

# Stimulus Control

## An Antecedent Variable

This training program is based on the RBT Task List (2nd ed.) and is designed to meet the 40-hour training requirement for RBT certification. The program is offered independent of the BACB

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# References

- Cooper, J. O., Heron, T. E., & Heward, W. L. (2020). *Applied Behavior Analysis (3<sup>rd</sup> ed.)*. Hoboken, NJ: Pearson.
- Behavior Analyst Supervisor (BAS) RBT Study Guide → <https://behavioralistsupervisor.com/>
- RBT Task List (2nd Edition) → <https://www.bacb.com/rbt/>



## In This Presentation

**C-7→ Implement Discrimination Training**

**C-8→ Implement stimulus control transfer procedures procedures**

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## What is Stimulus Control

“A situation in which the frequency, latency, duration, or amplitude of a behavior is altered by the presence or absence of an antecedent stimulus,” (Cooper et al., 2020)

A specific set of conditions that evokes a particular response.

# Stimulus Control

- Stimulus control is acquired when
  - Responses are reinforced only in the presence of a specific stimulus
    - Known as the discriminative stimulus ( $S^D$ )
  - And not in the presence of other stimuli
    - Known as stimulus deltas ( $S^\Delta$ )

# Terms to Know

- **Discriminative Stimulus ( $S^D$ )**
  - *A discriminative stimulus is "a stimulus in the presence of which a particular response will be reinforced". (Malott, 2007, p. 202)*
- **Stimulus Delta ( $S^\Delta$ ) Definition**
  - The stimulus delta is defined as 'a stimulus in the presence of which a particular response will not be reinforced' (Malott, 2007, p. 202).

# Correct and Incorrect Stimuli



Point to "B"

B

A

H

J



Discriminative  
Stimulus

Stimulus  
Delta

Stimulus  
Delta

Stimulus  
Delta



$S^D$

$S^\Delta$

$S^\Delta$

$S^\Delta$

*The correct and incorrect answers related to the discriminative stimulus and stimulus delta.*

Imagine found on:  
<http://www.educateautism.com/applied-behaviour-analysis/discriminative-stimulus-and-stimulus-delta.html>

# Think about what we have learned so far...

- Reinforcement and extinction of behaviors are the fundamentals in creating **stimulus control**.
- When the **stimulus** is present, the desired behavior is reinforced.
- When the **stimulus** is absent, the behavior is ignored or put on extinction.

# Development of Stimulus Control

- Stimulus discrimination training
  - Requires one behavior
  - Two antecedent stimulus conditions (the  $S^D$  and the  $S^\Delta$ )
- Responses that occur in the presence of the  $S^D$  are reinforced (thus, the response increases in the presence of the  $S^D$ )
- Responses that occur in the presence of the  $S^\Delta$  are not reinforced (this, the response decreases in the presence of the  $S^\Delta$ )
  - Can also result in a lesser amount or quality of reinforcement

# The Development of Stimulus Control



**SD**

**VS**

**MO**


# Stimulus Control and Motivating Operations

- Similarities
  - Both events occur before the behavior of interest
  - Both events have evocative functions
- However, they are different!

# Motivating Operations

- Remember, a motivating operation is something that changes the value of a stimulus as a reinforcer
  - Establishing operation (EO) makes the reinforcer more valuable
  - Abolishing operation (AO) makes the reinforcer less valuable

- **Antecedent stimuli that evoke behavior:**
  - **Some are S<sup>D</sup>s, Some are MOs**
  - **How do we tell them apart?**
- **An S<sup>D</sup> evokes behavior because a reinforcing consequence is more available in its presence than in its absence.**
  - **There's always an S<sup>Δ</sup> as well**
- **An MO evokes behavior because the consequence is more reinforcing in its presence than in its absence**
  - **There is no S<sup>Δ</sup> - the behavior will produce the consequence regardless of the presence or absence of the MO.**

