



Conditioning and Learning

Instructor Manual

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This module covers classical and instrumental conditioning—two different but fundamental forms of learning—and observational learning.

Classical conditioning is the Pavlovian response that occurs when we make behavioral or emotional connections to a stimuli. Instrumental, or operant, conditioning shapes behavior through reinforcers or punishers. The behavioral outcome can often look very similar with each type of conditioning. The module covers both the similarities and the differences between the two.

Observational learning is the learning that occurs by watching others. The final section of this module describes the classic Bobo doll study by Albert Bandura and the factors needed for optimal observational learning to take place.

Learning Objectives

- Relevant APA Learning Objectives (Version 2.0)
 - Describe key concepts, principles, and overarching themes in psychology (1.1)
 - Describe applications of psychology (1.3)
 - Use scientific reasoning to interpret psychological phenomena (2.1)
 - Engage in innovative and integrative thinking and problem solving (2.3)
- Content Specific Learning Objectives

- Distinguish between classical (Pavlovian) conditioning and instrumental (operant) conditioning.
- Understand some important facts about each that tell us how they work.
- Understand how they work separately and together to influence human behavior in the world outside the laboratory.
- Understand the basic processes facilitating observational learning.
- Students will be able to list the four aspects of observational learning according to Social Learning Theory.

Abstract

Basic principles of learning are always operating and always influencing human behavior. This module discusses the two very fundamental forms of learning that are represented in classical (Pavlovian) and instrumental (operant) conditioning. Through them, we respectively learn to associate (1.) stimuli in the environment or (2.) our own behaviors with significant events such as rewards and punishers. The two types of learning have been intensively studied because they have powerful effects on behavior and because they provide methods that allow scientists to analyze learning processes rigorously. This module describes some of the most important things you need to know about classical and instrumental conditioning, and it illustrates some of the many ways they help us understand normal and disordered behavior in humans. The module concludes by introducing the concept of observational learning which is a form of learning that is largely distinct from classical and operant conditioning.

Class Design Recommendations

Learning is optimally taught over a 2-class period. This section of the course not only represents a major approach in the field of psychology, it also includes some of the terms and concepts with the highest levels of difficulty (Gurung & Landrum, 2014). Be prepared to spend extra time with examples of classical and operant conditioning.

For two long class periods we recommend extending the classical conditioning activity and showing a video reinforcing learning concepts with real world examples. Starting a video in the first class period and finishing and/or discussing it in the second class period is a good

way to bridge the segments of related material. If you have one long and one short class period adjust the schedule accordingly (e.g., move observational learning to class one if that is your longer session). See the supplementary resources for video recommendations.

Please also refer to the Noba PowerPoint slides that compliment this outline.

1st class period (50 min – 75 min):

- Definition of behaviorism, stress focus on empiricism
- Classical Conditioning paradigm (US, UR, CS, CR)
- Application of Classical Conditioning paradigm to human experience
 - Conditioned Emotions (e.g., advertising)
 - Conditioned Taste Aversion

2nd class period (50 min – 75 min):

- Definition of Operant Conditioning
 - Three-term contingency
- Description of basic procedures (reinforcement & punishment)
- Schedules of Reinforcement
- Application of Operant Conditioning to human experience
 - Shaping
- Observational Learning

Module Outline

Two types of conditioning

- Scientists began to understand animal and human behavior through two basic forms of learning.
- Ivan Pavlov conducted the classic experiment demonstrating what is today known as classical or Pavlovian conditioning. The experiment trains a dog to salivate to the ringing of a bell, a previously neutral stimulus.
- Classical conditioning is when an unconditioned stimulus (UCS), which elicits an unconditioned response (UCR), is paired with a conditioned stimulus (CS) to train a conditioned response (CR) when eventually the CS is presented alone.
- Classical conditioning is important today because it represents conditioning that is always occurring in our lives when neutral stimuli become paired with psychologically significant events.
- Edward Thorndike and B. F. Skinner studied instrumental or operant conditioning.
- Operant conditioning is based on the animal operating on its environment and adjusting behavior based on a reward or punishment.
- Thorndike's law of effect says that, "When a behavior has a positive (satisfying) effect or consequence, it is likely to be repeated in the future. When a behavior has a negative (annoying) consequence, it is less likely to be repeated in the future."
- Classical and Operant conditioning are both useful for understanding learning and are both evident in the real world.

