Unit 5: Learning and Conditioning

For many species, including of course human beings, the ability to survive depends upon our ability to modify our behavior based upon experience. In other words, our survival depends upon our ability to learn. In this section of the course, you will learn about an important form of learning called conditioning that involves the formation of associations between stimuli or events in the environment and behavioral or physiological responses. There are two types of conditioning: classical conditioning and operant conditioning. This section of the course will also discuss learning that is based upon the observation of the experiences and behaviors of others—a form of learning called observational learning.

READING: Chapter 7

During this unit, we will be looking at the following topics:

1. Classical Conditioning
2. Operant Conditioning
3. Observational Learning
Part 1: Classical Conditioning (pp. 230–239)

The “Discovery” of Classical Conditioning (lecture)
Basic principles of classical conditioning
New reflexes from old: From neutral stimulus to conditioned stimulus
Extinction
Higher-order conditioning
Stimulus generalization and discrimination

Conditioning and Counterconditioning—Fear (pp. 236–238)

Adaptive Value of Classical Conditioning

Prepared Learning: Bait Shyness and Taste Aversion (lecture)
Part 1 Lectures

Classical Conditioning

VIDEO LECTURE: Click hear to watch the video lecture about the “Discovery of Classical Conditioning.”

Conditioning and Counterconditioning—Fear

VIDEO LECTURE: Click here to watch the video lecture about conditioning and counterconditioning.

Adaptive Value of Classical Conditioning

Many of the examples of classical conditioning that are provided to students involve responses that do not seem to be particularly beneficial to the organism. We know, for example, that many phobias develop, in part, through a process of classical conditioning. A lot of research on classical conditioning in humans has involved the conditioning of the human eye blink reflex. What possible value could there be in becoming conditioned to blink one’s eye when a particular note on a piano is played?

Why is it, then, that humans, and other species, are classically conditionable? What is the adaptive value of this form of learning?

Understanding the adaptive value of classical conditioning requires an understanding that the most critical feature of a situation that determines whether classical conditioning will occur is whether or not the neutral stimulus serves as a reliable predictor of the occurrence of the unconditioned stimulus. Does, for example, the bell PREDICT that food is likely to be presented? Does the experience of being presented a white rat to play with predict that a loud frightening noise is about to go off behind your head?

Thinking about classical conditioning in this way makes it clear that what occurs when an organism has become classically conditioned is that the organism now responds to a PREDICTOR of an important even as if that event itself had started to occur—a pattern of responding that is usually (although not always) adaptive. Thus, even before eating a tasty good, it is useful for some of our digestive processes to begin. Even before getting too close to an animal that injured you in the past, it would be adaptive for you to become afraid (and run away) just as an automatic response to the sight or smell of that animal. Note that in the fear example, it doesn’t matter whether you actually remember consciously that you had ever seen that animal before. All that matters, for your own well being, is that when you see that animal and get close enough to smell that animal, that
those sights and smells trigger a fear response that causes you to leave the situation. THAT is the essence of classical conditioning!

Prepared Learning: Bait Shyness and Taste Aversion

VIDEO LECTURE: Click here to watch the video lecture about prepared learning.
[insert “Prepared Learning: A Case of Bait Shyness”]
Part 2: Operant Conditioning (pp. 240–256)

Differences from Classical Conditioning

The Law of Effect

Primary and Secondary Reinforcers and Punishers

Four Types of Training
- Reward (+ve reinforcement)
- Punishment
- Escape training (—ve reinforcement)
- Omission training (—ve punishment)

Extinction

Discrimination Learning

Shaping: Use of the Method of Successive Approximation

Schedules of Reinforcement
Continuous vs intermittent reinforcement
Four partial (intermittent) schedules
The partial reinforcement extinction effect

Punishment: Pros and Cons
Activity: Use operant conditioning to train Sniffy, the virtual rat

When Rewards Can Backfire: Intrinsic vs Extrinsic Rewards
Part 2 Lectures and Activities

Differences from Classical Conditioning: Classical vs. Operant Conditioning

Classical and operant conditioning share one basic feature in common; they are both forms of associative learning. There are, however, some very basic differences between the two forms of conditioning.

One difference relates to the kinds of responses that can be conditioned. In classical conditioning, the responses are automatic physiological or emotional or behavioral reflexive responses. By definition, in classical conditioning there must be an unconditioned stimulus that automatically elicits the unconditioned response. In operant condition, in contrast, the responses are of the kind that we normally think of as voluntary behaviors: a dog learning to shake a paw, a child learning table manners, etc.

