Classical vs. Operant Conditioning

Operant conditioning (R ▸ S_{RF})

- *A **voluntary** response (R) is followed by a reinforcing stimulus (S_{RF})*
- *The voluntary response is more likely to be emitted by the organism.*
- *A reinforcer is any stimulus that increases the frequency of a behavior*
- *To be a reinforcer stimuli must immediately follow the response and must be perceived as contingent upon the response*

Classical conditioning (S ▸ R)

- *An involuntary response (UCR) is preceded by a stimuli (UCS), or*
- *A stimulus (UCS) automatically triggers an **involuntary** response (UCR)*
- *A neutral stimulus (NS) associated with UCS automatically triggers a conditioned response.*
- *The NS becomes a conditioned stimulus (CS).*

A teacher reported that she had been giving her students points on the chalkboard whenever their group was the most quiet and attentive. Eventually, her students learned to become quiet and attentive whenever the teacher approached the chalkboard. What type of conditioning is at work here? What is the role of the teacher by the chalkboard?

Even though there is a S ▸ R connection between the teacher standing by the chalkboard and students becoming quiet and attentive, this stimulus is an **antecedent (or discriminative) stimulus** (not a CS). This is an example of **stimulus control** in operant conditioning.

> *In operant conditioning, the antecedent stimulus does not directly elicit the response, as it does in classical conditioning. Instead, the stimulus sets the occasion for a response to be reinforced. When an antecedent stimulus influences the likelihood that a response will occur, we call that stimulus a **discriminative stimulus** ... and say that the response is under **stimulus control*** (Ormrod, 1999, pp. 56-57).

The teacher by the chalkboard does not directly elicit an involuntary response. Rather, a voluntary response (being quite and attentive) is strengthened by a reinforcing stimulus. The teacher by the chalkboard (S+) is a **cue**, a signal, or a signpost telling students that if they behave (R) in a certain way, a specific consequence is likely to follow (S_{RF}). [**(S+) R ▸ S_{RF}**]

Discriminative **Stimulus (S+)**	**Response (R)**	*Reinforcing* **Stimulus (S_{RF})**
Antecedent	*Behavior*	*Consequence*
Teacher by the chalkboard	Being quiet and attentive	Points on chalkboard

Teacher by the chalkboard is an antecedent telling students if they are quiet and attentive there is a probability that they will earn points on board. This type of stimulus is a cue or a reminder, not an automatic trigger. Also, note that similar stimuli (e.g., teacher standing anywhere in the classroom) may also cue (S+) behavior (R). This is known as **stimulus generalization**. The more similar the stimulus is (e.g., teacher standing close to the chalkboard vs. standing away from the chalkboard) the more likely it is to generalize (**generalization gradient**). Conversely, students can learn that a certain response may be reinforced in one situation (S+), but not in another (S-). For example, students may learn that they only are reinforced (R) when the teacher is out of her seat (S+) and not when she is sitting at her desk (S-). This is known as **stimulus discrimination**: [(S-) R ▸ (nothing)].

However, classical conditioning may be playing a role here. The teacher by the chalkboard, because of its association with a reward, may begin to elicit a conditioned response (a happy feeling). This "feeling" may help to remind children to behave in a certain way. It may help to make the antecedent a more powerful (or automatic) behavioral cue.

Stimulus	**Response**	**Stimulus**	**Response**
Antecedent	*Behavior*	*Consequence*	
Teacher by the chalkboard	Being quiet and attentive	Reward	Pleasure

NS	▸	UCS	▸	UCR
▾				▾
CS	▸		▸	CR
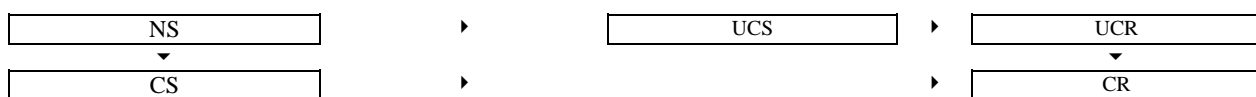
Behavioral Explanations of PTSD Symptoms

