
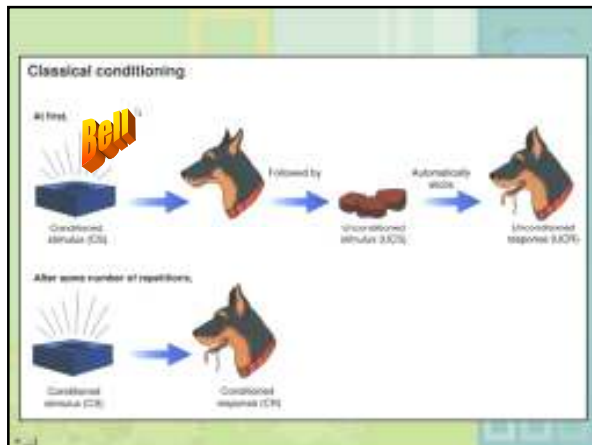


Classical conditioning

- Pavlov's Demonstration
- Terminology
 - Unconditioned Stimulus (UCS)
 - Conditioned Stimulus (CS)
 - Unconditioned Response (UCR)
 - Conditioned Response (CR)

**Volunteers?
Anyone?**

Learning: Some Key Terms

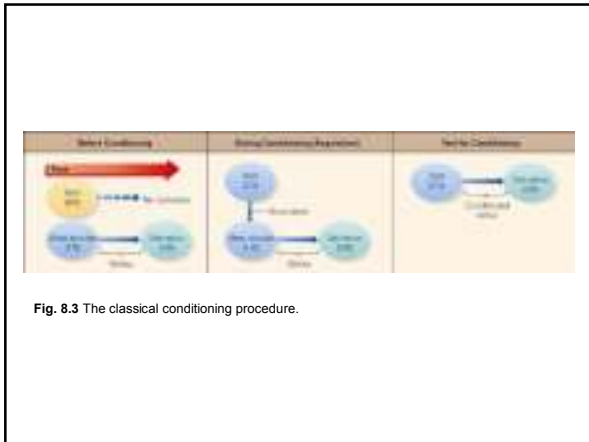
- Learning: Relatively permanent change in behavior due to experience
 - Does NOT include temporary changes due to disease, injury, maturation, or drugs, since these do NOT qualify as learning even though they can alter behavior
- Reinforcement: Any event that increases the probability that a response will recur
- Response: Any identifiable behavior
 - Internal: Faster heartbeat
 - Observable: Eating, scratching

Learning: More Key Terms

- Antecedents: Events that precede a response
- Consequences: Effects that follow a response

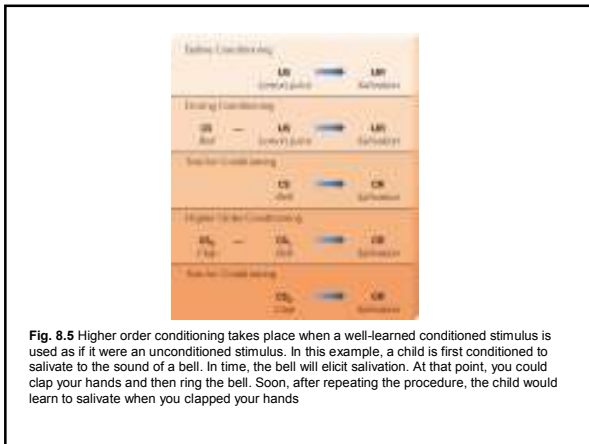
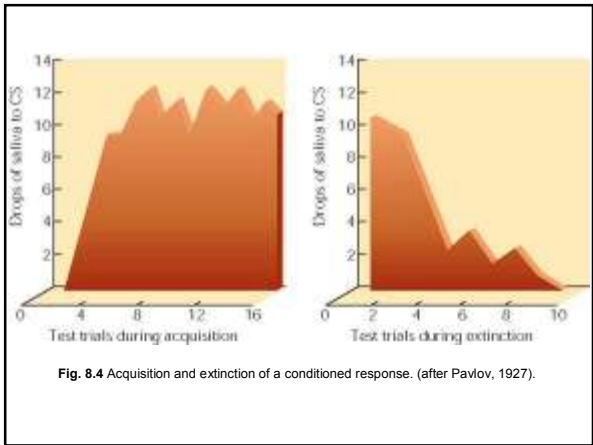
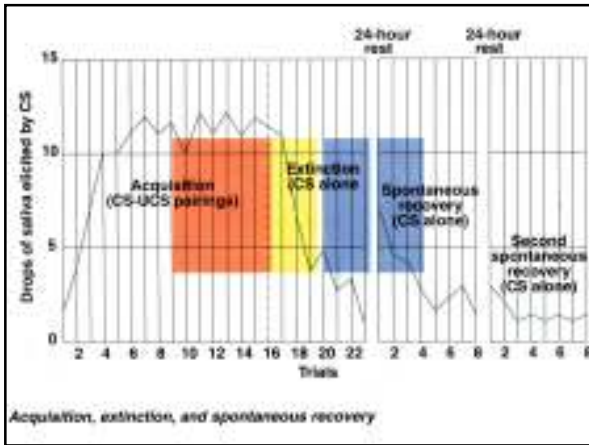
Classical Conditioning and Ivan Pavlov

