Behaviorism: Skinner and More

By Amy Quarton

Discussion Questions

- What caused behaviorism to expand in the late 1920s to early 1930s?
- Who is Edward Tolman? How did he contribute to behaviorism?
- Who is Clark Hull? How did he contribute to behaviorism?
- Who is B. F. Skinner? How did he contribute to behaviorism? What did he study?
- What is the difference between classical conditioning and operant conditioning?

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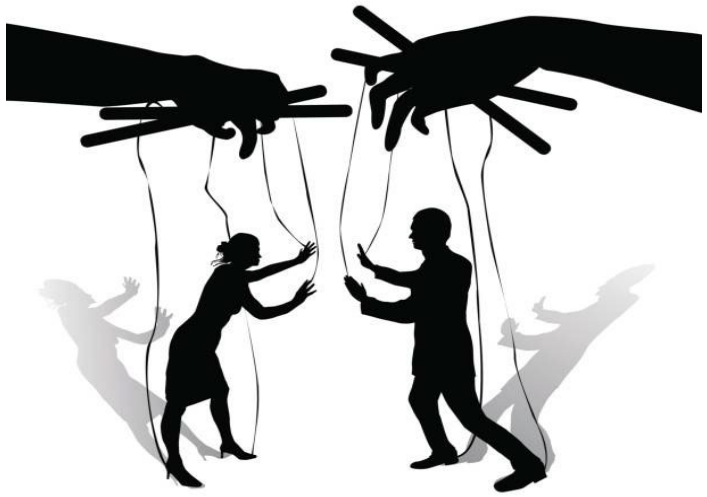
- **Reason #1 –** Americans demanded a practical psychology.
  - They believed behaviorism was applicable to relationships, parenting, education, and business.
- **Reason #2 –** Pavlov's classical conditioning research was translated into English.
  - His objective and precise methods became the model for American psychologists.

What caused behaviorism to expand in the late 1920s to early 1930s?

- **Reason #3 –** In 1927, Harvard physicist Percy Bridgman introduced several concepts:
  - Logical positivism distinguished between observable and unobservable behaviors.
  - Operationalism is the practice of defining concepts by defining the operations used to measure them.
    - Operational definitions are detailed descriptions of the procedures used to measure the variables of interest.

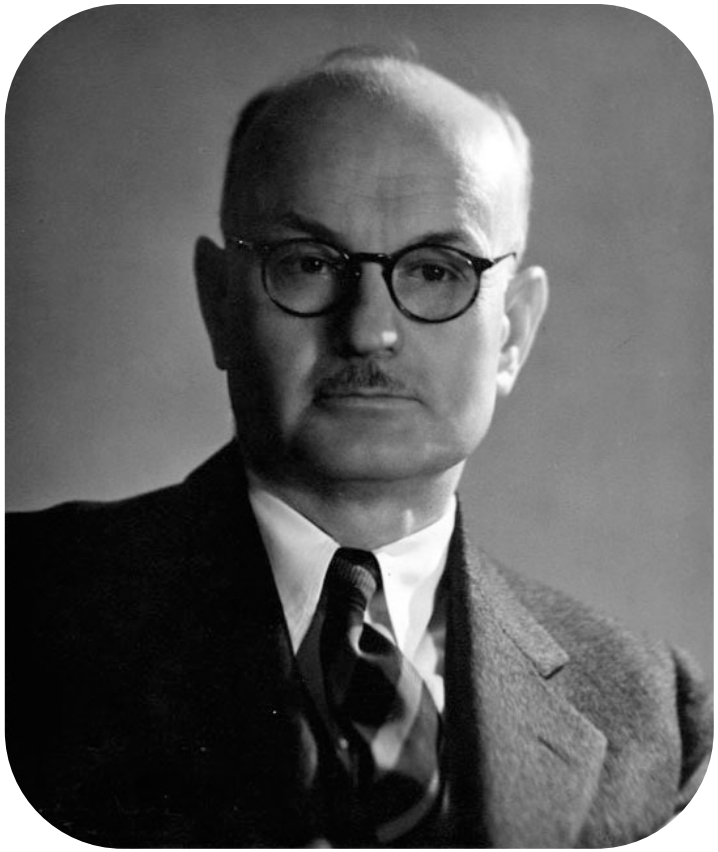
What caused behaviorism to expand in the late 1920s to early 1930s?