Useful Things to Know about Pavlovian Conditioning

- A Pavlovian response is more complex than discussed in Pavlov's classic experiment. Pavlov measured salivation only, but this does not mean that salivation was the only response elicited from the organism, other systems needed for digestion (e.g., insulin production) would also react.
- Taste aversion conditioning can happen naturally such as a dislike of tequila after a night of drinking too much.
- Fear conditioning can happen when people associate cues with emotional responses and can cause anxiety disorders.
- Another emotional pairing is with drug use (legal and illegal) and the cues of the environment in which they are ingested. These cues elicit responses that compensate for the upcoming effect of the drug (e.g., becoming more sensitive to pain before a dose of morphine, which would take away pain).
- Pavlovian cues can also motivate operant behavior. In the presence of a cue (CS) a person

or animal will work harder to earn the reinforcement (e.g., food) or to avoid the punishment (e.g., electric shock).

The Learning Process

- Simply pairing a CS with a UCS is not enough for an association to be learned. The CS must be the first CS paired. When adding a second CS to condition an effect called blocking takes place. The conditioning of stimulus "A" blocks the learning of stimulus "B".
- An application of blocking is seen in learning the color of money. In the US all money is green and the number tells the amount. When visiting Canada color and number are paired, however Americans will often use only the numerical value and fail to learn the color of a Canadian bill.

Erasing Pavlovian Learning

- Extinction is the process of eliminating a conditioned response to a conditioned stimulus. The concept and process of extinction can be used as a therapy for some phobias – for example the conditioned stimulus of the spider no longer elicits fear.
- Spontaneous recovery is when the CS elicits an extinct response. Spontaneous recovery and the renewal effect imply that extinction merely inhibits the response and does not erase it.

Useful things to know about Instrumental Conditioning

- Instrumental or operant conditioning is based on a system of reward and punishment. The bigger the reward or punishment, the bigger the effect on behavior.

Instrumental Responses Come Under Stimulus Control

- The classic response is a food reward with lever pressing. But the lever pressing can be paired with a stimulus, such as a light, where food comes only when the lever is pressed while the light is also on.
- The stimulus controlling the operant response is called a discriminative stimulus. This stimulus does not automatically elicit the response, but sets the stage for the operant behavior to occur.

- Stimulus-control techniques are used in laboratories to study perception. They can test how well an animal can see, hear, or smell. They can also test higher-order cognition where there are multiple levers, each paired with a different discriminative stimulus.

Operant Conditioning Involves Choice

- In operant conditioning there is always a choice. Push the lever or don't push the lever. Choosing "right" gets one reward or reinforcer, but each alternative comes with its own reinforcement as well.
- The study of choices has led to the quantitative law of effect where the choice made is based on that choice and its reinforcer in comparison to all alternatives and their reinforcers.

Cognition in Instrumental Learning

- Animals learn about the specific consequences of each behavior and choose to perform a behavior based on how much they currently value the consequence.
- The reinforcer devaluation effect is when a trained aversion to one choice is remembered. A rat is given two levers, one lever is paired with a conditioned taste aversion and the other is not. After training and rest, the rat is observed again and will choose the lever not associated with the aversion even in the absence of reinforcing foods.
- Instrumental goal-directed behaviors can also become habits. Such that if the rat was conditioned to push a lever extensively before taste aversion training the habit will take over and the rat will continue to push this lever.

Pairing Classical and Instrumental together

- In the laboratory classical and operant conditioning are studied separately, but in the real world they almost always occur together. A person who is reinforced for drinking or eating excessively is often presented with the same stimuli – place or people – which also works as a cure for the behavior.
- The stimulus and response work together to the same outcome. These associations are common and automatic.