- Russian physiologist who studied digestion
- Used dogs to study salivation when dogs were presented with meat powder
- Also known as Pavlovian or Respondent Conditioning
- Reflex: Automatic, non-learned response



Principles of Classical Conditioning

- Acquisition: Training period when a response is strengthened
- Higher Order Conditioning: A conditioned stimulus (CS) is used to reinforce further learning
- Extinction: Weakening of a conditioned response through removal of reinforcement
- Spontaneous Recovery: Reappearance of a learned response following apparent extinction



FOR THE NEXT FEW SLIDES
DETERMINE THE

- CS
- UCS
- UCR
- CR

- Suzy goes outside to play in her treehouse. A swarm of bees has nested near her treehouse, and she gets stung when she climbs up to the treehouse. This happens 3 times in a week. Suzy becomes afraid to go near the tree and cries violently when her dad tries to get her to climb up to the treehouse.

- Jerry's wife Mary gets a new nightgown and wears it whenever he is in the mood for sexual relations. After a month, the sight of the nightgown alone is enough to excite Jerry.

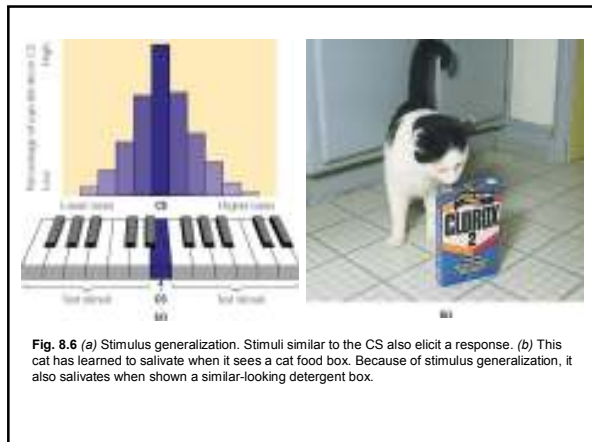
- A couple goes to a movie on their first date and they have a wonderful time, eventually getting married. Whenever they see this movie on the late night show, they get a tender feeling and think about each other.

- Five years later the husband has caught his wife cheating a dozen times. Now he beats her dog (that he got in the divorce) whenever she hears the name of that &^%\$@(* movie.

- A student survives a plane crash that occurred because of a thunderstorm. Now, whenever the student hears thunder, he gets anxious.

