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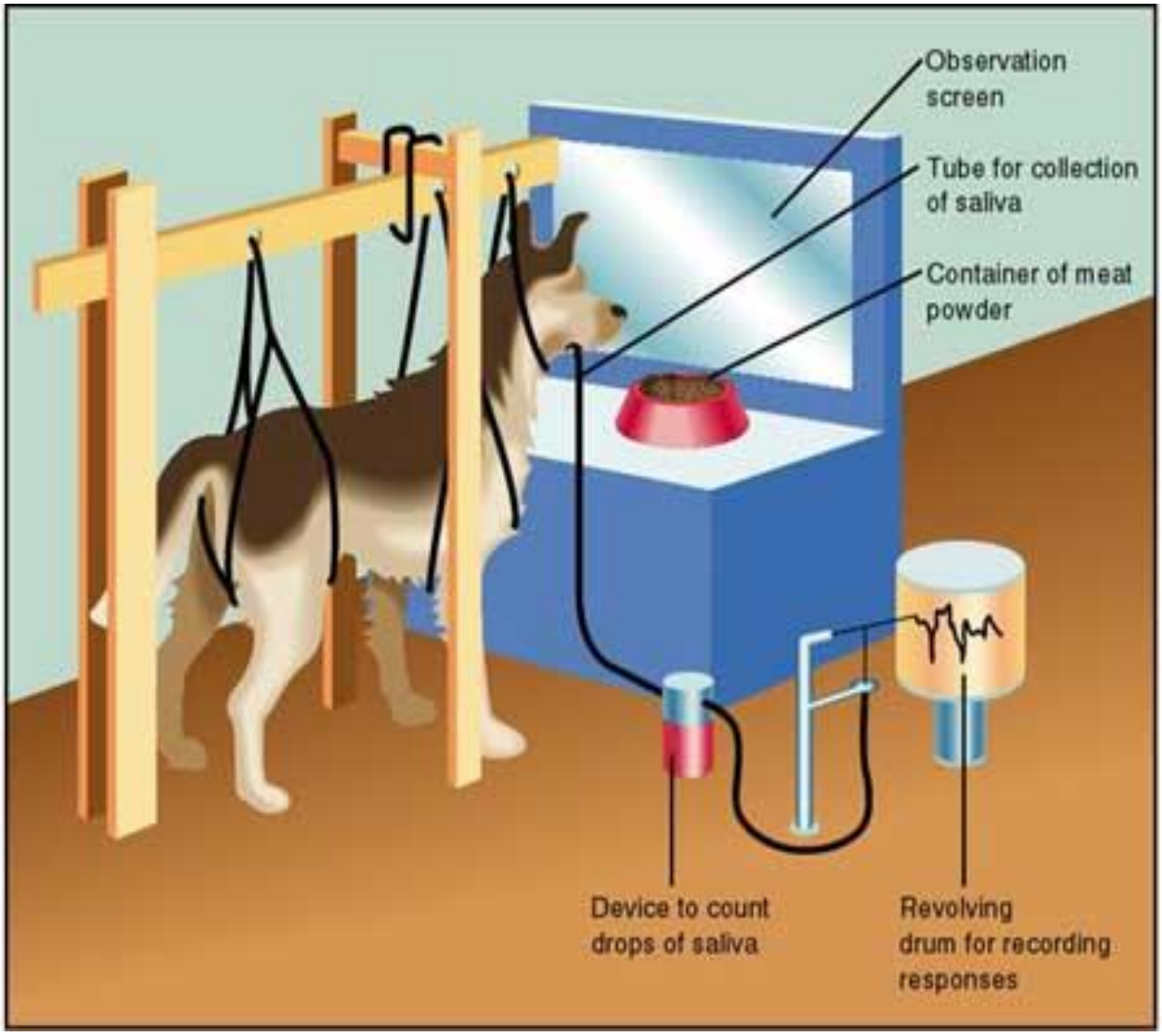
Classical Conditioning of Ivan Pavlov