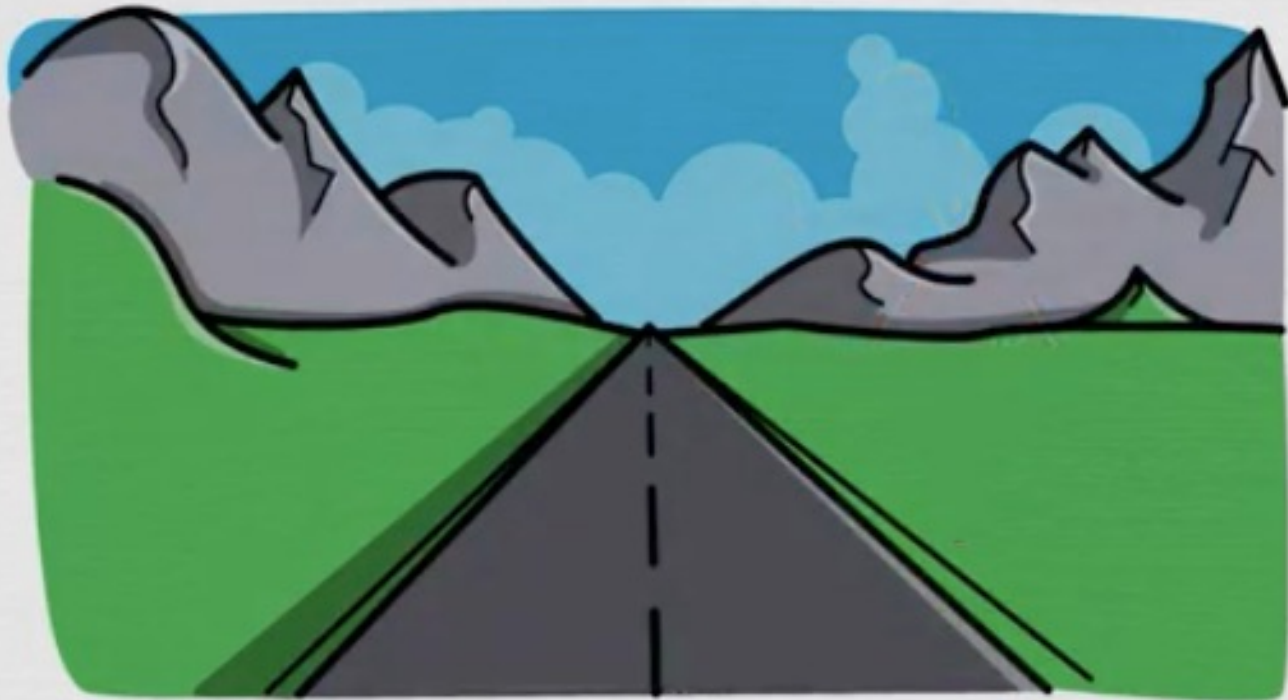


More to Come on  
Motivating  
Operations  
(MOs)



# WHAT IS STIMULUS CONTROL?

"THE EXTENT TO WHICH BEHAVIOR IS INFLUENCED BY DIFFERENT STIMULUS CONDITIONS"



