


Operant Conditioning (Lecture 6)

II. Operant Conditioning

A. Skinner's Analysis

- B F Skinner expanded the Law of Effect in the 1940s and 1950s into a system called **Operant Conditioning**.
- Operant Conditioning is learning produced by the active behavior of an organism interacting with the environment.
- Skinner renamed some terms
 B (Behavior) → C (Consequence) became
 R (Response) → Sr (Stimulus reinforcer)



II. Operant Conditioning

A. Skinner's Analysis

- Skinner characterize two types of Sr(s)
 - Sr+ (pleasant or rewarding)
 - Sr- (aversive or noxious)
- He also characterized two types of effects that Sr can have on behavior:
 - increase** the probability of the behavior occurring again (Reinforcement).
 - decrease** the probability of the behavior occurring again (Punishment).
- Thus we have four possible ways to change behavior.

II. Operant Conditioning

A. Skinner's Analysis

	Increase probability of behavior	Decrease probability of behavior
Sr+ Pleasant Stimulus	Positive Reinforcement R increases in frequency because it introduces a pleasant stimulus reinforcer.	Extinction (Negative Punishment) R decreases in frequency because it no longer elicits a pleasant stimulus reinforcer (as it once did).
Sr- Noxious Stimulus	Negative Reinforcement R increases in frequency because it removes (escapes) a noxious stimulus reinforcer.	Punishment (Positive Punishment) R decreases in frequency because it introduces a noxious stimulus reinforcer.

II. Operant Conditioning
B. Four ways to change behavior

- 1. Positive Reinforcement
 - Increases the probability of behavior by the behavior introducing a positive (pleasant) consequent (Sr+).
 - An anorexic woman was treated by therapists making social visitation and other privileges (a pleasant stimulus) contingent on her eating.
 - Thus the behavior of eating (R) was increased because it had the consequent of a positive reinforcer (Sr+).

II. Operant Conditioning
B. Four ways to change behavior

- 2. Negative reinforcement
 - Increasing the probability of avoidant or escape behavior by removing a negative (noxious) consequent (SR-).
 - A person with difficulty stuttering was given negative reinforcement by wiring him up so that whenever he stuttered, he would get delayed auditory feedback (a noxious stimulus).
 - Thus the behavior of normal speech (R) was increased because such behavior avoids the noxious stimuli (Sr-) that was made a contingency of stuttering.

II. Operant Conditioning
B. Four ways to change behavior

- 3. Punishment
 - Decreasing the probability of behavior by it being followed by a negative (noxious) consequence (Sr-).
 - Sometimes that is called Positive Punishment because Sr- is introduced or added to the situation
 - Autistic children have been shown to stop antisocial behavior when a mild shock was made contingent.
 - The probability of antisocial behavior was decreased by introducing a contingent aversive reinforcer (Sr-).
 - Problems with punishment
 - Mindless/enraged application, Fear in recipient, Effect is temporary, Not immediate enough, No shaping of appropriate behavior.

II. Operant Conditioning
B. Four ways to change behavior

- 4. Extinction
 - Decreasing the probability of behavior by having a positive (pleasant) reinforcer removed.
 - Sometimes that is called Negative Punishment because Sr+ is taken away or removed from the situation.
 - A child who throws temper tantrums when his parent leave the child's bedroom at night has his temper tantrums reduced by the parents merely ignoring them.
 - The attention of the parent was supporting the tantrums, so to reduce their probability of occurring, the positive reinforcer (Sr+) supporting the unwanted behavior was removed.

II. Operant Conditioning

B. Four ways to change behavior

- Child who hits other children:
 - Decrease probability of hitting behavior.
 - Increase probability of social behavior.
- Roommate who plays music too loud:
 - Decrease probability of loud music.
 - Increase probability of softer music
- Roommate who is does not leave messages:
 - Increase leaving message behavior.
 - Decrease not leaving message behavior.