Pavlov (1902) started from the idea that there are some things that a dog does not need to learn. For example, dogs don't learn to salivate whenever they see food. This reflex is 'hard-wired' into the dog. In behaviorist terms, it is an unconditioned response (i.e., a stimulus-response connection that required no learning). In behaviorist terms, we write:

Unconditioned Stimulus (Food) > Unconditioned Response (Salivate)

Pavlov showed the existence of the unconditioned response by presenting a dog with a bowl of food and the measuring its salivary secretions (see image below)



However, when Pavlov discovered that any object or event which the dogs learned to associate with food (such as the lab assistant) would trigger the same response, he realized that he had made an important scientific discovery. Accordingly, he devoted the rest of his career to studying this type of learning.

Pavlov knew that somehow, the dogs in his lab had learned to associate food with his lab assistant. This must have been learned, because at one point the dogs did not do it, and there came a point where they started, so their behavior had changed. A change in the behavior of this type must be the result of learning.

In behaviorist terms, the lab assistant was originally a neutral stimulus. It is called neutral because it produces no response. What had happened was that the neutral stimulus (the lab assistant) had become associated with an unconditioned stimulus (food).

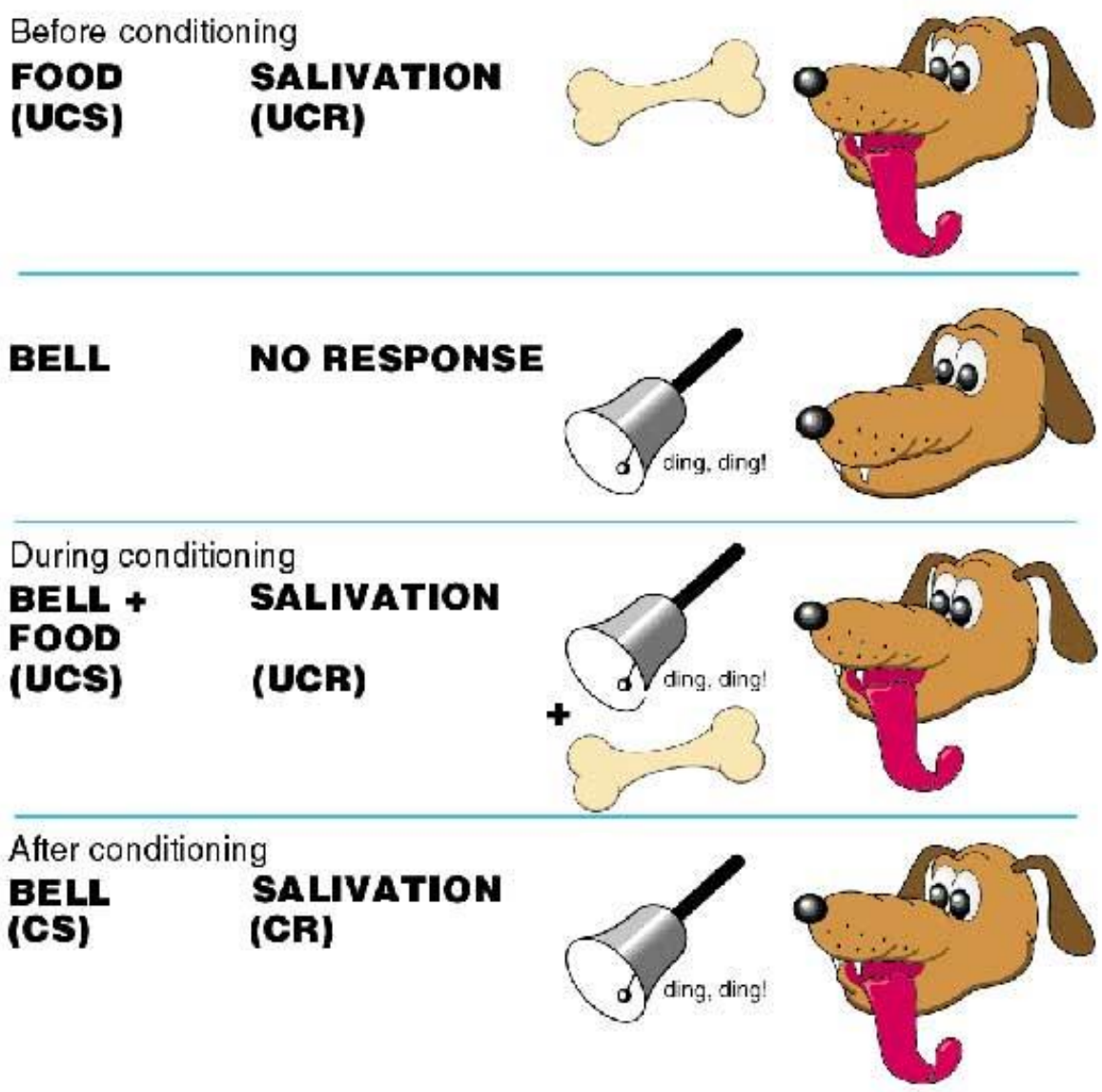
In his experiment, Pavlov used a bell as his neutral stimulus. Whenever he gave food to his dogs, he also rang a bell. After a number of repeats of this procedure, he tried the bell on its own. As you might expect, the bell on its own now caused an increase in salivation.