ONCE WE HAVE RECOGNIZED THE SD

WE MAY ALSO BEHAVE IN A SPECIFIC WAY IN ITS ABSENCE

# Stimulus Control and Stimulus Generalization are a Continuum

Stimulus  
Control



Stimulus  
Generalization



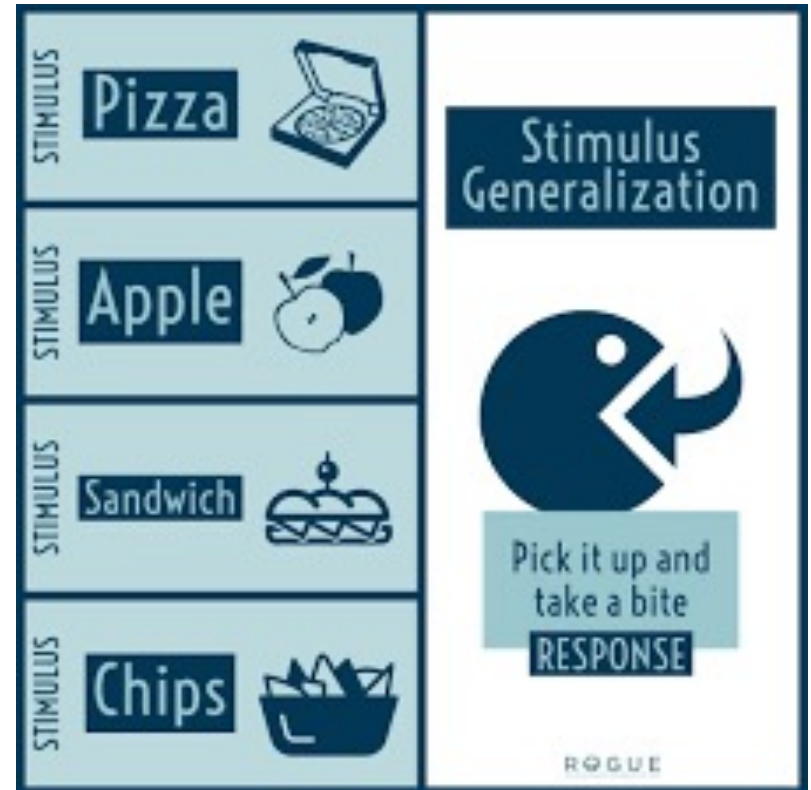
# Terms to Know

# Stimulus Generalization

- Responding to *antecedent stimuli* sharing certain aspects of the original SD; a broadening of the spectrum of stimuli that occasion certain responses.

- The individual responds to something in the same way that resembles the original thing from which they learned.

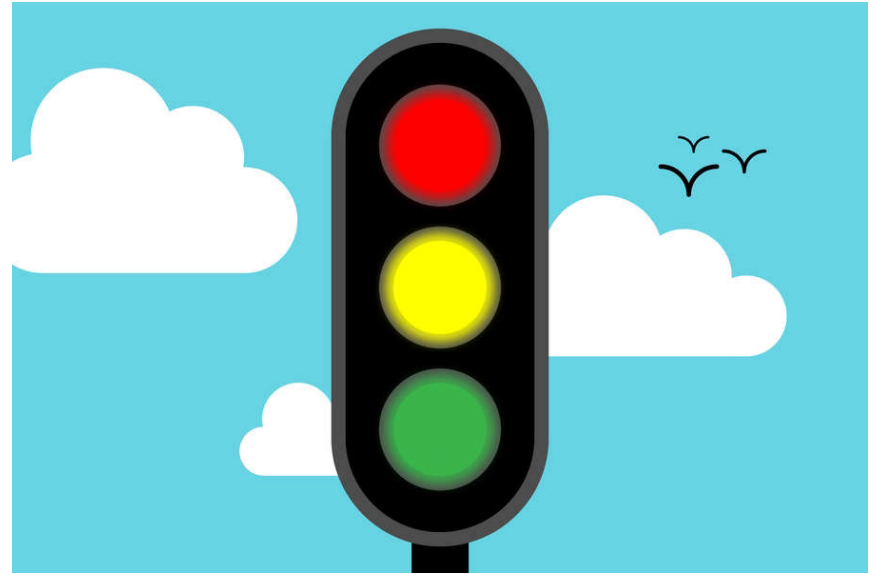
- Same behavior across different times, settings, people, etc.



(Imagine from Rouge ABA)

# Stimulus Discrimination

- Occurs when new stimuli that are similar to the controlling stimulus do not evoke the same response as the controlling stimulus



People learn to respond differently to red, green, and yellow lights; they learn to discriminate.