- **Reason #4 –** Four neo-behaviorists emerged: Guthrie, Tolman, Hull, and Skinner.
  - They used the experimental method to study animals and apply the results to humans.
  - They tried to identify (1) the environmental factors that shape behavior and (2) the laws of learning.
  - Their goal was to control behavior by controlling the environment.



Who is Edward Tolman? How did he contribute to behaviorism?

Who is Edward Tolman?



- In 1915, Edward Tolman (1886-1959) earned a PhD from Harvard University.
- He was trained in Titchener's structural psychology but questioned the usefulness of introspection.

How did Tolman contribute to behaviorism?

- His system, purposive behaviorism, studied both observable behavior *and* its goal orientation.
  - He said behavior is purposeful and oriented toward achieving a goal or learning the means to an end.
- His learning theory was a cognitive approach.
  - It predicted that the repeated performance of a task strengthens the learned relationship between environmental cues and the organism's expectations.

How did Tolman contribute to behaviorism?

- He introduced the concept of intervening variables, the unobserved and inferred factors within the organism that are the actual determinants of behavior.
  - He suggested five causes: environmental stimuli, physiological drives, heredity, previous training, and age.
  - He believed a complete theory of behavior requires the consideration of these variables.

How did Tolman contribute to behaviorism?

- He distinguished between learning and performance.
  - Rewards impact performance, but rewards are not necessary for learning.
  - In one of his maze studies, he demonstrated that latent learning can occur below awareness, even when we are not motivated by rewards.

How did Tolman contribute to behaviorism?

- The 1st group never received a reward, made plenty of errors, and showed little improvement.
- The 2nd group always received a reward and showed steady performance improvements.
- The 3rd group did not receive a reward for the 1st ten days and made plenty of errors.
  - On the 11th day, a reward was introduced.
  - The rats *immediately* showed improvements using what they had learned *latently* in the first 10 days.

How did Tolman contribute to behaviorism?

- He demonstrated that the rats learned the location of the goal, not a series of responses.

- He said rats learned developing a field map of the environment (cognitive map), not just by strengthening and weakening S-R connections.

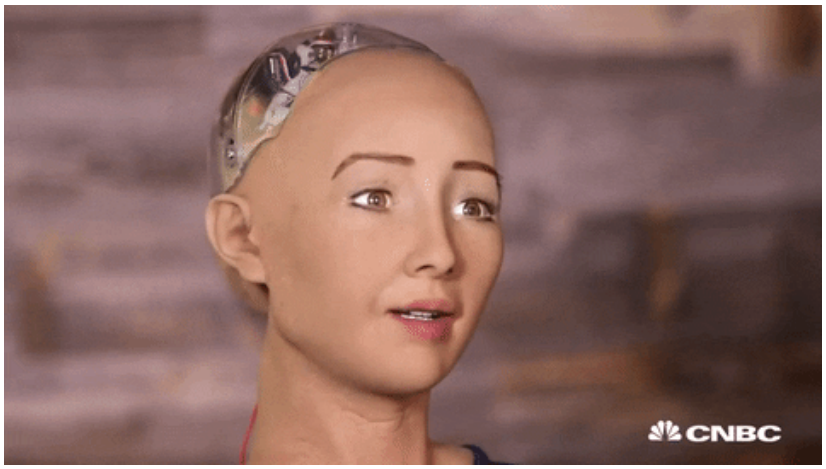
Who is Clark Hull? How did he contribute to behaviorism?

