

# Teaching Multiply Controlled Intraverbal Behavior

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Rethink Webinar  
November 19, 2020

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## Jack Michael

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**WHAT'S NEW?**  
New PowerPoint presentation given at the annual Mid-American Association for Behavior Analysis (MABA) conference.  
October 26, 2006

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### Skinner (1957) – Intraverbal

What's an animal?      Bear



**Definition:**

- Verbal response evoked by a verbal stimulus and reinforced by generalized social conditioned reinforcement
- No point-to-point correspondence between the antecedent stimulus and response product

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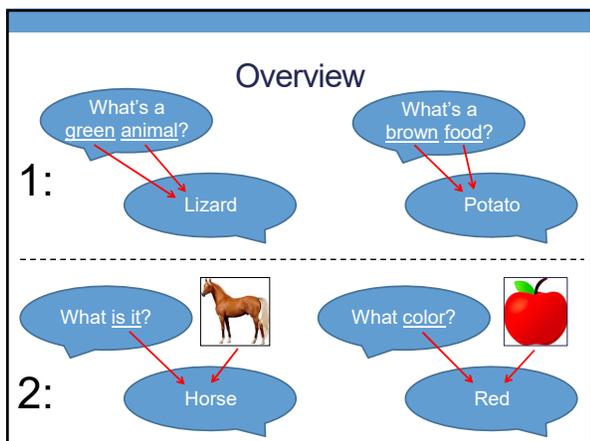
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**Table 6-1**  
Twenty-four learning and language acquisition barriers.

- Negative behaviors
- Instructional control (escape and avoidance behaviors)
- Absent, weak, or defective mand
- Absent, weak, or defective tact
- Absent, weak, or defective motor imitation
- Absent, weak, or defective echoic
- Absent, weak, or defective matching-to-sample
- Absent, weak, or defective listener repertoires
- Absent, weak, or defective intraverbal
- Absent, weak, or defective social behavior
- Prompt dependent
- Scarfing responses
- Defective scanning skills
- Failure to make conditional discriminations (C%)
- Failure to generalize
- Weak or atypical motivators
- Response requirement weakens motivation
- Reinforcement dependent
- Self-stimulation
- Articulation problems
- Obsessive-compulsive behavior
- Hyperactivity
- Failure to make eye contact, or attend to people
- Sensory defensiveness

**Topic 1:**

# Barriers Assessment

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The Analysis of Verbal Behavior 2008, 24, 159–174

**Conditional Discrimination in the Intraverbal Relation:  
A Review and Recommendations for Future Research**

**Judah B. Axe, The Ohio State University**

Conditional discrimination is inherent in the intraverbal relation when one verbal stimulus alters the evocative effect of another verbal stimulus and they collectively evoke an intraverbal response. Rarely in research on conditional discriminations have both conditional and discriminative stimuli been vocal verbal and rarely have the responses been topography-based. Making conditional discriminations in intraverbal behavior is a repertoire that is often delayed in children with autism and other developmental disabilities. Reviewed in this paper is research on teaching intraverbal behavior, auditory conditional discriminations, and restricted stimulus control. The purpose of these reviews is to identify the extent to which previous researchers examined conditional discriminations in the intraverbal relation and to recommend directions for research in this area.

*Key words:* intraverbal, conditional discrimination, verbal behavior, autism, developmental disabilities

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Conditional Discrimination (Catania, 1998)

Behavior comes under the control of one stimulus only when in the presence of another stimulus

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Conditional Discrimination (MTS)  
Visual-Visual (non-arbitrary)

Comparison 1

Comparison 2

Sample

Select

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Conditional Discrimination (MTS)  
Auditory-Visual (arbitrary)

“Shoe”

Select

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### Conditional Discrimination Auditory-Auditory

Simple intraverbal

- "Hello" → "Hi"
- "What's up?" → "Nothing"

What time is lunch?

