



CALIFORNIA STATE UNIVERSITY SACRAMENTO

Bidirectional Naming,
Problem Solving, and
Derived Stimulus
Relations

Caio F. Miguel







Conceptual Foundations of Radical Behaviorism

PART I: FOUNDATIONS OF RADICAL BEHAVIORISM
PART II: REALIZATION OF THE RADICAL
BEHAVIORIST PROGRAM
PART III: COMPARISON AND CONTRAST
WITH ALTERNATIVE VIEWPOINTS
PART IV: CONCLUSION

Jay Moore

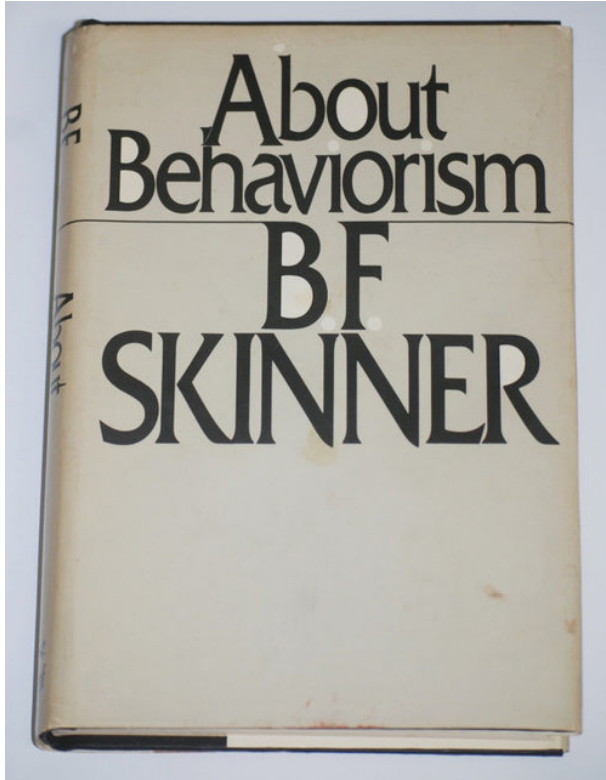
The Cambridge Center-Sloan Century Series
in Behavior Analysis

- “...the general tendency has been to give existence to the mediating terms, in the sense of hypothetical constructs” (Moore, 2010, p.45)

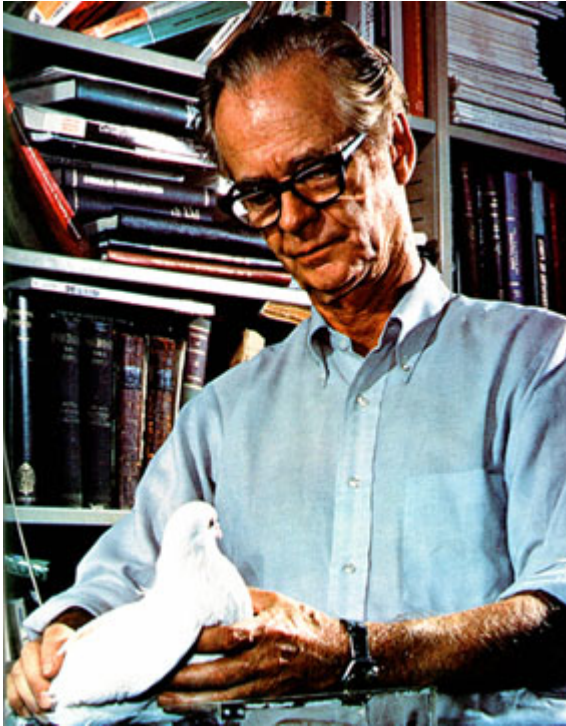


“...mentalism has obscured the environmental antecedents which would have led to a much more effective analysis” (Skinner, 1974; p.165)

“The objection of the inner workings of the mind is not that they are not open to inspection but they have stood in the way of the inspection of more important things” (p.165)



“A science of behavior must consider the place of private stimuli as physical things, and in doing so it provides an alternative account of mental life”
(Skinner, 1974; p. 211)