Observational Learning

- Sometime children learn through observing. Like at a playground, when a new kid arrives he might stand back and watch the game to understand the rules and how to play before joining in. He learning through observation.
- Bandura's Social Learning Theory says that people can learn novel responses through observation of others. Learning is not dependant on reinforcements, rather social models - the presence of someone to observe.
- Social models are people of higher authority (e.g., parents, teachers) or status (e.g., peer who already know the rules) to the person observing. Social models provide information as to how to act in specific situations.
- Bandura theorizes that observational learning is made up of four parts:
 - attention – the learner must pay attention to what they are observing
 - retention – the learner must remember what they have observed
 - initiation – the learner must be able to execute the observed behavior
 - motivation – the learner must want to learn what is observed
- In his most famous experiment, the Bobo Doll experiment, Bandura found that children who observed adults playing aggressively with the clown (Bobo) doll were more likely to play aggressively than children who observed adults who showed no aggression to Bobo.
 - Children used the social model of the adult to conclude that aggressive behavior was ok.
- However, children showed less aggression if they observed the adult who played aggressively receive punishment. Bandura called this vicarious reinforcement, as the children did not experience it [the punishment] directly, but were still influenced by it.

Regarding Difficult Terms

Please note that many students have a difficult time with what would otherwise be interesting and engaging material because of the many difficult terms involved with this topic. The abbreviations—CS, CR, UCS and UCR—can be a bit like learning vocabulary in a new language. Similarly, the various types of punishment and reinforcement can also be conceptually confusing, especially because of the similarity in terminology. Like learning a foreign language it may be helpful for students to create vocabulary flash cards or for you to post simple definitions (on the whiteboard, for example) if possible. Remember to be patient with your students here: for those who are confused or who begin daydreaming instead of paying attention it is not necessarily to concepts they are reacting to but, instead, the difficult

language.

Difficult Terms

behaviorism
classical conditioning
conditioned response (CR)
conditioned stimulus (CS)
conditioned taste aversion
instrumental learning
negative punishment
negative reinforcement
operant conditioning
Pavlovian conditioning
positive punishment
positive reinforcement
secondary reinforcers
shaping
social learning theory
stimulus discrimination
stimulus generalization
unconditioned response (UCR)
unconditioned stimulus (UCS)

Lecture Frameworks

Overview

Learning is a topic that can start out a bit confusing for students. The meaning of learning we talk about (classical and operant conditioning) is a bit different than what many students think of when they hear learning. They more often define learning as knowledge acquisition. This module is about the underlying mechanisms for learning. There are also a lot of terms to keep in mind, so going slowly and repeating information throughout the lectures helps. We also have included several activities and demonstrations that reinforce the terms and definitions

of learning.

First Class Period

- Discussion/warm-up
 - Start by asking students how they define learning. What is learning? How do we learn?
Although instructed to read before class – there will always be a mixture of those who have and have not. This general question works for both groups of students. Those who have not read will bring up preconceived notions, those who have read will likely state text definitions, but through probing you can get a sense of what they understand and where clarification is needed.
- Lecture – Refer to slides for the following:
 - To talk about classical conditioning. Cover Pavlov's classic experiment and the four parts of classical conditioning. Students can have a difficult time understanding which is the UCS the CS the UCR and CR. By going over these elements with the slides and activities multiple times, hopefully students will learn the distinctions and remember them forever.
 - To demonstrate CC via a "Rules" activity. *Before moving on, ask the students to write a short paragraph about how they felt when they saw the rules and thought there might be a quiz.*
 - To summarize key elements of classical conditioning.
 - To talk about some real world applications (e.g., advertising). Use the examples in the text and the notes from the slides as a springboard for other examples. Answer any student questions.
- Optional Quiz – This time a real quiz. Students can use the same paper from earlier. Ask students to identify the CS UCS CR and UCR from the lemonade activity, then answer questions from Appendix A.
- If you have time, we like to end this class with a video:
 - Smart Marine Mammals Nova Science Now (2009) run time – 10:35
<http://www.pbs.org/wgbh/nova/nature/smart-marine-mammals.html>
 - After the video discuss what types of learning was observed and what we can learn from animal behavior.

