinforcements from the Environment**

(Chapter Objectives 9–20)

*Operant conditioning*, as developed by B. F. Skinner, is a kind of learning in which behaviors are shaped by reinforcement. Behaviors in operant conditioning that are reinforced are more likely to occur, and the contingencies between actions and outcomes are critical in determining how an organism’s behavior will be displayed. Whereas classical conditioning involves behaviors that are elicited from an organism, operant conditioning deals with overt and emitted behaviors. *Shaping* by successive approximations is a procedure that encourages organisms to manipulate the environment.
in a way that may not be natural for them to do. Reinforcement is any operation that functions to increase the likelihood of the behavior that led to it, unlike punishment that functions to decrease the likelihood of a behavior.

Like classical conditioning, operant conditioning shows acquisition, generalization, discrimination, and extinction. The schedule with which reinforcements are delivered has a dramatic effect on how well an operant behavior is learned and how resistant it is to extinction. Also like classical conditioning, operant conditioning is better understood by taking into account underlying neural, cognitive, and evolutionary components. Latent learning and the development of cognitive maps in animals clearly implicate cognitive factors underlying operant learning.

**Lecture Suggestion 7.5**

Opportunity NYC, by Way of Mexico

Not many people have heard of Oportunidades (previously called Progresa), a government program developed in Mexico in the late 1990s. The goal of the program is to reduce poverty in rural areas by providing cash incentives to families for having their children attend school on a regular basis, for visiting health clinics, and for improving nutrition. It has served as a model for similar programs in Brazil, Jamaica, Turkey, Chile, Honduras . . . and the United States.

Opportunity NYC is another program not a lot of people have heard of, mainly because it began only in April 2007. Mayor Michael Bloomberg solicited over $40 million in funds from the Rockefeller Foundation, the Open Society Institute, the Robin Hood Foundation, and his own personal foundation. Modeled on Oportunidades, it is an experimental Conditional Cash Transfer program, which means receipt is conditional upon the recipient’s actions. In this case, the funds are earmarked for poor families, adults, and children who do the following:

- Attend parent-teacher conferences $25
- Obtain a library card $50
- Take the PSAT $50
- Graduate from high school $400
- Maintain health insurance $20 or $50 per adult
- Obtain preventative health screenings $100 to $200 per family
- Maintain full-time employment $150/month
- Complete job training or educational courses $200 to $400
As of September 2007, some 5,000 families were chosen at random from the rolls of people receiving housing assistance in New York City. These eligible families earn about $22,000 a year for a family of three, putting them just above federal poverty standards. Half of the families will receive incentive money, while the other half will serve as a control group. This sound experimental design will be in place for a test phase of two years; after that, private funding may give way to tax funding.

It remains to be seen whether the monetary reinforcement of socially desirable behaviors will produce the same types of substantial changes seen in Mexico and the more than 20 other countries that have tried something similar. If it does, it will be a social experiment worth considering for other underserved populations.

There’s one additional interesting link to psychology in all of this. After being a social psychology professor and provost at Yale for 25 years, then serving as the seventh president of the University of Pennsylvania (and the first woman to hold that position at an Ivy League university) for another 10 years, Judith Rodin is currently the president of the Rockefeller Foundation (one of Opportunity NYC’s major contributors). You might mention that to your students: A career in psychology can lead to unexpected places.

Sources:

http://opportunityny.org

http://www.robinhood.org/

http://www.oportunidades.gob.mx/ [in Spanish]


Lecture Suggestion 7.6

Bombs Away!

Animals have consistently played a prominent role in learning and conditioning experiments, from Edward Thorndike’s cats to Edward Tolman’s rats to the disobedient menagerie of Marian and Keller Breland. Included in this list are some very famous pigeons that almost helped the national defense.