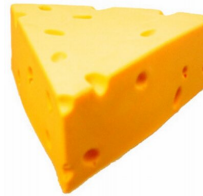


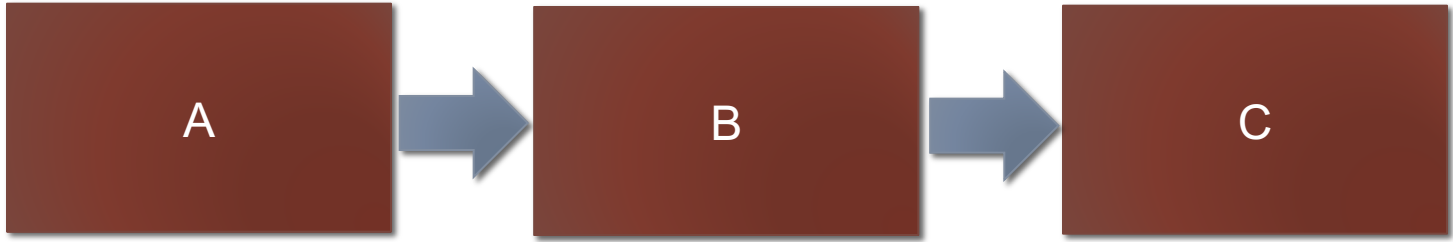
“The distinction between public and private is by no means the same as that between physical and mental.” (Skinner, 1945, 383-384)

“Solving problems is... a matter of taking steps to make that response more probable...” (Skinner, 1974; p.111)