Handout TM 7-2A for a grade



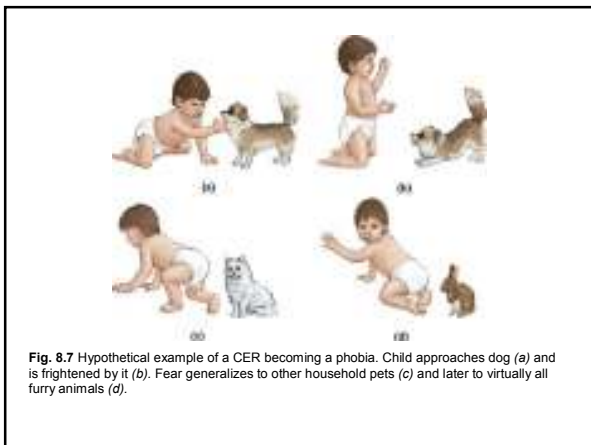


Classical Conditioning Experiments

- Grammar Experiment
- Number Story
- Earning Points

Classical Conditioning in Humans

- Phobia: Fear that persists even when no realistic danger exists (e.g., arachnophobia (fear of spiders; see the movie!))
- Conditioned Emotional Response (CER): Learned emotional reaction to a previously neutral stimulus
- Desensitization: Exposing phobic people gradually to feared stimuli while they stay calm and relaxed
- Vicarious Classical Conditioning: Learning to respond emotionally to a stimulus by observing another's emotional reactions



Operant Conditioning (Instrumental Learning)

- Definition: Learning based on the consequences of responding; we associate responses with their consequences
- Law of Effect (Thorndike): The probability of a response is altered by the effect it has; responses that lead to desired effects are repeated; those that lead to undesired effects are not
- Operant Reinforcer: Any event that follows a response and increases its likelihood of recurring

Principles of Classical Conditioning (cont.)

- Stimulus Generalization: A tendency to respond to stimuli that are similar, but not identical, to a conditioned stimulus (e.g., responding to a buzzer or a hammer banging when the conditioning stimulus was a bell)
- Stimulus Discrimination: The ability to respond differently to various stimuli (e.g., Rudy will respond differently to various bells (alarms, school, timer))

More Principals

- Shaping: Molding responses gradually in a step-by-step fashion to a desired pattern
- Extinction: When the CS (what had been neutral) is presented without the UCS for a relatively long period, the CS loses its association.

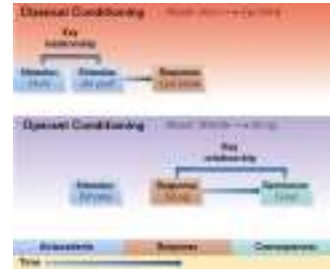


Fig. 8.1 In classical conditioning, a stimulus that does not produce a response is paired with a stimulus that does elicit a response. After many such pairings, the stimulus that previously had no effect begins to produce a response. In the example shown, a horn precedes a puff of air to the eye. Eventually the horn alone will produce an eye blink. In operant conditioning, a response that is followed by a reinforcing consequence becomes more likely to occur on future occasions. In the example shown, a dog learns to sit up when it hears a whistle

Handout TM 7-4A



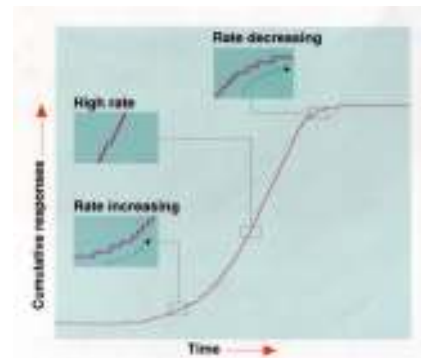
“reinforcer” Activity

- Get in pairs
- In your pairs divide into person 1 and B
- “B” Go into hall
- Once “B” is in the hall explain to “1” the rules.
- Bring “B” back in
- Run trials A, B, and C



Fig. 8.8 Assume that a child who is learning to talk points to her favorite doll and says either “doll,” “duh,” or “dat” when she wants it. Day 1 shows the number of times the child uses each word to ask for the doll (each block represents one request). At first, she uses all three words interchangeably. To hasten learning, her parents decide to give her the doll only when she names it correctly. Notice how the child’s behavior shifts as operant reinforcement is applied. By day 20, saying “doll” has become the most probable response.

Learning Curve



Operant Conditioning (Instrumental Learning) (cont.)

