

Ivan Pavlov's Theories in the Classroom

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Ivan Pavlov and Behavior in the Classroom

Oftentimes we hear about ideas and theories in medicine and science but we don't always make the connection to who actually began the research on these topics. We frequently think that these theories and practices have been around for so long that it would be hard to find out who really started the research and patented ideas. One such man who often doesn't get the credit he deserves is Ivan Petrovich Pavlov. Ivan Pavlov was a Russian psychologist who became a leader in the study of blood-circulation, digestion and conditioned reflexes (Sereisky, 1936, p. 345).

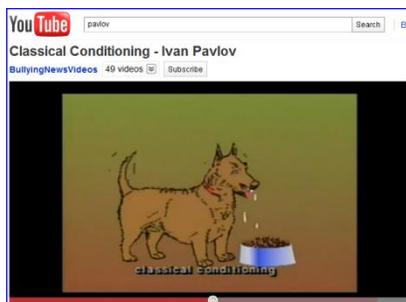
Ivan Pavlov was born in September 1849 in Ryazan, Russia. Ivan's family was very poor; his father was a local priest and his mother worked in the fields daily. At an early age, Ivan was taught the value of working hard and developed a love for physical labor and learning. When Ivan was nine years old he suffered a fall that affected his health and kept him out of school. At age eleven he entered into the second grade at the church school in Ryazan. Following his schooling in Ryazan, Ivan began training for priesthood at the Theological Seminary of Ryazan. While there he studied religion, language and philosophy (Death of Ivan Pavlov, 2011). Priesthood was not the life that Pavlov wanted to live. In 1870 Ivan dropped out of Seminary, enrolled at the University of St. Petersburg, and began studying natural science. After completing his work at St. Petersburg, Ivan then began studying at the Military Medical Academy. In 1879 he received his M.D. degree. While in medical school, Pavlov worked as a laboratory assistant and also published his first work on blood circulation and reflexes. In 1881 Ivan Pavlov married Serafima Karchevskais. Life didn't slow down with marriage though; in 1883

Running Head: Ivan Pavlov's Theories in the Classroom

Ivan became a professor/lecturer at the Medical Academy. Finally in 1891, Ivan was named director of the new Institute of Experiment Medicine where he remained until his death (Sereisky, 1936, 344).

In Sereisky's article the author states that Pavlov's lifelong work may be divided into four periods: first, his research on heart activity, second, his studies on digestion, third, conditional reflexes and lastly, research in the patho-physiology of the nervous system (1936). In 1904 Ivan Pavlov was awarded the Nobel Peace Prize for his work in the field of physiology of digestion. Some of Ivan's most famous findings came from his experiments using dogs.

As mentioned in 1904, Ivan Pavlov was the first Russian theorist to be awarded the Nobel Peace Prize. He was awarded this honor due to his research on digestion which led to discovering conditioned reflexes. This is often referred to as one of Pavlov's greatest studies. Pavlov began his experiments using the example of a hungry dog starting to salivate when hearing a bell. Previously, this dog had repeatedly heard the bell before food was then delivered to him. Pavlov studied these reflexes in dogs from 1898 to 1930. Pavlov even suggested that human language could be viewed as long chains of conditioned reflexes using words (Marks, 2004, p. 674).



The image above is hyperlinked to a short video about Pavlov's conditioning research (Classical Conditioning, 2008).

Pavlov's research on dogs and their salivary glands led to his honor of receiving the Nobel Peace Prize. Together with his colleagues, Pavlov placed fistulas in the ducts of the dog's salivary glands as well as in their digestive tracts to help with his research. Pavlov's research continued for more than 8 years. He is quoted saying:

Our healthy and happy animals did their laboratory work with real gusto; they always eagerly moved from their cages to the laboratory and readily jumped onto the tables where our experiments and observations were conducted...We can demonstrate at any time almost all phenomena of digestion without the loss of even a single drop of blood, without a single scream from the animal undergoing the experiment...Our success was mainly due to the fact that that we stimulated the nerves of animals that easily stood on their own feet and were not subjected to any painful stimulus either during or immediately before stimulation of their nerves (Marks. 2003. p. 674).