$$298 \times 12 = ?$$

$$298 \times 12 = 3576$$





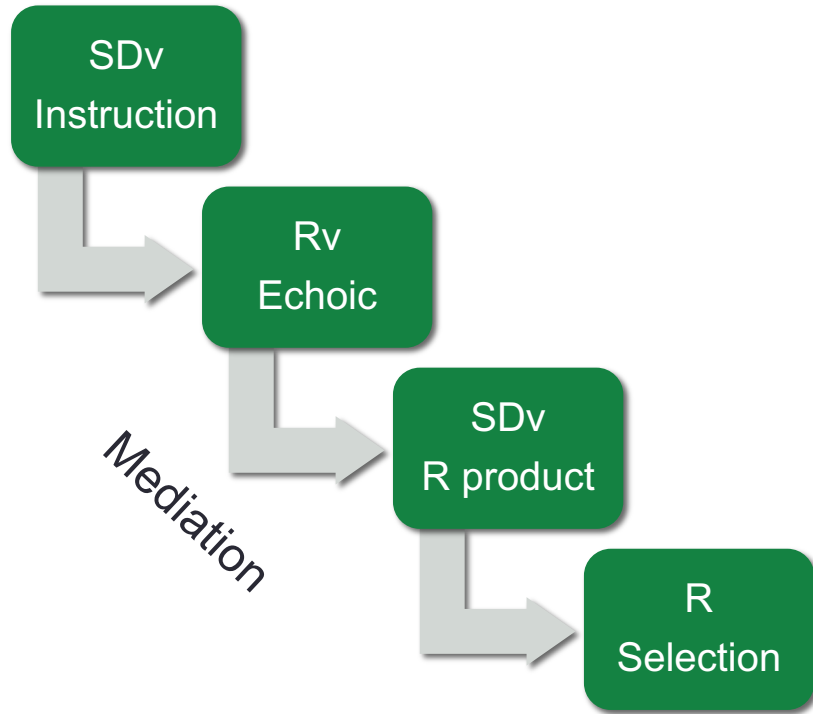


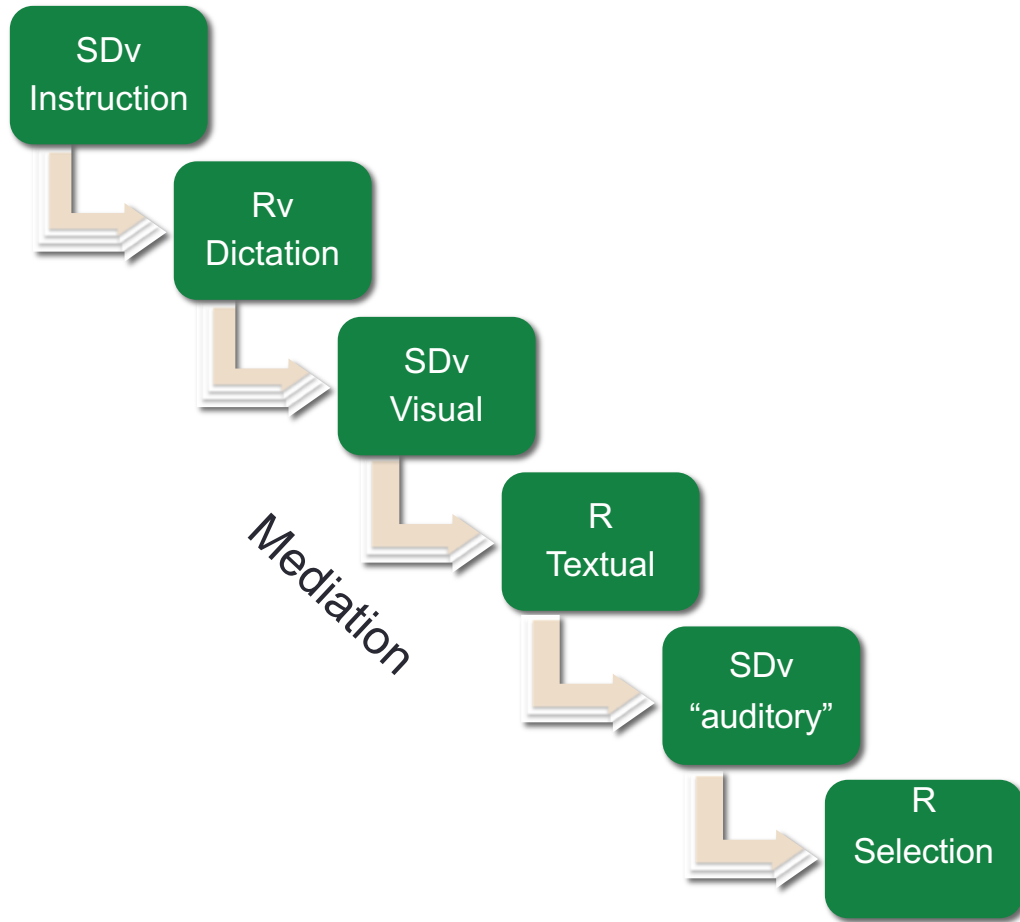
Instruction
(Sd)



Self-
Rehearsal
(echoic)







Teaching children to engage in sequences of steps
(verbal mediation) as a problem-solving strategy
facilitated accurate and sufficient responses
(Kisamore, et al 2011; Sautter, et al 2011)



ON THE ORIGINS OF NAMING AND OTHER SYMBOLIC BEHAVIOR

PAULINE J. HORNE AND C. FERGUS LOWE

UNIVERSITY OF WALES

We identify *naming* as the basic unit of verbal behavior, describe the conditions under which it is learned, and outline its crucial role in the development of stimulus classes and, hence, of symbolic behavior. Drawing upon B. F. Skinner's functional analysis and the theoretical work of G. H. Mead and L. S. Vygotsky, we chart how a child, through learning listener behavior and then echoic responding, learns bidirectional relations between classes of objects or events and his or her own speaker-listener behavior, thus acquiring naming—a higher order behavioral relation. Once established, the bidirectionality incorporated in naming extends across behavior classes such as those identified by Skinner as the *mand*, *tact*, and *intraverbal* so that each becomes a variant of the name relation. We indicate how our account informs the specification of rule-governed behavior and provides the basis for an experimental analysis of symbolic behavior. Furthermore, because naming is both evoked by, and itself evokes, *classes* of events it brings about new or *emergent* behavior such as that reported in studies of stimulus equivalence. This account is supported by data from a wide range of match-to-sample studies that also provide evidence that stimulus equivalence in humans is not a unitary phenomenon but the outcome of a number of different types of naming behavior.

