

Unit 6: Learning

I. Introduction

- A. Animals tend to live by an instinctive genetic code. For example, a salmon's life is pretty much hard-wired into its genes – birth, youth in the stream, adulthood in the ocean, then return to the stream to spawn and die.
- B. Humans also have an instinctive genetic code, but we however, can adapt to our environment and learn new behaviors and make changes.
- C. **Learning** is defined as a relatively permanent behavior change due to experience.
- D. This brings up the question, "How do we learn?"
 1. We learn by making **associations**. This is connecting events that occur one after another. These events can be good, like connecting the birthday song to eating cake, or bad like seeing a flash of lightning then hearing loud thunder.
 2. If a stimulus occurs normally in an environment, an animal's natural response may dwindle. This lessening of a response is called **habituation**. Think of the stimulus as becoming habit, so why respond to it?
 3. The examples above illustrate **associative learning**.
- E. To a psychologist, "learning" is more specific than what we think of learning in school. To psychologists, there are three main types of learning...
 1. **Classical conditioning** occurs when we associate two stimuli and thus expect a result.
 2. **Operant conditioning** occurs when we learn to associate our own behavior (or our response) and its consequence. We therefore repeat behaviors with good results, we cut down on behaviors with bad results.
 3. **Observational learning** occurs by watching others' experiences.
 4. One additional form of learning is through language. In this way, we can learn without experiencing something or watching someone else experience it.

II. Pavlov's experiments

- A. Classical conditioning falls under the psychological approach called **behaviorism**. Behaviorism is only concerned with observable behavior – things an animal or person does that can be seen and counted (measured).
 1. Behaviorism shunned the "mentalist" approaches as hogwash. They're unconcerned with anything that goes on in your head. They're only concerned with what you do, your behavior.
- B. **Ivan Pavlov** is the godfather of behaviorism.
 1. Pavlov was a Russian doctor who used dogs as his subjects.
 2. He noticed dogs salivated at the sight of food. This is a natural reaction. He wondered if he could associate something *unnatural* to salivation.
 - a. Pavlov rang a bell, then fed the dog. The bell meant nothing to the dog.
 - b. He repeated this over and over and over until, the bell did mean something – the bell meant food was coming!
 - c. Eventually, the bell alone could cause the dog to salivate.
 - d. He rigged tubes to the dog's neck to measure the salivation (and thus the response).
 3. Using this dog experiment, we can see the "parts" of classical conditioning...
 - a. **UCS (unconditioned stimulus)** – this is the natural stimulus – the food.
 - b. **UCR (unconditioned response)** – this is the natural response – salivation.

- c. **CS (conditioned stimulus)** – this is what’s associated to the UCS – the bell.
 - d. **CR (conditioned response)** – this is the response (which is the same as the UCR) – salivation.
 - 4. The key to classical conditioning is that it’s a natural thing, there is no decision involved. Usually it’s a biological process over which the person/animal has no control.
 - a. A person could be classically conditioned using the pucker response to a lemon, or cringe response to fingernails on a chalkboard, or dilated eyes to the change from light to dark.
- C. There are five main conditioning processes...
 - 1. **Acquisition** is the initial learning of a stimulus-response relationship. This is where the dogs learned to associate the bell and food.
 - 2. **Extinction** is the diminished association between the UCS (food) and the CS (bell) after the UCS is removed. In other words, if you stop nailing the food and the bell together, the link wears off – the bell goes back to meaning nothing to the dog.
 - 3. **Spontaneous recovery** emerges even after extinction. This is when, after a time lapse, the association between the UCS and the CS reappears. The association is not as strong as before, and will wear off if not linked with the CS.
 - a. See the graph at the bottom of this page.
 - 4. **Generalization** is the tendency to respond to a similar CS. For instance, Pavlov’s dogs might feel that a buzzer is close enough to a bell and they might salivate to a buzzer. Or, if they’re conditioned to respond to a white light, they might also respond to a red light.
 - 5. **Discrimination** is drawing the line between responding to some stimuli, but not others. For example, Pavlov’s dogs might respond to a bell or a buzzer, but discriminate against a police siren. They’re essentially saying, “The buzzer is like the bell, but the siren is not.”