Manifestations of Acute Distress

Type of Reaction	Symptoms		
	Re-experience	*Avoidance and Numbing*	*Increased Arousal*
Somatic	• Reactivity to reminders (e.g., sweating, rapid heart beat, nausea, dizziness, dry mouth, difficulty breathing)	• Sensory numbing	• Abdominal distress • Hot flashes or chills • Frequent urination • Trouble swallowing
Behavioral	• Insomnia • Increased activity • Aggression • Act as if trauma were recurring	• Avoidance of trauma reminders (e.g., activities, locations, conversations, people, things) • Decrease interest in significant activities • social withdrawal	• Insomnia • Exaggerated startle
Cognitive	• Intrusive recall • Flashbacks • Trauma nightmares.	• Amnesia	• Poor concentration • Hypervigilance
Emotional	• Psychological distress with exposure to reminders (e.g., anxiety, anger, guilt, shame, hopelessness)	• Emotional numbing	• Irritability • Outburst of anger

Classical conditioning = Symptoms of Reexperiencing

NS	+	UCS	=	UCR
(e.g., a setting)		(a trauma)		(acute distress)

NS>CS			=	CR
(e.g., a setting)				(acute distress)

Operant conditioning = Symptoms of Escape and Avoidance

Voluntary Response	=	Reinforcing Stimuli
(Escape/Avoidance)	=	(Negative Reinforcement)

Classical conditioning = Symptoms of Arousal

NS	+	UCS	=	UCR
(e.g., a setting)		(a trauma)		(fight or flight)

NS>CS			=	CR
(e.g., a setting)				(acute distress)

Basic Concepts in Operant Conditioning

Concept	Definition
Free Operant Level	Natural level of behavior (or baseline).
Terminal Behavior	Desired frequency of a behavior at the end of a planned reinforcement.
Extinction	Reinforcing stimulus no longer follows a response and the response is less frequent.
Superstitious Behavior	"Guesses" as to how one can to obtain reinforcement.
Shaping	When the free operant level of a behavior is very low (or absent), reinforcement is offered for successive approximations of the target behavior

Types of Reinforcers
Reinforcers increase the frequency of a response

Primary	Satisfies basic needs.
Secondary	Becomes reinforcing via learned associations (classical conditioning) with primary reinforcers.
Positive	Presentation of something desired (e.g., tangibles, attention, control, internal good feeling without external contingency).
Negative	Termination of something that is undesired. Stopping an aversive stimuli (escape). Learning to stay away from an aversive stimuli (avoidance).

	Primary Automatic reinforcers	*Secondary* Learned reinforcers
Positive Obtaining desired stimuli	- Physical pleasure	- Money
Negative Escape/avoid undesired stimuli	- Physical pain	- School

Types of Punishers
Punishers decrease the frequency of a response

Punishment I	PI (or positive punishment) = presentation of an aversive.
Punishment II	PII (or negative punishment) = removal of a pleasant stimulus

Factors Affecting Reinforcement Effectiveness

Timing of reinforcement

Magnitude and appeal

Consistency

Three Types of Reinforcement Schedules

Schedule	Description
Ratio	***Reinforcement given after a specified number of responses.***
Fixed Ratio	Specifies a consistent number of responses before reinforcement is offered.
Variable Ratio	Specifies a changing number of responses before reinforcement is offered.
Interval	***Reinforcement given after the first response emitted after a certain time period has elapsed.***
Fixed Interval	Reinforcement given after the first response emitted after a fixed time period has elapsed.
Variable Interval	Reinforcement given after the first response emitted after changing time periods have elapsed.
Differential	***Reinforcement following a specified number of responses within a specified time period.***
DRH	<u>Frequent</u> responses within a specific time period required for reinforcement.
DRL	<u>Waiting before</u> responding, for a specific time period, required for reinforcement.
DRO	<u>Performing anything but the specified response</u> for a specific time period.

"Continuous reinforcement is clearly the most effective way of teaching a new response. Once the terminal behavior has been reached, however, … intermittent reinforcement schedules – ratio, interval, and differential – can be beneficial both in preventing extinction … and in controlling the frequency and pattern of that response" (Ormrod, p.56).