Key words: naming, verbal behavior, language, symbolic behavior, stimulus equivalence, listener behavior, rule governance, speech for self, consciousness, match to sample, children



(Vouloumanis & Verker, 2007)



(Floor & Akhtar, 2006)





(Dube, MacDonald, Mansfield, Holcomb, & Ahearn, 2004)



(Baer, Peterson, & Sherman, 1967)







(Horne & Lowe, 1996; p. 196)

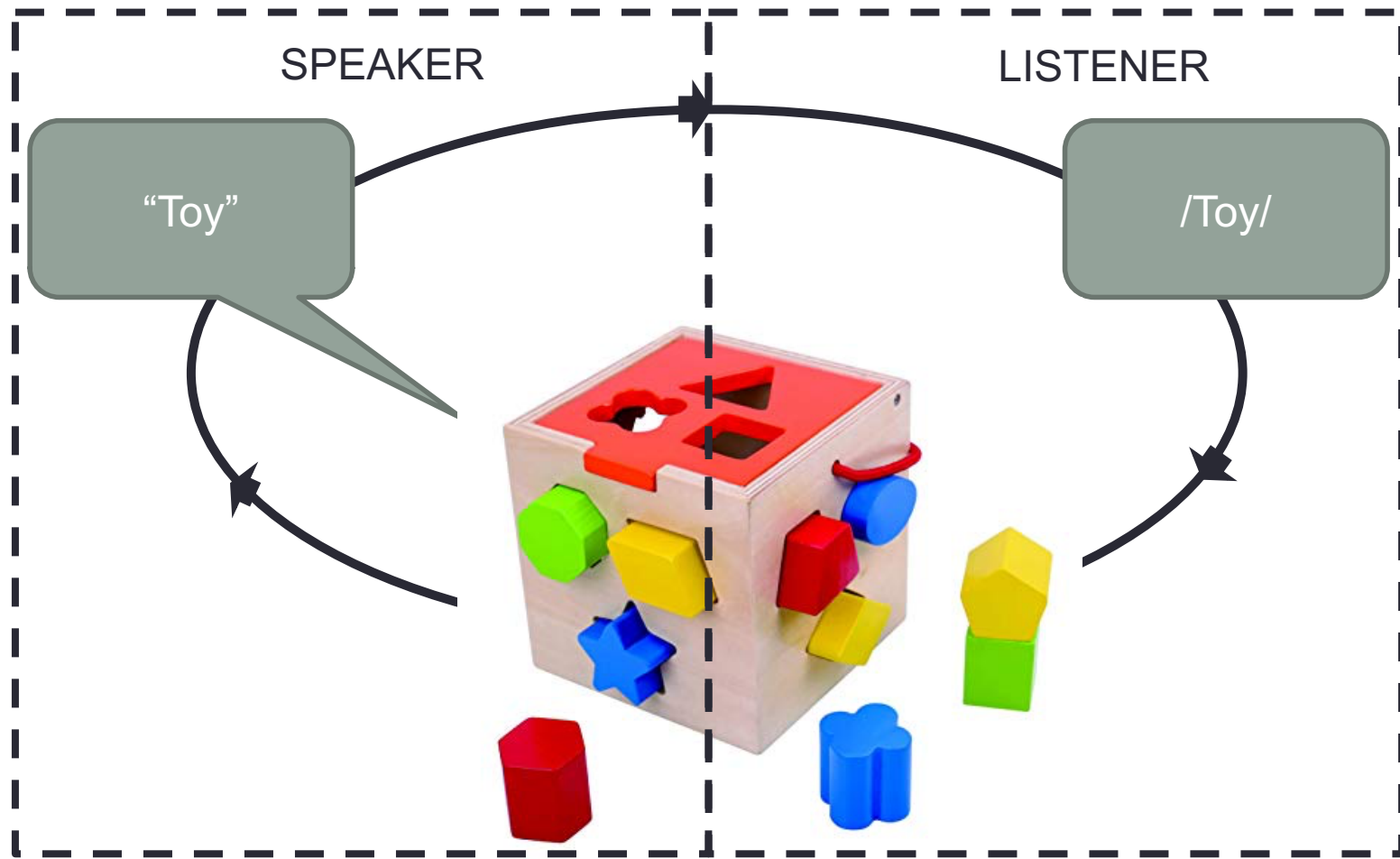





(Tamis-LeMonda, Bormstein, & Baumwell, 2001)



“toy”



(Horne & Lowe, 1996; Miguel, 2016)

A man with dark hair and a beard, wearing a white long-sleeved shirt, is leaning over a baby. The baby is wearing a blue and white striped shirt and is looking at a small white and black toy robot that the man is holding. The man is pointing towards the robot with his right hand. In the background, there are white vertical bars, possibly from a crib. There are also some colorful toys on the floor, including a red and yellow block and a red and blue ring toy.