Pavlov's main concern was that the animals in his experiments be treated appropriately. Pavlov also spent a great part of his life studying the nervous system and the condition of schizophrenia. Sereisky stated in his article:

His work on hysteria is of particular interest. He emphasized that hysterics, to a greater or lesser degree, live in a world of emotion rather than of reason, conditioned more by sub-cortical rather than cortical nervous activity. (p. 346)

Pavlov's studies on the brain and its processing opened the door for many other theorists to research these ideas further. Ivan said that his work was worthwhile. However, he was not a clinician, he would always remain a physiologist; it was too late in life for him to become a

clinician. One article even stated that Pavlov was a rare combination of a cautious scientist, a man with rare imagination, exceptional optimism, colossal organizing ability and precision of thought (Sereisky, 1936, p. 347-348).

Much of Pavlov's research and experiments took place during a time when Russia was dealing with a revolution. People were being murdered for even the slightest hint of opposition to the Russian government. Pavlov didn't always agree with the Soviet government. However, because he was so well known as a scientist this saved him even in the face of powerful leaders. Once, Pavlov was offered food when rations were slim. He refused them saying, "I will not accept these privileges unless you give them to every one of my collaborators-I am ashamed to be a Russian." Pavlov continued his work until his death in 1936. Even on his death bed, it was said that he had his students writing down everything he could remember. Pavlov was considered a groundbreaker in research despite war, revolution and ongoing turmoil around him. To this day researchers still pay Pavlov "lip service" even when their research owes little to him (Marks. 2003. p. 677).

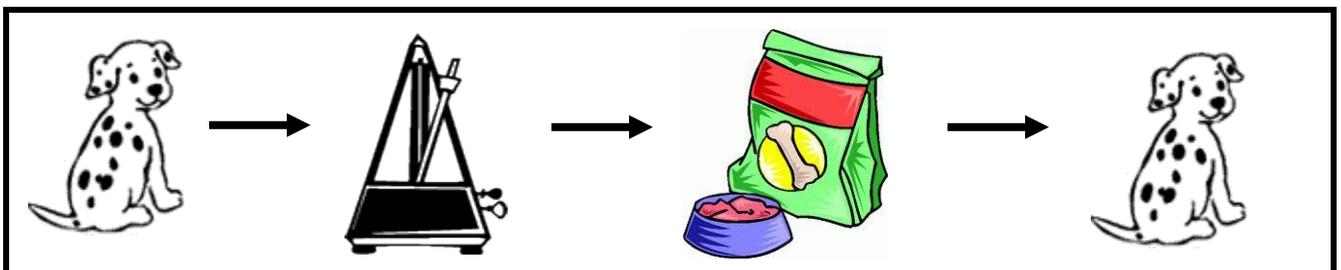
One of Pavlov's most well-known studies was that of classical conditioning. Our textbook for the semester described Pavlov's research as one of the most important developments that helped establish psychology as a science and learning as a legitimate field of study. Schunk described Pavlov as a man whose legacy to learning was left in his research and studies on classical conditioning. The remainder of this paper will focus on Pavlov's theory of classical conditioning and how it relates to my profession as an educator.

While Ivan Pavlov was the director of the laboratory at the Institute of Experimental Medicine in Petrograd, he began his study of the eating habits of dogs. While working at this lab, he noticed that the dogs would often salivate at the sight of food or even at the sound of an attendant's footsteps. Our text stated that "Pavlov realized that the attendant was not a natural stimulus for salivating (a reflexive action); rather, the attendant acquired this power by being associated with food." (Schunk, 2008, p. 34)