S<sup>C</sup>      S<sup>D</sup>

→ "Sandwich"      Simple IV

→ "Six o'clock"      Simple IV

→ "Noon"      Conditional Discrimination

Conditional discrimination in intraverbal: one verbal stimulus alters the evocative effect of another verbal stimulus and they collectively evoke an intraverbal response (Sundberg, 2006)

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<u>Simple Intraverbals</u>	<u>Conditional Discriminations</u>
What do you eat?	What do you eat that's red?
What do you drink?	What do you drink that's red?
What is red?	What do you eat that's yellow?
What is yellow?	What do you drink that's yellow?

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11

The Analysis of Verbal Behavior      2011, 27, 3-22

**The Multiple Control of Verbal Behavior**

Jack Michael, Western Michigan University  
David C. Palmer, Smith College  
Mark L. Sundberg, Sundberg and Associates

Divergent control

Convergent control

Figure 1. Divergent and convergent control in the intraverbal relation.

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12

<u>Simple Verbal Stimuli</u>	<u>Conditional Discriminations</u>
What do you do at recess?	What do you like to do at recess?
What do you like to do on the weekends?	Who do you play with at recess?
What are your favorite games?	What is your favorite game?
What are your favorite TV shows?	What is your least favorite game?

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13

Conditional Discriminations

What do you write with?	What is a brown animal?
What do you eat with?	What is a green animal?
What do you write on?	What is a brown food?
What do you eat on?	What is a green food?
What do you eat that's red?	What is a red food?
What do you play with that's red?	What is a red drink?
What do you eat that's round?	What is a yellow drink?
What do you throw that's round?	

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**Overselectivity and Restricted Stimulus Control**

Failure to respond to multiple stimuli in a stimulus complex (Dube et al., 2010, 2016)

Treatment: within-stimulus prompting (Striefel et al., 1978)

- Emphasis

Requiring differential observing response (DOR)

- Tacting then selecting stimuli (Koegel et al., 1981)
- Identity matching prior to delayed matching-to-sample (Dube & McIlvane, 1999)

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JOURNAL OF APPLIED BEHAVIOR ANALYSIS 2016, 49, 826-847 NUMBER 4 (WINTER)

*TEACHING MULTIPLY CONTROLLED INTRAVERBALS TO CHILDREN AND ADOLESCENTS WITH AUTISM SPECTRUM DISORDERS*

APRIL N. KISAMORE AND AMANDA M. KARSTEN  
WESTERN NEW ENGLAND UNIVERSITY

AND

CHARLOTTE C. MANN  
WESTERN NEW ENGLAND UNIVERSITY AND NEW ENGLAND CENTER FOR CHILDREN

Reciprocal conversations, instructional activities, and other social interactions are replete with multiply controlled intraverbals, examples of which have been conceptualized in terms of conditional discriminations. Although the acquisition of conditional discriminations has been examined extensively in the behavior-analytic literature, little research has evaluated procedures to establish multiply controlled intraverbals. Thus, the purpose of this investigation was to evaluate the effects of procedures based on conditional discrimination training on the acquisition of multiply controlled intraverbals with 7 participants who had been diagnosed with autism spectrum disorders. We evaluated the effects of prompt delay with error correction, a differential observing response (DOR), and a DOR plus blocked trials on the acquisition of intraverbals using a multiple baseline design. Accuracy of intraverbal performance increased for at least 1 set of stimuli for all participants under prompt delay with error correction conditions; however, 4 participants required additional teaching (i.e., DOR, modified DOR, modified prompt delay with error correction). Based on these findings, when prompt delay with error correction is not sufficient to establish multiply controlled intraverbals, prompted DORs may be an effective alternative.

