

Applying Psychology

Lecture 1: Behavioral Approaches to Teaching

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I. INTRODUCTION

A. Goals

- **1. Power of the teacher in T&L**
- This week, did anyone have a teaching/learning experience centered on the issue of control (or lack thereof).
- Follow-up questions
 - How much control do teachers have over teaching and learning in the classroom?
 - Is it good for a teacher to exert control over the teaching and learning process?
 - In what ways is a teacher in control of the teaching and learning process in the classroom?

I. INTRODUCTION

A. Goals

- We will spend the semester exploring the teaching and learning process in the classroom.
 - Minimizing teachers' impact.
- However, teachers remain in control of teaching and learning in three ways:
 - **Rewarding:** Teachers control who gets rewarded for which behavior
 - **Targeting:** Teachers control the material to be learned and the way in which it is presented.
 - **Timing:** Teachers control the timing of when rewards and the target material will be presented.

I. INTRODUCTION

A. Goals

- **2. Behaviorism as a theory of T&L**
- **Behaviorism** is a perspective that focuses on the role of "rewarding", "targeting", and "timing".
 - **Behaviorism:** The approach to psychology that focuses on overt behavior and observable actions and the environmental contingencies that give rise to and support those behaviors or actions.
 - **Learning** is central to behaviorism and is defined as the relatively permanent change in behavior.

I. INTRODUCTION

A. Goals

- To think like a behaviorist you must rid yourself of all thoughts about mental processes and only consider behavior and their environmental contingencies (rewards/punishments).
- **2. Mind as irrelevant: Watson's challenge**
 - All this suggests that the learners' mind is irrelevant in thinking about teaching and learning.
 - John Watson, the father of Behaviorism made this explicit by suggesting that learning is the basis for all behavior.

I. INTRODUCTION

A. Goals

- In 1925 Watson's stated :

Give me a dozen healthy infants, well-formed and my own specified world to bring them up in and I'll guarantee to take any one at random and train him to become any type of specialist I might select, doctor, lawyer, artist, merchant chief, and yes even a beggar-man thief, regardless of his talents, penchants, tendencies, abilities, vocations, and race of his ancestors.
- What do you think of this?
 - Do people internally choose their own destinies?
 - Are people's destinies under such external control?

I. INTRODUCTION

B. Application

- Behaviorism provides the scientific principles to effectively **target learning, successfully reward it, and efficiently time** targeting and rewarding activities.
- Can you characterize a teaching/learning experience (lesson, problem) in the language of behaviorism?
 - Focus on targeted behavior
 - Focus on behavioral consequences (rewards/punishments)
 - Focus on timing of presenting consequences.

I. INTRODUCTION

B. Application

- **1. Translating T/L problems into behavioral ones**
- Define learning as a change in behavior.
 - Students learn actions (e.g., ways to behave, perceive, group, and organize) rather than entities (e.g., concepts or strategies).
 - When they fail they have behavioral problems rather than learning disabilities, problem personalities, etc.
- Define teaching as techniques to change behavior.
 - Teachers teach by **targeting** and **rewarding** specific behaviors, determining the best **timing** to do each.

II. OPERANT CONDITIONING

A. Thorndike's and Skinner

- Edward L. Thorndike formulated the **Law of Effect** in 1911 while studying how cats escaped from of puzzle boxes.
 - If the consequence (C) of behavior (B) is a *pleasant*, the p. of the behavior occurring again is *increased*.
 - If the consequence of a behavior is *not pleasant or noxious*, the p. of the behavior occurring again is *decreased*.
- According to the Law of Effect is that we can set up the environment to change a person's behavior by altering the contingency of the behavior –without reference to the person's mind.

II. OPERANT CONDITIONING

A. Thorndike's and Skinner

- B F Skinner expanded the Law of Effect in the 40s and 50s into a systematic and experimental analysis of behavior, called **Operant Conditioning**.



- Operant Conditioning is learning produced by an active organism interacting with the environment.
- Skinner renamed some terms
 - B (Behavior) → C (Consequence) became
 - R (Response) → Sr (Stimulus reinforcer)

II. OPERANT CONDITIONING

A. Thorndike's and Skinner

- 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 possibilities, four possible ways to change behavior.