Who is Clark Hull?

- In 1918, Clark Hull (1884-1952) earned a PhD from the University of Wisconsin.
- Despite a poor childhood, he was ambitious with a passion for engineering.
- He was influenced by Darwin, Pavlov, Watson, and Thorndike.

How did Hull contribute to behaviorism?

- In the late 1920s, he developed his theory at Yale University's Institute of Human Relations:
  - Humans are controlled by precise mathematical laws.
  - A complete understanding of human behavior is only possible if we can build an indistinguishable machine.

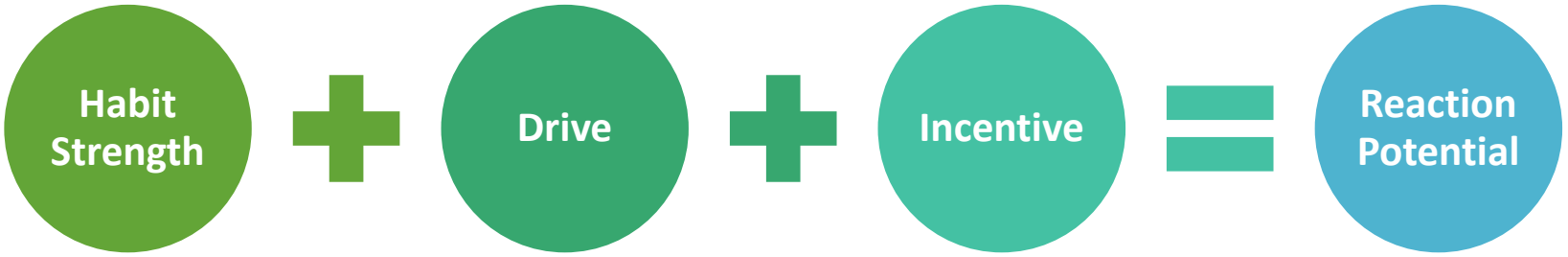


How did Hull contribute to behaviorism?

- He explained behavior in terms of stimulus and response (S-R) associations.
  - Habit strength ($_SH_R$) is the strength of an association, which increases as a function of the:
    - The presence of reinforcers,
    - The number of reinforced trials, and
    - The reduction of physiological or psychological drives.
  - Learning results from a gradual accumulation of habit strength.

How did Hull contribute to behaviorism?

- Reaction potential ($_SE_R$) is the probability that a response will occur at a given time.
  - A response is more likely when drive and habit strength are high and when rewards are present.
  - A response is less likely when either drive or habit strength are low and when rewards are not present.



How did Hull contribute to behaviorism?

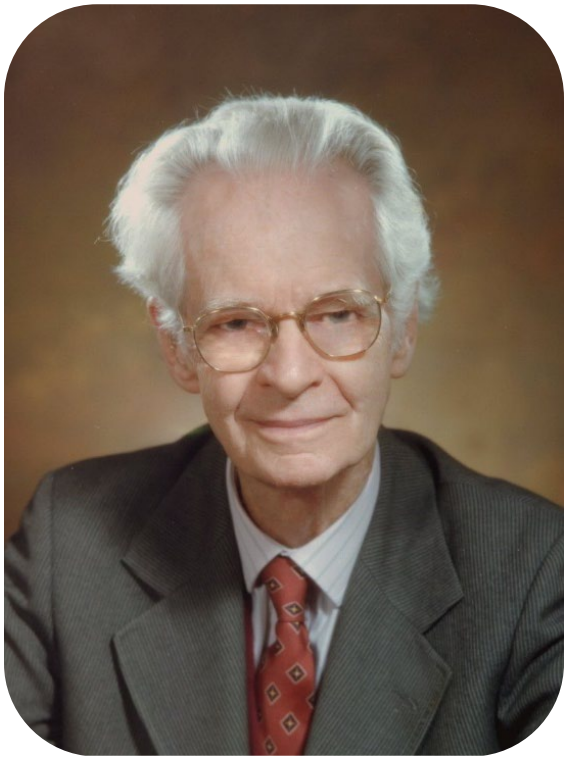
- What is the reaction potential that a hungry child will cry when grandma (who normally spoils the child) doesn't buy candy at the checkout?
  - Stimulus: The word "no"
  - Response: Cry
  - Habit strength: High (strong connection)
  - Drive: High (hungry)
  - Reinforcer(s): Yes (grandma's attention, candy)
  - Reaction potential: High probability

