Learning & Behavioral Theory

Learning

**** **Defined:** Learning is reflected by a relatively permanent change in the potential for responding that results from prior experience or practice.{a relatively permanent change due to experience, in either behavior &/or mental associations}

1. From a cognitive perspective, the relatively permanent change associated with learning can be solely in the form of knowledge initially. It is "initially," because when the individual acts on that change in knowledge/understanding, the behavior will be changed as well.

2. From a behaviorist perspective, learning is **only** reflected in change in behavior.

Concepts in Learning

1. Principles of Learning: Identify specific factors that consistently influence learning & describe the particular effects of the factors. Answers the "what" question regarding the important factors involved in learning
2. Laws of Learning: these are principles that have withstood the test of time, i.e., they tend to be universal in nature, are consistent across time, and have broad application.
3. Theories of Learning: Provide explanations about the underlying mechanisms involved in the learning process. Answers the "why" question regarding the factors involved in learning.

Advantages of Theories over Principles

1. Theories allow for a short, concise integration of many principles of learning across many research studies, i.e., they are "parsimonious".
2. Theories provide starting points of conducting research.
3. Theories help us to make sense of research findings.
4. Theories help us to design learning environments that help to optimally facilitate the learning process.

Disadvantages of Theories vs Principles

1. No ONE theory of learning can explain everything that researchers know or have discovered about learning……THEORIES ARE LIMITED AND LIMITING.
2. Theories strongly affect what new information gets published and can therefore, BIAS the knowledge that we have about learning.

Behavioristic Assumptions

1. Behavior is primarily the result of the environment.
2. Learning is described in terms of relationships among *observable* events, i.e., stimulus -->response.
3. Learning is change in behavior.
4. Learning occurs when specific events occur in conjunction with other events.
5. The most useful theories tend to be parsimonious ones.
6. Principles of learning apply equally to different behaviors and to different species of animals -- "**equipotentiality**".

Classical Conditioning (frequently referred to as *Pavlovian Conditioning*)

Defined: The learning of predictive relationships that exist between stimuli in the environment.
— In short, one can learn that certain stimuli can serve as a signal for the occurrence of other significant events.

I. Terms in Classical Conditioning (CC):

7. Neutral Stimuli: A stimulus not connected to a response.
8. Unconditioned Stimulus (US): A stimulus that automatically produces an emotional or physical response.
9. Unconditioned Response (UR: Naturally occurring emotional or physical change.
10. Conditioned Stimulus (CS): A stimulus that evokes an emotional or physical response **after** conditioning has occurred.
11. Conditioned Response (CR): A learned response to a previously neutral stimulus.
12. Generalization : Responding the same way to **similar** stimuli.
13. Discrimination: Responding differently to similar stimuli, but not identical stimuli.
14. Extinction: The **gradual** disappearance of a learned response, i.e., unconditioned response, when a conditioned stimulus is repeatedly presented without the unconditioned stimulus.
15. Spontaneous Recovery: The recurrence of a conditioned response when a period of extinction is followed by a rest period. They tend to be weaker than the original conditional response & extinguishes more quickly.
16. Higher-order Conditioning: Occurs when a NS1 becomes a CS1 by being paired with an UCS and thereby eliciting a CR. A second NS2 is paired with CS1 and then independently elicits a similar CR. The second stimulus has also become a CS2. (pg. 28)
17. Sensory Preconditioning: Similar to higher-order conditioning except the steps occur in a different order. (see pg 29, Fig. 3-3).

Key points of CC

18. The contingency between the conditioned and unconditioned stimuli is more important than their contiguity. (immediately preceding or following something).
    1a. CC is most likely to occur when the CS is presented just before the UCS
    1b. CC is less likely to occur when the CS and UCS are presented at the exact same time
    1c. CC will rarely occur when the CS is presented after the UCS.
19. The Characteristics of the CS affect the degree to which the conditioning occurs.
    2a. The more salient the a NS is the more likely it is to become a CS when paired with an US. This also referred to as: ***association bias***.
20. From a Cog/Beh. Perspecive, CC involves cognition as well as responding, i.e., for CC to actually take place, one must form mental associations to those stimuli involved.

II. CC in classroom Application:

21. Associate positive, pleasant events with learning tasks. (Ex's.)
22. For more ideas see:
    Morrow, L. & Weinstein, C. (1986). Encouraging voluntary reading: The impact of literature. Reading Research Quarterly, 21, 330-346.
23. Help students risk anxiety-producing situations voluntarily & successfully. (Ex's)

Operant Conditioning (OC)

**** Frequently and **inappropriately** referred to as *"Instrumental"* conditioning.

Defined: Both Operant/Instrumental conditioning occurs when an organism (in this case, an indiv.) learns about the relationships between their responses and the consequences of those responses.

**** a. Discrimination between Instrumental & Operant Conditioning:

Instrumental conditioning situations: Environmental constraints only allow an indiv. to respond or emit a behavior at a specific time. The experimenter controls when one can respond and when one cannot.