Implement stimulus control transfer  
procedures procedures (C8)

# Factors Affecting Stimulus Control

- Consistent use of reinforcers contingent upon correct responding in the presence of the  $S^D$  is critical
- Also important are:
  - Pre-attending skills
  - Stimulus salience
  - Masking and overshadowing

# Pre-attending

- A prerequisite skill for stimulus control
  - Looking at instructional materials
  - Looking at teacher when responses are modeled
  - Listening to oral instructions
  - Sitting quietly for short periods of time
- These may need to be taught before stimulus control procedures are implemented

# Stimulus Saliency

- Prominence of the stimulus in the environment
- Increased saliency facilitates efficiency of instruction

# Masking and Overshadowing

- Increase or decrease salience of stimuli
- Competing stimuli may block the evocative function of an  $S^D$
- To limit the negative effects of these:
  - Rearrange the environment
  - Make instructional stimuli more intense
  - Consistently reinforce behavior in the presence of instructionally-relevant stimuli

# Using Prompts

- Supplementary antecedent stimuli used to occasion a correct response in the presence of an  $S^D$  (that will eventually control behavior)
  - Response prompts operate directly on the response
  - Stimulus prompts operate directly on the antecedent task stimuli

# Transfer of Stimulus Control

- Prompts should be used only during acquisition
- Transfer stimulus control from prompt to naturally-existing stimuli quickly using fading

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## Transferring Stimulus Control: Examples

Someone shows you two fruits and asks you which one is a banana (**stimulus condition**)-you chose the banana (**correct response**)

The presentation of the fruit and the question controlled the response (**stimulus control**) because when you present these the correct answer is given

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## Transferring Stimulus Control Continued

Sometimes the response is controlled by something other than the stimulus we want.

Given our example, if you present the two fruit and Jimmy grabs one before you present the question simply because he loves that fruit, then his response is not under the correct stimulus control, even if he happened to grab the correct fruit.

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## Transferring Stimulus Control Continued

Given our situation with Jimmy (grabbing the fruit prior to asking the question), the therapist must **transfer stimulus control**.

Instead of grabbing his favorite fruit, Jimmy must wait for the question and chose the answer to that question.

Accomplished by using empirical strategies and tactics based in the principles of behavior analysis (Intervention Plan)

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## Transferring Stimulus Control: Example

A RLT might move the fruit out of Jimmy's reach and present a correction procedure (learn unit instruction).

You would continue with learn unit instruction until you presented the fruit, Jimmy waited, and finally responded correctly to the the question or questions presented

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## Transferring Stimulus Control Continued

Transferred control of response from the presentation of the fruit to BOTH the presentations of the fruit and the question by providing reinforcement only for correct responses.

The specific procedures to transfer stimulus control should be developed by your supervisor

# More Examples

A decorative white torn paper edge runs horizontally across the bottom of the slide, with irregular, jagged edges that give it a hand-torn appearance. The rest of the slide is solid black.