- Conditioning Chamber (Skinner Box): Apparatus designed to study operant conditioning in animals
- Response-Contingent Reinforcement: Reinforcement given after a desired response occurs

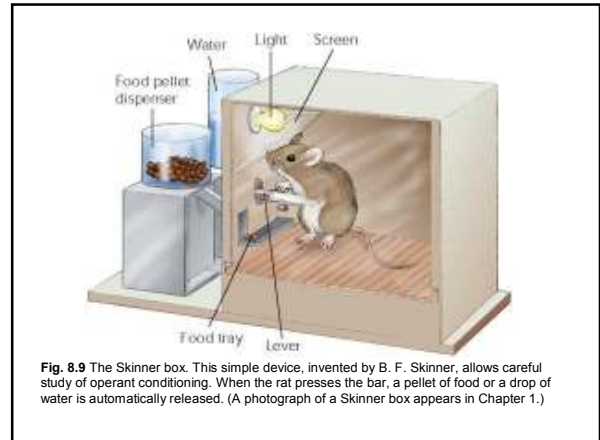


Fig. 8.9 The Skinner box. This simple device, invented by B. F. Skinner, allows careful study of operant conditioning. When the rat presses the bar, a pellet of food or a drop of water is automatically released. (A photograph of a Skinner box appears in Chapter 1.)

Timing of Reinforcement

- Operant reinforcement most effective when given immediately after a correct response
- Shaping/Response Chain: A linked series of actions that leads to reinforcement
- Superstitious Behaviors: Behaviors that are repeated because they appear to produce reinforcement, even though it is not necessary
- Successive Approximations: Ever-closer matches

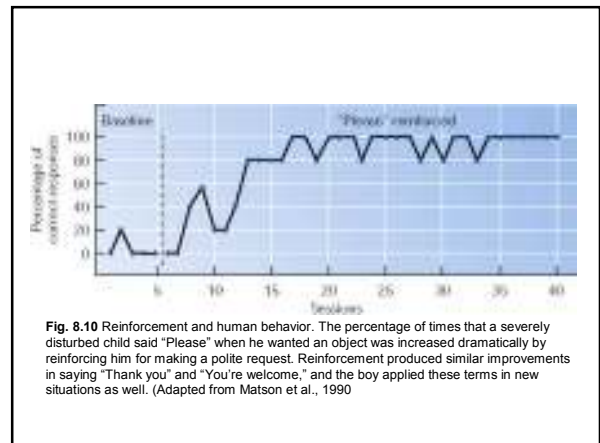


Fig. 8.10 Reinforcement and human behavior. The percentage of times that a severely disturbed child said "Please" when he wanted an object was increased dramatically by reinforcing him for making a polite request. Reinforcement produced similar improvements in saying "Thank you" and "You're welcome," and the boy applied these terms in new situations as well. (Adapted from Matson et al., 1990)

Operant Extinction

- Definition: When learned responses that are NOT reinforced gradually fade away
- Negative Attention Seeking: Using misbehavior to gain attention

Negative Reinforcement Quiz

- If you were doing a crossword puzzle on the subject of behavior management, and were asked for a synonym for negative reinforcement, what word would you choose?
- When you supply negative reinforcement, it usually results in
 1. Weakening of a "bad" behavior
 2. Strengthening of a "good" behavior

Quiz continued

- Do people usually look forward to negative reinforcement?
- Do you anticipate regularly (consciously) supplying positive reinforcement to those you might manage in the future?
- Do you anticipate regularly (consciously) supplying negative reinforcement to those you might manage in the future?

More Operant Conditioning Terms

- Positive Reinforcement: When a response is followed by a reward or other positive event
- Negative Reinforcement: When a response is followed by the removal of an unpleasant event (e.g., the bells in Fannie's car stop when she puts the seatbelt on); ends discomfort
- Punishment: Any event that follows a response and decreases the likelihood of it recurring (e.g., a spanking)
- Response Cost: Reinforcer or positive thing is removed, e.g., losing X-Box privileges

Consequences Matrix

Stimulus Type	Supply a Stimulus	Remove a Stimulus
Something DESIRED	1 Positive Reinforcement	2 Time-Out
Something DISLIKED	3 Punishment	4 Negative Reinforcement