B. F. Skinner worked at the University of Minnesota during the Second World War. Interested in applying the principles of operant conditioning to the war effort, Skinner trained pigeons to peck at disks that had moving pictures of enemy targets displayed on them. The pecking served to close electronic circuits, which in turn formed a self-regulating system. Although this is no great feat in itself—these actions faithfully follow the most basic rules of operant conditioning—Skinner’s vision was to install his pigeons, disks, and circuits in gliders packed with explosives. The idea was to have the pigeons peck on cue to manipulate the circuits, which in turn would keep the glider on its kamikaze course toward an enemy target. A neat, tidy bombing run, with no loss of human life.
The National Defense Research Committee gave Skinner $25,000 to pursue this work, but ultimately killed the project in 1944. (Project Orcon, short for “organic control” or “controlled by a pigeon or mouse or bat or some small animal,” had been around in the military prior to Skinner’s suggestion; it was revived in 1948, then abandoned for good by 1953.) Skinner had demonstrated to top scientists that the homing device withstood electronic jamming, the apparatus was inexpensive to build, and the basic set-up could be applied to a range of enemy targets. Alas, the prospect of a pigeon put in charge of bombing runs seemed too far-fetched for military leaders.

Sources:


Lecture Suggestion 7.7

Why Pop Quizzes Are a Good Idea

Here’s a way to have some fun in the classroom. Walk in to your next class meeting, put a stern look on your face, and announce that there will immediately be a pop quiz worth 50% of the final grade. After the tears, howling, and shrieking subside, you can tell your students you were just kidding. Though, in fact, unannounced quizzes might not be such a bad idea.

Haig Kouyoumdjian reports that giving unannounced 3-point multiple-choice quizzes throughout the semester produced a beneficial effect on students. Students were told that a total of six quizzes would be given (for a total of 18 points), although only 15 points would be counted. Therefore, a student could miss one quiz with no ill effects; in fact, a few extra credit points were given to students who took all six quizzes. This course also had a cumulative final exam worth 100 points. When asked to rate these markers of performance at the end of the semester, students reported that the unannounced quizzes had a greater influence on their motivation to attend class and to study the material, more so than the cumulative exam. Although the exam amounted to more total points overall, it was the prospect of pop quizzes that kept noses to the grindstone.

This is not surprising, and hence the link to learning. Reinforcement on a variable interval schedule tends to produce the highest rate of responding by an organism. Never knowing when the next quiz would be led students to maintain a high rate of studying and attendance. So much for intrinsic motivation! But if it works . . .

Source:

Kouyoumdjian, H. (2004). Influences of unannounced quizzes and cumulative exam on

**Lecture Suggestion 7.8**

The Hidden Cost of Reward

While reinforcement can increase the likelihood of a behavior occurring, there are concerns that rewards can undermine the inherent interest a person has for a task which would lead to declines in the behavior in the absence of reward. Mark Lepper and his colleagues (1973) investigated the hidden costs of reward in a study with preschool children. They gave these children a chance to play with colored markers, a relatively novel item in the 1970s, and recorded how much time the children spent coloring. This served as the baseline measure of the children’s interest in the markers. Two weeks later, the researchers returned and randomly divided the children into three groups: One group was asked to draw pictures with the markers, a second group was told they would get a certificate with a gold star if they colored with the markers, and a third group was asked to color pictures and then these students got a surprise reward at the end of the day that was just like the second group’s reward but not linked to their coloring behavior. A week later, the researchers returned to the classroom with the colored markers and left the markers out for the children to play with. They measured the amount of time children spent playing with the markers in this nonrewarded situation and found that the time spent with the markers declined for children who had been rewarded for their coloring, but there was no change in time spent coloring for the other two groups. Apparently coloring with the markers was now less interesting for the students who had been rewarded (paid) for their coloring, and they weren’t interested in using the markers in the absence of reward.

Source:


**Lecture Suggestion 7.9**

Lists of Learning

The list of learning theories seems pretty short: classical conditioning, operant conditioning, observational learning, cognitive theory, and maybe a few theories here or there that don’t quite fit those molds. Edward Tolman proposed six kinds of learning:

- **Drive discrimination.** Organisms can distinguish among various drive states, which leads them to modulate their behavior. For example, rats know that hunger, thirst, sexual, and aggressive drives are not all the same, so they act to achieve goals appropriate to the particular drive state being experienced.

- **Field expectancies.** Organisms learn which events in their environment lead to other events. For example, a dog may come to expect that when a barn door is opened it
will be followed eventually by cows trampling in. Confirmation of this expectation is the only reinforcement necessary.

- **Cathexis.** An association between a particular drive state and a particular stimulus is called a cathexis. For example, the drive state of thirst might become associated with certain stimuli, such as the typical means used to quench it (sugar-free Red Bull with a twist of lemon). When the drive occurs, a person will actively seek out the stimuli that have been associated with the drive’s satisfaction.

