

OPERANT CONDITIONING

- Operant Conditioning is a method of learning normally attributed to B F Skinner, where the consequences of a response determine the probability of it being repeated.
- Skinner called his theory “operant conditioning” as it is based on certain operations or actions which an organism has to carry out.
- Reinforcement and punishment are the basis of Operant Conditioning – Conditioning takes place forming an association between a certain behavior and the consequences of that behavior, you learn.
- Behavior which is reinforced (rewarded) will likely be repeated and behavior which is punished will occur less frequently.
- E.g. When lab rats press a lever when a green light is on, they receive a food pellet as a reward. When they press the lever when a red light is on, they receive a mild electric shock. As a result, they learn to press the lever when the green light is on and avoid the red light.
- Reinforcement :
 - (i) Positive Reinforcement –presentation of pleasant experience to promote desired behavior.
 - (ii) Negative Reinforcement- removal of painful experience to promote desired behavior.
- Example, if a parent rewards their child with praise every time they pick up their toys, the desired behavior is consistently reinforced. As a result, the child will become more likely to clean up messes.

- Operant conditioning is not just something that takes place in experimental settings while training lab animals. It also plays a powerful role in everyday learning.
- Reinforcement and punishment take place in natural settings all the time, as well as in more structured settings such as classrooms or therapy sessions.
- Today, reinforcement techniques are used in human education and animal training.

B F SKINNER(1904- 1990)

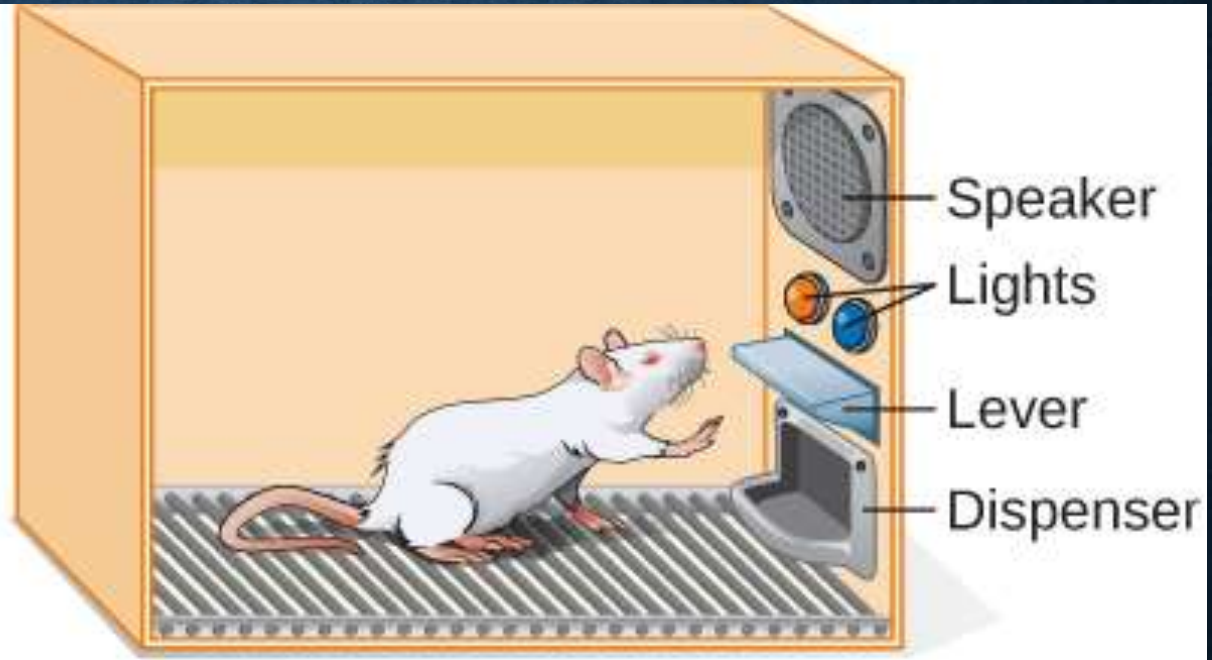
- Burrhus Frederic Skinner
- Was 20th century's most influential psychologist, pioneering the science of behaviorism, inventor of the "Skinner Box"
- He discovered the power of positive reinforcement in learning and he designed the first psychological experiments to give quantitatively repeatable and predictable results.
- Skinner's greatest discovery was of "immediate reinforcement" or " instant conditioning".
- Skinner never used the term " Skinner's Box" himself, rather he preferred calling it " lever box" or " operant conditioning chamber".
- He described his discoveries in this field in his 1938 book "Behavior of Organisms"