Homework – between class periods

Choose one or two of the discussion questions and post as online homework through your institution's course management system (e.g., Blackboard, Moodle).

Second Class Period

- Discussion/warm-up
 - Go over homework question(s) and answers (if assigned), or use one of the questions to start a discussion. These questions will get students oriented back to the topic and ready to learn about operant conditioning.
- Lecture – Refer to slides for the following:
 - To talk about operant conditioning. Plan to spend extra time on positive and negative rewards and punishments, as it is confusing for many students to grasp the concepts of negative rewards and positive punishments. There are examples in the slide notes with extra discussion questions.
- Optional Activity: Shaping (see Activities/Demonstrations)
 - Go through activity 2-5 times.
- Lecture – Refer to slides for the following:
 - To talk about Observational Learning. Cover Social Learning Theory and the Bobo Doll.
 - Ask students what they think observational learning is and how it works (depending on if they read or not you may get more brainstorming) then go through the four parts of observational learning.
 - Discuss the Bobo Doll experiment and show video (*use the one in text or the link from Supplemental Material; each approximately 5 minutes*)
 - To talk about some real world applications.
 - Ask students to think about the different types of learning we've covered and what types of learning they encounter most often.

- To review
 - Use the Appendix slides to quiz students or go over the material further.
 - Use review time to answer students' questions.

Activities & Demonstrations

Shaping activity

From the STP Primer:

- Shaping: Ask one volunteer to leave the room briefly. The remaining students should pick a simple behavior such as standing behind the podium, writing on the chalkboard, or turning the lights off/on. The remaining students should also decide on a “reinforcer” such as tapping on their desks or stomping their feet. When the volunteer returns to the classroom, instruct him/her to move around the classroom earning as many reinforcers (taps, stomps) as possible.
- This works well with students tapping a pencil on the desk, although there are types of clickers or noisemakers that could be purchased and used. Students usually need an example to learn how/when NOT to tap for incorrect behavior. It's easy to get caught up in tapping and forget why you are tapping.
- For the first try it is a good idea to tell the students they need to shape you and give a behavior such as to open the book on your podium or take a drink of water. Something simple and in this case you know the outcome, so can purposefully do wrong actions – hopefully the reinforcing tapping will stop – and right actions where the tapping will get stronger.
- Use 2-5 volunteers to give different students a chance to participate and the rest of the class gets multiple opportunities to learn when and how to tap.
- By the end of the trials students should understand how reinforcing behavior shapes behavior.
- After the activity ask students to think about reinforcers in real life that shape their behavior.

For example in elementary school getting a sticker for raising your hand. Or getting a big tip for extra service at work.

Additional Activities

Batsell, W.R. (2006). Acquisition, Extinction, and Renewal of Classical Conditioning: Updating Cogan and Cogan (1984). *Teaching Of Psychology*, 33(2), 129-131.

- Cogan and Cogan (1984) introduced a classroom demonstration of **classicalconditioning** that involved pairing a neutral cue with lemonade powder. This article reports an addition to the Cogan and Cogan method to incorporate the phenomenon of renewal. Renewal, a relatively new phenomenon in **classicalconditioning**, occurs when acquisition and extinction occur in different contexts. If testing occurs in the acquisition context or a neutral context, a return of responding to the extinguished cue occurs. This outcome provides evidence that extinction is new, context-dependent learning. This exercise promotes understanding the procedures and results of renewal experiments as well as the theoretical and clinical implications of this phenomenon.

Owren, M. J., Scheuneman, D. L., Nallan, G. B., Bentley, M., Lukas, K. E., Marr, M., & ... Batsell, W. r. (2000). Using animals to teach learning. In M. E. Ware, D. E. Johnson (Eds.) , *Handbook of demonstrations and activities in the teaching of psychology: Physiological-comparative, perception, learning, cognitive, and developmental, Vol. II (2nd ed.)* (pp. 107-123). Mahwah, NJ US: Lawrence Erlbaum Associates Publishers.