- **Equivalence beliefs.** Tolman thought that previously neutral events could develop the capacity of satisfying a need, as when seeing a red cardigan sweater comes to reduce a person’s need for affiliation. Equivalence beliefs are similar to secondary reinforcers in many ways, although Tolman emphasized social drives rather than physiological drives in this type of learning.

- **Field-cognition modes.** Tolman tentatively held that field-cognition modes were innate strategies, modified by experience, for approaching a problem-solving task.

- **Motor patterns.** This type of learning refers to the overt behavior patterns an organism must learn in order to obtain a desired goal. For example, a dog might learn to vigorously shake a fencepost in order to reveal the grubs and mealworms beneath it that provide a meal.

- In many ways, Tolman’s statement of these types of learning reflects his attempt to consolidate into a single system the best ideas from Clark Hull, Edwin Guthrie, Gestalt theories, operant conditioning, and his own views. Aspects of these various schools of thought are either implied or explicit in many of the types of learning Tolman proposed.

Source:


**Classroom Exercise 7.7**

We’re Not Jokin’, Try a Token

“Practice what you preach” finds a corollary in “practice what you teach.” As your students are learning about operant conditioning and the value of reinforcement, why not demonstrate it in your own classroom?

Kurt Boniecki and Stacy Moore suggest setting up a token economy in the classroom. Participation, especially in large classes, can sometimes be problematic. Nobody really likes a dull silence, yet at the same time, nobody really wants to be the first to break it. However, active engagement in learning—through asking questions, offering comments, or simply sharing viewpoints—can enhance the learning process for all concerned.
To shape participation, offer your students tokens as reinforcements for answering questions or (if you prefer) for simply speaking up in an appropriate fashion (i.e., hand raised, on topic, respectful of others).

The tokens themselves can be anything—checkers, marbles, your signature on a piece of paper—and the reward can be something suitable. (Boniecki and Moore gave students tokens for answering direct questions in class; these tokens were later exchanged for extra credit points on an upcoming exam.)

In your situation, consider having students exchange tokens for something else they value: candy treats, 5 extra minutes on an exam, a 4-hour grace period in submitting an upcoming assignment.

Boniecki and Moore reported that in over 11 class meetings, participation went up from a baseline after introducing the token economy, and response latency (i.e., quickness to answer questions) also increased.

Token economy: It works in hospitals, prisons, mental institutions . . . why not a large survey course as well?

Source:


**Classroom Exercise 7.8**

Operant Conditioning

This is an in-class exercise that you can do with your students to demonstrate the power of reinforcement on behavior. Divide the students into pairs, and have one student take on the role of experimenter and the other student be the research participant. Give the experimenter the data collection sheet **Handout 7.3** and have them read the research methods to themselves. Student experimenters will need to have some way of identifying two-minute intervals (watch, cell phone, clock) or you can have a single timekeeper for the entire class. Before you begin to collect data, you can have each experimenter read the instructions to their participant, or you can read a version of the instructions to the entire class.

Sources:


Classroom Exercise 7.9

Shaping a Student

You can liven up your coverage of operant conditioning with an easy, fun, and active demonstration of shaping successive approximations to a desired behavior.

■ Ask for a volunteer to serve as a “rat,” and send that person outside the classroom.

■ The remaining students should agree on a behavior for the rat to perform, such as turning off the lights, turning on the overhead projector, picking up a piece of chalk, scratching the head, and so on.

■ The students should also select a method of reinforcement: smiles (big or small), nods (slight or vigorous), or even pencil taps work well.

■ Tell your students that they should reinforce successive approximations of the desired goal behavior. That is, they should reinforce the rat (through smiling, nodding, tapping, or whatever reinforcement was chosen) when it is close to performing the behavior.

■ They should do nothing when the rat is far from the desired behavior.

■ Invite the “rat” back into the classroom, and explain that the “rat’s” task is simply to move slowly about the room and pay attention to the feedback that is given.

In short order you should find that your student-rat reliably executes the desired behavior, much to the amusement of all concerned!

You can extend this demonstration by comparing the effectiveness of reward versus punishment by shaping a second student’s behavior through the punishment of incorrect responses, for example, booing. Compare the experiences of the two students and see how much longer it takes the punished participant to figure out the target behavior.