Eliminating Undesired Behaviors

Extinguishing Responses	Removal of the reinforcer.
Reinforcing Other Behaviors	Reinforcement for **not** displaying a behavior/response.
Reinforcing Incompatible Behaviors	Reinforcement for displaying a behavior that an incompatible behavior.

NOTE: When these prove ineffective a form of punishment will need to be considered.

Explaining the Failure of a Reinforcement System

- The "reinforcer" is not reinforcing

- Reinforcement is inconsistent

- The response is not worthwhile

- Shaping takes place too rapidly

Contingency Contracts

- An agreement between a student and a teacher that specifies certain expectations for the student (the terminal behavior) and the consequences of the student's meeting those expectations (the reinforcer).

- The contact should specify the desired behavior of the student and the consequence (reinforcer) that will be contingent on that behavior.

- Early contracts should require small tasks that a student can accomplish within a short period of time.

- A criterion for judging the quality of the desired behavior should be specified.

(Ormrod, 1999, pp. 80-81)

Understanding Children's' Behavior:
As Simple as ABC

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The behavior management technique known as *behavior analysis* provides a strategy for better understanding children's' behavior. Through this understanding it is hoped that parents and teachers can create environments where all children can experience success. The most important assumption of behavior analysis is that all behavior is learned. Children behave as they do because they have learned to do so. Further, children can learn either adaptive or maladaptive ways of behaving.

The second major assumption of behavior analysis is that the child's environment provides cues telling children how to behave. Theses cues are referred to as *antecedents*. Antecedents can be thought of as signposts telling a child what to do. They set children up to behave in a certain way. Anything in the child's environment, which occurs before a given behavior, is a potential antecedent.

> **A**ntecedents ▸ **B**ehavior
> antecedents cue behaviors
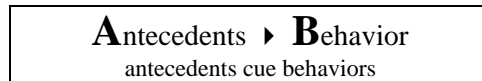
Examples of antecedents include school bells (which tell children to line up), the presence of a substitute teacher (which may tell children that it is time to goof off), a teacher giving direction (which may tell children to do school work), parents arguing (which may tell children to behave in a way that distracts their parents' fight), etc.

Another set of events, which behavior analysts call consequents, occur after the child exhibits a given behavior and serve to either increase or decrease the frequency of the behavior. An event such as a parent yelling at a child for misbehavior is an example of a consequent. If the parents yelling decrease the occurrence of the misbehavior the consequent would be considered a punisher. On the other hand, if the parental yelling increased the occurrence of the behavior (it gave the child wanted attention) the consequent would be considered a reinforcer.

> **A**ntecedents ▸ **B**ehavior ▸ **C**onsequents
> antecedents cue behaviors
> consequents are punishers or reinforcers
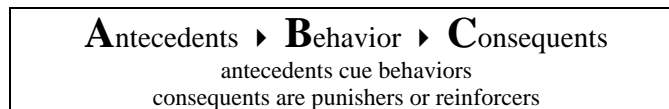
An example of the ABC approach to understanding behavior can be found in the scenario of a family where the parents constantly fight. This fighting is very disturbing the couple's child who does whatever it takes to stop parental arguments. As soon as an argument begins the child starts to misbehave. The child throws violent temper tantrums. This in turn angers the child's parents to the point that they stop their own fight to punish the child. In this scenario the parent's argument is an antecedent to the child's temper tantrum behaviors. The argument serves as a cue for the child to do something to stop the fight. The child's temper tantrum results in the parents stopping the argument to scold their child. Here the stopping of the parental fight and the parents scolding the child serve as the consequents. Because the child wants the parents to stop fighting this consequent acts as a reinforcer. It increases the likelihood that the child will throw a temper tantrum the next time his parents fight.

The last major assumption of behavior analysis is that a child's behavior can be changed by changing the environment. Any environment whether at home or at school, can be restructured to teach children new more adaptive behaviors. Desired behaviors occur in response to cues in the child's environment. The cues can be either auditory or visual, or might consist of models provided by others. Similarly, the desired behavior will be sustained when it is followed immediately by events that are reinforcing to the student, and when inappropriate behavior not reinforced and/or punished. For example, if the parents in the above scenario learn new ways to resolve their differences they not only remove a visual and auditory cue for their child's temper tantrums, but also provide the child with a model of how to appropriately gain someone attention. By ignoring temper tantrums when the do occur these same parents will show their child that they will not change their activities simply because he chooses to act out.