III. Extending Pavlov’s understanding

- A. Behaviorists dismissed anything mental as hogwash. They might just have gone too far though, and underestimated cognitive processes (thinking, perceptions, and expectations) and biological constraints.
- B. Cognitive processes
 - 1. Animals, to a behaviorist, are simply very complex machines. Animals go beyond just robotic, mechanical reactions though. They get into *prediction*, a mental process.
 - a. In one experiment for example, when accompanied with an unpleasant electrical shock, rats can distinguish light and a tone. They recognized that the tone was a better indicator of a coming shock. Thus, they predicted the likelihood of a shock based on the stimulus (light or tone).
 - 2. Animals, and people, who are trapped or just feel that they’re trapped become depressed and passive. This situation is called **learned helplessness**.
 - a. This was seen in an experiment by Martin Seligman with caged dogs who were given shocks. They eventually cowered in fear. Even after the trap was “unlocked” and they could’ve escaped, they didn’t try. A dog who had not learned the helplessness would quickly escape.
 - 3. People certainly respond to their environment but the message seems to be that, with people especially, what we think about a situation matters as well.
 - a. What goes on outside of us stimulates our behavior.
 - b. What goes on in our heads also affects our behavior.

C. Biological predispositions

1. Like it or not, animals and people are hard-wired by their biology. We naturally tend to like certain things, dislike others, and we have limitations on what we can do.
2. The early behaviorists (Pavlov, Watson) thought all animals were the same. To them, we're simply machines responding to stimuli (our environment).
3. However, there are non-examples to this idea...
 - a. Rats associate best by using the sense of taste (rather than sight or sound). This may help them survive by distinguishing "okay" and "not okay" food to eat.
 - b. Humans similarly associate very well by taste. Anyone who's ever gotten food poisoning will likely have a hard time going back to that food again.
 - c. Men seem predisposed to find the color red attractive in females. The idea is that red is naturally sexy.

IV. Pavlov's legacy

A. Two major lessons come out of Pavlov's work...

1. Classical conditioning is very broad – many responses can be associated to many stimuli in many organisms.
2. Classical conditioning showed how something as abstract as "learning" can be studied objectively (with opinions stripped away).

B. Applications came out of Pavlov's work as well such as the health and well-being of people.

1. For example, a drug addict may re-enter the world and situations that were associated with getting high, then get the urge to take the drug again. Therefore, addicts are encouraged to not go back to those situations.
2. Or in an experiment, when a taste was associated with a drug that boosts the immune system, it got to the point where the taste alone was able to boost the immune system.

C. Building on Pavlov's work, **John B. Watson** became the second well-known classical conditioning behaviorist.

1. Watson worked with a baby known as **Little Albert**, an average baby.
2. Watson knew that babies/people have a natural fear of sudden, loud sounds. Also, babies do not have a fear of white rats. Watson associated the two.
3. Watson placed a white rat next to Albert. Albert wanted to touch the rat. As he reached out, Watson banged a hammer on metal just behind Albert. Albert was scared and cried. This was repeated over and over.
4. Finally, the white rat and banging sound were associated. Merely the sight of the rat caused Albert to cry.
 - a. UCS = banging sound, UCR = crying
 - b. CS = white rat, CR = crying
5. In this demonstration, there were definitely ethical problems here. Specifically, the APA's suggestion of "informed consent" wasn't met. Though Albert's mother gave the okay, he certainly didn't.
 - a. After resigning in a scandal (where he eventually married his assistant), Watson went on to work for Maxwell House and start the "coffee break".

V. Skinner's experiments

A. **Operant conditioning** differs from classical conditioning in the following ways:

1. Classical – two outside stimuli are associated with one another.
 - a. This is natural, automatic, and biological. Pavlov's dogs didn't choose to salivate. It was natural, automatic, biological.
2. Operant – your actions are associated with consequences.