Sources:


Classroom Exercise 7.10

Punishment vs. Reinforcement

Reinforcement is conceptually the opposite of punishment. Reinforcement serves to increase or strengthen a behavioral response, whereas punishment serves to decrease or
weaken a behavioral response. Either reinforcement or punishment can be positive or negative. Seems easy enough, yet students often have a hard time distinguishing negative reinforcement from punishment. **Handout 7.4** contains examples of behaviors that can be classified as positive reinforcement (PR), negative reinforcement (NR), or punishment (PUN). After you have discussed these principles in class, test your students’ ability to apply what they’ve learned by going over this short exercise. Here are the correct answers:

1. PR 6. PR 11. NR 16. PR
2. PUN 7. NR 12. PR 17. PUN
3. PUN 8. PUN 13. PUN 18. PR
5. PR 10. NR 15. PR 20. PR

**Classroom Exercise 7.11**

Reinforcement Schedules

After you have lectured on schedules of reinforcement, test students’ ability to apply fixed interval (FI), fixed ratio (FR), variable interval (VI), and variable ratio (VR) schedules to everyday behavior. **Handout 7.5** contains many real-world examples of these ways of administering reinforcement. Here are the correct answers:

1. FI 6. VR 11. FR 16. FI
2. VI 7. FI 12. FR 17. VI
3. VR 8. FR 13. FI 18. FI
5. FR 10. VR 15. VI 20. FR

Source:


**Classroom Exercise 7.12**

A Map of the World . . . or Part of It

Edward Tolman popularized the idea of a cognitive map at a time when such an idea was
not popular! The notion that organisms formed mental representations of their environments ran counter to the behaviorism of his time. With the renaissance of cognition in psychology, mental representation enjoyed a return to its rightful place inside the head.

Ask your students to sketch their own cognitive map of a familiar environment. If your university is in a small enough town, this might be the town itself. If your campus is large, choose that. If you live in a major city, choose a well-known district.

Regardless of what you choose, you should find that there are interesting similarities and differences in the maps your students produce. For example, if your university has dorms clustered in one area of campus, don’t be surprised to find that your students who live there produce detailed renderings of that section, and perhaps impoverished sketches of places on campus they rarely go. As a general principle, if most of your students shuttle between dorms and classroom buildings, you should find that out-of-the-way places, such as the bursar’s office or the maintenance department, are practically nonexistent on the maps. The same is true of city maps. The cognitive representations of the important and unimportant parts of your city should be a function of experience with those locations.

Discussion:

Discuss with your students how and why their maps came to be. What landmarks were central to most maps? Were there differences related to major, athlete status, sex, or years on campus? Were any features commonly left out? Were there differences between students who live on campus and those who commute? Like Tolman’s rats, your students should find that experience shapes our view of the world, in more ways than one.

Multimedia Suggestions

**Feature Film: Nova: Kings of Camouflage (2007, 60 min, not rated)** Finally, cuttlefish get the recognition they deserve! Both brainy and bizarre, cuttlefish are masters of camouflage in their natural environments and pretty good students as well. A small but significant number of researchers worldwide have relied on cuttlefish to study both classical and operant conditioning in the process of learning. You can learn more about this film by visiting [http://www.pbs.org/wgbh/nova/camo/](http://www.pbs.org/wgbh/nova/camo/).

**Web site: Cases in Negative Reinforcement**
(http://www.acs.brockport.edu/~mdesroch/Negative_Reinforcement/) This is a 2009 STP Instructional Resource Award–winning site created by Marcie Desrochers from SUNY–Brockport. It is designed to teach students about negative reinforcement and other basic principles of learning. The site includes definitions, examples, videos, and online quiz questions to help students master these concepts.

See the Preface for product information on the following items:

**Interactive Presentation Slides for Introductory Psychology:** 7.2 Operant Conditioning and Observational Learning
***PsychSim 5 Tutorials***

- Maze Learning
- Operant Conditioning
- Helplessly Hoping

***Worth Video Series***

- Video Anthology for Introductory Psychology: Learning – Thorndike’s Puzzle Box
- Video Anthology for Introductory Psychology: Thinking and Language – Problem Solving in Genus *Corvus* (Crows, Ravens, and Magpies)
- Video Anthology for Introductory Psychology: Learning – B. F. Skinner Interview
- Video Anthology for Introductory Psychology: Learning – Cognitive Maps

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***III. Observational Learning: Look at Me***

(Chapter Objectives 21–23)

Learning can take place through the observation of others and does not necessarily require that the acquired behaviors be performed and reinforced. Observational learning does not simply result in imitation; it can also show creative elements. A child who sees an adult behave in a gentle manner with a toy will often show a variety of gentle reactions, including ones that were not exhibited by the adult model. When one organism patterns its actions on another organism’s successful behaviors, learning is speeded up and potentially dangerous errors are prevented. These behavioral advantages can save an organism from considerable pain. At a neural level, mirror cells possibly provide an additional advantage related to imitation and expectation, which is why they are implicated in the process of empathy.

