Phase 2

Learning Theory

Learning Theory, also known as behaviorism, is a theory of learning based on the idea that all behaviors are acquired through conditioning. Learning theory studies how a dog's behavior results from stimuli presented to the dog, controlling for as many other variables as possible. Emphasis is on how dogs learn new behaviors, and what motivates them to change or remain the same. '**Learning**' is about how an **animal's** potential for a behavior changes with experience. 'Training' describes the techniques used to ensure that **learning** comes about in a predictable way in response to human intervention. ... The **animal** learns to associate its behavior with a particular outcome.

It all began with Russian physiologist Dr. Ivan Pavlov who was the first to experiment on animal behavior. In Pavlov's groundbreaking study of **classical conditioning**, dogs learned that a stimulus (in this case, a bell) meant they were about to be fed. Starting with two things that are naturally paired -- salivating and being fed -- Pavlov added a third component by ringing a bell before feeding. After a few trials, the dogs learned to associate the bell with being fed and would react by salivating at the sound of the bell in anticipation of their food but without any food present.

Since dogs naturally begin salivating when offered food, food is an **unconditioned stimulus**. No conditioning or special training is necessary to cause the dog to salivate, which is an **unconditioned response**. In contrast, a ringing bell does not normally cause dogs to salivate; they will do so only if they have been conditioned to associate a bell with being fed. Therefore, the bell is a **conditioned stimulus**. The dog's new reaction is a reflex to the stimulus and is a **conditioned response**. Many of us see this today with our own dogs when they break into a frenzy of barking at the sound of the doorbell, sometimes even a doorbell on television. In this case, the dog has been conditioned to associate the stimulus of the bell with the imminent arrival of a stranger.

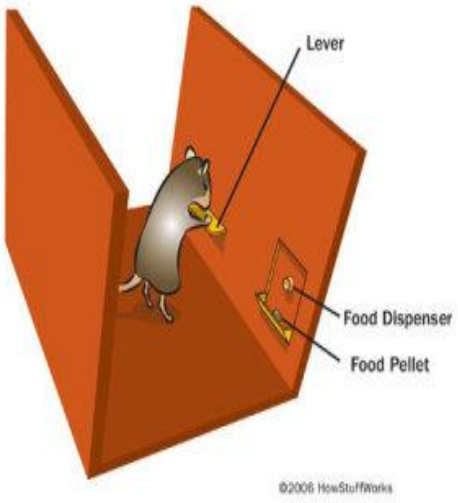
When we see flashing lights or hear a siren behind us while driving, we may reflexively tense up and our heart rate may increase. We have been conditioned to associate the sound of sirens with the unpleasant and stressful experience of getting a ticket. This is **classical conditioning**. Both animals and people can learn to relate a pair of events and respond to the first in anticipation of the second. This type of learning is passive and involuntary; it occurs without the learner doing anything and often without awareness.

Edward Thorndike was a contemporary of Ivan Pavlov. It was Thorndike that was the first to apply psychological principles to the area of **learning**. His research led to the development of **operant conditioning** within behaviorism. Whereas classical conditioning depends on developing associations between events, operant conditioning involves learning from the consequences of our behavior. Thorndike's famous puzzle box experiments with cats lead to the development of his **Law of Effect**, which states that responses immediately followed by satisfaction will be more likely to recur. It also suggests that behaviors followed by dissatisfaction will become less likely to occur.

B.F. Skinner expanded on the work of Thorndike and Pavlov to create the concept of **operant conditioning**. This is what dog training is based on. While Pavlov's work dealt with a reflexive reaction to a conditioned stimulus, and Thorndike's work dealt with how likely or not behavior would recur, Skinner became interested in creating a specific behavioral reaction which included a stimulus and increasing the frequency by adding a **reinforcer**. A reinforcer can be either a **reward** or a **punisher**. A reward is anything that increases the frequency of an action; a punisher is anything that decreases its frequency.

When we are rewarded for a certain behavior, we are likely to repeat that behavior. When we are punished for a certain behavior we are likely to stop. This type of learning is active and voluntary; it depends on the actions of the learner.

Because the definition of a reinforcer is based on its effectiveness, it's important to remember that a reward for one person may not be meaningful, and thus not a reward, for another. Similarly, what is a reward in one context may not be somewhere else.