SKINNER'S EXPERIMENT

- Experiment : He put a hungry rat in his box known as 'Skinner box'. Inside the box, there was a lever and a device for delivering a pellet of food when the lever is operated in a particular way. The rat began to move about restlessly and sometimes pressed its paw on the lever, by which action it could get a pellet of food..
- Gradually, the rat learned to press the lever to get food, and the response in the form of lever-pressing got strengthened because it gave reward in the form of food.
- Here food(reward) reinforced the lever pressing response (operant response).
- It was also found that when the lever pressing was not followed by food (reinforcing stimulus), the operant response was discontinued.
- In other words, the operant response underwent extinction with non-reinforcement.



(a)



(b)

- Skinner only liked to use reinforcement techniques.
- He did not advocate punishment for people or other animals , believing it produced avoidance behavior that could have worse consequences than the behavior being punished.

Educational Implications:

Skinner's theory is one of the most important contributions to learning. It has revolutionized the learning process by bringing forward the following practical ideas:

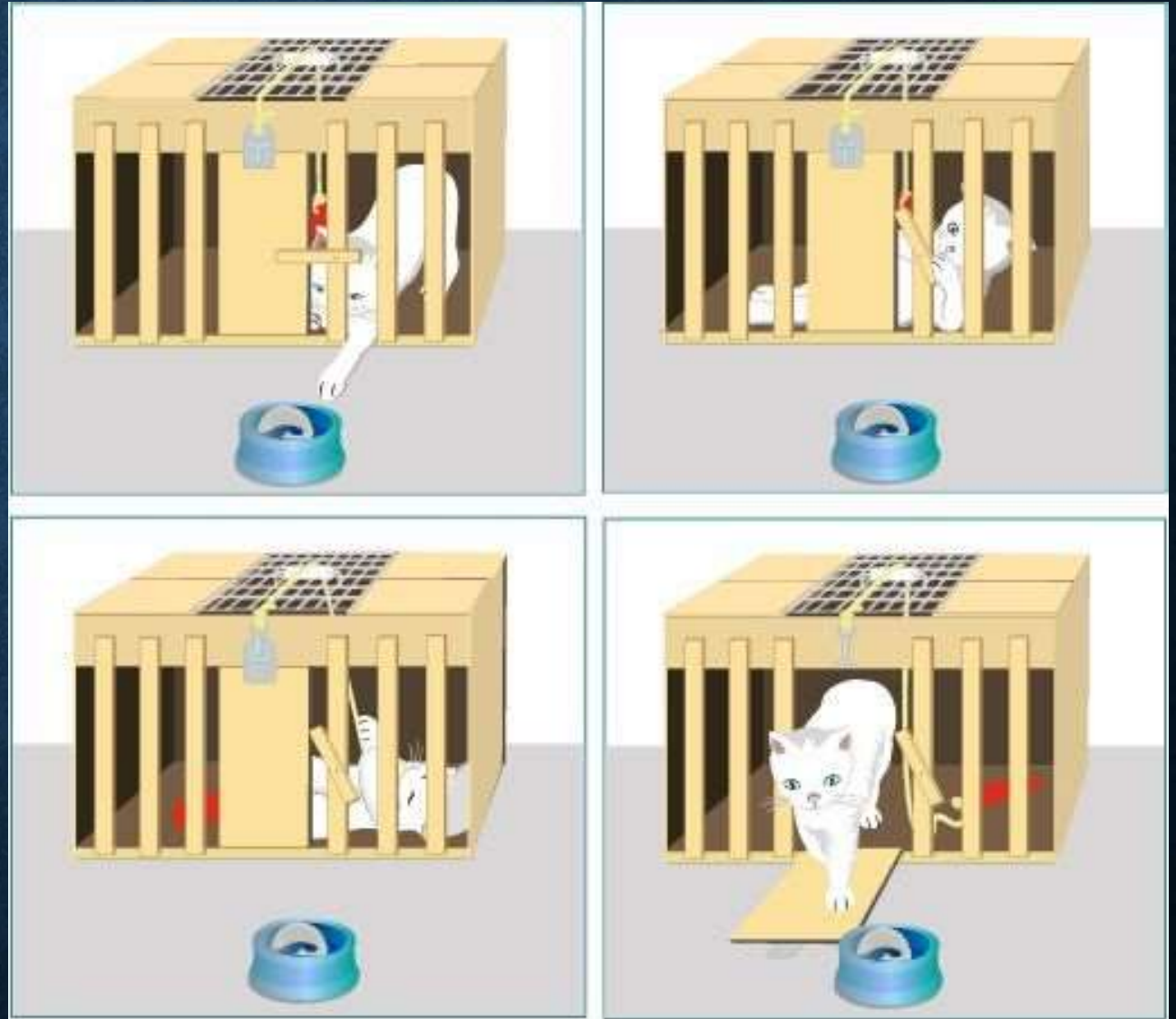
- The learning process and the environment must be designed to create minimum frustration and maximum satisfaction to a learner to reinforce the desired learning.
- The desired behavior should be rewarded immediately. When this is done, the frequency of occurrence of the desired behavior will enhance. By repeating this procedure we will be able to make the individual learn the desired behavior with efficiency and thoroughness.
- In the classroom, the immediacy of reinforcement is very important. Praise for a well done job, given immediately, can be a stronger reinforcer or motivator than a grade given much later.
- Through reinforcements and rewards teachers can make desirable behavior in the students.

