LEARNING

Learning- a relatively permanent change in behavior due to experience.

CLASSICAL CONDITIONING – learning based on association of stimuli

Ivan Pavlov

Unconditioned stimulus (US)

Unconditioned response (UR)

Conditioned stimulus (CS)

Conditioned response (CR)

Acquisition phase

Delayed conditioning

Simultaneous conditioning

Backward conditioning

Generalization

Discrimination

Extinction

Spontaneous recovery

First-order conditioning

Second-order conditioning

Equipotentiality

Learned taste aversions

Salient

Contiguity model – the Pavlovian model, the more times two things are paired, the greater the learning that will take place

Contingency model- Rescorla – rests of cognitive view of classical conditioning: If A is contingent on B and vice versa then one predicts the other, learning more powerful.

OPERANT CONDITIONING – kind of learning based on the association of consequences with one's behavior.

Edward Thorndike

Law of effect

Instrumental learning

B.F. Skinner

Skinner box

Positive reinforcement

Negative reinforcement

Omission training

Punishment

Escape learning

Avoidance learning

Shaping

Chaining

Primary reinforcers

Secondary reinforcers

Reinforcement schedules differ in two ways:

- What determines when reinforcement is delivered – the number of responses made (ratio) or the passage of time (interval)
- The pattern of reinforcement – either constant (fixed) or changing (variable)

Observational learning –

- also known as modeling
- was studied by Albert Bandura in formulating his social-learning theory
- A significant body of research indicates that children learn violent behaviors from watching violent television programs and violent adult models

Latent learning

- studied by Edward Tolman
- is hidden learning
- experiment with maze running rats, ones that didn't initially get a reward didn't seem to learn, but when they started being rewarded their performance changed drastically

Abstract learning

- involves understanding concepts such as tree or same
- Skinner box pigeons picking out certain shapes

Insight learning

- Wolfgang Kohler did studies with chimpanzees
- Insight learning occurs when one suddenly realizes how to solve a problem
- Chimps using boxes to reach banana

What Is Learning?

*Learning is a relatively permanent change in behavior due to experience. Learning resulting from conditioning depends on reinforcement. Reinforcement increases the probability that a particular response will occur.

Classical (or respondent) conditioning and Operant (or instrumental) conditioning are two basic types of learning.

In classical conditioning, a previously neutral stimulus begins to elicit a response through association with another stimulus. In operant conditioning, the frequency and pattern of voluntary responses are altered by their consequences.

How does classical conditioning occur?

Classical conditioning, studied by Pavlov, occurs when a neutral stimulus (NS) is associated with an unconditioned stimulus (US).

The US causes a reflex called the unconditioned response (UR). If the NS is consistently paired with the US, it becomes a conditioned stimulus (CS) capable of producing a response by itself. This response is a conditioned (learned) response (CR).

When the conditioned stimulus is followed by the unconditioned stimulus, conditioning is reinforced (strengthened).

From an informational view, conditioning creates expectancies, which alter response patterns. In classical conditioning the CS creates an expectancy that the US will follow.

Higher order conditioning occurs when a well-learned conditioned stimulus is used as if it were an unconditioned stimulus, bringing about further learning.
When the CS is repeatedly presented alone, conditioning is extinguished (weakened or inhibited). After extinction seems to be complete, a rest period may lead to the temporary reappearance of a conditioned response. This is called spontaneous recovery.
Through stimulus generalization, stimuli similar to the conditioned stimulus will also produce a response. Generalization gives way to stimulus discrimination when an organism learns to respond to one stimulus but not to similar stimuli.

Does Conditioning affect emotions?
Conditioning applies to visceral or emotional responses as well as simple reflexes. As a result, conditioned emotional responses (CERs) also occur.
Irrational fears called phobias may be CERs. Conditioning of emotional responses can occur vicariously (secondhand) as well as directly.

How does operant conditioning occur?
Operant conditioning occurs when voluntary action is followed by a *reinforcer*. Reinforcement in operant conditioning increases the frequency or probability of a response. This result is based on the law of effect.
Complex operant responses can be taught by reinforcing successive approximations to a final desired response. This is called *shaping*. It is particularly useful in training animals.
If an operant response is not reinforced, it may *extinguish* (disappear). But after extinction seems complete, it may temporarily reappear (*spontaneous recovery*).