- "An Inexpensive Habituation and Sensitization Learning Laboratory Exercise Using Planarians" / Michael J. Owren and Dana L. Scheuneman / describes a lab exercise using planaria to give students hands-on experience with concepts such as dishabituation, spontaneous recovery and short- vs long-term habituation processes
- "A **ClassicalConditioning** Laboratory for the **Psychology** of Learning Course" / Gary B. Nallan and D. Mark Bentley / discusses a **classicalconditioning** component using existing operant **conditioning** equipment
- "Teaching Operant **Conditioning** at the Zoo" / Kristen E. Lukas, M. Jackson Marr and Terry L. Maple / explains the partnership forged by the authors between Georgia Tech and Zoo Atlanta that enabled students to observe zoo animals, develop a plan for shaping specific behaviors and implement the plan

- "Classical-Conditioning Demonstrations for Elementary and Advances Courses" / Charles I. Abramson, Tim Onstott, Shawn Edwards and Kathy Bowe / describes **classicalconditioning** procedures using common houseflies and earthworms
- "A Classroom Demonstration of Taste-Aversion Learning" / Michael R. Best and W. Robert Batsell, Jr. / explains procedures used to demonstrate the development of taste aversions in rats.

Shenker, J. I. (2008). Classical conditioning: An all-purpose demonstration using a toy watergun. In L. r. Benjamin (Ed.), *Favorite activities for the teaching of psychology* (pp. 109-111). Washington, DC US: American Psychological Association.

- In this popular in-class activity, students see human **classicalconditioning** actively unfold in an entertaining, understandable, and memorable demonstration. This demonstration requires minimal preparation, is easy to execute, and reliably generates excellent student questions and observations. It is appropriate for classes in introductory **psychology**, learning and memory, and cognition. It involves one or two student volunteers, usually takes 10 to 20 minutes, and can be used in most any class size.

Sparrow, J., & Fernald, P. (1989). Teaching and demonstrating classical conditioning. *Teaching Of Psychology*, 16(4), 204-206. doi:10.1207/s15328023top1604_8

Lawson, T. J. (2002). The media assignment: Enhancing psychology students' ability to apply their knowledge of psychology. In R. A. Griggs (Ed.) , *Handbook for teaching introductory psychology: Vol. 3: With an emphasis on assessment* (pp. 178-180). Mahwah, NJ US: Lawrence Erlbaum Associates Publishers.

- Describes a media assignment completed by 69 undergraduates that was designed to improve Ss' ability to apply their knowledge of psychological concepts to examples of real-world events. Ss collected examples from the popular media that illustrated operant **conditioning** (OC) or **classicalconditioning** (CC) concepts. Afterward, Ss took a quiz that contained factual and applied multiple-choice questions on OC and CC. Ss who collected examples of OC principles performed better than Ss who collected CC examples on quiz questions that assessed Ss' ability to apply their knowledge of OC. However, no effect was found with Ss who collected CC examples. Media assignments may enhance students' learning and their ability to apply course knowledge to real-world events.

Vernoy, M. W., Kohn, A., Kalat, J. W., Sparrow, J., & Fernald, P. (2000). Teaching classical conditioning. In M. E. Ware, D. E. Johnson (Eds.) , *Handbook of demonstrations and activities in*

the teaching of psychology: Physiological-comparative, perception, learning, cognitive, and developmental, Vol. II (2nd ed.) (pp. 127-134). Mahwah, NJ US: Lawrence Erlbaum Associates Publishers.

- Demonstrating **ClassicalConditioning** in Introductory **Psychology**: Needles Do Not Always Make Balloons Pop!" / Mark W. Vernoy / describes a demonstration to illustrate the **classicalconditioning** response of flinching or blinking when someone stabs a balloon with a needle.
- "Preparing for an Important Event: Demonstrating the Modern View of **ClassicalConditioning**" / Art Kohn and James W. Kalat / demonstrates **classicalconditioning** where the CR was significantly different from the unconditioned response (UCR)
- "Teaching and Demonstrating **ClassicalConditioning**" / John Sparrow and Peter Fernald / uses an apparatus called a Conditioner to demonstrate the **classicalconditioning** process; presents instructional guidelines for **teachingclassicalconditioning** and related processes.

