Operant Conditioning

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- What is operant conditioning?

- **Behavior that not only operates on the environment, but also influences it.**

- The frequency of the behavior is a function of the consequences that follow the behavior.

- Positive consequences strengthen a given behavior, whereas negative consequences weaken it.

Operant behavior is emitted, not necessarily elicited by preceding stimuli.

- While respondent behavior (reflexive; eyeblink) is elicited in response to a preceding stimulus (USC-puff of air to eye), operant behavior does not necessarily occur in response to preceding stimuli.

- **Most operant behaviors originate as emitted responses**. (e.g., An newborn produces a unique type of cry when hungry & receives milk in response. This strengthens the behavior, making it more likely the infant will produce the unique cry when hungry.

- When these first behaviors are produce the consequences of the environment (positive or negative), act to either strengthen or weaken them.

The difference between operants and respondents:

- 1. **Operants are emitted; Respondents are elicited.**

- **Operant behaviors tend to occur naturally and are not elicited by preceding stimuli.**

- A baby learns that sucking her thumb is comforting & continues to do so on other occasions. *No stimulus elicited the thumb-sucking behavior.* Rather, the baby managed to insert her thumb into her mouth & experienced pleasurable sensations as a result. These pleasurable sensations strengthened this behavior.

2. Operants, once emitted, may or may not continue to occur due to their consequences. In contrast, respondents occur because of their antecedents.

- Whether we are likely to continue producing given behaviors depends on the consequences of our actions.
- Consequences that increase the frequency of a behavior, are referred to as "reinforcers," whereas events that decrease the frequency of behavior are called "punishments."
- Most operant behavior is signaled or guided by **antecedent stimuli**, which "evoke" given responses.
- In contrast to elicited stimuli in respondent behavior, antecedent stimuli in operant behavior signal given responses to occur **if and only if** the response cues a certain consequence (book-light switch example).

3. Operants consist of a broader range of behaviors than do respondent behaviors.

- **Respondents are limited to *reflexive responses* that occur to elicited stimuli.** (UCS that occurs to UCR). These are Universal I behaviors (*startle reflexes, orientation reflexes, salivation, autonomic responses*).

- Operants, like respondents, may include reflexive responses (crying, smiling), but also include volitional behaviors we can produce in the absence of preceding stimuli (these include, motor responses, thought processes, language, etc.).

- As behavioral analysts, you will deal significantly more with operants than respondents.

4. Operant conditioning—produces novel behaviors.

- New behaviors emerge when strengthened by reinforcers.
- Behaviors may be shaped or complex patterns of behavior may be developed (chains of behaviors).

Classifying Operant responses

Three ways to classify Operant Responses.

1. **Topography**—operant responses may be classified based on their form (lever pressing responses, key pecking responses, etc.).

2. **Functional response classes**—consists of operant behaviors that have the same function (produce same consequence). Examples include: turning off a faucet or putting a knot in a hose, will both stop the distribution of water.)

3. **Physical Location**—operant behaviors may be classified based on location. Events outside the skin (public events") differ from events inside the skin ("private events").

Reinforcement

- What are reinforcers?

- Stimuli or actions that strengthen a response.

- Notice that reinforcers may be behaviors that an individual finds pleasurable (a child being rewarded for cleaning his or her room, by being given the privilege to play a video game (video game playing behavior is the reinforcing event for cleaning behavior).

Types of reinforcement

- 1. **Positive Reinforcement** – A desirable behavior increases in frequency following the presentation of a pleasant (appetitive) stimulus or behavior.

(E.g., Susan experiences endorphin release from running and as a result, has begun running 20 miles a week.)

2. **Negative Reinforcement** – A desirable behavior increases in frequency following the removal or termination of an aversive stimulus.
3. (E.g., Luke smokes often to reduce the unpleasant experience of nicotine withdrawal.)

Punishment:

Anything that weakens the strength of a given behavior &/or reduces the likelihood that it will occur again.

- 1. **Positive Punishment:** reduces the frequency of a behavior by applying an aversive stimulus following the response.
- E.g., A child touches a hot iron and is burned. This painful experience will likely result in the child avoiding the iron in the future.
- 2. **Negative Punishment:** reduces the frequency of a behavior by removing an appetitive (aversive) stimulus.

  E.g., a teenager who gets a speeding ticket and has their driving privileges revoked by their parents.