*Key words:* autism spectrum disorders, conditional discriminations, differential observing response, multiply controlled intraverbals

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**Kisamore et al. (2016)**

7 children with ASD (ages 4-18)

**Problem:**

- What's an animal that's red? → parrot
- What's a vehicle that's red? → parrot

**More Questions**

What's a fruit that's green (kiwi, melon)  
 What's a vegetable that's green (cucumber, broccoli)  
 What's a fruit that's orange (peach, mango)  
 What's a vegetable that's orange (sweet potato)

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17

**Kisamore et al. (2016): Conditions**

**Intraverbal pretest:** each question (4) asked 5 times

**Prompt delay + error correction**

- If correct: praise + edible/token
- If incorrect: repeated question + echoic prompt → praise

**Differential Observing Response (DOR)**

- "What's an animal that's red?" + Say "animal red"
- Participant echoed "animal red"
- "What's an animal that's red?" (same consequences)

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18

**Kisamore et al. (2016): Conditions**

**Modified DOR Condition (Craig and Jeb)**

- "What's a fruit" + point → "fruit"
- "That's green" + point → "green"
- "What are you supposed to say?" → "fruit green, kiwi"

**Progressive prompt delay (Jeb)**

- Start with 0 sec delay (errorless) → 4, 5 sec delay

**Modified prompt delay with error correction (Jeb)**

- Included partial vocal prompt ("co" to prompt "coffee")

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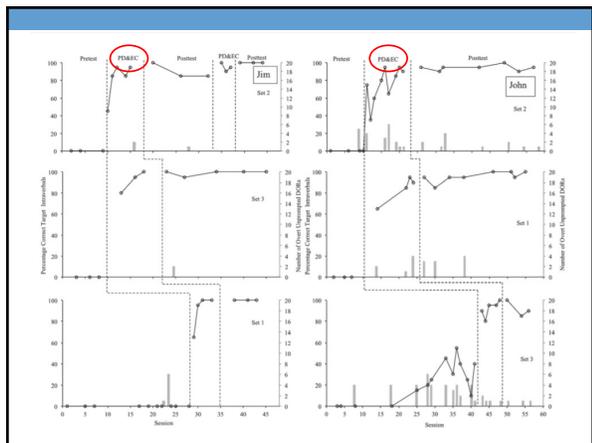
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**Overall Results**

- All Ps mastered at least 1 set with PD&EC
- Jim, John, and Paul mastered all sets with PD&EC
- Jeb, Craig, Ryan, and Dan needed extra procedures for some sets

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**Results/Discussion**

Ryan and Craig: showed restricted stimulus control

- "What's a fruit that's green" → "cucumber"
- "What's a vegetable that's orange" → "peach"
- DOR – repeating "fruit green" – facilitated correct responding

Dan: many no responses

- DOR increased correct responding – enhanced stimulus control

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**Results/Discussion**

Jeb: many completely incorrect responses

- Modified prompt delay – with partial vocal prompt – increased correct responses

With four participants who were taught DOR, more echoing relevant parts of question

- Problem solving strategy
- Jim and Paul moved their lips – covert echoing (DOR)

Study showed importance of using behavior analytic strategies and individualized procedures and error analyses

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**Conclusions of Topic 1**

- We should move beyond simple intraverbals
- Program intraverbals that require conditional discrimination
- Use a differential observing response (DOR) to ensure attending to each critical antecedent verbal stimulus
  - Overcome restricted stimulus control

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27

## Topic 2: The Effects of Incorporating Echoic Responding into Intraverbal-Tact Training

**Olga Meleshkevich**, Simmons University,  
ABA Consulting, Inc.

**Judah B. Axe**, Simmons University

**Francesca degli Espinosa**, ABA Clinic, U.K.,  
University of Salerno, Italy

(published online, *JABA*)

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28

## Acknowledgements

Taylor Murphy

Melanie McCarthy-Pepin

Jason Pepin



Bridgewater, MA  
New Bedford, MA

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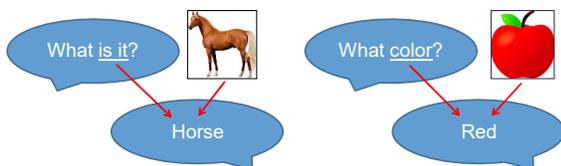
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## Topic 2