Videos for inclusion

Inside the Animal Mind (2000)

Nature. (no longer available for purchase) If your department has a copy of this older Nature, it has several excellent examples of animal learning.

Episode Detail from TV guide: "Inside the Animal Mind," a three-part probe of animal intelligence and emotion, begins by pondering the question "Are Animals Intelligent?" The hour is full of examples of rats, elephants and birds using their "mental maps." Also: a dolphin is seen following a command in a way that clearly indicates it understood the command. Meanwhile, an orangutan washes clothes immediately after it sees a person doing the same thing. "Is this just aping," asks narrator Steve Kroft, "or does this animal understand what it is doing?"

Smart Marine Mammals Nova Science Now (2009)

Run time – 10:35

<http://www.pbs.org/wgbh/nova/nature/smart-marine-m...>

- This video shows learning in pinnipeds (e.g., walrus, sea lion). Examples of operant condition are shown in the school where researchers are working to understand how these animals think and learn. This video goes with the learning module, but could also be used in a discussion of the differences in human and animal intelligence.

What are animals thinking? (2012)

Short Clip – Aimal Morality run time 13:37 <http://www.pbs.org/wgbh/nova/nature/animal-moralit...>

- Do animals have a moral sense? To determine if dogs feel guilt researchers set up an experiment where a dog is told not to eat the treat. Then, while the owner is out of the room, the researcher takes the treat. When the owner returns the dog is chastised and acts guilty. But the dog did nothing, so is reacting to the tone/words of the owner. The dogs have been conditioned to respond this way. A second experiment is to determine if dogs understand fairness. The first dog is trained by placing a paw, but no reward is given. Then a second dog is brought in. When the second dog correctly places his paw, he gets a reward. After several trials, the first dog stops cooperating without a reward. The final two experiments in this clip are about empathy in animals and involve Bonobos and Rats.
- The full episode is available and includes stories of animal intelligence: <http://www.pbs.org/wgbh/nova/nature/what-animals-t...>

2014 NOVA: Inside Animal Minds

(purchase only no streaming)

<http://www.shoppbs.org/product/index.jsp?productId...>

- The description is similar to the 2000 series of the same name that is no longer available. The PBS description is: "What would it be like to go inside the mind of an animal? Now, the revolutionary science of animal cognition is revealing hard evidence about how animals understand the world around them, uncovering their remarkable problem-solving abilities, and exploring the complexity of their powers of communication and even their emotions. In the three-hour special "Inside Animal Minds," NOVA explores these breakthroughs through three iconic creatures: dogs, birds, and dolphins. We'll travel into the spectacularly nuanced noses of dogs and wolves and ask whether their reliance on different senses has shaped their evolution. We'll see through the eyes of a starling in flight and test the tool-using skills of one of the smartest birds, the crow. We'll listen in as scientists track dolphins

in the Caribbean and elephants on the African savannah, trying to unlock the secrets of animal communication. As we discover how researchers are pushing the animal mind to its limits, we'll uncover surprising similarities to—and differences from—the human mind."

2011 The Brain: A Secret History – Emotions; Bandura Bobo Doll Experiment

- YouTube (5 minutes): <https://www.youtube.com/watch?v=zerCK0IRjp8>
- Vimeo (full documentary – 60 minutes): <http://topdocumentaryfilms.com/brain-secret-histor...>
- This video clip is from a documentary that originally aired on BBC. It is not currently available from the BBC, but in addition to the two links above there are other sites that list it as available for streaming.
- BBC synopsis: Dr Michael Mosley continues his exploration of the brutal history of experimental psychology. Experiments on the human mind have led to profound insights into how our brain works - but have also involved great cruelty and posed some terrible ethical dilemmas. In this film, Michael investigates how scientists have struggled to understand that most irrational and deeply complex part of our minds - our emotions. Michael meets survivors - both participants and scientists - of some of the key historical experiments. Many of these extraordinary research projects were captured on film - an eight-month-old boy is taught to fear random objects, baby monkeys are given mothers made from wire and cloth, and an adult is deliberately violent before a group of toddlers. Michael takes part in modern-day experiments to play his own small part in the quest to understand emotions.