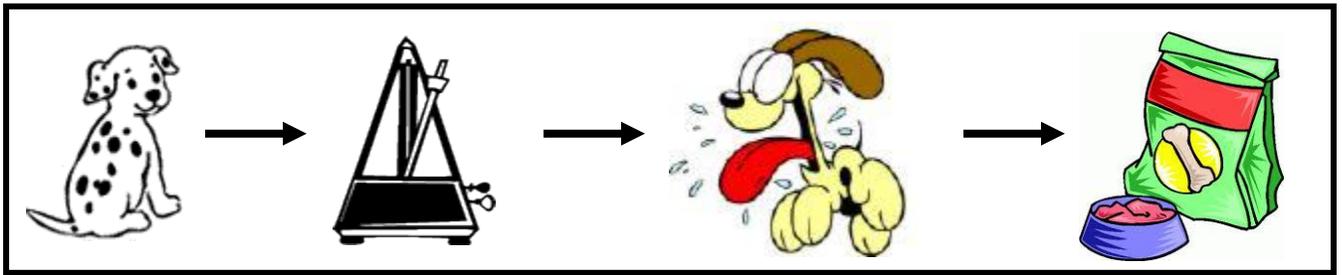
Pavlov's theory can be a very complicated one. It is a multi-step procedure. First, one must be presented with an unconditioned stimulus (USC) which in turns omits an unconditioned response (URC). Our text says Ivan Pavlov presented these dogs with meat powder (USC) which would cause the dog to salivate (URC). In order for the animal to become "conditioned" one must present them with a neutral stimulus many times before giving them the USC. Pavlov used a ticking metronome as his neutral stimulus. Of course in the early stages of his research when the animal heard the ticking from the metronome no salivation occurred. However after multiple tests the dogs then began to salivate when they heard the ticking before the meat powder was presented. Eventually the metronome had become a conditioned stimulus (CS) that produced a conditioned response (CR) (Schunk, 2008, p. 34).

Below you will find a diagram that helped me better understand the pattern to Pavlov's theory:

Initial Trials:



After Multiple Trials



After I began researching Pavlov's theory, I wanted to see how modern day educators used Ivan's theory. I found multiple articles on how teachers taught Pavlov's theory. In many of the case studies I read, teachers demonstrated Pavlov's classical conditioning theory to their students. In the first experiment a classroom teacher used earthworms to demonstrate classical conditioning. In this article Abramson described a classroom where they conditioned earthworms based on vibrations and light. Each student was given their own worm on which to experiment. The worms were not hurt during this experiment. The students considered the conditioned stimulus to be the vibrations and the light to be the unconditioned stimulus. The experiment went as such: the students first removed the worm from its current habitat. The worm was then cleaned off with de-chlorinated water and placed into a conditioning chamber where it was given 5 minutes to adapt to its new surroundings. A ruler was placed inside the conditioning chamber to help record the CR and the UR. The students would then present the worm with the CR and UR and wait for the worm to contract. Next, the ruler was used to measure the contraction. Initially there was no contraction, however, each time the stimulus was presented the students were able to see the contractions getting bigger and bigger (1996).

A second experiment that Abramson described was that of classical conditioning in a housefly. Houseflies were trapped in test tubes and then classical conditioning was demonstrated by pinning the fly to a wax pieces, making them temporarily unconscious and then presenting them with acetic acid (CS) and sucrose solution (US). Just as in the first experiment, the acetic acid would be presented to the fly and initially the fly would have no response. After the CS has been given to the fly the students would then place the sugar water (US) on a piece of filter paper and give it to the fly to quickly suck on. Eventually, like Pavlov's dogs, the fly would smell the acetic acid and know that sweet sugar water was soon to follow but only for a few seconds. Abramson said that the students enjoyed both hands-on experiences and were impressed at how quickly the animals learned (1996).

In an article written by John Sparrow and Peter Fernald, it was stated, "Presenting classical conditioning in a manner that captures students' interests and remains faithful to Pavlov's procedures is not an easy task." In this particular experiment students placed dental rolls in their mouths while a hamburger was being cooked. Their goal was to measure the conditioned salivary response. They first weighed the roll before placing it in their mouths and then weighed the roll again after the burger had been cooked. This soggy, messy method was soon discontinued. A second demonstration of classical salivary conditioning involved sweetened lemon powder. The students were instructed to watch their teacher for the signal to dip a moist finger into the powder and then place onto the tip of the tongue. However, this experiment was also put to rest due to the difficulty in distinguishing between the conditioned responses. The article also shared one last classroom experiment. This experiment demonstrated the classical conditioning startle reaction. The students used balloons and large

needles for this experiment. When the needle was pushed into the sides of the balloon the balloon popped, causing a loud noise that startled the students. However, when the needle was pushed into the knot of the balloon it only flinched, because the students had been conditioned to think that when the needle entered the balloon it would pop and result in a loud noise.

