

Lecture 8

Chapter 8: Doing the Right Thing at the Right time and Place – Stimulus Discrimination and Stimulus Generalization

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Summary

Learning to Respond at the right time and place: Any situation in which behavior occurs can be analyzed in terms of three sets of events (a) the stimuli that exist just prior to the occurrences of the behavior called antecedent stimuli, (b) the behavior itself and (c) the consequences of the behavior. When a behavior is reinforced in the presence of a particular stimulus but not others, that antecedent stimulus begins to exert control over the occurrence of that behavior. when a particular behavior is more likely to occur in the presence of a particular stimulus but not others, we say that the behavior is under the control of that stimulus. The term ‘stimulus control’ is used to refer to the degree of correlation between the occurrence of a particular stimulus and the occurrence of a subsequent response. ‘good or effective stimulus control’ refers to a strong correlation between the occurrence of a particular stimulus and a particular response; that is, when the stimulus occurs, the response is likely to follow. While some stimuli are consistent predictors that a particular behavior will be reinforced, other stimuli are consistent predictors that a particular behavior will not be reinforced. For e.g. an out of order sign at a vending machine is a cue that the behavior of inserting money into the machine will not be reinforced.

Type of controlling stimuli: A discriminative stimulus is a stimulus in the presence of which a response will be reinforced or it is a cue that a particular response will pay off. An S delta is a stimulus in the presence of which a response will not pay off. A discriminative stimulus might be called a stimulus for reinforcement, and an S delta might be called a stimulus for extinction. A stimulus can simultaneously be a discriminative stimulus or an S delta for one response as an S delta for another. In other words, in the presence of a particular stimulus, one response may be reinforced while another may not be reinforced.

Stimulus discrimination training: It refers to the procedure of reinforcing a response in the presence of a discriminatory stimulus and extinguishing that response in the presence of an S delta.

Stimulus generalization: It refers to the procedure of reinforcing a response in the presence of a stimulus or situation and the effect of the response becoming more probable in the presence of

another stimulus or situation. In other words, instead of discriminating between 2 stimuli and responding differentially to them, an individual responds in the same way to 2 different stimuli. Therefore it is the opposite of stimuli discrimination.

- Unlearned stimulus generalization due to considerable physical similarity: People and animals are likely to perform a behavior in a new situation if that situation is similar to the one in which they learned the behavior.
- Learned stimulus generalization involving minimal physical similarity: For e.g. if a child has learned to say “dog” to a large German Shepherd, he may not be able to say “dog” to a Chihuahua due to their limited physical similarities. Stimulus generalization is not likely to occur in the latter case until the child has learned the stimulus class dog. Another term for stimulus class is ‘concept’. Furthermore, a ‘common – element stimulus class’ is a set of stimuli, all of which have one or more physical characteristics in common. Behavior modifiers generally refer to such a set of stimuli as a stimulus class. When an individual emits an appropriate response to all members of a common- element stimulus class and does not emit that response to stimuli that do not belong to the class, we say that the individual generalizes to all members within a common – element stimulus class or concept such as recognizing red objects as red, and discriminating between common element stimulus classes such as between red objects and blue objects. This type of behavior is termed as ‘conceptual behavior’.
- Learned stimulus generalization due to stimulus equivalence classes: Example- if we are shown a no. of items such as a carrot, a calculator, a pea, a pencil and a carton of milk and we are asked to identify the food items. We would be able to do so showing conceptual behavior with respect to the concept of food, yet nothing about a carrot, a pea and a carton of milk is physically similar. We have learned that these items belong to a ‘stimulus equivalence class’, a set of completely dissimilar stimuli that an individual has learned to group or match together.

If a response that has been reinforced to one stimulus occurs to a different stimulus (due to unlearned generalization, the learning of a common-element stimulus class or the learning of a stimulus equivalent class), we say that ‘stimulus generalization’ has occurred.

Factors determining the effectiveness of stimulus discrimination training:

1. Choosing distinct signals: When considering a stimulus to be set up as a discriminative stimulus for the behavior of another person, the following questions need to be asked-
 - i) Is the stimulus different from other stimuli along more than one dimension? That is, is it different in location, size, color and sensory modality (vision, hearing, touch, etc.?)