Are there different kinds of operant reinforcement?
In positive reinforcement, a reward or pleasant event follows a response. In negative reinforcement, a response that ends discomfort becomes more likely.
Primary reinforcers are “natural”, physiologically based rewards. Intracranial stimulation of ‘pleasure centers’ in the brain can also serve as a primary reinforcer.
Secondary reinforcers are learned. They typically gain their reinforcing value by direct association with primary reinforcers or because they can be exchanged for primary reinforcers. Tokens and money gain their reinforcing value in this way.
Feedback, or knowledge of results, aids learning and improves performance. It is most effective when it is immediate, detailed and frequent.
Programmed instruction breaks learning into a series of small steps, and provides immediate feedback. Computer-assisted instruction (CAT) does the same but has the added advantage of providing alternate exercises and information when needed. Four variations of CAI are drill and practice, instructional games, educational simulations, and interactive videodisk instruction.

How are we influenced by patterns of reward?
delay of reinforcement greatly reduces its effectiveness, but long chains of responses may be built up so that a single reinforcer maintains many responses.
Superstitious behaviors often become part of response chains because they appear to be

associated with reinforcement….
Reward or reinforcement may be given continuously (after every response) or on a schedule of partial reinforcement. Partial reinforcement produces greater resistance to extinction.
The four most basic schedules of reinforcement are fixed ratio, variable ratio, fixed interval, and variable interval. Each produces a distinct pattern of responding.
Stimuli that precede a reinforced response tend to control the response on future occasions (stimulus control). Two aspects of stimulus control are generalization and discrimination.
In generalization an operant response tends to occur when stimuli similar to those preceding reinforcement are present.
In discrimination, responses are given in the presence of discriminative stimuli associated with reinforcement (S+) and withheld in the presence of stimuli associated with nonreinforcement (S-)

What does punishment do to behavior?
Punishment decreases responding. Punishment occurs when a response is followed by the onset of an aversive event or by the removal of a positive event (response cost)
Punishment is most effective when it is immediate, consistent and intense. Mild punishment tends to only temporarily suppress responses that are also reinforced or were acquired by reinforcement.
The undesirable side effects of punishment include the conditioning of fear to punishing agents and situations associated with punishment, the learning of escape and avoidance responses, and the encouragement of aggression.

What is cognitive learning?
Cognitive learning involves higher mental processes. such as understanding, knowing, or anticipating. Even in relatively simple learning situations, animals and people seem to form cognitive maps (internal representations or relationships).
In latent learning, learning remains hidden or unseen until a reward or incentive for performance is offered.
Discovery learning emphasizes insight and understanding, in contrast to rote learning.

Does learning occur by imitation?
Much human learning is achieved through observation, or modeling. Observational learning is influenced by the personal characteristics of the model and the success or failure of the model's behavior. Studies have shown that aggression is readily learned and released by modeling.
Television characters can act as powerful models for observational learning. Televised violence increases the likelihood of aggression by viewers.

How does conditioning apply to practical problems?
Operant principles can be readily applied to manage behavior in everyday settings. When managing one's own behavior, self-reinforcement, self-recording, feedback, and behavioral contracting are all helpful.
Four strategies that can help change bad habits are reinforcing alternate responses, promoting

extinction, breaking response chains, and avoiding antecedent cues.
In school, self-regulated learners typically do all of the following: They set learning goals, plan learning strategies, use self-instruction, monitor their progress, evaluate themselves, reinforce successes, and take corrective action when required.

How does biology influence learning?
Many animals are born with innate behavior patterns far more complex than reflexes. These are organized into fixed action patterns (FAPs), which are stereotyped, species-specific behaviors.
Learning in animals is limited at times by various biological constraints and species-typical behaviors.
According to prepared fear theory, some stimuli are especially effective conditioned stimuli.
Many responses are subject to *instinctive drift* in operant conditioning. Human learning is subtly influenced by many such biological potentials and limits