It is important to keep in mind that whenever we want to change a child's behavior we must first look closely at the environment in which the undesired behavior occurs. Behavior analysts argue that we can always find reasons for behavior in the environment an that by changing the environment we can change the behavior

BEHAVIOR ANALYSIS WORKSHEET
CONTINGENCY ANALYSIS CHART CHECKLIST*

ANTECEDENT	*BEHAVIOR*	*CONSEQUENCE*
3 **What environment cues the undesirable behavior?** What is the subject matter and activity? What is the teacher doing? What are the students doing? What time of day (period) is it? When during the lesson is the behavior most apt to occur? What is the social context? What is the student(s) current level of achievement in this area?	**1** **Excess Behavior** (undesirable behavior) Behaviorally define the undesirable behavior. This definition should allow all observers to agree when the excess behavior is occurring.	**2** **What is the result(s) of the behavior?** **What is the student's goal(s)** What are typical responses of the teacher to the behavior? What are typical responses of other students? What effect does the target behavior have upon the assigned task? Are any other events typically seen to follow this behavior? Behavior goals include the following: a) *Positive reinforcement:* control, attention, privileges (or things) b) *Negative reinforcement:* escape, avoidance.
5 **What environment cues the desirable behavior?** What is the subject matter and activity? What is the teacher doing? What are the students doing? What time of day (period) is it? When during the lesson is the behavior most apt to occur? What is the social context? What is the student(s) current level of achievement in this area?	**4** **Deficit Behavior** (desirable behavior) Select a behavior that will take the place of the undesirable or excess behavior. This behavior should be incompatible with the excess behavior. This behavior should provide for a more appropriate way for obtaining the goal(s) specified in step 2 Does the Deficit behavior exist? Yes or No If "Yes" go to step 5 If "No" go to step 7	**6** **What is the result(s) of the behavior?** What are typical responses of the teacher to the behavior? What are typical responses of other students? What effect does the target behavior have upon the assigned task? Are any other events typically seen to follow this behavior? Do the consequences of the behavior allow the student to obtain his or her goal (i.e., positive, negative, and/or self reinforcement)?
9 **Develop a plan for responding to the undesirable behavior** What is the goal of the student's behavior? What plan can be developed for ensuring that the goal of the student's behavior is not obtained. What rule can be explained to the student telling him or her the consequences of engaging in the behavior? What signal can be used to indicate that the rule has been broken, (a) as a warning, and (b) to inform the student that a consequence has been given. Is it appropriate to role play the steps of the plan?	**1** **Excess Behavior** (undesirable behavior) Behaviorally define the undesirable behavior. This definition should allow all observers to agree when the excess behavior is occurring.	**10** **Implement a plan for responding to the undesirable behavior.** When the undesired behavior occurs and the signal (or warning) is disregarded by the student, what is the student to do? What is done if the student disregards the final signal? Make sure that the consequence for the undesired behavior does not allow the goal of the student's behavior to be obtained!!!
7 **Develop a plan for facilitating the desirable behavior** What new skills or behaviors need to be taught? What subject matter and activity changes can be made? What social context changes can be made? What plans for reinforcing the desired behavior can be made and explained to the student? What steps can or should be role played?	**4** **Deficit Behavior** (desirable behavior) Select a behavior that will take the place of the undesirable or excess behavior. This behavior should be incompatible with the excess behavior. This behavior should provide for a more appropriate way for obtaining the goal(s) specified in step 2	**8** **Implement a plan for responding to the desirable behavior.** How will the child be allowed to obtain their goal(s) (i.e., attention, control, privileges, escape, avoidance) for the desirable behavior? What rewards will be given and how will they be delivered (on what schedule and for what criterion)? What arrangements are made for updating selection and scheduling of rewards?

Punishment Options

Time Out

Response Cost

Verbal Reprimand

Restitution and Overcorrect ion