So the dog had learned an association between the bell and the food and a new behavior had been learned. Because this response was learned (or conditioned), it is called a conditioned response. The neutral stimulus has become a conditioned stimulus.

Pavlov found that for associations to be made, the two stimuli had to be presented close together in time. He called this the law of temporal contiguity. If the time between the conditioned stimulus (bell) and unconditioned stimulus (food) is too great, then learning will not occur.

Pavlov and his studies of classical conditioning have become famous since his early work between 1890-1930. Classical conditioning is "classical" in that it is the first systematic study of basic laws of learning / conditioning.

To summarize, classical conditioning (later developed by John Watson) involves learning to associate an unconditioned stimulus that already brings about a particular response (i.e., a reflex) with a new (conditioned) stimulus, so that the new stimulus brings about the same response.



Pavlov developed some rather unfriendly technical terms to describe this process. The unconditioned stimulus (or UCS) is the object or event that originally produces the reflexive / natural response.

The response to this is called the unconditioned response (or UCR). The neutral stimulus (NS) is a new stimulus that does not produce a response.

Once the neutral stimulus has become associated with the unconditioned stimulus, it becomes a conditioned stimulus (CS). The conditioned response (CR) is the response to the conditioned stimulus.

Educational Implication

The implications of classical conditioning in the classroom are less important than those of operant conditioning, but there is still a need for teachers to try to make sure that students associate positive emotional experiences with learning.

If a student associates negative emotional experiences with school, then this can obviously have bad results, such as creating a school phobia.

For example, if a student is bullied at school they may learn to associate the school with fear. It could also explain why some students show a particular dislike of certain subjects that continue throughout their academic career. This could happen if a student is humiliated or punished in class by a teacher.

References

McLeod, S. A. (2013). Pavlov's dogs. Retrieved from www.simplypsychology.org/pavlov.html

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Operant Conditioning of B.F.Skinner

Operant conditioning is a method of learning that occurs through rewards and punishments for behaviour. Through operant conditioning, an individual makes an association between a particular behaviour and a consequence (Skinner, 1938).

By the 1920s, John B. Watson had left academic psychology, and other behaviourists were becoming influential, proposing new forms of learning other than classical conditioning. Perhaps the most important of these was Burrhus Frederic Skinner. Although, for obvious reasons, he is more commonly known as B.F. Skinner.