- a. The animal or person makes a choice or decision about what it does.
 - b. Realize that a "consequence" can be either bad or good.
- B. **E. L. Thorndike** was the first big name in operant conditioning.
 - 1. **Thorndike** came up with his "**Law of Effect**" which said a "rewarded behavior is likely to recur."
 - a. Simply put, if you do something then get a reward, you'll likely do it again.
 - 2. Thorndike built "puzzle boxes" and put cats in them. The cat had to do a series of things to escape.
 - a. Being a behaviorist, Thorndike had to objectively measure the "learning" the cats made. So, he measured the time it took for the cats to escape after successive tries.
 - b. The resulting graph showed a clear and typical "learning curve" – the cats learned quickly, then not quite as much, and then their learning leveled off.
 - i. See the graph at the bottom of this page.
- C. **B. F. Skinner** built on Thorndike's work and is likely the biggest name in operant conditioning.
 - 1. He built "**Skinner Boxes**", which were contraptions in which an animal could manipulate things and/or respond to stimuli. The responses were measured.
 - 2. A typical Skinner Box was set up with a (1) food dispenser, (2) water dispenser, (3) a light bulb, (4) a speaker, and (5) a lever the animal could pull. An (6) electrical shock might be added as well.
 - a. Being a behaviorist, Skinner had to measure behaviors. So, each pull of the lever was tallied.
 - b. Skinner typically placed pigeons or lab rats in his boxes . He used **shaping** to "teach" them to do things like walk in figure-8s or "play" ping pong. Shaping simply rewards desired behavior and directs the animal toward a desired behavior. At first, the animal is rewarded for getting close to the behavior, then rewarded for going a bit further, and finally rewarded for the actual behavior.
 - c. A **discriminative stimulus** is a stimulus that an animal can distinguish from another. A pigeon might respond to a speaker making a "ding dong" sound in its box, but might not respond to a "whoop whoop" sound.
 - i. These discriminative stimuli enable us to determine things like, "Can a dog see colors?" (will they respond to one color but discriminate another). Can a baby do this?
 - 3. There are two main types of **reinforcers** – anything that INCREASES a response.
 - a. **Positive reinforcement** STRENGTHENS a behavior with a pleasurable stimulus after a response.
 - i. Simply, if you do what's wanted, you get a doggie treat!
 - ii. For example, a dog sits and you give him a piece of a hot dog. This increases the likelihood he'll sit.
 - b. **Negative reinforcement** STRENGTHENS a behavior by removing something unpleasant.
 - i. Simply, you do something to make something bad go away.
 - ii. For example, you hit the snooze button to make the annoying sound stop. This increases the likelihood you'll hit it again.
 - iii. It's important to remember, negative reinforcement is not punishment.

1. Negative reinforcement encourages a behavior by removing something bad.
2. Punishment discourages a behavior by adding something bad.
4. There are two other types of reinforcers...
 - a. **Primary reinforcers** are natural, they are unlearned, such as food or getting rid of pain.
 - b. **Conditioned** or **secondary reinforcers** get their power by attaching to a primary reinforcer. This "attaching" must be learned.
 - i. For example, in a Skinner Box, rats learned that pulling the lever (conditioned reinforcer) gave some food (primary reinforce).

VI. **Schedules of reinforcement** try to the answer questions like, "When should the reinforcement be given, every time? Some times?"