II. OPERANT CONDITIONING

B. 4 Ways to Change Behavior

	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, Penalty) R decreases in frequency because a pleasant stimulus reinforcer is removed.
Sr- Noxious Stimulus	Negative Reinforcement R increases in frequency because it removes (escapes) a noxious stimulus reinforcer	Punishment (Present-ation or + Punishment) R decreases in frequency because it introduces a noxious stimulus reinforcer

II. OPERANT CONDITIONING

B. 4 Ways to Change Behavior

- 1. Positive Reinforcement
 - Increasing the probability of behavior by the behavior introducing a positive (pleasant) consequence (Sr+).
 - The effective use of praise
 - The effective use of approval
 - Are there dangers in positive reinforcements?
 - In the Motivation & Emotion chapter, we will learn that intrinsic motivation (the desire to do something for its internal and intrinsic pleasure) can be undermined with external reinforcers.

II. OPERANT CONDITIONING

B. 4 Ways to Change Behavior

- 2. Negative Reinforcement
 - Increasing the probability of avoidant or escape behavior by removing a negative (noxious) consequence (SR-).
 - Empowering students to learn to avoid punishment
 - Failure to clean classroom → no recess!
 - 100% on practice spelling tests → don't take the formal test.
 - Don't pass classes → summer school

II. OPERANT CONDITIONING

B. 4 Ways to Change Behavior

- 3. Punishment (Presentation/Positive 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
 - Sometimes teachers must use punishment
 - When a child places self or others in danger. But should.. Provide alternatives, Use with Sr+, Explain problem.
 - Problems with punishment
 - Mindless/enraged application, Fear in recipient, Effect temporary, Not immediate enough, inconsistently applied.

II. OPERANT CONDITIONING

B. 4 Ways to Change Behavior

- 4. Extinction (Negative Punishment, Penalty)
 - Decreasing the probability of behavior by having a positive (pleasant) reinforcer removed.
 - Sometimes that is called Negative Punishment or Penalty because Sr+ is taken away or removed from the situation.
 - A child who throws temper tantrums has his temper tantrums reduced by them no longer eliciting attention.
 - The attention of the teachers was supporting the tantrums, so to reduce the probability of them reoccurring, remove the positive reinforcer (Sr+) supporting the unwanted behavior.

II. OPERANT CONDITIONING

C. Behavior Modification in the Classroom

- **1. Choosing and Scheduling Reinforcers**
- Two types of Reinforcers:
 - **Primary:** Sr in 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.
- Reinforcers are individually defined! Each child may have different ones!

II. OPERANT CONDITIONING

C. Behavior Modification in the Classroom

- Srs may be delivered after each behavior (R) or on some the schedule
- **Continuous Schedule of Reinforcement:** Every R gets a Sr
- **Partial Schedule of (or Intermittent) Reinforcement:** Not every R gets Sr.
 - Schedule of delivery of Srs varies over time (interval) or by number of Rs (ratio).
 - The source of variance (time or number) can be fixed or variable.
 - This results in 4 types of schedules or reinforcement.

II. OPERANT CONDITIONING

C. Behavior Modification in the Classroom

Rs under different schedules of reinforcement	Distribution	
	Fixed	Variable
Time (Interval)	FIXED INTERVAL Grading periods where Sr+ (or Sr-) are distributed every number of weeks during the school year.	VARIABLE INTERVAL Studying for unpredictable pop quizzes. Studying pays off after some time from the last pop quiz.
Measure between Sr Number (Ratio)	FIX RATIO Sr+ for reading a fixed number of books in a summer reading program (pizza for 10 books).	VARIABLE RATIO Raising hand to answer questions in class: Sr+ occurs on average x number of times.

II. OPERANT CONDITIONING

C. Behavior Modification in the Classroom

- 2. Operant conditioning involves decreasing and increasing probability of targeted behaviors.
 - Child who hits other children
 - Decrease probability of hitting behavior.
 - Increase probability of social behavior.
 - Child learn to carry "ones" in multi-digit math task.
 - Decrease probability of errors
 - Increase probability of "carrying" behavior
 - Learning letters.
 - Reinforce good traces.
 - Decrease improper starts or poor tracing.

II. OPERANT CONDITIONING

C. Behavior Modification in the Classroom

- **Shaping:** Procedure in which successive approximations of a desired behavior are reinforced.
- **Successive approximations:** Increasing closeness of similarity to the desired response.
 - **Classroom Cleaning through successive approximations**
 1. Reinforce child for touching things on the floor.
 2. Reinforce child for picking up things on the floor.
 3. Reinforce child for putting things on floor away.