“Look at the
robot”

“What is
this?”

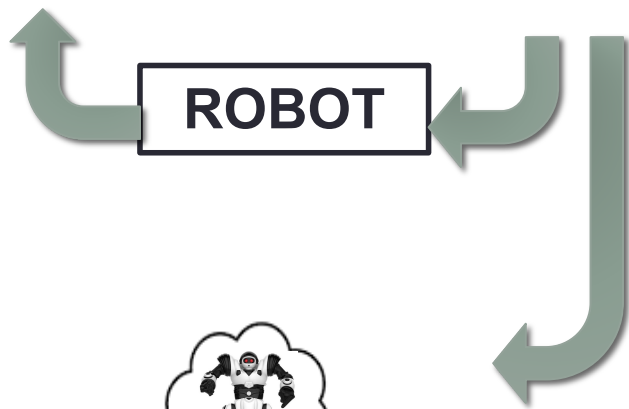


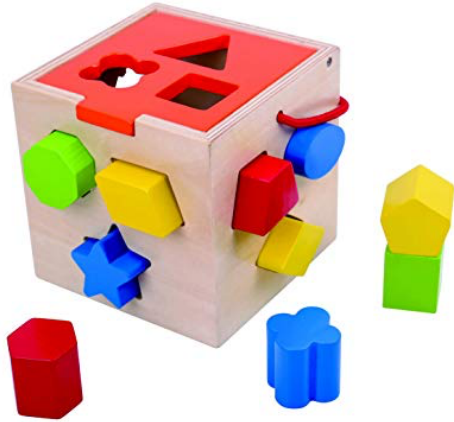
“Robot”

“Where is
the robot?”



“Robot” /Robot/





“Toy”

Naming = *Frame of coordination* between words and objects

RELATIONAL
FRAME THE
A Post-Skinnerian
of Human Language
and Cognition

Edited by
Steven C. Hayes
Dermot Barnes-Holmes
and
Bryan Roche

Derived
Relational
Responding

Applications for Learners with
and Other Developmental Disabilities

PRACTICAL
APPLICATIONS
OF THE MOST
CURRENT
RESEARCH

A
Progressive
Guide to
Change

- Three sections of skill-based strategies to help individuals with developmental disabilities
- Establish prerequisite skills
- Acquire early relational operations
- Speak with meaning & listen with comprehension
- Read with comprehension
- Use appropriate syntax
- Develop reasoning, problem-solving, and social skills
- Be more empathetic, observant, and socially competent

EDITED BY RUTH ANNE REHFELDT,
& YVONNE BARNES-HOLMES
FOREWORD BY STEVEN C. HAYES, PH.D.

CHAPTER 7

Naming and Frames of Coordination

Caio F. Miguel, California State University, Sacramento;
and Anna I. Petursdottir, Texas Christian University

Analysis Verbal Behav (2016) 32:125–138
DOI 10.1007/s40616-016-0066-2



SPECIAL SECTION: THE INTRAVERBAL RELATION

Common and Intraverbal Bidirectional Naming

Caio F. Miguel¹

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Vol. 26, Núm. 1 pp. 71-91

Efeitos do ensino do tato na emergência da categorização em crianças com Transtorno do Espectro Autista

(Effects of tact training on the emergence of categorization in children with Autism Spectrum Disorders)

Daniela Mendonça Ribeiro^{*,**1}, Rayssa Sarmiento Teodosio Cavalcante^{*}, Maria Thaís Santos Bandeira^{*}, Ana Carolina Sella^{*} & Caio F. Miguel^{***}

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Journal of Applied Behavior Analysis

2020, **9999**, 1–12

NUMBER 9999 ()

Using multiple-tact training to produce emergent visual categorization in children with autism

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Universidade Federal de Alagoas and Instituto Nacional de Ciência e Tecnologia sobre Comportamento, Cognição e Ensino (INCT-ECCE)

Caio F. Miguel

California State University, Sacramento

NUMBER 3 (MAY)

DREN

NUMBER 2 (MARCH)