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***Lecture Suggestion 7.10***

This Just In: Chimp Spears Bushbaby for Evening Meal

One of the big headlines of 2007 may have escaped your attention: Some 22 observations have been made of Senegalese chimps fashioning spears to hunt for small mammals.

Perhaps you thought this kind of behavior was typical; after all, we’ve all seen those *National Geographic* specials where the chimpanzee dips a stick into a termite mound to pull out some tasty snacks. But this is different. For starters, anthropologist Jill Pruetz and biologist Paco Bertolani observed that chimps selected a living branch from a tree, stripped it of bark, and often sharpened the end with their teeth. In all, the apes typically
went through a four-step process to craft the tools. What’s more, the chimps in the Fongoli research site were observed jabbing the spears into the hollows of trees with enough force that they could easily stab a small mammal (such as a bushbaby) hiding there. The chimps would pull out the tool and smell or lick it after most jabs; again, these are not the actions associated with simple probing and poking.

Perhaps most interesting, however, is that this behavior was seen most often among adolescent females (and younger chimps in general). Adult males are usually regarded as hunters; however, as Pruetz points out, “It’s classic in primates that when there is a new innovation, particularly in terms of tool use, the younger generations pick it up very quickly. The last ones to pick up are adults, mainly the males.” Part of the reason, according to anthropologists, is that young chimps spend a great deal of time with their mothers, observing their behaviors and learning from them. The extension to human evolution is intriguing: females may have played a correspondingly key role in the development of tool use among humans.

As you relate this tale of learning to your students, you might also point out a common practice among primate field researchers. Pruetz and her research team spent 4 years habituating the chimpanzees to their presence; that is, tracking them through the bush, keeping up with their daily antics, and generally getting the chimps used to having humans loitering around. Four years can seem like a long time to spend learning in college, but it probably feels longer learning in the jungle. In either case the rewards can be invaluable.

Sources:


Multimedia Suggestions

*Interactive Presentation Slides for Introductory Psychology: 7.2 Operant Conditioning and Observational Learning*

*PsychSim 5 Tutorials* Monkey See, Monkey Do

*Worth Video Series*

Video Anthology for Introductory Psychology: Learning – Do Video Games Teach People to Be Violent?

Video Anthology for Introductory Psychology: Thinking and Language – Learning through Visualization: A Gymnast Acquires New Skills
IV. Implicit Learning: Under the Wires

(Chapter Objectives 24–25)

Implicit learning takes place largely in the absence either of awareness or of the actual learning or the knowledge of what was learned. Complex behaviors, such as language use or socialization, can be learned through this implicit process. Infants show intact implicit learning long before they develop conscious awareness. Even those with severe neurological disorders or psychosis show virtually normal implicit learning.

Implicit learning is mediated by areas in the brain that are distinct from those activated by explicit learning. The brain structures that regulate the implicit learning system evolved much earlier than those that regulate explicit processing.

Lecture Suggestion 7.11

Minds, Brains, and Programs

Imagine this claim: Girls’ and boys’ brains are assembled so differently that girls and boys respond differently to the environment, value experiences differently, encode information differently, and therefore should receive separate and different kinds of instruction in schools that capitalize on their strengths and minimize their weaknesses. Sound fishy? Maybe. Maybe not.

It’s fair to say that there is evidence for between-groups variability when comparing the brains of girls and boys, just as there is when comparing the brains of women and men. For example, parts of the interstitial nucleus of the anterior hypothalamus are larger in men than in women. There is also evidence that exposure to various sex hormones (androgens, estrogen, testosterone) during critical periods of development have an organizational effect on the brain development of girls and boys. Some evidence from impairment shows that women experience aphasia more often after anterior damage (rather than posterior damage) to the brain, whereas posterior damage in men more often affects speech. However, women seldom experience apraxia after left posterior damage, whereas men often do. These scattered examples provide only a brief sketch, but in short, a case can be made for sex differences in the brain.