Complexity of contingencies in behavior

- The strength of some behaviors can be explained by a combination of reinforcers.

- E.g., Imagine 5-year Sandy throws a temper tantrum in the grocery store because she wants a new toy. Her mother doesn't want to buy the toy for Sandy. However, after 20 minutes of whining Sandy's mother gives in and buys Sandy the toy. What type of reinforcement is at work on behavior here???
- What do you think???

Complexity (contd.)

- In Sandy's case, whining behavior was *positively reinforced*, since she got the toy (consequence of increased whining behavior). This means Sandy is likely to increase her whining behavior in other situations to get what she wants.

- In Sandy's Mother's case, the Mother's "**acquiescence**" was *negatively reinforced* by removing her daughter's aversive temper tantrum.

Question to class

- What do you think Sandy's Mother should have done during the temper tantrum ?

- 1. One way Sandy's Mother could have handled the situation would have been to ignore the temper tantrum. Here Sandy wouldn't have been reinforced for tantrums, thereby decreasing chances that more tantrums would occur.

- 2. Sandy's Mother could have distracted Sandy with a game or other behavior, so that a positive behavior could be reinforced.

- 3. Sandy's Mother, could have punished Sandy for the tantrums.

Extinction- reduces a behavior by withholding reinforcement.

- If Sandy's Mother had ignored Sandy's tantrum over the toy, she would have been putting Sandy's behavior on extinction.

- Extinction is more gradual than punishment. There may be a brief period of time when the undesired behavior may occur with greater intensity, frequency, and variability. This is called the **extinction burst**.
- So Sandy may tantrum for even longer and harder next time, in the hope that she will be reinforced. As long as she is not reinforced in the future for tantrum behavior, they will likely extinguish.

Discriminative Stimuli (S^d)

- Is the antecedent stimulus that sets the occasion for the appropriate response. Thus, it signals or cues the response.

- E.g., **Stop signs are discriminative stimuli**. They signal for us to "stop" driving, look both ways, & then to proceed. The sign is the S^d, reinforcer is avoiding a ticket/avoid death from car accident, & the behavior is "stopping behavior."

The Development of Reinforcing Stimuli: Primary Reinforcers

- Primary Reinforcers—universal reinforcers that strengthen behaviors. These are innately reinforcing & often are related to survival.
- E.g., food, water, shelter, sleep, sex, etc.

- Primary negative reinforcers—painful stimuli, bright lights, unpleasant odors, etc.

Secondary Reinforcers

- While primary reinforcers are innate & related to physical survival of species (they are unlearned), secondary reinforcers gain reinforcement strength by being paired (correlated) with other primary & secondary reinforcers.
- These are also called *conditioned reinforcers*.
- E.g., money, praise, grades, etc.

Classes of reinforcers

- 1. **Tangible reinforcers**—objects that can be held, viewed, smelled, and physically observed (stickers, toys,etc.)
- 2. **Edible reinforcers**—reinforcers than can be orally consumed (skittles, M&Ms, crackers, etc.)
- 3. **Social reinforcers**—acquired reinforcers that have been associated with primary reinforcers (affection, smiles, praise, hugs, kisses).
- 4. **Activity Reinforcers** (behaviors we find pleasant). Premack principle—argues high probability behaviors (swinging, playing) may reinforce low probability behaviors (doing homework, chores)

Shaping

- Most Behavior analysts (BA) use shaping when first working with a client.
- Shaping (rewarding successive approximations of a desired behavior) is an effective way for the BA to get their clients to produce behaviors close to those that will be desired in therapy.
- For example, when working with children, most BA therapists will start by trying to get the child to “attend.” This is done so that other programs (matching objects, imitating actions with objects, imitating actions, etc.) can be initiated. **How might the therapist do this???**

Shaping “Attending”

- 1. Find what is reinforcing to the child first (edibles, tangibles, social).

- 2. Give command, either by saying name of child (“Christopher”) while looking at child or (“Look at me”).

Chaining

- Is a set of discrete behaviors sequenced in a particular order (making tea).
- If child doesn't know the sequences of events in the chain, you can start by shaping each behavior in the chain. If you start with the first behavior and progress from there this is called forward chaining.
- If you start with the last behavior in the chain, and then subsequently shape each proceeding behavior until the chain is complete you have backwards chaining (e.g., learning to tie your shoes).