

Education 173
Cognition and Learning in
Educational Settings

Behaviorism

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What is Learning? Two
Answers.

- A Change in *Behavior*
 - Or the capacity to behave
 - That is relatively enduring
 - And not primarily developmental.—or—
- A Change in the *Mind*
 - Manifest as a new information-processing capability
 - That is presumably stored in the brain
 - And inferred from behavior.

What is Behaviorism?

- The theory that human or animal activity can be understood through studying *behavior alone*, without reference to “mental” qualities, such as knowledge, desires, or goals.
- Two Kinds of Behaviorism
 - Classical Conditioning
 - Operant Conditioning



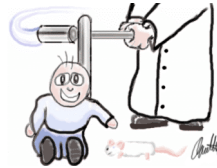
Pavlov: Classical Condition



- Conditioning Means *Learning* (in Behaviorism)
- Classical Conditioning is Stimulus Substitution
 - Unconditioned Stimulus (food) produces an Unconditioned Response (salivation)
 - Conditioned Stimulus (bell) produces a Conditioned Response (salivation)
- Stimulus Generalization (to other similar bells)
- Stimulus Discrimination (but not *all* bells)
- Classical Conditioning Explains Only Simple Behavior, Such as Emotional Reactions

John B. Watson

- Pushed Behaviorism as the Only Legitimate Form of Psychology
 - circa 1920
- Little Albert
 - Learned to fear a white rat when paired with a loud noise
 - His fear generalized to a
 - rabbit, dog, and fur coat
- Watson Believed Strongly in the Effects of Experience (Nurture) on Development
 - “Give me a dozen healthy infants”
- Watson Inspired Skinner

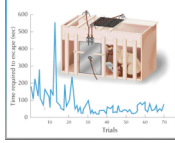




Edward L. Thorndike

- Another Behaviorist
- One of the First Educational Psychologists
- Believed in the Advancement of Education and Psychology Through Scientific Research

Thorndike's Experiment



- Trial and Error Learning
 - Puzzle box: Can the cat escape?
 - Yes, but only by accident (at first)
- Thorndike's Law of Effect
 - A behavior is more likely to recur if followed by a "satisfying state of affairs"
- Thorndike's Cat's Behavior was More Sophisticated than Pavlov's Dogs'

B. F. Skinner



- Introduced A Different Paradigm
 - Not classical conditioning
 - But similar to Thorndike's theory
- Operant Conditioning Is Intended to Explain All Behavior, Including Complex Behavior
 - All behavior is the product of reinforcement histories
 - What did you do today?
- *Operants* are emitted behaviors, some of which are reinforced

More Skinner



- Not Welcome: Mental Talk
 - Such as think, believe, plan, goal, feeling
- Behavior is Determined, Not Chosen
 - Therefore, freedom is an illusion
 - So is dignity (virtue)
 - If behavior is programmed, then why not try to create a Utopian society?
 - Walden II
- Skinner's Theory had an Enduring Impact
 - On Education
 - On Child-Rearing

Operant Conditioning in Schools

- Encouraging Good Behavior
 - Stickers
 - Smiley Faces
 - Praise
 - Aren't these reinforcements at least *partly* manipulative? (means to an end)
- Discouraging Bad Behavior
 - Extinction: "Just ignore him"
 - Withholding reinforcement



Reinforcement and Punishment

- Reinforcement Increases the Likelihood that Behavior Will Be Repeated
 - Reinforcement is identified only by its effects
 - Want a hamburger? A hug?
- Punishment Decreases Likelihood
- *Positive* and *Negative* Refer to Adding or Subtracting a Consequence
 - What is negative reinforcement?

Reinforcement Schedules



- *Continuous* Reinforcement is Best for Starting a New Behavior
 - Reinforce every time the behavior occurs
- *Variable Ratio* Reinforcement is Best for Making Behavior Robust
 - Resistant to extinction once reinforcement is withdrawn
 - Slot machines, fishing
 - For education: Don't reward every time

Complex Behavior



- Use Successive Approximations (Shaping)
 - Gradually raise expectations
- Widely Used in Animal Training
 - Whales and dolphins in Sea World
- For Humans: Behavior Modification
 - Reinforcement, M&Ms, token economies
 - Sometimes useful with behavior disorders
- Can Reinforcement Backfire?
 - Magic Markers and the Good Player Award
 - Be careful if intrinsic motivation is already present

One Application to Education: Programmed Learning

- Skinner's "Teaching Machines"
 - Machine "tutors" helped shape the learner
 - Used a *program* of small steps
 - Now obsolete
- Computer-Assisted Instruction
 - Many more capabilities now, of course
 - Sometimes computers present material in a Skinnerian format

What's Wrong With Behaviorism?

- Noam Chomsky's Critique of Skinner's Book, "Verbal Behavior"
 - Language can't be learned only through reinforcement
 - The brain *must* be a built-in (innate) language capability
- Donald Norman's Critique of Skinner's Work
 - Was operant conditioning a half-century distraction?



Why Use a Cognitive (Thinking) Approach?

- Behaviorism Does Not Address All the Important Goals of Education
 - It Neglects Important Learning Outcomes
 - Understanding, Interest, Curiosity, Confidence
 - It Neglects Certain Aspects of the Learner
 - Beliefs, Motivation, Values, Goals
- It's Best to Investigate the Mind as a Real Entity, Not Treat it as an Illusion
- Is There a Metaphor We Can Use?