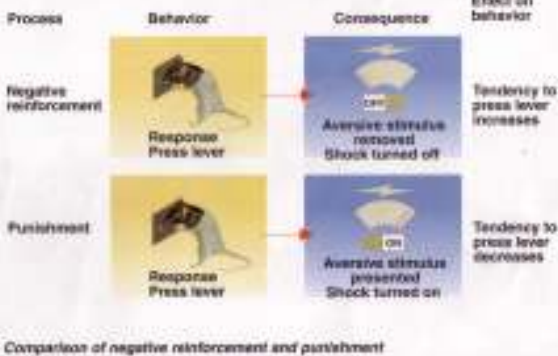
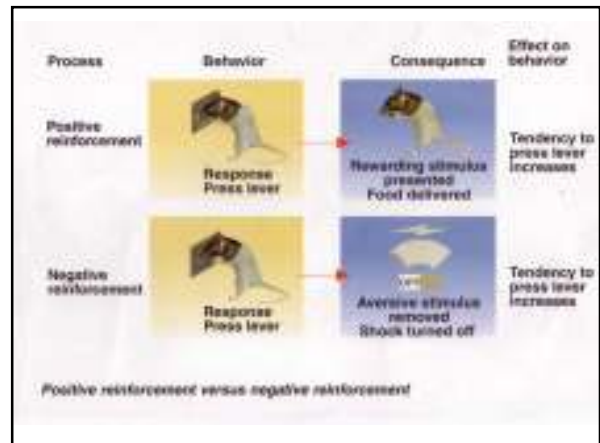


Fig. 8.22 Types of reinforcement and punishment. The impact of an event depends on whether it is presented or removed after a response is made. Each square defines one possibility: Arrows pointing upward indicate that responding is increased; downward-pointing arrows indicate that responding is decreased. (Adapted from Kazdin, 1975.)

Punishment

- Punisher: Any consequence that reduces the frequency of a target behavior
- Keys: Timing, consistency, and intensity
- Severe Punishment: Intense punishment, capable of suppressing a response for a long period
- Mild Punishment: Weak punishment; usually slows responses temporarily

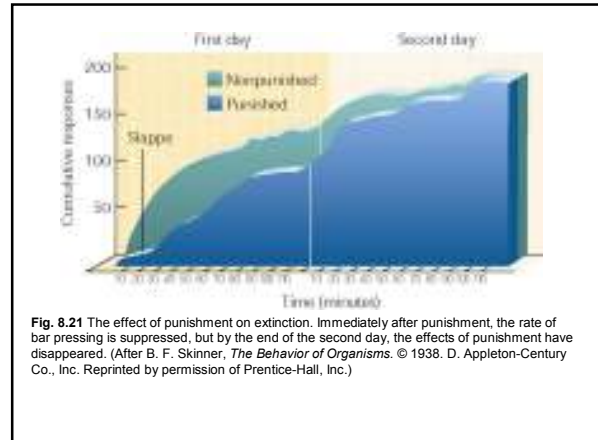


Fig. 8.21 The effect of punishment on extinction. Immediately after punishment, the rate of bar pressing is suppressed, but by the end of the second day, the effects of punishment have disappeared. (After B. F. Skinner, *The Behavior of Organisms*. © 1938. D. Appleton-Century Co., Inc. Reprinted by permission of Prentice-Hall, Inc.)

Punishment Concepts

- Aversive Stimulus: Stimulus that is painful or uncomfortable (e.g., a shock)
- Escape Learning: Learning to make a response to end an aversive stimulus
- Avoidance Learning: Learning to make a response to avoid, postpone, or prevent discomfort (e.g., not going to a doctor or dentist)
- Punishment may also increase aggression

Types of Reinforcers

- **PRIMARY** Reinforcer: Non-learned and natural; satisfies biological needs (e.g., food, water, sex)
 - Intracranial Stimulation (ICS): Natural primary reinforcer; involves direct activation of brain's "pleasure centers"
- **SECONDARY** Reinforcer: Learned reinforcer (e.g., money, grades, approval, praise)
 - Token Reinforcer: Tangible secondary reinforcer (e.g., money, gold stars, poker chips)
 - Social Reinforcer: Provided by other people (e.g., learned desires for attention and approval)