How did Hull contribute to behaviorism?

- What is the reaction potential that a 4.0 GPA student with perfect attendance and a 100% in the course will skip class on a beautiful day?
  - Stimulus: Beautiful day
  - Response: Skip class
  - Habit strength: Low (weak connection)
  - Drive: Low (current A grade)
  - Reinforcer(s): Yes (relaxation)
  - Reaction potential: Low probability

Who is B. F. Skinner? How did he contribute to behaviorism? What did he study?

Who is B. F. Skinner?



- Burrhus F. Skinner (1904-1990) was an American psychologist known for his operant conditioning studies.
- In 2002, the APA named him the most influential psychologist of the 20th century.

Who is B. F. Skinner?

- In 1931, he earned a PhD from Harvard University and worked as a researcher until 1936.
- He taught at the University of Minnesota (1936-1945), Indiana University (1945-1948), and Harvard (1948-1974).
- Throughout his lifetime, he published 21 books and 180 articles!

How did Skinner contribute to behaviorism?

- In *The Behavior of Organisms* (1938), he said:
  - Free will is an illusion as all behaviors are conditioned.
  - We function like machines in orderly, predictable ways.
  - Psychologists should focus on observable behaviors.

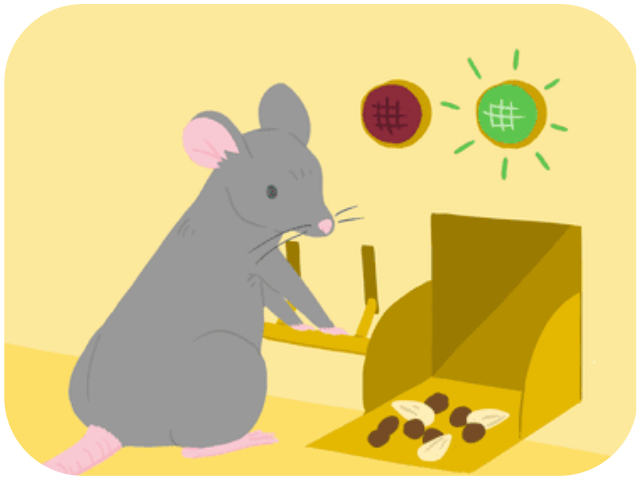
- Operant conditioning is a procedure that attempts to change a behavior by changing its consequences.

What did Skinner study?

- A respondent behavior is a conditioned response elicited by a stimulus.
  - AKA reflexes
  - They are less important and cannot account for all behavior.
- An operant behavior is a conditioned behavior that is expressed voluntarily or spontaneously.
  - AKA most behaviors
  - They “operate” on the environment by impacting consequences.

What did Skinner study?

- Operant behaviors can be conditioned by reinforcing desired behaviors and punishing undesired behaviors.



Reinforcement encourages behavior.

Punishment discourages behavior.

What did Skinner study?