Outside Resources

Article: Rescorla, R. A. (1988). Pavlovian conditioning: It's not what you think it is. *American Psychologist*, 43, 151–160.

Book: Bouton, M. E. (2007). *Learning and behavior: A contemporary synthesis*. Sunderland, MA: Sinauer Associates.

Book: Bouton, M. E. (2009). Learning theory. In B. J. Sadock, V. A. Sadock, & P. Ruiz (Eds.), *Kaplan & Sadock's comprehensive textbook of psychiatry* (9th ed., Vol. 1, pp. 647–658). New York, NY: Lippincott Williams & Wilkins.

Book: Domjan, M. (2010). *The principles of learning and behavior* (6th ed.). Belmont, CA:

Wadsworth.

Video: Albert Bandura discusses the Bobo Doll Experiment.

<https://www.youtube.com/watch?v=eqNaLerMNOE>

Evidence-Based Teaching

Abramson, C. I., Onstott, T., Edwards, S., Bowe, K., Kohn, A., Kalat, J. W., & Vernoy, M. W. (2000). Learning. In M. R. Hebl, C. L. Brewer, L. r. Benjamin (Eds.) , *Handbook for teaching introductory psychology*, Vol. 2 (pp. 221-228). Mahwah, NJ US: Lawrence Erlbaum Associates Publishers.

Gurman, E. B., Holliman, W., & Camperell, K. (2002). Oral application questions as a teaching strategy. In R. A. Griggs (Ed.) , *Handbook for teaching introductory psychology: Vol. 3: With an emphasis on assessment* (pp. 93-95). Mahwah, NJ US: Lawrence Erlbaum Associates Publishers.

Examined the effect of using application questions presented orally in a classroom situation. During the 8th and 9th weeks of the semester, 154 undergraduates in a general **psychology** course were exposed to one of two instructional approaches during two 1-hr small-group discussion sessions. After watching a training film emphasizing applications of **classical** and operant **conditioning** concepts, Ss in the treatment group were asked questions that required them to apply basic principles and information from the lecture and readings. Ss in the control group watched 2 films covering the same topics without discussion. Ss were scored on a 50-item multiple choice test administered the following week, 30 items of which pertained to **classical** and operant **conditioning**. Results show that treatment Ss scored higher than controls on factual questions, but not on application questions. Although the difference for correctly answered factual questions was small, it represented 25% of items measuring this variable. Asking students to apply principles was beneficial only to the extent that it helped make questions more personally relevant, leading to improved retention of factual material.

OPERANT CONDITIONING

Poonati, S., & Amadio, D. M. (2010). Use of popular television to enhance students' understanding of operant conditioning. *Psychology Learning & Teaching*, 9(1), 25-29. doi:10.2304/plat.2010.9.1.25

Students typically struggle to understand **operantconditioning** concepts. However, no well-designed experimental research exists examining the efficacy of popular media in **teaching** these concepts. The present randomised, double-blind experiment examined the impact of

using exemplars of **operantconditioning** concepts (positive and negative reinforcement and positive and negative punishment) from popular television on learning **operantconditioning** concepts in a group of 171 undergraduate students enrolled in introductory **psychology** classes. The experimental group indicated more enjoyment of the educational session but scored only marginally higher on a learning assessment of basic **operantconditioning** concepts.

Sheldon, J. P. (2002). Operant conditioning concepts in introductory psychology textbooks and their companion web sites. *Teaching Of Psychology*, 29(4), 281-285. doi:10.1207/S15328023TOP2904_04

This study is a content analysis of the presentation of **operantconditioning** in introductory **psychology** textbooks and their companion Web sites to discover if these information sources assist student learning or add to confusion. Results indicate that the failure to refer to changes in the likelihood of the organism's behavior when discussing **operantconditioning** was extremely common; this problem should be remedied to reduce students' misunderstandings.