- ii) Is the stimulus one that can be presented only or at least mainly on occasions when the desired response should occur to avoid confusion with the occurrence of the stimulus on other occasions?
 - iii) Is the stimulus of the type that the probability of the person attending to it when it is presented is high?
 - iv) Are there any undesirable responses that might be controlled by the chosen stimulus? (if some undesirable response follows the stimulus, it will interfere with the development of new stimulus control of the desired response.)
2. Minimizing the opportunities for error: During discrimination training, a response to an S delta or a failure to respond to a discriminatory stimuli is typically referred to as an error. For eg. a child learning to pick up a phone when it rings but not to when it is silent. The responses of picking up the phone if it is silent or failure to pick up the phone when it rings would be errors. Stimulus control can be developed most effectively when the behavior modifier minimizes the possibility of errors. (e.g. placing the phone out of reach of the child when it is not ringing and adding verbal prompts.)
 3. Maximizing the no. of trials: In general, it is well accepted that a no. of reinforced trials are necessary to develop consistent behaviors in persons with developmental disabilities and other individuals who are behaviorally deficient. This is often true for all of us when we are acquiring new discriminations. After a no. of instances of reinforcement for correct responding to the discriminatory stimuli and extinction for responses to the S delta, those discriminatory stimuli and S delta will likely control the response on subsequent trials.
 4. Using rules: Describe the contingencies – In general, a contingency is an if-then type of arrangement. For e.g. if you press the button on the water fountain, then a stream of water will appear. We say that the appearance of water is contingent upon the button-pressing response. According to Skinner, “ an adequate formulation of the interaction between an individual and his or her environment must always specify three things (1) the occasion upon which a response occurs (2) the response itself; and (3) the reinforcing consequences. The interrelationship among them are the ‘contingencies of reinforcement’”. Behavior that develops because of its immediate consequences is referred to as ‘contingency shaped behavior’. A ‘rule’ (from a behavioral perspective) describes a situation in which a behavior will lead to a consequence. Thus, a rule describes a three term contingency of reinforcement. ‘Rule governed behavior’ is behavior that is controlled by the statement of a rule. When we wish to develop good stimulus control over a particular behavior, we should always provide the individual with a rule or set of rules stating what behaviors in what situations will lead to what consequences.

Pitfalls of stimulus discrimination training: Any effective method can be misapplied inadvertently by the unwary, and stimulus discrimination training is no exception. For example, behavioral episodes of the following sort are common in many households with young children. Terri, a 3 year old is playing with the remote control for the TV set. Mother says quietly, "Terri please leave that alone." Terri continues to fiddle with the remote control. A few minutes later, mother yells a little louder and a little less politely, but she continues to fiddle with the remote. At last, mother says, this time loudly and with a threatening look and Terri obeys. The discrimination Terri is learning is that of waiting until Mother is really angry and threatening before attending to her requests.

Guidelines for effective stimulus discrimination training:

1. Choose direct signals: specify conditions under which the behavior should and should not occur.
 2. Select an appropriate reinforcer.
 3. Develop the discrimination: a) arrange for several reinforced responses in the presence of the discriminatory stimuli:
 - i) Specify clearly in a rule the discriminatory stimulus – desirable response – reinforcer sequence. Help identify the cues that indicate the behavior will be reinforced versus the cues that indicate that the behavior will not be reinforced, and use instructions when appropriate to teach the person to act in a particular way under one set of circumstances but not under another.
 - ii) Keep verbal cues constant initially.
 - iii) Post the rules in a conspicuous place, and review them regularly.
 - iv) Recognize that stimulus control over the behavior will not develop in the individual is not attending to the cues; therefore, use prompts to emphasize the cues.
 - v) To teach the individual to act at a specific time, present prompts for correct performance just before the action is to occur.
 - b) When the S delta is presented, make the change from the discriminatory stimulus very obvious and follow the rules for extinction for the behavior of concern. Stimuli that can acquire control over behavior include such things as location of training place; physical characteristics and location of furniture, equipment, and people in the training room; time of day of training; and sequence of events that precede and accompany training. A change in any of these may disrupt stimulus control.
4. Weaning the individual from the program:
 - a) If the behavior occurs at the right place at the right time at a desirable rate during a dozen or so of the opportunities for the behavior and if it is not occurring in the presence of the S delta situations, it might be possible to gradually eliminate contrived reinforcers and maintain the behavior with natural reinforcers.

- b) Look for other natural reinforcers in the environment that might maintain the behavior once it is occurring in the presence of the discriminatory stimuli and not in the presence of the S deltas.
- c) After the program is terminated, plan periodic assessments of the behavior to ensure that it is occasionally being reinforced and that the desired frequency of the behavior is being maintained in the presence of the discriminatory stimuli.