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Question	Answer
What is it?	Cat
What does it say?	Cat
What color is it?	Cat

Attending more to the picture than to the questions

- More nonverbal stimulus control
- Less verbal stimulus control
- Delay in "question discrimination"

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31

**Teaching Generalised Multiply  
Controlled Verbal Behaviour  
to Children with Autism**

**Francesca degli Espinosa**  
 Ph.D., BCBA-D, CPsychol

National Autism Conference, Penn State, 6<sup>th</sup> August 2014

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32



What is it?

Horse



What color?

Red

Prompt  
Fade  
SR+



What is it?

It's a horse



What color?

Color red

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Shape Number	Circle	Triangle	Square	Oval	Star	Diamond
1	Train		g			PA
2	g	Train			PA	
3		g	Train	PA		
4	PA			G		
5		PA			G	
6			PA			G

**Category 1**  
Shape/Number

“What shape?”  
“What number?”

PA: pre-assessment stimuli  
 Train: training stimuli  
 g: generalization stimuli with components trained  
 G: generalization stimuli without components trained

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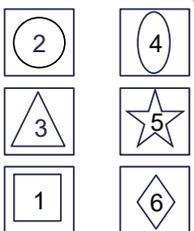
**Training**



**Generalization**

g

G



**Category 1**  
Shape/Number

“What shape?”  
“What number?”

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**Training**



**Generalization**

g

G



**Category 2**  
Object/Color

“What is it?”  
“What color?”

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39

Trial	Question	Visual Stimulus	Response
1	What shape?	1 – Circle	+ - +p -p NR
2	What number?	2 – Triangle	+ - +p -p NR
3	What shape?	3 – Square	+ - +p -p NR
4	What shape?	2 – Triangle	+ - +p -p NR
5	What number?	3 – Square	+ - +p -p NR
6	What number?	1 – Circle	+ - +p -p NR
7	What shape?	3 – Square	+ - +p -p NR
8	What shape?	1 – Circle	+ - +p -p NR
9	What number?	2 – Triangle	+ - +p -p NR
10	What number?	1 – Circle	+ - +p -p NR
11	What shape?	2 – Triangle	+ - +p -p NR
12	What number?	3 – Square	+ - +p -p NR

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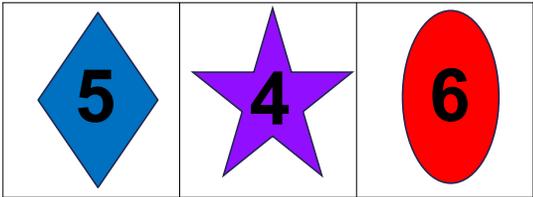
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**Cross-category stimuli:**  
Shape/Number/Color

“What shape?”  
“What number?”  
“What color?”




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**Cross-category stimuli:**  
Shape/Color

“What shape?”  
“What color?”




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**Cross-category stimuli:**      “What number?”  
 Number/Color                      “What color?”

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**Dependent Variable**

Percentage correct of answering questions (with or without the key word in the question)

Question/ Stimulus	Correct responses during probes
“What color?”	“Yellow” “Color yellow”

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**Training with Echoic**

**Category 1: Shape/Number**

“What number?” → “Number one”

“What shape?” → “Shape circle”

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**Category 2: Object/Object Color**

“What is it?” → “It is a cat”

“What color?” → “Color yellow”