Buoyed by such findings, The International Mind Brain and Education Society (IMBES) launched a 2007 journal, Mind, Brain, and Education, dedicated to the emerging field of educational neuroscience. With a center at Harvard University and members such as Howard Gardner, Kurt Fischer, and Maryanne Wolf, the society seeks to link findings in biology, cognitive neuroscience, and developmental psychology with the field of education. That seems a fine goal, as there is mounting evidence that a better
understanding of the brain can contribute to a better understanding of learning. For example, Dénes Szücs and Usha Goswami report evidence that both visual and pre-motor areas are active when children begin forming mental representations of letters. This suggests that trying to write their letters as they’re trying to recognize them might strengthen the learning process for children. Similarly, mental representations of numerical magnitude (e.g., 100 is bigger than 23) and physical size (e.g., a car is bigger than a dog) share neurons in common, suggesting that early-childhood activities of the car–dog variety may facilitate later acquisition of math skills.

But what about the sex differences? Note that these research-based findings hint at intriguing ways that brain science and education can be linked. Coupling this recent work with more established findings regarding sex differences may be premature, but it hasn’t stopped a movement arguing that girls’ and boys’ brains are assembled so differently that . . . you get the picture.

Michael Gurian, a self-described “social philosopher, family therapist, and corporate consultant,” holds a BA in journalism and a master of fine arts degree. Gurian points out that 70% of children diagnosed with learning disabilities, 80% of high-school dropouts, and less than 45% of college students are male. To the staff at the Gurian Institute, this indicates a need to radically change the way instruction is delivered. For starters, girls and boys should be educated in separate classrooms. Males have less serotonin in their brains, which contributes to their greater fidgetiness; removing desks from the classroom and having more frequent exercise breaks is the way to go. Girls, by comparison, with their greater amount of oxytocin, should have inviting areas where they can sit and discuss their feelings with one another. Boys’ greater competitiveness, due to higher levels of testosterone, should be funneled into timed multiple-choice tests, whereas girls should be encouraged to each do their best in whatever time it takes. Boys need brighter classrooms and louder teachers, because research suggests that males don’t see or hear as well as females. Boys are visually oriented learners, so teachers should sketch out a story before reading it. And while we’re at it: because most elementary school teachers are women, they tend to teach in the ways that they learn. Girl-learning and boy-learning are different, so teachers need to be taught to teach in different ways for different groups.

What seems to be at work in all of this is an unfortunately common experience at the forefront of science. As researchers gained a better understanding of emotional intelligence, it suddenly seemed that EQ was the lifeforce of . . . well, everything: management styles, curriculum development, relationship enhancement, personality differences. Scientists have recently made great strides in better understanding happiness: what produces it, how it is sustained, and how we misjudge its lingering effects. An industry of happiness gurus has arisen in the wake of these findings. Magnetic resonance imaging has opened a window to the brain that previously was nailed shut, but now “MRI” has become an adjective applied to many things to which it shouldn’t be applied. Research into sex differences in the brain is promising and enlightening. Knowing that evidence from neuroscience may one day better inform the educational process is encouraging; we want no child to be left behind. But a premature mash-up of science and opinion may fail its most important constituency: curious kids who are excited about learning stuff in school.
Sources:
http://www.michaelgurian.com/
http://www.gurianinstitute.com/
http://www.gendertrainings.com/
http://www.imbes.org/


**Lecture Suggestion 7.12**

The Message in the Music

Here’s a little tidbit that doesn’t have much to do with anything. Your sharp eye probably noticed that three of the subheadings in this chapter were lifted from song titles. These are:

*Look at Me*

Artist: Geri Halliwell (former Spice Girl)
Album: *Schizophonic*
Release Date: 1999
Label: EMI

*One Thing Leads to Another*

Artist: The Fixx
Album: *Reach the Beach*
Release Date: 1983
Label: MCA Records
Under the Wires
Artist: The Cramps
Album: Psychedelic Jungle
Release Date: 1981
Label: IRS Records

If you’d like to point this out to your students, they might think you’re hip: the “we’re reliving the ’80s” dance crowd will appreciate the Fixx reference, the “Spice Girls were my favorite when I was 7” crowd will recognize the Geri Halliwell allusion, and the “we’re creepy and underground” kids will immediately recognize The Cramps. If you’d like to play these tracks, bear in mind that none of them has much to do with actual psychology . . . except maybe the descriptively accurate One Thing Leads to Another in the case of classical conditioning. While you’re at it: recall that The Tokens had a big hit in 1961 with The Lion Sleeps Tonight. If you discuss token economies, you might toss that in as well!