II. Operant Conditioning

C. Primary and Secondary Reinforcers

- Two types of Reinforcers:
 - **Primary:** Sr which is inherently reinforcing or punishing , typically by satisfying a biological need or being biologically aversive.
 - **Secondary:** Sr which is not inherently reinforcing or punishing but has acquired such properties through association. Money, praise, demerits, criticisms grades
- **Be careful not to evoke mental states such as goals, wants, etc.** when thinking about Srs

II. Operant Conditioning

D. Shaping and successive approximations

- **Shaping:** Procedure in which successive approximations of a desired behavior are reinforced.
- **Successive approximations:** Increasing closeness or similarity to the desired response.
- **Room Cleaning**
 1. Reinforce child when he is in the room.
 2. Reinforce child for touch things on the floor.
 3. Reinforce child for picking up things on the floor.
 4. Reinforce child for putting away things that are on floor.

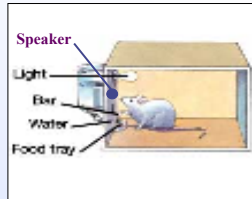
II. Operant Conditioning

E. Sd Generalization and Discrimination

- We have only considered behavior in light of environmental contingencies that control it after it has been performed: R → Sr
 - There is another aspect of the control of behavior.
 - Think of a telephone call.
 - Your behavior of calling a sequence of numbers is a response (R) and you talking to a person is the positive reinforcement (Sr+).
 - If you pick up a phone and don't hear a dial tone, you won't dial.
 - If you pick up a phone and hear a dial tone, you will dial

II. Operant Conditioning
E. Sds, Generalization and Discrimination

- The presence or absence of the dial tone serves as a **Discriminative Stimulus (Sd)**:
 - Sd: A stimulus that signals that a response will (or will not) lead to a stimulus reinforcer.
 - Sd → R → Sr+
 - dial tone → dialing → talking
- Skinner studied the environmental control behavior in Skinner Boxes designed for lab rats.



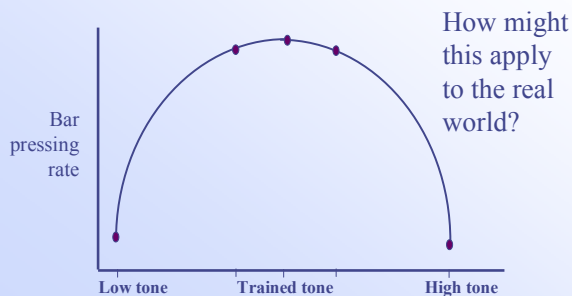
A hungry or thirsty rat in a Skinner box quickly learns that pressing the bar (R) when the light or buzzer is on (Sd), a food pellet or drop of water is released (Sr+).

II. Operant Conditioning
E. Sd Generalization and Discrimination

- An animal trained to a tone (Sd) signaling that a bar press (R) will be positively reinforced (Sr+), will show two properties
 - **Generalization**: Sds similar to target Sd will have similar influences on behavior.
 - Similar sounding tone will produce bar pressing
 - **Discrimination**: Sds dissimilar to target Sd will have dissimilar influences on behavior.
 - Dissimilar sounding tone will produce less bar pressing

II. Operant Conditioning
E. Sd Generalization and Discrimination

- Pattern of generalization and discrimination



II. Operant Conditioning
F. Schedules of Reinforcement

- Srs may be delivered after each behavior (R) or on some schedule
 - **Continuous Schedule of Reinforcement**: Every R gets a Sr
 - **Partial**: Not every R gets Sr. It varies over time (interval) or by number (ratio) of Rs.
 - Consider two women each going to a party and each meeting a new boy. Each boy says he will call her everyday at 6:00 o'clock. **Boy A** does so but **boy B** calls only every so often at 6:00.
 - Say each boy decides never to call again, which woman waits at 6:00 for a longer period of time?

II. Operant Conditioning
 F. Schedules of Reinforcement

Rs under different schedules of reinforcement		Distribution	
		Fixed	Variable
Time (Interval)	FIXED INTERVAL Waiting for a letter and checking more frequently as the time of mail delivery approaches	VARIABLE INTERVAL Studying frequently and regularly for unpredictable pop quizzes.	
Measure Between Srs Number (Ratio)	FIX RATIO Piecework payment which makes people work harder closer to completion of the product than the beginning.	VARIABLE RATIO Gambling (slot machine), which the next payoff is unpredictably related to the last one.	