- A. **Continuous reinforcement** occurs when the reinforcement is given every time the behavior is down.
- B. **Partial** or **intermittent reinforcement** occurs when the reinforcement is not given after every behavior.
 1. **Fixed ratio** – reinforcer is given after a set number of behaviors.
 - a. Think of being paid for every 10 units you make on an assembly line.
 2. **Variable ratio** – reinforcer is given after a random number of behaviors.
 - a. Think of pulling a slot machine handle, you never know which pull will win.
 3. **Fixed interval** – reinforcer is given after a set time period.
 - a. Think of being paid every Friday.
 4. **Variable interval** – reinforcer is given after a random time period.
 - a. Think of watching a bob-cork and waiting for a fish to bite.
 - i. See the graph at the bottom of this page.
- C. **Punishment** is often confused with negative reinforcement. Punishment DISCOURAGES a behavior (whereas negative reinforcement encourages a behavior by removing something unpleasant).
 1. Punishment can be very effective if it's sure and swift.
 2. Physical punishment, like spanking, is looked down upon by some groups. Their belief is that:
 - a. The punishment isn't forgotten, but suppressed.
 - b. It teaches that it's okay to do the behavior some times, but not others.
 - c. It teaches fear of the body doling out the punishment.
 - d. It might increase aggressiveness by modeling aggression itself.

VII. Extending Skinner's understanding

- A. Up until his death, Skinner shunned anything cognitive – anything having to do with thinking or the mental. To him, even things going on inside your head are just more behaviors in response to stimuli. We're robots.
- B. But, there seems to be evidence that's disagrees with Skinner's anti-cognitive beliefs...
 1. **Latent learning** is learning that doesn't become apparent until later when it's needed. Until then, it remains latent (hidden).
 - a. **Edward Tolman** did an experiment with rats in a maze showed latent learning.
 - i. There were two groups of rats – one was given a reward at each correct decision. They got to the end quickly. Another group was given no reward until they finished the maze. Needless to say, they floundered around and it took them a long time.

- ii. After each group finally learned the maze, however, the second group was able to run the maze even quicker than the first group. They'd developed a "**mental maze**." This learning didn't become apparent until later.
 - b. Similarly, children learn things from parents and adults that they may not use until much later in life, perhaps when they become parents themselves.
 - 2. **Insight learning** is learning that comes all-at-once. You may be stumped on something, but then, all-of-a-sudden, the problem is solved in a flash.
 - 3. **Intrinsic motivation** is the desire to perform a behavior for its own sake. This would be like reading a book just for the joy of reading it.
 - a. If appears that offering rewards to something that's intrinsically motivated can actually decrease the motivation. It's as if the thinking becomes, "If they have to bribe me to do this, it must not really be worth doing."
 - 4. **Extrinsic motivation** is the desire to perform a behavior in order to get some type of reward. This would be like reading a book in order to get an "A" in class or to win a prize.
- C. People and animals have **biological predispositions**, meaning we're naturally good at some things and bad at others.
 - 1. Animals easily learn to associate things that help them to survive.
 - 2. And, animals don't easily learn things that don't help them survive.
 - a. For example, in one experiment, pigs were being taught to pick up wooden "dollars" then put them in a piggy bank as fast as possible. The natural urge of the pigs to root with their noses slowed down their time.

VIII.

Skinner's legacy

- A. B. F. Skinner was a controversial figure in psychology, mainly due to his belief that we were nothing more than biological reactors to stimuli. People were machines or robots.
- B. Still, he said that operant conditioning can improve our lives, such as in the fields of:
 - 1. School
 - a. Skinner felt we'd eventually use computers alone to teach. The program would give instant feedback, right or wrong, then direct the learner to the appropriate next-step.
 - 2. Sports
 - a. When learning a skill, we can start small, master that skill, then move to the next skill.
 - b. Through shaping, we can gradually build toward the desired skill.
 - c. Notably, athletes are well-known to be superstitious. If they do something just before hitting a home run, a ball player might start to think of that action as having something to do with the home run. He or she may likely repeat that behavior.
 - 3. Work
 - a. Operant conditioning can boost productivity. For this to happen, the reinforcement needs to be specific and immediate. General reinforcers, like "merit", don't cut it.
 - 4. Home
 - a. Parents can notice good behavior in children, reward it, then watch the behavior increase.
 - b. Yelling at the child doesn't seem to help. Pointing out what's wrong is okay, but the ideal is again, to notice good behavior in children, reward it, then watch the behavior increase.
 - 5. Self-improvement

- a. To better yourself, first state your goal in measurable terms then announce it to someone.
- b. Secondly, monitor how you spend your time and avoid wasting it.
- c. Reinforce the desired behavior with a reward.
- d. Gradually reduce rewards. This will move the motivation away from the extrinsic and toward the intrinsic.