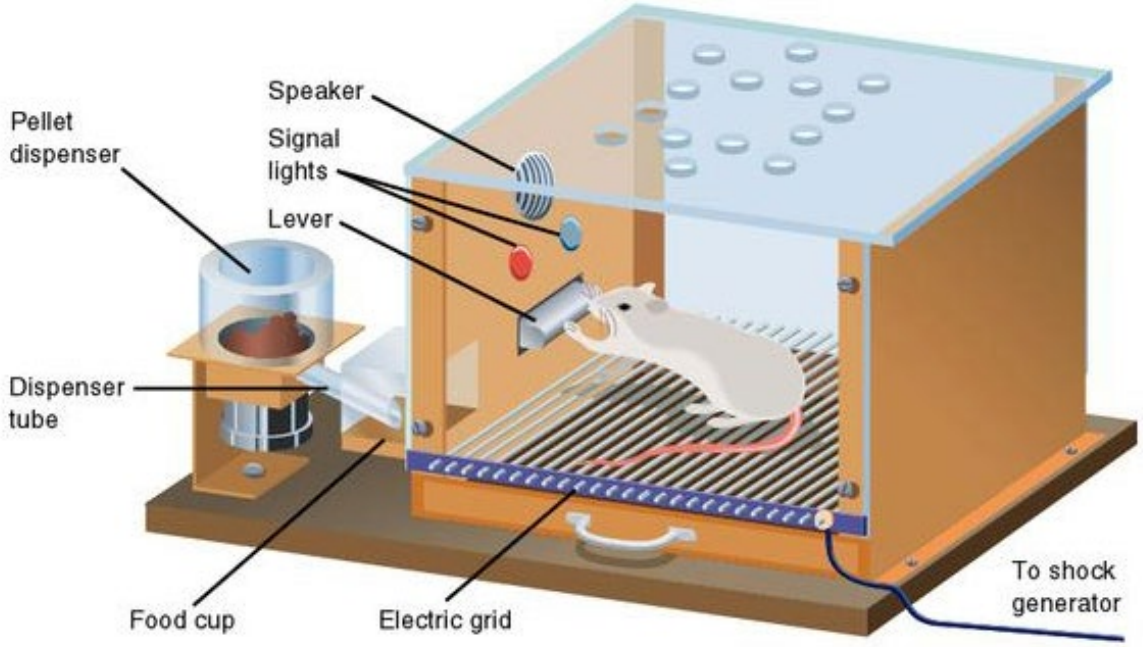
Positive Reinforcement	Extinction	Punishment
• The act of strengthening a response by adding reward • Reinforcers – Responses from the environment that increase likelihood of repetition	• The process of eliminating a behavior by withholding reinforcement	• The act of weakening a response by applying undesirable consequences • Punishers – Responses from the environment that decrease likelihood of repetition

What did Skinner study?

- He studied operant conditioning by training pigeons and rats to perform a variety of actions.
  - In 1957, the results of his experimental studies were published in his book, *Schedules of Reinforcement*.

What did Skinner study?

- To standardize the training process, he created the operant chamber with a light, a speaker, a food dispenser, a lever, and an electrified floor grid.



What did Skinner study?

- Using the operant chamber, the food-deprived animals were isolated and presented with stimuli.
- Their rate of response was recorded using a cumulative recorder.

What did Skinner study?

- Once inside the box, desired behaviors, like going near the food dispenser, were reinforced with food but *only when a light was on*.
  - Undesirable behaviors, like walking away, were extinguished by withholding food and punished with electric shocks.
- After many trials, the light gained stimulus control over their behavior as they learned to press the bar *only when the light was on*.

What did Skinner study?

- Complex behaviors can be conditioned by reinforcing behaviors that become closer approximations of the desired behavior (successive approximations or shaping).
  - At first, parents reinforce their infants' babbling by smiling, laughing, and talking.
  - Over time, they reinforce only the sounds that approximate real words.

What did Skinner study?