Operant conditioning situations: The individual is free to respond as often as he/she wishes in a given situation.

In Instrumental conditioning paradigms, individuals are given discrete, limited opportunities to respond.

The emphasis is on:

a) the probability of that an individual will respond when given the opportunity
b) the speed at which an individual responds when the opportunity for responding is present
c) the accuracy with which an individual responds when the opportunity for responding is present.

In Operant conditioning paradigms, individuals are placed in a situation and are given unlimited opportunity to emit a response.

The emphasis is on the individual's RATE of responding.

**** b. Discrimination between Classical & Operant Conditioning:

Where as the environment operates on the individual to produce a response in classical conditioning, the individual operates on the environment to produce a desired response in operant conditioning.

1. Basic Principles of Operant conditioning:

2. Learning is measured by the rate of responding.
3. The frequency of a response increases when followed by a reinforcement.
4. In instrumental conditioning, learning is measured by probability, speed, & accuracy of responding.

5. Terms in Operant Conditioning:

6. Respondents: Responses (generally automatic/involuntary) elicited by a specific stimuli.
7. Operants: Voluntary (generally goal directed) behaviors emitted by a person.
8. Antecedents: Events that precede an action.
9. Consequences: Events that follow an action.
10. Reinforcer: Any event that follows a behavior and increases the chances that the behavior will occur again.

1. Consequences of Responding
   2. Reinforcement:
      — Any event that increases the probability that a prior response will occur again.
   3. Positive Reinforcement:
      — The **giving** or **presenting** of some type of rewarding stimulus.
   4. Negative Reinforcement:
      — The **removal** or **disappearance** of some type of aversive stimulus following a response.

   5. Punishment:
      — Any consequence of responding that leads to a **decrease** in the probability that a specific response will occur.
   6. Positive Punishment:
      — Occurs when an individual responds and then receives some form of aversive stimuli that causes the response to decrease. (Ex's)
   7. Negative Punishment:
      — Occurs when the undesirable consequence results from the **removal** of something pleasurable. (Ex's)

II. Schedules of Reinforcements

1.1 Continuous: The presentation of a reinforcer following **every** correct response.

1.2 Intermittent / Differential: The presentation of a reinforcer after **some,** but not all responses.

2a. Interval: Refers to the **length of time** that must elapse between reinforcers.

Fixed interval: Refers to the **length of time** between reinforcers as being **consistent**ly the same.
Ex: a. q10" or q30" b. q5", q10", q5", q10", q5", q10"

Variable interval: Refers to the **length of time** of between reinforcers as being **random.**.
Ex: a. 5", 8", 23", 2", 9", 3", 19", and so on.

2b. Ratio: Refers to the **number of responses** that must be emitted between reinforcers.

Fixed Ratio: Refers to the **number of responses** between reinforcers as being **consistently** the same.
Ex: a. 5, 5, 5, 5, 5, 5, 5, 5, 5 or 8, 8, 8, 8, 8, 8, 8, 8, 8, 8, 8, 8, and so on.

Variable Ratio: Refers to the **number of responses** between reinforcers as being **random**.
Ex: a. 5, 3, 26, 8, 19, 33, 2, 6, 1, and so on.

*** For best results, it is best to initially begin with a continuous schedule of reinforcement until the desired behavior has been established. Afterward, it tends to be best to change to a more appropriate schedule of reinforcement that is **NOT** predictable, i.e., variable ratio / variable interval. As a general rule of thumb, variable ratio tends to elicit the most consistent, longest lasting response rate.

III. Variables that effect Instrumental Responding

Positive Reinforcement Situations:

The rate of responding is influenced most strongly by the characteristics of the reward. For example, amount, quality, time that has elapsed between a response & the presentation of the reward.

==> In most cases, instrumental responding occurs faster & becomes more accurate as we increase the amount of reward given after each response (Pros / Cons).

==> Responding increases as quality of reward increases.

==> The longer the delay of reward, the poorer the performance of the instrumental response.

*** Best overall results occur with partial reinforcement after the desired behavioral response has been established.

IV. Behavior Modification

Define: A systematic application of antecedents and consequences to change behavior.

1.1 Steps to follow:

1.1.1 Clearly specify the target behavior to be changed and note the current level.
1.1.2 Plan a specific intervention using antecedents, consequences, or both.
1.1.3 Keep track of results and modify the plan as necessary.

1.2 Methods of Encouraging Behavior:

1.2.1 Reinforcing with attention – offer liberal praise for good behavior. (Ex's.)
==> See guidelines for using praise – overheads.
1.2.2 Ignoring – should be used primarily as a means for dealing with minor misbehavior that does not disrupt the learning process.
1.2.3 Premack Principle – often referred to as the "Grandma Rule."
(Generic definition): "First do what I want you to do, then you may do what you want to do."