III. CLASSICAL CONDITIONING

A. Classical Conditioning

- Operant conditioning concerns freely emitted or voluntary behavior (R) and the environmental conditions (Sr) that control it.
 - J.B. Watson also showed other kinds of behavior that is under environmental control.
 - Gave 11 month-old “Little Albert” a white rat to play with to which he showed no fear.
 - While Albert was watching the rat, Watson struck a steel bar with a hammer which startled and scared Albert who started to cried.
 - This pairing of the rat and a scary, startling sound was continued. After 7 pairings, every time Albert saw the rat, he started to cry!

III. CLASSICAL CONDITIONING

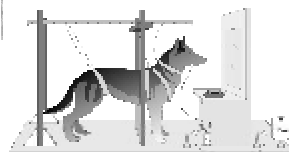
A. Classical Conditioning

- Can you think of other physiological responses which have become associated with neutral objects.
 - Exams (neutral object) → anxiety (physiological responses)
 - Hospital (neutral object) → sick feeling (physiological responses)
- This is **classical conditioning**: The environmental control of physiological responses or reflexes.

III. CLASSICAL CONDITIONING

B. Ivan Pavlov's Salivation Studies

- Ivan Pavlov was a medical researcher in Russia at the turn of the century.
 - He studied digestion and had won a Nobel prize
 - He was exploring the function of saliva in digestion.
 - He discovered that the dog would salivate when seeing the dish, before any food was available.

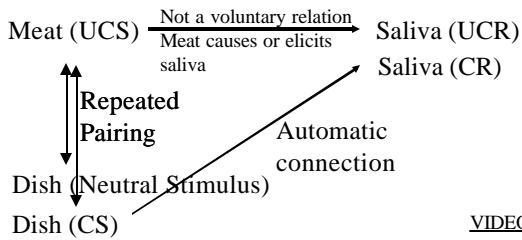


Harness and fistula (mouth tube) help keep dog in a consistent position and gather uncontaminated saliva samples
The drum recorded when & how much saliva the dog produced.

III. CLASSICAL CONDITIONING

B. Ivan Pavlov's Salivation Studies

- What Pavlov discovered in was the fundamental principles of Classical Conditioning



III. CLASSICAL CONDITIONING

B. Ivan Pavlov's Salivation Studies

- Definition of terms:
 - Unconditioned Stimulus UCS: A stimulus that elicits a reflexive response in the absence of learning.
 - Conditioned Stimulus CS: An initially neutral stimulus that comes to elicit a CR after being associated with an UCR.
 - Unconditioned Response UCR: A reflexive response elicited by a stimulus in the absence of learning.
 - Conditioned Response CR: A response elicited by a conditioned stimulus. Occurs after the CS is associated with an UCS.

III. CLASSICAL CONDITIONING

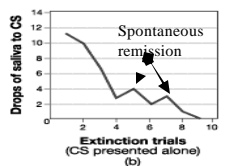
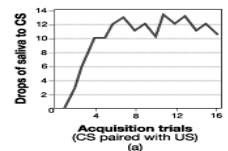
B. Ivan Pavlov's Salivation Studies

- 1. Conditions of CER
- CC is the means of acquiring **conditioned emotional responses** (CER) like fear to an exam.
- Critical in CER is that the CS comes before and signals the UCS.
 - If CS doesn't come before and signal (predict) UCS, no classical conditioning
 - CS and UCS presented simultaneously, no CC.
 - UCS comes before CS, but CS lasts longer, no CC.
 - CS fails to statistically predict UCS, no CC.

III. CLASSICAL CONDITIONING

B. Ivan Pavlov's Salivation Studies

- Acquisition:** A neutral stimulus that is consistently followed by an UCR will become a CS
- Extinction:** The weakening and eventual disappearance of a learned response when the CS is no longer paired with the UCR.



III. CLASSICAL CONDITIONING

C. CER in the Classroom.

- Many of the emotions and emotional reactions in the classroom are CERs
 - Test triggered anxiety
 - Bell triggered aggressiveness
 - Report-card triggered dread
 - School triggered fear
 - Substitute teacher triggered joy
- These emotions can easily be extinguished (CS not longer leading to CR)
- Relaxation techniques (effective with phobias).

