Chapter 6 – Learning and Language Development

Classical Conditioning

Learning is defined as a relatively permanent change in behavior brought about by practice or expertise. It is referred as this because as we learn, our brain is physically changed. The belief by many is that what we learn is always present even if we can’t access it.

Change however does not mean learning – only change in the way an organism behaves is considered learning. Some changes occur through the maturation process – which is a result of genetics.

Principles of Classical conditioning

The principles of classical conditioning came about because of an accident. Ivan Pavlov – a Russian physiologist was doing an experiment with dogs. he noticed that as dogs were presented with food that they had an automatic reflex (involuntary response) of salivating. The stimulus was the food – or any object, experience that causes a response or reaction in an organism. He noticed that dogs were salivating when they were not supposed to – like when they saw the food bowl – not the actual food. This was the beginning of the study of classical conditioning.

Elements of Classical Conditioning

To test his theory out – Pavlov paired the food with a ringing of a bell. The food is the unconditioned stimulus – a natural occurring stimulus. This leads to an unconditioned response or reflex. For classical conditioning to work, you pair the unconditioned stimulus with a neutral stimulus. Something that would not cause an automatic reaction. In this case it was the bell (dogs didn’t respond to it) Once the pairing took place several times, the bell predicted the arrival of food and became a conditioned stimulus. This resulted in the conditioned response or original reflex.

The dogs began to respond to similar sounds as well such as a door bell. This is called stimulus generalization, but when this new stimulus is not followed by food, the dogs learned to discriminate between the two stimuli. This is referred to as stimulus discrimination.

Classical conditioning does not always last forever. When the CS is repeat without the presence of the UCS eventually the CR will die out. This is called extinction. This is believed to happen because new learning has taken place. That learning is weakened when the pairing no longer takes place. Pavlov then tested to see what would happen if he reintroduced the CS. After a few weeks, Pavlov took the bell out again (after not having used it for several weeks), rang it, and the dogs began to salivate once again. This is referred to as spontaneous recovery. It proves that the new learning isn’t forgotten, but maybe inhibited or suppressed.

Classical conditioning shows up in a variety of ways. Being hit by a car, might make people cringe when they get to close. That is a conditioned response.

**How can classical conditioning be specialized to affect emotions?**

Pavlov’s experiment was taken a step further by John Watson. He is considered to be the founder of behaviorism – where the belief is that all things can be learned and explained –even phobias. He set out to prove this with the Little Albert and White Rat experiment. He paired a white rat, with a loud noise and a baby (Little Albert). Albert was not afraid of the rat, but due to its constant pairing with the loud noise, he eventually became so. There were a lot of problems with the experiment. They caused Little Albert to develop a phobia and the parents did not give informed consent.

Learning of phobias is often called conditioned emotional response. It is a type of classical conditioning that happens all the time. Think about T.V. commercials. They will have certain type of people or even products to promote a certain emotional response. Sometimes we can become classically conditioned simply through watching other people respond to a stimuli. This is called vicarious conditioning. In the 50’s students would line up at school to get their vaccinations. Several kids were crying that by the time the nurse got to the end of the line the children were crying before they were even given their shots.

**How does it function in our everyday lives?**

One of the most common ways that classical conditioning exists for us is through conditioned taste aversion. My sister in law once had the stomach flu. Before realizing she had the flu – she ate chocolate pudding. To this day she can’t stand chocolate pudding and says it makes her stomach queasy. Conditioned taste aversions are types of biological preparedness. This is why we smell our food. If we don’t like how it smells we stay away from it. Animals will do this because it promotes survival.

Operant Conditioning

Explain the process of operant conditioning?

Behaviors can be involuntary or voluntary. Classical conditioning deals with involuntary behaviors. Operant conditioning deals with voluntary behavior.

Edward Thordike is one of the first to begin to look at operant conditioning. He studied this with the use of a cat. He put a cat in a box and placed a dish of food outside the box. There was a lever in the box that when pushed would allow him to get out of the box. The cat did not learn right away to push the lever, but eventually did, was released from the box and got fed. When the cat was put back into the box the amount of time it took for him to push the lever was reduced each time. The lever would be moved around which would start the process over again. But each time the cat would eventually figure it out and then the next time would do it faster. Thorndike referred to this as the law of effect – when an action is followed by a pleasurable consequence, it will tend to be repeated. If its followed by an unpleasant one, it will not be repeated.

Thorndike’s work was followed up by B.F. Skinner who named the learning of voluntary behaviors as operant conditioning, saying that learning voluntary behaviors allow people and animals to operate in the world so operant behavior is any voluntary behavior.