Timing Plays a Role-

- Reinforcement schedules are important in operant conditioning. This process seems fairly straight forward—simply observe a behavior and then offer a reward or punishment.
- However, Skinner discovered that the timing of these rewards and punishments has an important influence on how quickly a new behavior is acquired and the strength of the corresponding response
- *Continuous reinforcement* involves rewarding every single instance of a behavior. It is often utilized at the beginning of the operant conditioning process. But as the behavior is learned, the schedule might switch to one of partial reinforcement.
- *Partial reinforcement* involves offering a reward after a number of responses or after a period of time has elapsed. Sometimes, partial reinforcement occurs on a consistent or fixed schedule.

EDWARD THORNDIKE(1874-1949)

- Was the chief exponent of the theory of connectionism.
- The basis of learning according to Thorndike is an association between stimulus (S) and response (R). Such an association he called by the name **bond** or **connection**.
- Stimuli are the sources of energy which impinge on the living organism and evoke response.
- A stimulus is connected with its response by what is known as S-R bond.
- Because of the S-R bond, when the stimulus(S) is repeated the response® will follow.
- It is the strengthening or weakening of such bonds that accounts for the making and breaking of habits.
- On this account the theory is known as **connectionism** or the **bond theory** of learning.
- Thorndike thinks that learning is a mechanical process leading to formation of bonds and that these are created by the learner making mistakes and then correcting them. That's why this theory is known also as **trial and error theory**.



This theory of learning is based on the following three factors:

- The stimulus element which involves an environment or event
- The response element which indicates a behavioral act
- The formation of a bond which implies that every stimulus is linked with some kind of response which in turn shapes the structure of behavior.

The S-R bond is in fact a neutral connection.

THORNDIKE'S EXPERIMENT

- Thorndike's theory of trial and error is the result of a series of experiments conducted on fishes, chicken, cats, dogs and monkeys.
- Of these his experiments on a cat are classical.
- He put a hungry cat in a puzzle box. There was only one door for exit which could be opened by correctly manipulating a latch. Fish was placed at a little distance in front of the puzzle box. Smell of the fish worked as a strong motive for the hungry cat to come out of the box. The cat made every possible efforts to come out. At first, it tried to squeeze through every opening, then it stretched its paws out of the cage and tried to catch hold of the fish and again began to scratch and bite the bars. All its attempts, however were in vain. But while making these trials, its paws accidentally knocked against the latch and the door flung open. The cat came out and had its food.
- In every successive trial the erroneous reactions of the cat was found to decrease in number and the time required to open the door was reduced.
- In due course, the cat was in a position to manipulate the latch as soon as it was put in the box. In this way, gradually, the cat 'learnt' the art of opening the door. This proves that its erroneous movements were gradually **stamped out**, while its correct ones were **stamped in**.