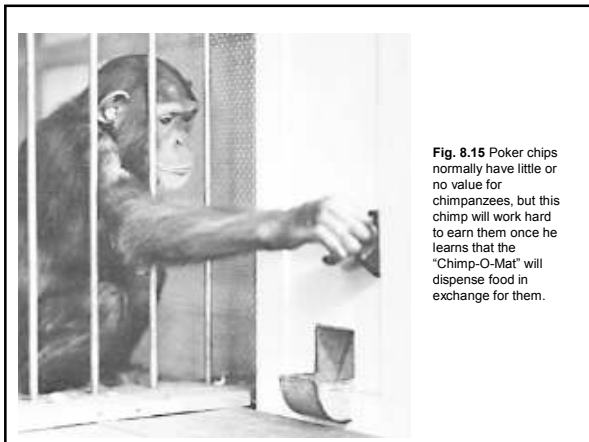


Fig. 8.15 Poker chips normally have little or no value for chimpanzees, but this chimp will work hard to earn them once he learns that the "Chimp-O-Mat" will dispense food in exchange for them.

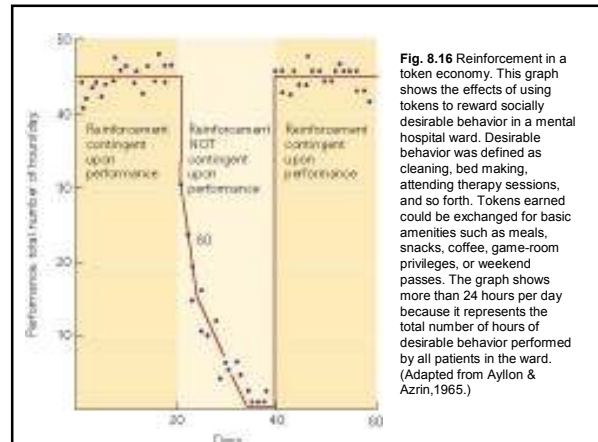


Fig. 8.16 Reinforcement in a token economy. This graph shows the effects of using tokens to reward socially desirable behavior in a mental hospital ward. Desirable behavior was defined as cleaning, bed making, attending therapy sessions, and so forth. Tokens earned could be exchanged for basic amenities such as meals, snacks, coffee, game-room privileges, or weekend passes. The graph shows more than 24 hours per day because it represents the total number of hours of desirable behavior performed by all patients in the ward. (Adapted from Ayllon & Azrin, 1965.)

Reinforcement Concepts

- Schedules of Reinforcement: Plans for determining which responses will be reinforced
- Continuous Reinforcement: A reinforcer follows every correct response
- Partial Reinforcement: Reinforcers do NOT follow every response
- Partial Reinforcement Effect: Responses acquired with partial reinforcement are very resistant to extinction

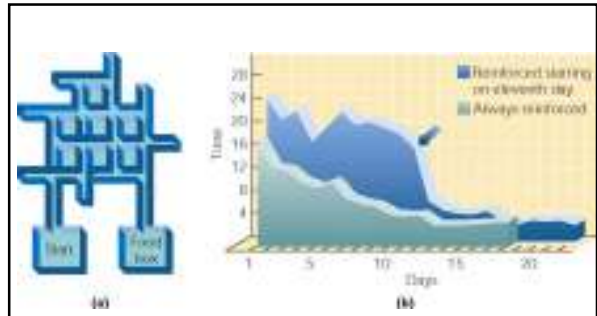


Fig. 8.23 Latent learning. (a) The maze used by Tolman and Honzik to demonstrate latent learning by rats. (b) Results of the experiment. Notice the rapid improvement in performance that occurred when food was made available to the previously unreinforced animals. This indicates that learning had occurred, but that it remained hidden or unexpressed. (Adapted from Tolman & Honzik, 1930.)

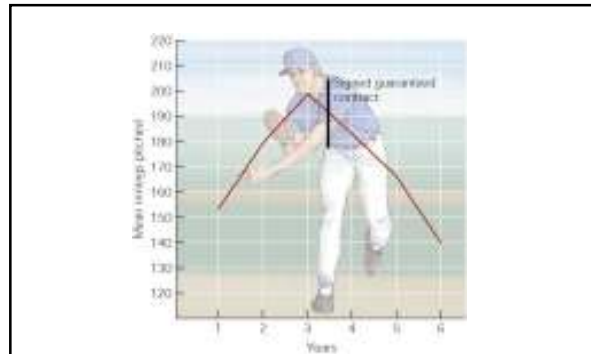


Fig. 8.11 Average number of innings pitched by major league baseball players before and after signing long-term guaranteed contracts. (Data from O'Brien et al., 1981.)