Regardless of the outcomes of all of these experiments, the authors of this article summed it up well when they said, "To demonstrate classical conditioning as a process, the instructor must use both an appropriate conditioned apparatus and teaching procedures that carefully and precisely spell out Pavlov's paradigm of how a NS becomes a CS" (Sparrow, 1989, p. 204).

After reading through the research and how classroom teachers taught their students about classical conditioning, I wanted to take a different spin and not only teach my children about classical conditioning but see how they are conditioned on a daily basis. I started out simple. I am currently on the downhill slope of my third year of teaching. Each year has been a very different experience and I am sure that it will continue to be just like that. I am currently working in a collaborative classroom; this means that I have students on many different levels in my classroom. However, one thing that remains the same is their high energy levels. Now I too am a very enthusiastic person and I can see where my students feed off me but each morning starts off like a zoo in my classroom. It can be very frustrating. When beginning my research for this project, I decided to start with the balloon experiment. Each morning my children are given morning work to complete, they are to come in, unpack, make their lunch choice, give me any notes, money, bus passes, etc and then get busy on their work. This is rarely the case unless I constantly raise my voice and ask them to get busy. For my first Pavlov experiment I began with the balloon popping method. One Monday the students entered my

classroom and immediately began acting like animals. I let this go on for about 5 minutes and then I began my experiment. I went to my desk and got out a balloon and a needle. While the children were acting silly and not doing as they were told I quickly took the needle and popped the balloon. Of course the noise echoed off the walls. Immediately it was silent. They all turned to look at me and I quietly said, "This is not play time, get to work." The students quickly got to their seats and began working, their efforts were short lived however, and in a matter of minutes they were back to acting silly and not working on their assignments. I repeated this experiment daily for two weeks. Each day the children would be startled by the sound and then immediately get back to work. However, one thing I noticed was that as the weeks went on the amount of time the children worked, after hearing the pop, began to increase. The students didn't like the sound of the balloon popping and they knew that if they continued working then I would be happy with their efforts and not pop another balloon. So far this conditioned experiment has been successful and the students are taking their morning routine more seriously. Now, if the children start to get crazy I simply reach for the needle in my top draw and they all run to their seats. With reverberating concrete walls, no one wants to be startled like that.

A second experiment I tried really wasn't a new concept but one I already used on a daily basis. After Christmas I needed a new spin on my discipline method. It was time to get serious and buckle down on the content we needed to get through before testing. I implemented a sticker chart method. Each child was given a sticker chart on their desk. When the chart was filled with 25 stickers the children would earn a homework pass. Much like Pavlov, it took multiple attempts to stimulate the children. While they were working on

independent work at their seats, I would often circle the room to make sure my friends were on task. After the sticker charts were implemented I began carrying a sheet of stickers with me. At first there was no change in the students. Then, however after the students started to see my very well behaved students filling their charts quickly, independent work became sacred time. This tiny sticker conditioned their behavior in such a way that all they wanted was to please me.

One last experiment I tried was with my classroom lights. As you have seen from my first two experiments my students are very rowdy. Transitions are very hard for us. One transition they can't seem to master is lining up to leave our room. When I would tell them to line up it would become mass chaos. Oftentimes they would have to return to their seats and make several attempts before successfully making a 3rd grade line ready to leave the room. Much like my other experiments, I started this on a Monday. When it was time to leave the room, I turned off the lights. I waited for the students to give me their attention and I said, "Boys and girls it's time to go to _____, please quietly get up, push in your seats and line up." I was amazed at how well it worked. I repeated this experiment Tuesday through Friday. Each time I would repeat the same phrase. I don't know if it was the dim lights or the whisper of my voice but each time the children did as they were asked and quietly got in line. The second week of my experiment I still turned the lights off but instead of using the phrase, I waited for them to give me their attention and I pointed to the door. My pointing signal meant they were to do the same thing as the week prior, only they already knew what was expected and didn't need specific instructions. Each time the children got up and quietly went to the door. One week of conditioned instruction taught the children what was expected and what turned-off lights meant. To this day, when the lights go off the children know what they need to do.

I will be honest, when starting this paper/project I didn't know a lot about Pavlov, other than his experiments on dogs. However, after researching his ideas and methods and seeing how his theories relate to education, I can see now how classical conditioning can have an impact on classroom control and structure.

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