IV. OBSERVATIONAL LEARNING

A. Bandura's Studies

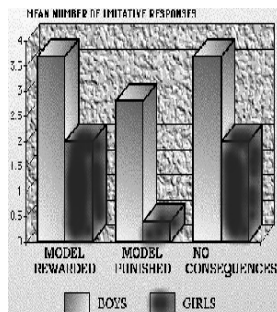
- Operant and Classical Conditioning require that our own responses are modified by the environment for learning to occur.
 - Neutral Stimuli can come to elicit responses.
 - Behavior can be increase or decrease in probability.
- Learning can also occur through observation.
 - **Observational Learning:** A process in which an individual learns new responses by observing the behavior or another (a model) rather than through direct experience.
- Break from Watson's & Skinner's Behaviorism

IV. OBSERVATIONAL LEARNING

A. Bandura's Studies

▪ Role of Observation in Learning.

Bandura observed children's play with a bobo doll after they watched video of an aggressive adult (model) being rewarded, punished, or having no consequences for her behavior. He found that observational condition affected performance ([video](#))



IV. OBSERVATIONAL LEARNING

A. Bandura's Studies

1. Cognitive factors in observational learning:
 1. Attention. The model must not simply be seen but actually the topic of attention. Paying attention to models is difficult the more that distractions are available in the classroom. Emotionality (enthusiasm and passion) and variability (acting uniquely) for what one is doing gets people's attention
 2. Retention. Memory for the modeled actions and retrieval of that memory at the time the modeled behavior is performed. To improve memory, have students verbalize the modeled behavior.

IV. OBSERVATIONAL LEARNING

A. Bandura's Studies

- 3. Motivation: Motivation to engaged in the modeled behavior. To improve motivation have students receive reinforcements directly, vicariously (watch others receiving them), or from the self.
- 4. Potential for Modeling: Not everyone is modeled (the eating behavior of cats are rarely modeled by young children). Potential “modelers” are those who are seen as salient, liked and respected, similar, reinforced.
- Think of ways to be a powerful model for (not just a teacher of) student in your classes.
- In what ways are expert teachers “models”

IV. OBSERVATIONAL LEARNING

B. Cognitive-behavior Modification

- Cognitive-behavioral Modification is a combination of behavioral and cognitive principles used to shape and encourage desired behavior.
 - Thoughts are targeted as sources of behavior control (verbal rules) and reinforcement (self-praise).
 - Self-instruction: Teaching oneself, typically through self-speech of verbal problem-solving rules.
 - Teachers can model this by verbalizing rules to follow.
- Goal is self-regulation which is the ability to control one's own behavior.

IV. GAGNE AND INSTRUCTIONAL DESIGN

A. Gagne as a Behaviorist

- Gagne developed Instructional Design, defined as the analysis of learning needs and goals and the development of a delivery system to meet those needs.
- Assumptions of Instructional Design
 - Focus on Behavior
 - Focus on an important role of the environment in behavior and behavior change
 - Focus on active role and control of teachers
 - Rejection of the role of “insight” in learning.
 - Focus on elements and associationism (S→R)

IV. GAGNE AND INSTRUCTIONAL DESIGN

B. Theory of Instructional Design

- Gagne defined 5 behavioral learning outcomes
 - **Verbal Information**: oral or written expression of information
 - **Intellectual Skills**: Manipulation of symbols in the environment (basic and most pervasive structures of formal ed.)
 - **Motor Skills**: Performing a sequence of actions until smooth, precise and well timed.
 - **Attitudes**: Predispositions (potentialities) for + or - actions towards persons, objects, and events.
 - **Cognitive Structures**: Control and management of learning, remembering and thinking.

IV. GAGNE AND INSTRUCTIONAL DESIGN

B. Theory of Instructional Design

- To Gagne, complex learning involves hierarchical organizations of capacities.
 - Paralleling parking → **Motor** (positions, backing up) + **Intellectual** (identifying correct angle, alignment)
- Learning represented by a hierarchy which specifies and organizes sets of intellectual skills.
 - Instructions must focus on hierarchy (not content) and on the training of prerequisite skills.
 - Basic acquisitions acquired first and more complex skills are acquired contingently.

IV. GAGNE AND INSTRUCTIONAL DESIGN

B. Theory of Instructional Design

- Instruction promotes learning.
 - Learning process may be influenced by instructional events that support internal learning processes. Although instruction is not necessary to learning
- Learning outcomes defined by precise language of the acquired capacity.
- Phases of learning
 - Preparation: Attending, Expectancy, Retrieval
 - Acquisition/performance: Selective perception, Semantic encoding, Retrieval/responding, Sr+
 - Transfer of Training: Cue retrieval, Generalizability