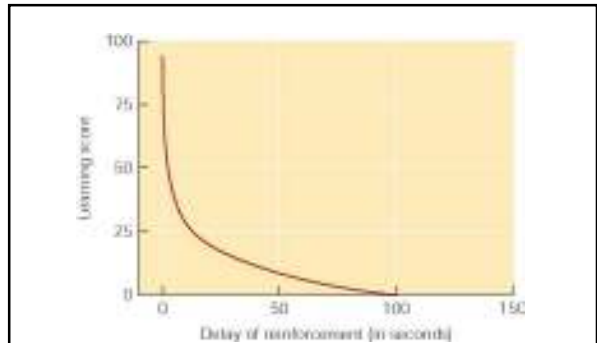


Fig. 8.12 The effect of delay of reinforcement. Notice how rapidly the learning score drops when reward is delayed. Animals learning to press a bar in a Skinner box showed no signs of learning if food reward followed a bar press by more than 100 seconds (Perin, 1943).

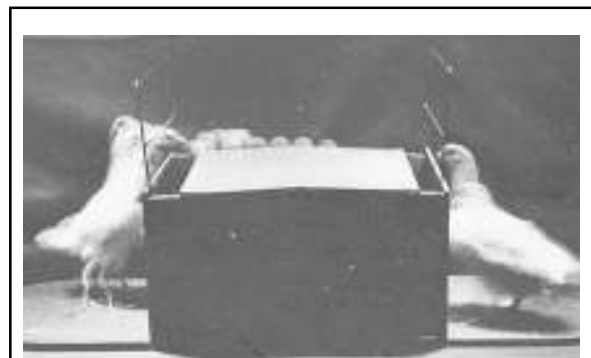


Fig. 8.13 Operant conditioning principles were used to train these pigeons to play Ping-Pong.

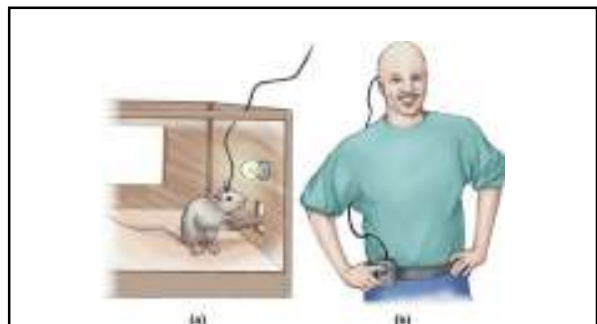
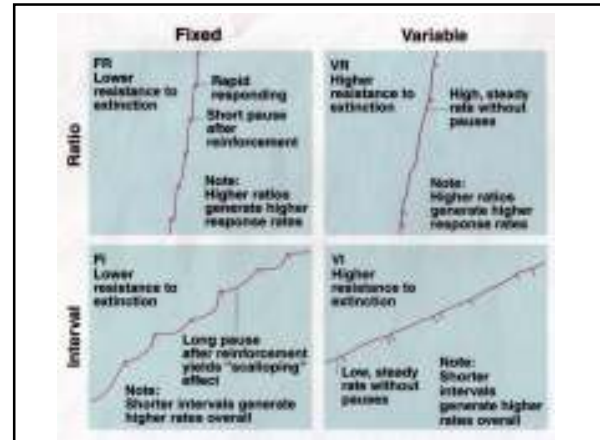


Fig. 8.14 In the apparatus shown in (a), the rat can press a bar to deliver mild electric stimulation to a "pleasure center" in the brain. Humans also have been "wired" for brain stimulation, as shown in (b). However, in humans, this has been done only as an experimental way to restrain uncontrollable outbursts of violence. Implants have not been done merely to produce pleasure.