Operant conditioning is based on the idea that learning takes place as a result of what happens after the behavior is done. Reinforcement – or “what’s in it for me” is anything that follows a response that might cause the response to happen again. This is the pleasurable response that Thorndike was referring to. (remember though the pleasurable response might also be avoiding something). Skinner tested his theory with what became known as a Skinner box. He would place a rat in it where if the rat hit a lever food would appear.

There are several different type of reinforcers. Primary reinforcers are tied to basic needs like hunger. They are great for animals and little children. Secondary reinforcers need to be learned and gets its value from being associated with a primary reinforcer. So for example money is not really that important until you realize that it can buy you food – a basic need. Secondary reinforcers get their “power” through the process of classical conditioning.

Reinforcers are also different based on how they are used. Reinforcement always refers to something that strengthens a behavior. There are two types. Positive which adds something pleasurable after a behavior and negative which removes something unpleasant. So for example you take out the trash because you get $1 – positive reinforcement. You take out the trash to avoid getting yelled at – negative reinforcement.

There are things that get the behavior to slow down. The first is punishment. This is actually the opposite of a reinforcement. This weakens the responses because you receive something bad as a result of the behavior. There are two types of punishment – punishment by application – when something unpleasant is added to the situation. You fail a test you get yelled at. It is often urged to avoid this type of punishment as it can lead to abuse. The 2nd type of punishment is punishment by removal or omission training. This is when you remove something pleasurable. You fail a test your phone gets taken away.

The way to tell the difference between punishment by removal and negative reinforcement is to see what is taken away. In punishment by removal the pleasant thing is taken away so the behavior goes down. With negative reinforcement, the unpleasant thing is taken away to the behavior increases.

**Specializations of operant conditioning**

There are several different ways that operant conditioning takes place that are beyond just simple reinforcement.

Shaping – this is when small steps toward some gal are reinforced until the goal itself is reached. Think about teaching dogs tricks. If you want them to jump through a hoop, you need to start with the hoop on the ground. Put a treat on the other side of the hoop and the dog goes through because it’s the shortest way to get the treat. Once this is done successfully, you raise the hoop up a little and reinforce again. Eventually you will be able to raise the hoop off the ground to any height and the dog will jump through it. The process of rewarding each little step is called successive approximation.

Sometimes the learning does go away with operant conditioning as it does with classical conditioning. Extinction occurs when the reinforcement is removed. Generalization occurs when operantly conditioned responses are generalized to similar stimuli. For example babies might say Dada to all males. But when the other males don’t respond, the baby learns to discriminate between some random male and their father. The father becomes the discriminative stimulus – which is any stimulus that provides the organism with a cue fro making a certain response in order to obtain reinforcement

Spontaneous recovery can also happen with operant conditioning.  Often times you have to reinforce the old trick before the new one can be achieved.  Often times the animals will do all the old tricks before they do the first one because they think they are getting the treat.

Schedules of Reinforcement

Timing of reinforcement is just as important as the reinforcement itself.  Reinforcing every behavior every time is not the best way to teach/change long term behavior.  Continuous reinforcement might cause a quicker change in behavior, but the behavior will not last as soon as the reinforcement stops.

Zoe gets a quarter every time she makes her bed. Paige gets a $1.00 once a week.  When I stop giving Zoe the quarter she no longer makes her bed. Paige however has learned that she needs to do it consistently if she wants her money.  When the reinforcer stops, Paige might continue for a couple more days, even another week hoping that it will come again. Zoe received continuous reinforcement while Paige received partial reinforcement.  The behaviors learned through partial reinforcement are harder to extinguish than those of continuous - it's also more realistic to the real world.

There are different patterns of partial reinforcements. When timing is included its called an interval schedule. When it is the number of responses it is called a ratio schedule.  You can also have a fixed where it is the same number or time every time or a variable where it is a different number or interval every time.

The most popular type is fixed interval schedule of reinforcement - this is when a reinforcer is received after a certain, fixed interval of time has passed. Getting paid every two weeks.  Doesn’t member how much you work you only get paid after two weeks.

The more effective kind though is a variable interval schedule of reinforcement.  This is when the amount of time changes between reinforcements. When you don’t know when you are going to be reinforced, you are more likely to do the behavior. Speed is not important so the rate of responding is slow but steady.  Social networking a prime example of this. You don’t know when you going to get the like or retweet so you keep checking.