A rat in a basic Skinner box

Skinner showed that both animals and people would perform certain behaviors for a reward. In his experiments with rats and pigeons, Skinner showed how animals could learn to press a lever to get a food reward. When the animals were first introduced to the test box they moved around randomly. When they accidentally depressed the lever, a food pellet was dispensed. They quickly learned to depress the lever on purpose to get a pellet. He also **shaped behaviors** that are more complicated by reinforcing them step by step. Skinner called his approach "operant conditioning" because the animal's behavior actually operated on the environment (pressing the lever) in response to the anticipated outcome (getting a food reward).

Rewarding to encourage good behavior and punishing to discourage bad is something most of us do instinctively; it's common sense. Operant conditioning had a long history in animal training even before it was ever defined by Skinner. Colonel Konrad Most, who published "Training Dogs: A Manual" in 1910, was using many of the same principles that Skinner studied, decades before he described them. Col. Most's training methods seem somewhat harsh by today's standards, but he is considered by many to be the father of modern dog training. Most trainers use both rewards and punishers to shape and reinforce desired behavior. Reinforcers can involve either the addition of a new element or the removal of an element currently present. The terminology for this is a little confusing, but **adding** something is referred to as "positive," though not necessarily in the sense of "happy" or "good." "Negative," in this case, is the **removal** of something, and doesn't necessarily mean "bad." Therefore, both rewards and punishers can be either positive or negative.

Giving a parrot a piece of fruit for waving its foot is an addition of something good (a positive reward); a horse moving faster to stop the pressure of spurs is the ending of something bad (negative reward). Even though "negative reward" sounds like an oxymoron, the removal of something bad is a kind of reward.

There are many ways to teach a dog to sit using a reinforcer. The trainer may push or lure the dog into a sitting position, or he may simply wait until the dog sits naturally on its own. Once the dog sits, the trainer may offer a positive reward such as verbal praise ("good boy!"), tactile praise (a pat on the head), a favorite toy, or a treat. Some trainers use negative rewards like electronic collars to administer a mild shock to the dog, which stops as soon as he sits. The dog learns he can eliminate the shock by sitting. For ethical reasons, many people frown on this. However, it follows the same principles of operant conditioning. In every case, the dog will learn that when he hears the command "sit" and he sits, he will get a reward.

Reinforcers can be almost anything as long as they are meaningful to the dog. One dog may think treats are more valuable than toys, while another may feel the opposite. It doesn't really matter what the reinforcer is, but for practical reasons, some reinforcers are easier to work with than others. Also, the same reinforcer doesn't have to be used every time or in every situation. Some tasks may require a more valuable reinforcer than others. As PetSmart obedience trainer Dan O'Leary puts it, "you would probably step over a chair if I offered you a dollar to do it. But you probably wouldn't wash and wax my car for a dollar." Similarly, your dog may work for one type of reward in the relative calm of your home but may need something more desirable to maintain focus in class.

Many of the same problems are inherent in training dogs. If a dog sits, then jumps up, spins around and is given a treat, it will probably not know which part of the performance pleased the handler. This is especially true if it took a minute for the trainer to pull out the treat and present it to the dog. Typically, the dog will pair the reward with the final behavior that it performed before it got the treat. So if the dog sat, then jumped up and got a treat, what it's really being trained to do is jump up, not sit. This is also true of punishers. If a dog runs away from its owner and engages in a game of hide-and-seek, it is natural for the owner to punish the dog when he catches it. However, the last thing the dog did before being punished was come to the owner. So coming when called is the behavior that is likely to decrease, instead of running away.

Marian Breland, a student of B.F. Skinner, designed a **marker**, or cue, that would let the animal know it had performed correctly and would be getting a reward shortly. Breland used classical conditioning to pair a marker signal with a reward, so that when the animal heard the signal it knew it would be getting a reward. Then he used operant conditioning to shape behavior using positive rewards. The marker helps to reinforce the correct behavior because it is immediate. The marker is not the reward; it is simply a signal that the behavior was correct and a promise of a reward to come.

Many trainers depend on a dog's keen hearing abilities and use a clicker as a marker. The click means, "you did something, it was the right thing, and you will be getting a treat for it." Many

beginning trainers make the mistake of clicking to mark a behavior, but then not following the click with a treat. With no actual reward, the dog may continue to offer the behavior for a while but it will eventually disappear.

We use various markers in specialty training which we will discuss in Phase 8.

It is worth mentioning Albert Bandura who theorized the Social Learning Theory which states that people (and animals) learn from one another through observation, imitation and modeling. This comes into play when dogs are brought in for training and are unfamiliar with their surroundings. We let them acclimate by watching us handle other dogs and somewhat learn what we expect them to do as well.