Schedules of Partial Reinforcement

- Fixed Ratio Schedule (FR): A set number of correct responses must be made to obtain a reinforcer
- Variable Ratio Schedule (VR): Varied number of correct responses must be made to get a reinforcer
- Fixed Interval Schedule (FI): The first correct response made, after a certain amount of time has elapsed, is reinforced
- Variable Interval Schedule (VI): Reinforcement is given for the first correct response made after a varied amount of time



Cognitive Learning

- Higher-level learning involving thinking, knowing, understanding, and anticipating
- Latent Learning: Occurs without obvious reinforcement and is not demonstrated until reinforcement is provided
- Rote Learning: Takes place mechanically, through repetition and memorization, or by learning a set of rules
- Discovery Learning: Based on insight and understanding

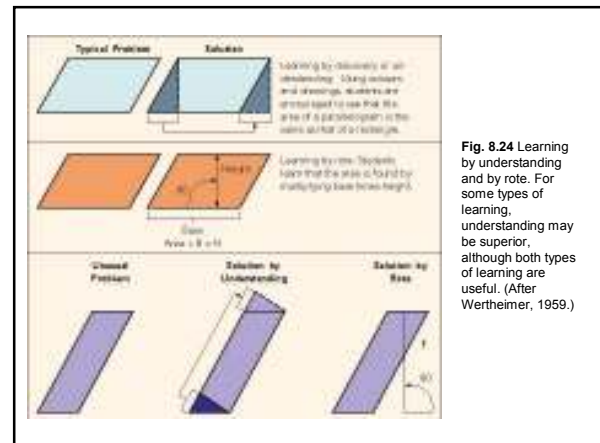


Fig. 8.24 Learning by understanding and by rote. For some types of learning, understanding may be superior, although both types of learning are useful. (After Wertheimer, 1959.)

Modeling or Observational Learning (Albert Bandura)

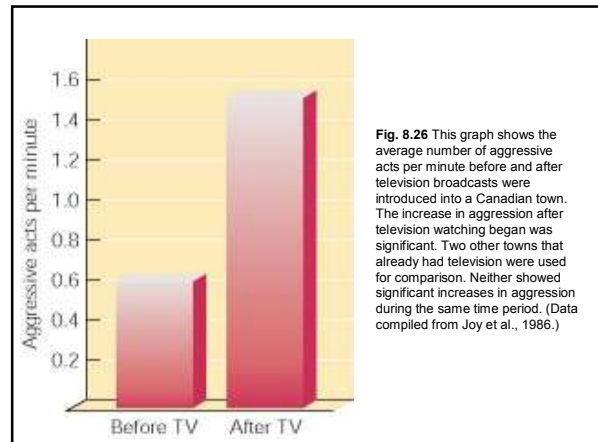
- Model: Someone who serves as an example
- Occurs by watching and imitating actions of another person or by noting consequences of a person's actions
 - Occurs before direct practice is allowed



Fig. 8.25 A nursery school child imitates the aggressive behavior of an adult model he has just seen in a movie. (Photos courtesy of Albert Bandura.)

Steps to Successful Modeling

- Pay attention to model
- Remember what was done
- Reproduce modeled behavior
- If a model is successful or his/her behavior is rewarded, behavior more likely to recur
- Bandura created modeling theory with classic Bo-Bo Doll (inflatable clown) experiments



Self-Managed Behavioral Principles

- Choose a target behavior
- Record a baseline
- Establish goals
- Choose reinforcers
- Record your progress
- Reward successes
- Adjust your plan as you learn more about your behavior

Self-Managed Behavior (cont.)

- Premack Principle: Any high frequency response can be used to reinforce a low frequency response (e.g., no GameBoy until you finish your homework)
- Self-Recording: Self-management based on keeping records of response frequencies

How to Break Bad Habits

- Alternate Responses: Try to get the same reinforcement with a new response
- Extinction: Try to discover what is reinforcing an unwanted response and remove, avoid, or delay the reinforcement
- Response Chains: Scramble the chain of events that leads to an undesired response
- Cues and Antecedents: Try to avoid, narrow down, or remove stimuli that elicit the bad habit

How to Break Bad Habits (cont.): Behavioral Contracting

- Behavioral Contract: Formal agreement stating behaviors to be changed and consequences that apply; written contract
- State the rewards you will get, privileges you will forfeit, or punishments you must accept
- Type the contract, sign it, and get a person you trust to sign it