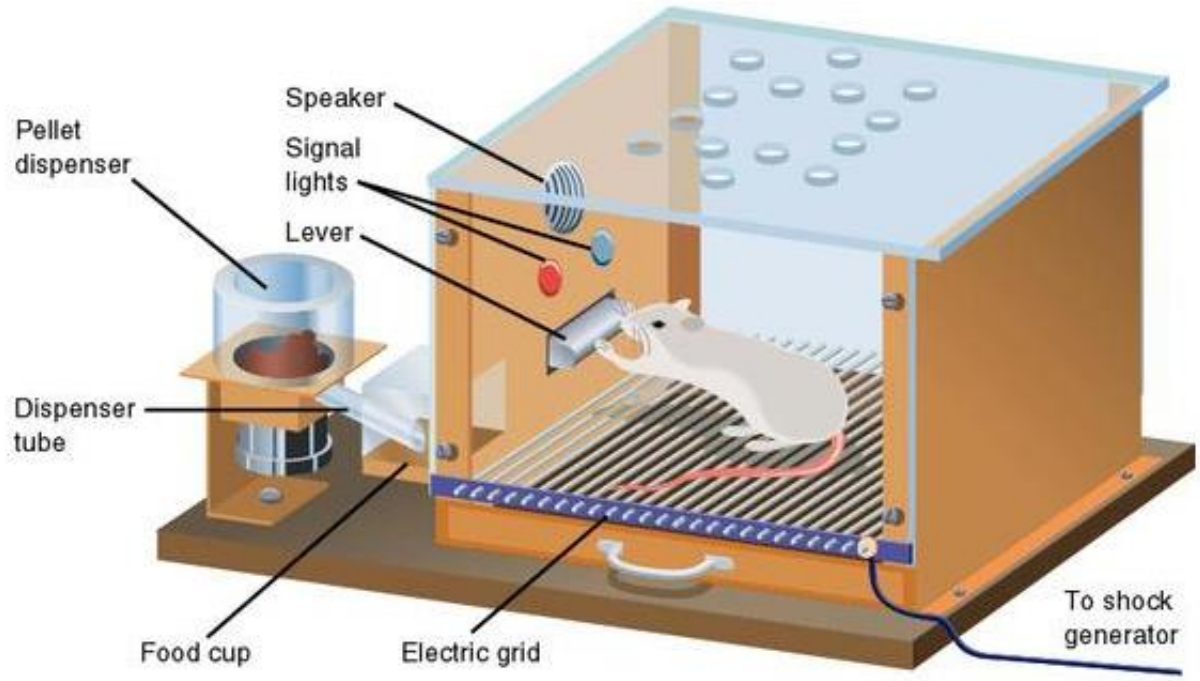
Skinner's views were slightly less extreme than those of Watson (1913). Skinner believed that we do have such a thing as a mind, but that it is simply more productive to study observable behaviour rather than internal mental events.

The work of Skinner was rooted in a view that classical conditioning was far too simplistic to be a complete explanation of complex human behaviour. He believed that the best way to understand behaviour is to look at the causes of an action and its consequences. He called this approach operant conditioning.

Skinner is regarded as the father of Operant Conditioning, but his work was based on Thorndike’s (1898) law of effect. According to this principle, behaviour that is followed by pleasant consequences is likely to be repeated, and behaviour followed by unpleasant consequences is less likely to be repeated.

Skinner introduced a new term into the Law of Effect - Reinforcement. Behaviour which is reinforced tends to be repeated (i.e., strengthened); behaviour which is not reinforced tends to die out-or be extinguished (i.e., weakened).

Skinner (1948) studied operant conditioning by conducting experiments using animals which he placed in a 'Skinner Box' which was similar to Thorndike’s puzzle box.



Skinner identified three types of responses, or operant, that can follow behaviour.

• Neutral operants: responses from the environment that neither increase nor decrease the probability of a behaviour being repeated.

• Reinforcers: Responses from the environment that increase the probability of a behaviour being repeated. Reinforcers can be either positive or negative.

• Punishers: Responses from the environment that decrease the likelihood of a behaviour being repeated. Punishment weakens behaviour.

We can all think of examples of how our own behaviour has been affected by reinforcers and punishers. As a child you probably tried out a number of behaviours and learned from their consequences.

For example, if when you were younger you tried smoking at school, and the chief consequence was that you got in with the crowd you always wanted to hang out with, you would have been positively reinforced (i.e., rewarded) and would be likely to repeat the behaviour.