When it comes to the amount of responses you are looking at a fixed ratio schedule.  You do the behavior a certain amount of times you get rewarded. Doing piecework where you have to do a certain number of pieces before you get paid is an example of this. You tend to work faster so that you can get paid.  When the number of responses changes that is a variable ratio schedule. This behavior is still done pretty rapidly because the number of responses still matters, you just aren’t sure when the reinforcement is going to come.  Playing a slot machine is an example of this.

There are some things that are important regardless of what schedule you use.  Reinforcement needs to be given right away. Delaying reinforcement does not tend to work as well - especially with young children and animals.  Also you have to remember to reinforce the desired behavior only. For example giving a treat even when the chore was not done. You are in essence reinforcing the bad behavior.

Operant conditioning in everyday life.

Behavior modification is one of the most common ways that operant conditioning is used in real life.   Sometimes tokens are used in a token economy. Where you can trade in a token received for doing the proper behavior for something else. The ticket is a secondary reinforcer.  Time out is another example. This ia mild punishment of removal. When used with children it should be 1 minute for every year of age with a max of 10 minutes. You don’t want them to forget why they were put in time out in the first place.

Applied behavior analysis is a modern term that uses the shaping process.  ABA breaks down tasks into small pieces and reinforces each task. It is often used with autistic children.  Prompts are given as needed when the child is learning a skill or refuses to cooperate. As they begin to master the skill and receives reinforcement in the form of treats or praise, the prompts are gradually removed until they can do it independently.

There are other techniques that have been used to change even involuntary behaviors such as heart rate or breathing.  Biofeedback is one example. The use the biological information to create a state of relaxation. A newer type is neurofeedback that is used to treat attention problems. They try to change the brain waves.  People are connected to an electroencephalograph, a machine that records the brain’s electrical activity.

Making punishment more effective -

1. Needs to be immediately after the behavior it is meant to punish
2. Needs to be consistent. Every time the behavior happens the response needs to be the same
3. Should be paired with reinforcement of the right behavior.

**Cognitive Learning and Observational Learning**

What occurs in observational learning?

Observational learning is the idea of learning a new behavior by watching or observing others. This was studied by Albert Bandura and the Bobo Doll. This involved putting a child in a room with an model and a bobo doll. The child first observed a model who played with the toys but ignored the bobo doll. Some children also observed a model who was more aggressive with the bobo doll. The children were then allowed to be in the room by themselves. Those that observed the model being aggressive toward the doll was aggressive in the exact same way. They had learned this behavior through observation.

Bandura followed this up with the model being aggressive and then being rewarded while others watched the aggressive behavior that was later punished. Those that witnessed the model being rewarded acted the same way, but those that witnessed them being punished was not aggressive toward the doll. Then Bandura told the kids that he would reward them if they would show him what happened in the first group the kids did it. This showed that consequences do matter in motivating a person to imitate a particular model. This shows a couple of things – 1 that actions of the parents do matter and 2 so do the consequences of the behavior. This is why there is a link between exposure to violence and tv. The data that has been connected to tv violence and observational learning is long but it is correlational. There is a relationship but not an actual cause.

How does observational learning function in everyday life.

There are four aspects for observational learning to take place

1 – attention – you have to pay attention to be able to learn. Sometimes this is easier said then done. Often times we pay attention to things that are similar to us.

2 – memory – you must be able to retain the memory of what was done.

3 – imitation – you have to reproduce or imitate the actions of the model.

4 - motivation – you have to have the desire to perform the action.

Cognitive Learning Theory

Learning was focused specifically on behavior until the mid 1950s and 60s when computers came about. They were seen as “thinking machines” and scientists wanted to learn more about how people think. Three psychologists began to look specifically at congition and developed the following theories.

Edward Tolman – he used a rat and a maze to look at cognition. The first group was reinforced every step of the way of the maze. The second was let free to roam around and after several days was finally reinforced. The third was the control group and not reinforced at all. As predicted the first group solved the maze quickly while the other two wandered around. The 10th day, the 2nd group was reinforced and they found their way out much quicker than the first group did. (it should have taken the same amount of time). Tolman believed the 2nd groups of rats had created a mental map. They were able to store this information until it was needed. This is referred to as latent learning.

Wolfgang Kohler was looking at chimpanzees. He put a banana just out of reach of Sultan in his cage. So Sultan used a stick that was inside the cage to get it. They then put the banana a little further than the arm and the stick could reach and placed two sticks in the cage. Neither would reach it alone, but if they were put together they would reach. Sultan first put one and then pushed it out with the other, but when he tried to pull it back in, only the one in his hand came back. Kohler returned the other stick, Sultan looked at them and then found a way to put them together, and got his banana. Kohler referred to Sultan’s quick response as insight and determined it could be gained through the process of trial and error.