IX. Contrasting classical and operant conditioning

- A. The differences between classical and operant conditioning can be summarized as...
 - 1. Classical conditioning
 - a. Links two stimuli together through association.
 - b. Involves a natural, biological response. There is no decision made – Pavlov’s dogs salivated naturally, biologically, with no decision of their own.
 - 2. Operant conditioning
 - a. Links a behavior to its results.
 - b. There is a decision made here to do or not do a behavior. Behavior that gets reinforced is more likely to be repeated.

X. Mirrors in the brain

- A. People can learn without actually experiencing something. We can learn by watching others through what’s called **observational learning**. Observational learning is learning by observing others or learning without direct experience or our own.
 - 1. In modeling, we learn by watching and mimicking others.
 - 2. This is simply like the old adage, “monkey see, monkey do.”
- B. We have mirror neurons that “fire” in the brain when we watch someone else doing an action. It’s as though we’re actually doing it, but we’re just observing it.
 - 1. Mirror neurons improve our empathy for others. It helps us to feel others’ pain.
 - 2. More concrete examples are how we imitate others when they yawn or how it’s difficult to smile when looking at a frown, or vice versa.

XI. Bandura’s experiments

- A. **Albert Bandura** is the top name in observational learning.
- B. He is most famous for the **Bobo doll experiment**.
 - 1. In this experiment, a child watched an adult beat up an inflatable clown. The adult yelled things like, “Take that!” in the process.
 - 2. The children were then placed into a “play room” and mimicked the adult by beating up the Bobo doll with almost the exact same actions and words as the adult model.
 - 3. Children who had not observed the adult were less aggressive to the doll.
- C. Bandura felt that we...
 - 1. Imitate based on reinforcements and punishments that we see others get (or don’t get).
 - 2. Will imitate people like us, who we see as successful, or who we see as admirable.

XII. Applications of observational learning

- A. In business, observational learning has been applied usefully to train workers. It’s best to watch someone model the appropriate behavior than to just study it.
- B. Prosocial effects of observational learning...
 - 1. Role models can have a very real positive impact on young people.
 - 2. Observational learning of morality starts at a very young age and is real.
 - 3. Parents who live by the “Do as I say, not as I do” mentality tend to raise kids that wind up doing what they do. Then they in turn tell their kids, “Do as I say, not as I do.” Hypocrites beget hypocrites. This shows, in a not-so-good way, the power of parental role models.
- C. Antisocial effects of observational learning...

1. Abusive parents are more likely to turn out kids who turn into abusive parents.
2. Men who beat their wives are more likely to turn out sons who beat their wives.
3. Are these findings more due to nature (due to genetics) or nurture (due to upbringing)? A study of monkeys leans toward saying the cause is nurture.
4. Television takes up a lot of our time and can therefore be a powerful tool in observational learning.
 - a. A person who lives to 75 years old will spend 9 years watching TV.
 - b. 9 out of 10 teens watch TV daily.
 - c. Kids see lots of violence on TV – 8,000 murders and 100,000 violent acts before getting out of grade school.
 - d. The “violence-viewing effect” occurs when...
 - i. A violent act goes unpunished (happens 74% of the time).
 - ii. The victim’s pain is not shown (happens 58% of the time).
 - iii. The violence is somehow “justified” (happens about 50% of the time).
 - iv. The violent person is shown as attractive (happens about 50% of the time).
 - e. Two key results seem to occur due to the violence-viewing effect...
 - i. People imitate the behavior they see.
 - ii. People become desensitized to violence – we’re not as shocked if we see graphic violence.
 - f. Correlational studies have linked TV violence and real violence.
 - i. When TV came to America in the mid-late 1950s, homicide rates rose dramatically.
 - ii. The same tendency was seen in other countries that got TV later. Their homicide rates spiked too in sync with TV.