If, however, the main consequence was that you were caught, caned, suspended from school and your parents became involved you would most certainly have been punished, and you would consequently be much less likely to smoke now.

Positive Reinforcement Skinner showed how positive reinforcement worked by placing a hungry rat in his Skinner box. The box contained a lever on the side, and as the rat moved about the box,

it would accidentally knock the lever. Immediately it did so a food pellet would drop into a container next to the lever.

The rats quickly learned to go straight to the lever after a few times of being put in the box. The consequence of receiving food if they pressed the lever ensured that they would repeat the action again and again.

Positive reinforcement strengthens a behaviour by providing a consequence an individual finds rewarding. For example, if your teacher gives you £5 each time you complete your homework (i.e., a reward) you will be more likely to repeat this behaviour in the future, thus strengthening the behaviour of completing your homework. Negative Reinforcement The removal of an unpleasant reinforcer can also strengthen behaviour. This is known as negative reinforcement because it is the removal of an adverse stimulus which is 'rewarding' to the animal or person. Negative reinforcement strengthens behaviour because it stops or removes an unpleasant experience.

For example, if you do not complete your homework, you give your teacher £5. You will complete your homework to avoid paying £5, thus strengthening the behaviour of completing your homework.

Skinner showed how negative reinforcement worked by placing a rat in his Skinner box and then subjecting it to an unpleasant electric current which caused it some discomfort. As the rat moved about the box it would accidentally knock the lever. Immediately it did so the electric current would be switched off. The rats quickly learned to go straight to the lever after a few times of being put in the box. The consequence of escaping the electric current ensured that they would repeat the action again and again.

In fact Skinner even taught the rats to avoid the electric current by turning on a light just before the electric current came on. The rats soon learned to press the lever when the light came on because they knew that this would stop the electric current being switched on.

These two learned responses are known as Escape Learning and Avoidance Learning. Punishment (weakens behaviour) Punishment is defined as the opposite of reinforcement since it is designed to weaken or eliminate a response rather than increase it. It is an aversive event that decreases the behaviour that it follows.

Like reinforcement, punishment can work either by directly applying an unpleasant stimulus like a shock after a response or by removing a potentially rewarding stimulus, for instance, deducting someone's pocket money to punish undesirable behaviour.

Note: It is not always easy to distinguish between punishment and negative reinforcement.

There are many problems with using punishment, such as:

Punished behaviour is not forgotten, it's suppressed - behaviour returns when punishment is no longer present.

Causes increased aggression - shows that aggression is a way to cope with problems.

Creates fear that can generalize to undesirable behaviours, e.g., fear of school.

Does not necessarily guide toward desired behaviour - reinforcement tells you what to do, punishment only tells you what not to do.

Educational Implications

In the conventional learning situation, operant conditioning applies largely to issues of class and student management, rather than to learning content. It is very relevant to shaping skill performance.

A simple way to shape behaviour is to provide feedback on learner performance, e.g., compliments, approval, encouragement, and affirmation. A variable-ratio produces the highest response rate for students learning a new task, whereby initially reinforcement (e.g., praise) occurs at frequent intervals, and as the performance improves reinforcement occurs less frequently, until eventually only exceptional outcomes are reinforced.

For example, if a teacher wanted to encourage students to answer questions in class they should praise them for every attempt (regardless of whether their answer is correct). Gradually the teacher will only praise the students when their answer is correct, and over time only exceptional answers will be praised.

Unwanted behaviours, such as tardiness and dominating class discussion can be extinguished through being ignored by the teacher (rather than being reinforced by having attention drawn to them). This is not an easy task, as the teacher may appear insincere if he/she thinks too much about the way to behave.

Knowledge of success is also important as it motivates future learning. However, it is important to vary the type of reinforcement given so that the behaviour is maintained. This is not an easy task, as the teacher may appear insincere if he/she thinks too much about the way to behave.

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McLeod, S. A. (2018, Jan, 21). Skinner - operant conditioning. Simply psychology: Psychology. https://www.simplypsychology.org/operant-conditioning.html