# Examples



Phone rings

Pick it up

Talk

Phone doesn't  
ring

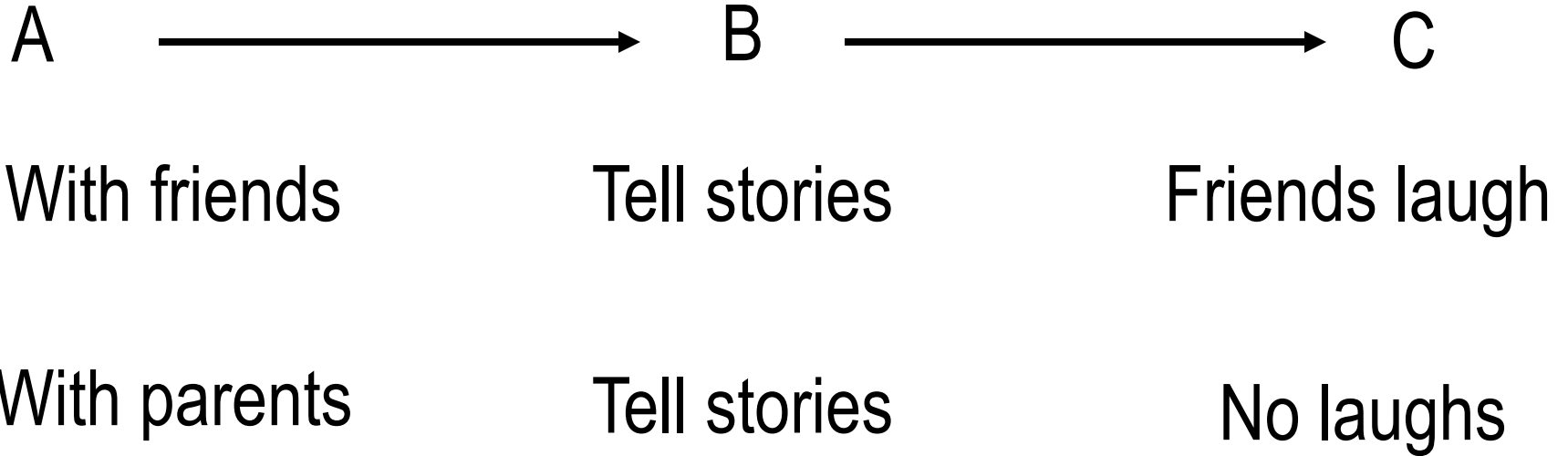
Pick it up

No one there

Outcome:

You are more likely to pick up the phone when it rings  
but not when it is not ringing

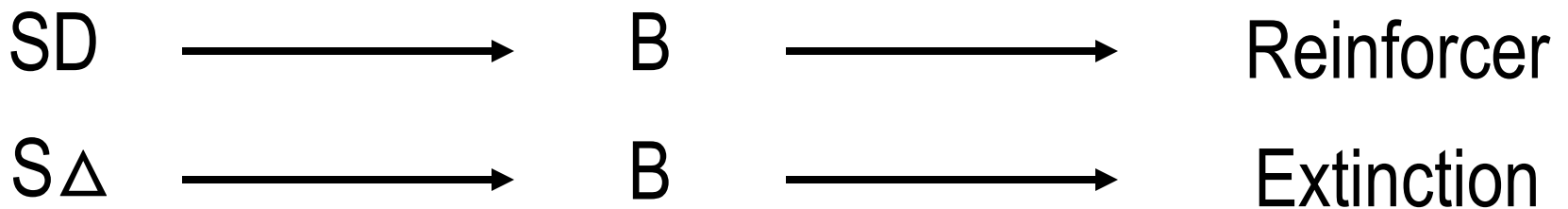
# Examples



Outcome:

You are more likely to tell stories to friends but not to parents

- $S^D$  = the antecedent stimulus that is present when the behavior is reinforced
- $S^\Delta$  = antecedent stimulus that is present when the response is not reinforced



Outcome:

In the future, the behavior is more likely to occur when the  $S^D$  is present

# Examples

- **You feed your dog each time she begs when you are at the dinner table.**
- **You never feed her when she begs and you are not at the dinner table.**
- **Now she only begs when you are at the table.**



# Examples



- **When Billy falls at soccer practice and Mom is there, he cries and Mom responds with attention.**
- **When Dad is there, he tells Billy to get back on the field.**
- **Now, Billy cries when he falls only when Mom is at soccer practice.**

# Be Careful In Session!

- **A technician may unintentionally present stimuli in a way that promotes FAULTY STIMULUS CONTROL:**
  - **Placing the correct answer for a point-to Learn Unit in a particular position disproportionately may result in a side bias.**
- **Avoid *opposite actions* in target sets as one behavior may evoke a related behavior, rather than your vocal instruction:**
  - **One Steps: “*Stand up,*” then “*sit down*”**
  - **Running targets in the same order each time, regardless of program**

# **Be Careful In Session!**

- **Don't have certain stimuli present only when running related Learn Units:**
  - **When running “place the ball into the cup,” if the student only sees the ball and cup used in that task when you are preparing to run that Learn Unit, the student is likely to be responding to the presence of the visual stimulus and not to your vocal instruction.**

# Summary

- **A response that is evoked or suppressed by an  $S^D$  is said to be under stimulus control**
- **Stimulus Control is acquired when:**
  - **Responses are reinforced only in the presence of a specific stimulus (discriminative stimulus-  $S^D$ )**
  - **Not in the presence of other stimuli (Stimulus delta-  $S^\Delta$ )**