A second difference between the two types of conditioning relates to the timing of the most critical event. In classical conditioning, it is what happens just BEFORE the response that is important. Did the NS regularly precede and predict the occurrence of the UCS? In operant conditioning, it is what happens AFTER the behavior that is most important. Was the behavior followed by something the organism liked (in which case the behavior will occur more often in the future) or was the behavior followed by something the organism did not like?

The Law of Effect

The essence of operant conditioning is captured by a principle called the Law of Effect: Behaviors that are followed by reinforcement (something that the organism likes) tend to be repeated in situations where reinforcement is again likely to occur as a consequence for that behavior.

Four Types of Training

This table below summarizes the types of training.

[Josh, can you improve this table? I can’t get it to move left or even up the printing.]

<table>
<thead>
<tr>
<th>Presentation</th>
<th>Removal</th>
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6
**Positive stimuli**
*(positive reinforcers)*

<table>
<thead>
<tr>
<th>Positive reinforcement/reward training</th>
<th>Negative punishment/omission training/extinction</th>
</tr>
</thead>
</table>

**Aversive stimuli**
*(negative reinforcers)*

<table>
<thead>
<tr>
<th>Punishment</th>
<th>Negative reinforcement/escape training</th>
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### The Partial Reinforcement Extinction Effect

Different kinds of schedules of reinforcement have two kinds of effects on behavior. First, as you have already learned, they affect the rate and pattern of production of the behavior. A response rewarded on a fixed ratio schedule tends to be emitted at a fast steady rate. A response rewarded on a variable interval schedule tends to be emitted at a slow steady pace. A response rewarded on a fixed interval schedule tends to occur only after a delay following the most recent reward.

A good example of the latter phenomenon (the pattern of behavior produced by a fixed interval schedule) is the style of studying called “cramming” (I’m sure you’ve heard of this). If you think of each test as the “reward” for studying, you can observe the following. After each reward, the amount of studying occurs at a very slow rate. As the moment of the next reward approaches, the amount of studying increases. As the moment of the next reward gets very close, the amount of studying increases dramatically. Compare this with the chart in your textbook that shows how a rat responds when pressing a bar on a fixed interval schedule! (Incidentally, your text has a typo in this graph—the labels should be “interval,” not “internal.”)

The second way in which different schedules of reinforcement affect behavior is by affecting resistance to extinction. The more resistant a behavior is to extinction, the longer that behavior will continue to occur after all rewards for the behavior have ceased to occur.

It is reasonable to think that the more regular and frequent the rewards have been for a behavior, the stronger would be the conditioning of that behavior, and the more resistant the behavior would be to extinction. That idea is reasonable—but wrong! In fact, in general, the more intermittent and variable the schedule of the reinforcement, the stronger the resistance to extinction. Consider, for example, two rats who have been trained to press a bar for food. One has been trained on a fixed-ratio 2 schedule (receiving a bit of food every second time it presses the bar). The other rat has been trained on a fixed-ratio 5 schedule. You wait until both animals are well trained, and then never reward bar pressing again. Which rat will take longer to stop pressing the bar? The answer is the rat on the FR5 schedule. Similarly, greater resistance to extinction is produced by a variable ratio 5 schedule than by a fixed ratio 5 schedule.
Consider another example. John’s 3-year-old son always throws a tantrum in the grocery store if he (the son) doesn’t get what he wants. Allen’s son does the same. John can’t deal with the tantrums and gives in every time—which, of course, is why his son does what he does. Allen knows he shouldn’t give in, so he tries not to, but some days he just can’t stand it and he does the one thing he knows will stop the tantrum—he gives in. In this example, we can think of John as rewarding his son’s tantrum behavior on a fixed ratio 1 schedule; the behavior gets rewarded every time. Allen rewards his son’s tantrums on something like a variable ratio 3 schedule. On average, he rewards the behavior about every third time it occurs. Both dads know that something has to be done so they go to a psychologist who provides the great idea that they should both stop rewarding the behavior (duh!). Which boy is likely to persist in throwing tantrums the most in the future, now that neither dad ever gives in? Allen’s!

Operant Conditioning

WEBLINK ACTIVITY: Use operant conditioning to train Sniffy, the virtual rat.
Part 3: Observational Learning (pp. 258–261)

Does Media Violence Increase Levels of Aggression in Society?

Click below for two articles on this topic on the APA (American Psychological Association) web site.

Violence on Television: What Do Children Learn? What Can Parents Do?


Childhood Exposure to Media Violence Predicts Young Adult Aggressive Behavior, According to a New 15-Year Study

WEBLINK: http://www.apa.org/releases/media_violence.html

You can also read here about the effects of violent video games.

WEBLINK: http://www.apa.org/releases/videogames.html

After reading those articles, click below for a rather different, but still reasonable, perspective on these issues.

WEBLINK: http://www.fepproject.org/factsheets/mediaviolence.html