Progressive time delay (0, 1, 2, 3, 4, 5 sec), praise

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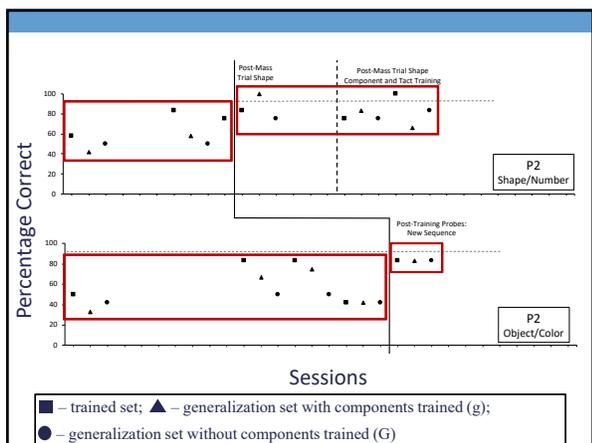
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Question/ Stimulus	Responses during probes	
"What color?" 	"Yellow"	<ul style="list-style-type: none"> <li>Correct question discrimination</li> <li>Correct tact</li> </ul>
	"Color yellow"	<ul style="list-style-type: none"> <li>Correct frame or no frame</li> </ul>
	"Green"	<ul style="list-style-type: none"> <li>Correct question discrimination</li> <li><b>Incorrect tact</b></li> </ul>
	"Color green"	<ul style="list-style-type: none"> <li>Correct frame or no frame</li> </ul>

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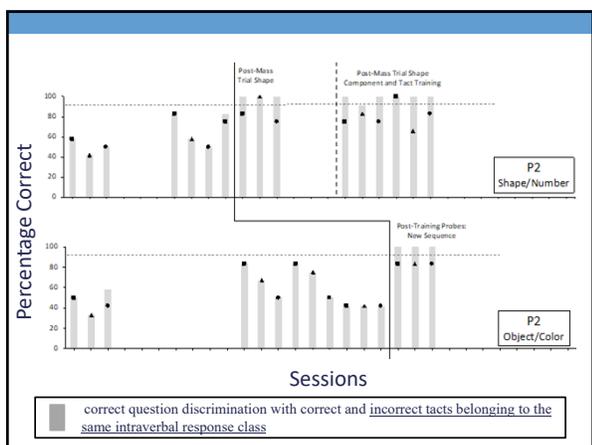
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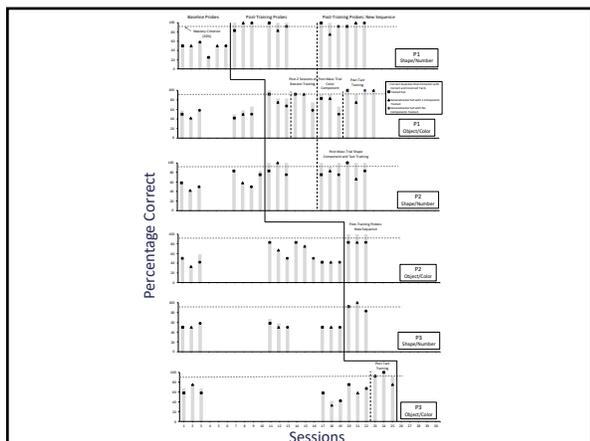
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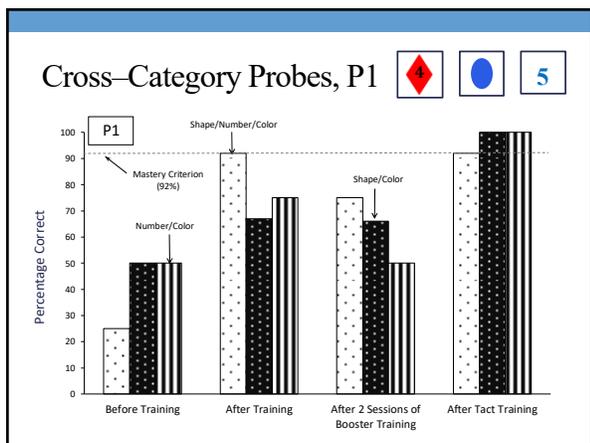
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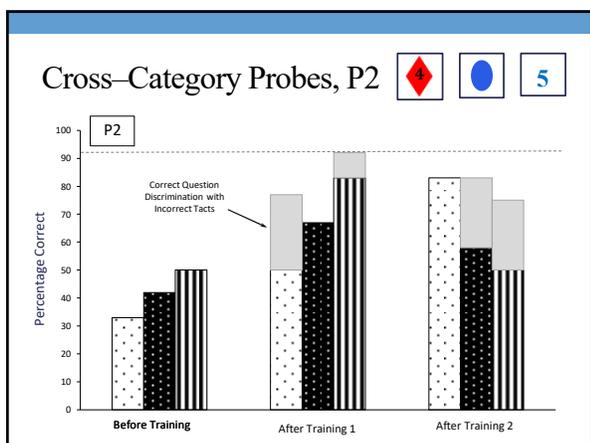
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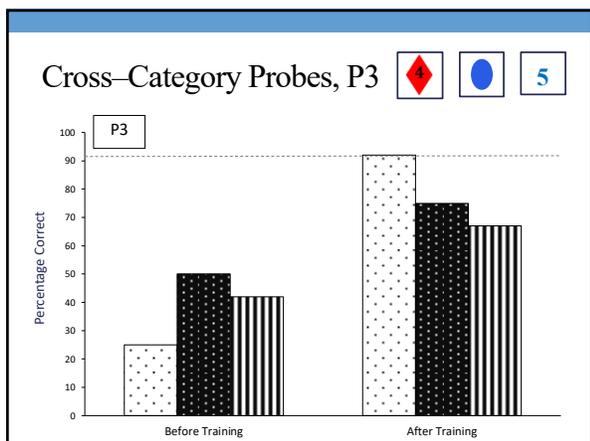
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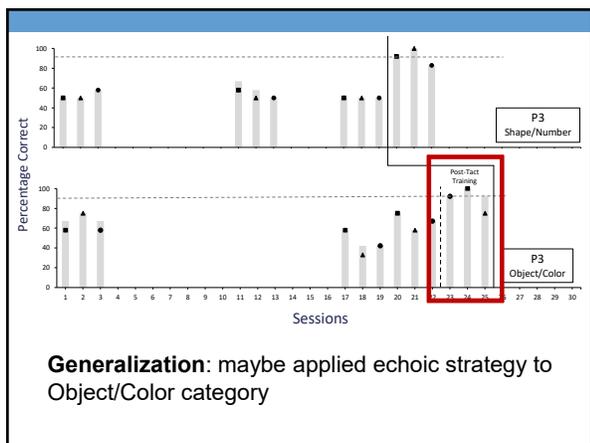
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### Discussion