Suggestions from the Society for Teaching's Introductory Psychology Primer

Estle, S. J. (2013). Learning. In S.E. Afful, J. J. Good, J. Keeley, S. Leder, & J. J. Stiegler-Balfour (Eds.). *Introductory Psychology teaching primer: A guide for new teachers of Psych 101*. Retrieved from the Society for the Teaching of Psychology web site: <http://teachpsych.org/ebooks/intro2013/index.php>

POSSIBLE ASSESSMENTS (Out of Class)

Literature Search: Have each student choose a learning phenomenon discussed in the module. Students should then perform a literature search, locate one article, and describe how the chosen phenomenon can be applied to common human experience. The benefit of this assessment is that it allows students to come in contact with primary readings. In addition, it allows them to make connections between the “science” and everyday life. In my experience, this assignment works best for students that have already been exposed to empirical articles and databases such as Psycinfo earlier in the semester. (LO 1.2a, 1.3) Scavenger Hunt: Ask

students to identify principles of learning as observed in their own experience. Alternatively, you could instruct them to visit the local zoo, mall, or any other public location. The following principles could be included: classical conditioning, positive reinforcement, shaping, schedules of reinforcement, negative reinforcement, positive punishment, negative punishment. This is an activity that has been very well received in my courses (I frequently send students to the St. Louis Zoo for this assignment). In addition, it forces students to do more than just memorize definitions – they have to apply those concepts and identify unique examples. (LO 1.2a, 1.2di, 1.3) Behavior Modification Project: Ask students to identify a target behavior that they would like to change. Students should state a behavior change goal as well as outline how they would apply one of the behavior change procedures learned in class (e.g., positive reinforcement). Depending on time, you could ask students to collect baseline data, and then continue to collect data while implementing the behavior change procedure. This is another activity that is relatively easy to implement and is typically enjoyed by students. I often provide examples of behaviors

ACTIVITIES & TECHNIQUES (In Class)

Shaping: Ask one volunteer to leave the room briefly. The remaining students should pick a simple behavior such as standing behind the podium, writing on the chalkboard, or turning the lights off/on. The remaining students should also decide on a “reinforcer” such as tapping on their desks or stomping their feet. When the volunteer returns to the classroom, instruct him/her to move around the classroom earning as many reinforcers (taps, stomps) as possible. Alternatively, you could use the software *Sniffy the Virtual Rat* to shape behavior as a class. A demonstration version of the software is available at http://www.wadsworth.com/psychology_d/templates/st...niffy/download.htm

Podcasts: There are a number of interesting podcasts available at www.thepsychfiles.com. These podcasts could be used as starting points for in-class discussions or alternatively, assigned as homework.

PowerPoint Presentation

This module has an associated PowerPoint presentation. Download it at

https://nobaproject.com//images/shared/supplement_editions/000/000/274/Conditioning%20and%20Learning.pptx?1416598470.

About Noba

The Diener Education Fund (DEF) is a non-profit organization founded with the mission of re-inventing higher education to serve the changing needs of students and professors. The initial focus of the DEF is on making information, especially of the type found in textbooks, widely available to people of all backgrounds. This mission is embodied in the Noba project.

Noba is an open and free online platform that provides high-quality, flexibly structured textbooks and educational materials. The goals of Noba are three-fold:

- To reduce financial burden on students by providing access to free educational content
- To provide instructors with a platform to customize educational content to better suit their curriculum
- To present material written by a collection of experts and authorities in the field

The Diener Education Fund is co-founded by Drs. Ed and Carol Diener. Ed is the Joseph Smiley Distinguished Professor of Psychology (Emeritus) at the University of Illinois. Carol Diener is the former director of the Mental Health Worker and the Juvenile Justice Programs at the University of Illinois. Both Ed and Carol are award-winning university teachers.

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