THORNDIKE'S LAWS OF LEARNING

On the basis of his experiments, Thorndike propounded the following three laws of learning:

- **Law of Readiness-** Since learning is an active process, students must have adequate rest, health, and physical ability. Basic needs of students must be satisfied before they are ready or capable of learning. Students who are exhausted or in ill health cannot learn much. If they are distracted by outside responsibilities, interests, or worries, have overcrowded schedules, or other unresolved issues, students may have little interest in learning. For example, we may identify the situation of an academic examination of a school, in which the cause of securing good marks in various subjects leads to mental and emotional readiness of students to do more hard labor in acquiring knowledge.
- **Law of Exercise-** Every time practice occurs, learning continues. These include student recall, review and summary, and manual drill and physical applications. All of these serve to create learning habits. The instructor must repeat important items of subject matter at reasonable intervals, and provide opportunities for students to practice while making sure that this process is directed toward a goal. But in some or many cases, there is no need for regular practice if the skill is acquired once. For instance if we have learnt cycling once, we will not forget the knowledge or skill even if we aren't exercising it for a long time.
- **Law of Effect-** However, every learning experience should contain elements that leave the student with some good feelings. A student's chance of success is definitely increased if the learning experience is a pleasant one.

Behaviorism learning theory

- In the classroom, the behavioral learning theory is key in understanding how to motivate and help students. Information is transferred from teachers to learners from a response to the right stimulus. Students are a passive participant in behavioral learning—teachers are giving them the information as an element of stimulus-response. Teachers use behaviorism to show students how they should react and respond to certain stimuli. This needs to be done in a repetitive way, to regularly remind students what behavior a teacher is looking for.
- Positive reinforcement is key in the behavioral learning theory. Without positive reinforcement, students will quickly abandon their responses because they don't appear to be working. For example, if students are supposed to get a sticker every time they get an A on a test, and then teachers stop giving that positive reinforcement, less students may get A's on their tests, because the behavior isn't connected to a reward for them.
- Repetition and positive reinforcement go hand-in-hand with the behavioral learning theory. Teachers often work to strike the right balance of repeating the situation and having the positive reinforcement come to show students why they should continue that behavior.
- Motivation plays an important role in behavioral learning. Positive and negative reinforcement can be motivators for students. For example, a student who receives praise for a good test score is much more likely to learn the answers effectively than a student who receives no praise for a good test score. The student who receives no praise is experiencing negative reinforcement—their brain tells them that though they got a good grade, it didn't really matter, so the material of the test becomes unimportant to them. Conversely students who receive positive reinforcement see a direct correlation to continuing excellence, completely based on that response to a positive stimulus.

STRENGTHS AND WEAKNESSES

- One of the major benefits of behaviorism is that it allowed researchers to investigate observable behavior in a scientific and systematic manner. However, many thinkers believed it fell short by neglecting some important influences on behavior.

| Strengths | Weaknesses |
|--|--|
| Focuses on observable, measurable behaviors | Does not account for biological influences |
| Useful for modifying behaviors in the real-world | Does not consider moods, thoughts, or feelings |
| Useful applications in therapy, education, parenting, child care | Does not explain all learning |

STRENGTHS

- One of the greatest strengths of behavioral psychology is the ability to clearly observe and measure behaviors. Behaviorism is based on observable behaviors, so it is sometimes easier to quantify and collect data when conducting research.
- Effective therapeutic techniques such as intensive behavioral intervention, behavior analysis, token economies, and discrete trial training are all rooted in behaviorism. These approaches are often very useful in changing maladaptive or harmful behaviors in both children and adults.

WEAKNESSES

- Many critics argue that behaviorism is a one-dimensional approach to understanding human behavior. Critics of behaviorism suggest that behavioral theories do not account for free will and internal influences such as moods, thoughts, and feelings.
- Noam Chomsky brings on the end to behaviorism by stating that language is too complex or novel to be learned through mimicry alone.
- Freud, for example, felt that behaviorism failed by not accounting for the unconscious mind's thoughts, feelings, and desires that influence people's actions.
- Other thinkers, such as Carl Rogers and the other humanistic psychologists, believed that behaviorism was too rigid and limited, failing to take into consideration personal agency.

- More recently, biological psychology has emphasized the power of the brain and genetics play in determining and influencing human actions. The cognitive approach to psychology focuses on mental processes such as thinking, decision-making, language, and problem-solving. In both cases, behaviorism neglects these processes and influences in favor of studying just observable behaviors.
- Also, behavioral psychology does not account for other types of learning that occur without the use of reinforcement and punishment. Moreover, people and animals can adapt their behavior when new information is introduced even if that behavior was established through reinforcement.