Martin Seligman is the most current psychologist to look at cognition. He created what is known as positive psychology. However, in the late 60’s he and colleagues accidently learned about helplessness. They were working with dogs that had been conditioned to fear a sound. They were placed with dogs that were not conditioned and when the sound occurred they unconditioned dogs jumped out while the conditioned dogs stayed. It was concluded that they had learned helplessness – that even though there was a way out they weren’t going to take it because they thought there was no escape. He used this to explain depression. They stay in unpleasant work places or relationships rather than trying to leave. He believed depressive behaviors was a type of learned helplessness.

**Language**

Language is the one things that makes humans the same. It is a combination of symbols that allow us to give meaning and communicate both with others and to have our own internal mental activity.

All language contains the same structures.

Grammar – the system of rules governing the structuring and use of language. According to Noam Chomsky the language acquisition device is a part of our brain that allows us understand and produce language. We do learn the specifics of language, but the ability to understand the complexities of grammar are hard wired or instinctive.

Grammar is made up of the rules for syntax – the order of words, morphology – the study of the formation of words, phonemes – basic sounds, and pragmatics – the practical social expectations and uses of language.

Syntax – these are the rules for combining rules and phrases to form grammatically correct sentences. It might seem simple but can change the meaning. John, the kidnapped boy versus John kidnapped the boy.

Morphemes – are the smallest units of meaning. They are governed by semantics or the rules for determining the meaning of words and sentences. Sometimes semantics can be the same with different syntax – Johnny hit the ball versus the ball was hit by Johnny.

Phonemes – they are the basic units of sound. Infants are born with the ability to pronounce all phonemes, but because they don’t use them the ability is lost as they get older. That is why some people pronounce English different. For example there is no W sound in German.

Pragmatics – this is the practical aspects of communicating with others. These are things like taking turns in a conversation or what gestures help you get your point across. Some aspects of pragmatics is the intonation that you use when speaking to different people.

**How are thought and Language related?**

Early psychologists Jean Piaget and Lev Vygostky looked at the relationship between language and thoughts.

Piaget believed that concepts came first and helped form language. He looked at children and found that they often spoke to themselves – even when interacting with others. He referred to this as a collective monologue and said it was egocentric. He believed that once children became more socialized that it would go away.

Vygotsky thought the opposite. He said that language helps create thought. For example – once the child learns the word mama – they begin to identify what make moms mama – being warm, soft, food, safety, etc. he looked at the egocentric speaking as a way for the child to form thoughts and control actions. He thought private speech would actually increase as people became more social.

Cognitive Universalism – this looks at the influence that language has on the way we think. The belief is that concepts are universal and influence the development of language. In sociology this is the saphir-whorf theory.

Animal Studies in language

Language is defined as the use of symbols. Abstract symbols don’t have any meaning until it is given to them by people. The question was can animals learn language too. There have been lots of studies done with chimpanzees that were able to learn and use language.

Theories and Stages of Language Development

Language is learned through various steps. Babies start out with cooing, then babbling (creating consonant sounds). Around the age of one children begin to start to use holophrases or single words that. By about 18 months they are grouping words together and by the time they are 6 they are generally fluent in their language – just a limited vocabulary.

Theories of language acquisition

Early on it was based on reinforcement, but Chomsky changed all that when he said that all humans are born with the LAD that allows us to use and learn language. Recordings have shown that all babies regardless of where they are from make the same babbling noises. Another aspect that is universal is the brain region that are dedicated to forming and comprehending speech. Both of these are why its important and beneficial for kids that to learn language at an early age.

Newer theories believe that children have expressive language delay – meaning they understand a lot more than they can create so they use gestures and other sounds to communicate.

Areas of the brain associated with language

There are two parts of the brain associated with language. Broca’s area and Wernicke’s Area

Broca’s Area – this is in the left frontal lobe. This allows you to speak smoothly. Damage here may cause someone to have a hard time saying what they want to say. Sometimes speech is mispronounced. Broca’s aphasia is when words are left out or mispronounced. Aphasia is when you can’t use or understand either written or spoken language.

Wernicke’s Area – this is in the left temporal lobe. Damage here is linked to problems with understanding speech. Someone with Wernicke’s aphasia is able to speak fluently and pronounce words correctly but uses the entirely wrong words.