Increased intraverbal-tacts

- Progressive time delay
- Requiring an echoic response

Question: is requiring the echoic response necessary?

- Future research: comparative study

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### Discussion

Object/Color required twice as many training sessions to mastery compared to Shape/Number

- Overselectivity produced by history of tacting items
- Recommendation: start question discrimination sooner

Clear pronunciation is required for echoic

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### How Does It Work?

Category 1: Shape/Number

“What number?” → “Number one”

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- **Echoic:** attending to the key word (DOR)
- **Intraverbal:** “number” evoked a number (e.g., 1)
- **Autoclitic frame:** when I say “number,” I fill in the frame with a number, IV control within frame
- **Joint Control:** when visual stimulus matches the product of my echoic, I emit name of visual stimulus

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56

### Ideas for Practice

1. Train 2 questions about 3 pictures  
 “What is it?”  
 “What does it say?”
 




2. Train 2 other questions and 3 other pictures  
 “What color?”  
 “What does it have?”
 




3. Probe, combine 4 questions

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57

## Conclusions

Thank you!  
judah.axe@simmons.edu

- Study multiple control
- Arrange for multiple control
  - Multiply controlled intraverbals
  - Intraverbal-Tacts
- DOR: attend to antecedent verbal stimuli
- Require echoic: facilitate multiply controlled VB



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