V. Learning in the Classroom
(Chapter Objective 26)

A growing body of psychological research has identified what strategies and techniques do and do not work in facilitating students’ retention of material. While many students rely on cramming for their exams, a practice psychologists refer to as massed practice, research consistently demonstrates that spreading one’s studying out over a period of time, that is, distributed practice, is a much more effective learning strategy. Research has also shown that including practice testing with one’s studying of material also increases retention. Furthermore, when brief tests or quizzes are interspersed with classroom lectures students are more likely to pay attention in class and to take better notes, leading to increased success. Another benefit of testing, whether in class or as part of a studying strategy, is that the results of a test provide students with a clearer sense of what they do or do not understand. We know that one’s judgments of learning (JOLs), what one thinks they understand about a topic, influences what material a student decides to study. Unfortunately, students JOLs are wrong and they fail to study topics that they mistakenly think they have mastered. When students take a practice test, they get immediate feedback on the accuracy of their JOLs and can make corrections in their study strategies prior to an exam.

Other Film Sources

Behavior Modification with the Point System (2003, 22 min, IM). This how-to video is designed for people in occupations who need to rely on principles of behavior modification. It may be useful to illustrate the practical applications of learning theory.

B. F. Skinner’s Keynote Address (1990, 18 min, APA). Professor Skinner’s last public appearance was at the 1990 annual convention of the American Psychological Association, where he delivered the keynote address. His remarks focus on the analysis of behavior as the proper subject matter for psychology and a general historical overview of the development of psychological paradigms over the previous several decades.

Classical and Operant Conditioning (1996, 56 min, FHS). This feature provides an overview of behaviorism, learning theory, and the basic approaches of both classical conditioning and operant conditioning. Part of the Psychology of Learning seven-part series.

Discipline (2000, 22 min, FHS). This brief video argues, quite correctly, that punishment is less effective for teaching than is the skillful application of discipline, often in the form of setting appropriate limits for children as they grow and develop.

Further Approaches to Learning (1996, 56 min, FHS). Latent learning, learning sets, insight, the neuropsychological basis of learning, and social learning each get their due in this part of the Psychology of Learning seven-part series.

His Own Best Subject: A Visit to B. F. Skinner’s Basement (2000, 20 min, Davidson). Watch out! Don’t bump your head on that pipe. And the furnace is on . . . be careful not to back into it. Oh yeah; there’s also a bunch of cool inventions down here, that host Julie Vargas’s dad used to help him write about behaviorism.

How Children Learn (1997, 23 min, Davidson). This video is composed of whimsical animations that illustrate basic aspects of learning theory, but without jargon and professional terminology. It might be appropriate for teaching these concepts to certain types of audiences.

Inside Dyslexia (2007, 57 min, FHS). Theories of learning are important for understanding human behavior, but applications of learning are also helpful. This video illustrates some of the difficulties in learning associated with dyslexia.

The Learning Machine (2006, 30 min, IM). Animals and humans are effective learning machines. These machines run on many kinds of fuel: reinforcement, association, observation. Get under the hood and keep the gears grinding with this video.

Maria Montessori: Her Life and Legacy (2004, 35 min, Davidson). This profile of the life and work of Maria Montessori illustrates some applied aspects of learning theory.

Observational Learning (1987, 23 min, HARR). This video focuses on social learning theory and the effects of modeling on behavior. It includes a demonstration of the Bandura and Walters Bobo doll experiment.

Perception and Action: The Contributions and Importance of Non-Human Animal Research in Psychology (14 min, APA). A lot of classic findings in learning theory involved the participation of animals as research subjects. Animal research clearly plays a
significant role in many other areas of psychology. This video presents a broad look at the importance of non-human subjects in the conduct of science.

Understanding Learning Disabilities (1996, 16 min, FHS). Many of us take for granted the ability to read effortlessly, concentrate appropriately, or process information skillfully. The conditions that make such tasks a challenge are explored in this brief video.

Due to loss of formatting, Handouts are only available in PDF format.