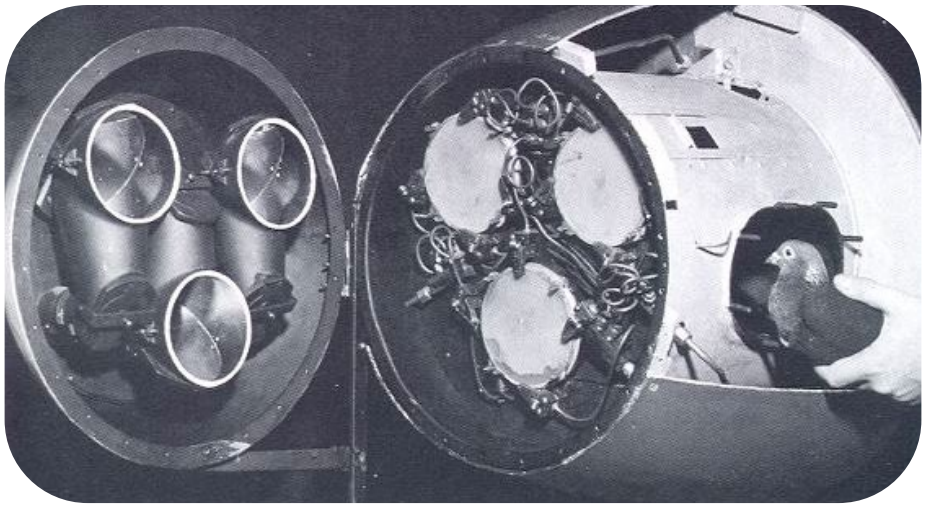
- He used shaping to teach pigeons how to play ping-pong!

What did Skinner study?

- Although he said all behaviors are conditioned, he also said we can increase our control over the environment by:
  - Monitoring our behavior.
  - Changing the environment.
  - Redirecting our attention.
  - Reinforce and punish ourself.
  - Informing others about our goal for behavior change.

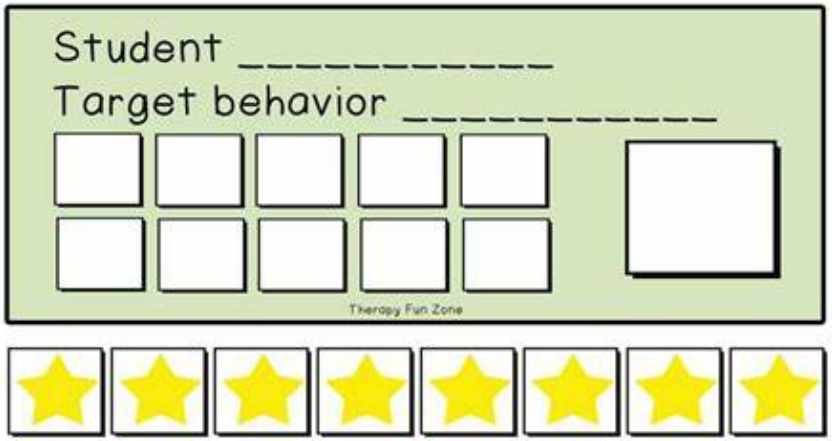
How did Skinner contribute to behaviorism?

- To fulfill his vision of predicting and controlling behavior, he applied behaviorism to a variety of real-world problems.
  - E.g., He taught pigeons how to guide missiles in WWII.



How did Skinner contribute to behaviorism?

- His ideas inspired behavior modification, a therapy that uses reinforcement to change behavior.
  - In a token economy, participants' desirable behaviors are rewarded with tokens that can be exchanged for valued objects or privileges.
  - For decades, it has been used in classrooms, clinics, businesses, and industries.



How did Skinner contribute to behaviorism?

- He designed a "teaching machine" for children.
- He built an enclosed climate-controlled "air crib" for infants.

How did Skinner contribute to behaviorism?

- His work contributed to the business of training animals to perform for an audience.

What is the difference between classical conditioning and operant conditioning?

What is the difference between classical and operant conditioning?

CLASSICAL CONDITIONING

- "Type S"
- Associated with Pavlov
- Created in Russia
- Stimuli (before) and reflexes

OPERANT CONDITIONING

- "Type R"
- Associated with Skinner
- Created in the USA
- Voluntary behavior and consequences (after)