ION BY

BELL³

2, **28**, 111–117

Emergent

NUMBER 3 (FALL 2013)



ELSEVIER

A fur
on de
with
Greg P

California State University, Sacramento, United States

Hound (1)

Work (2)

Toy (3)

Set A



Set B



Set C



Listener Training

Touch
hound
dog



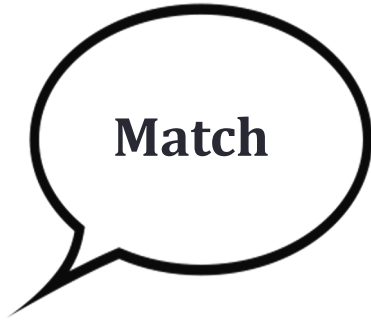
Tact/Label Test

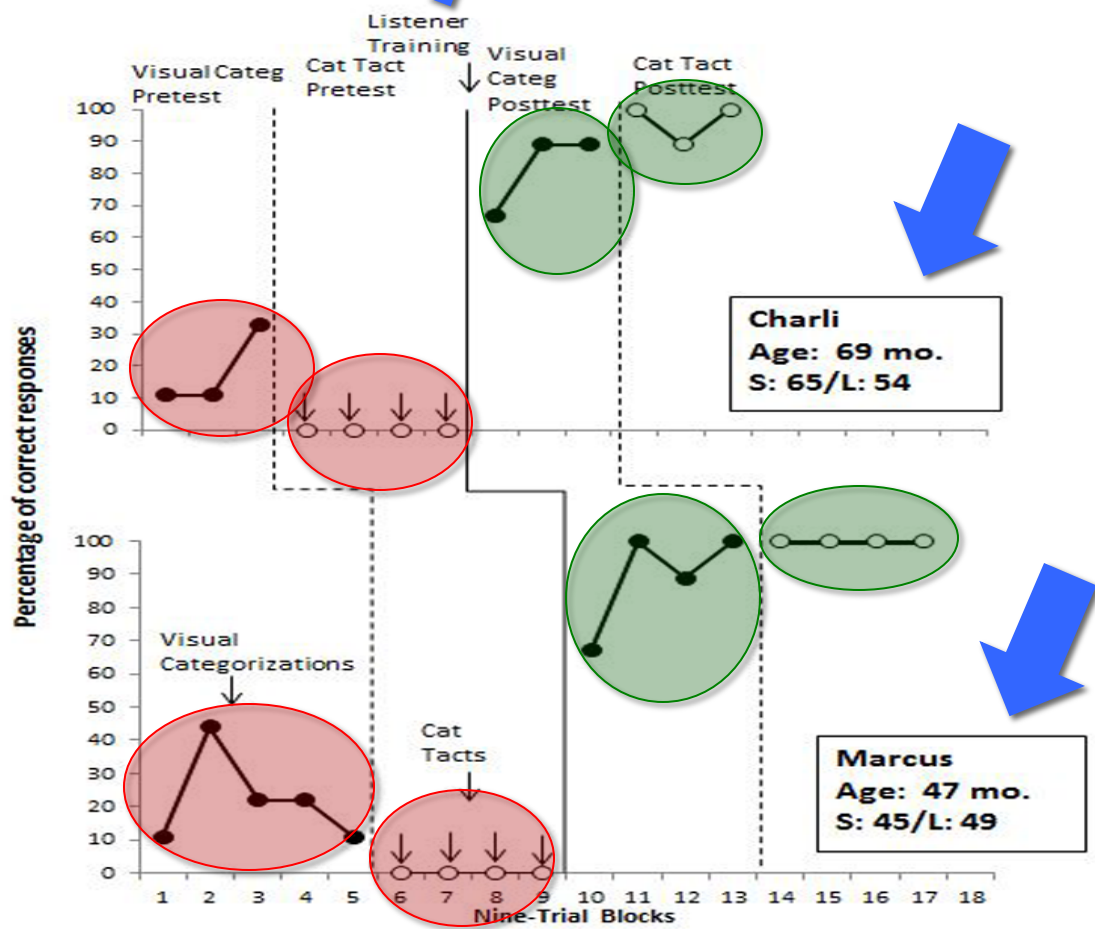
**What is
it?**

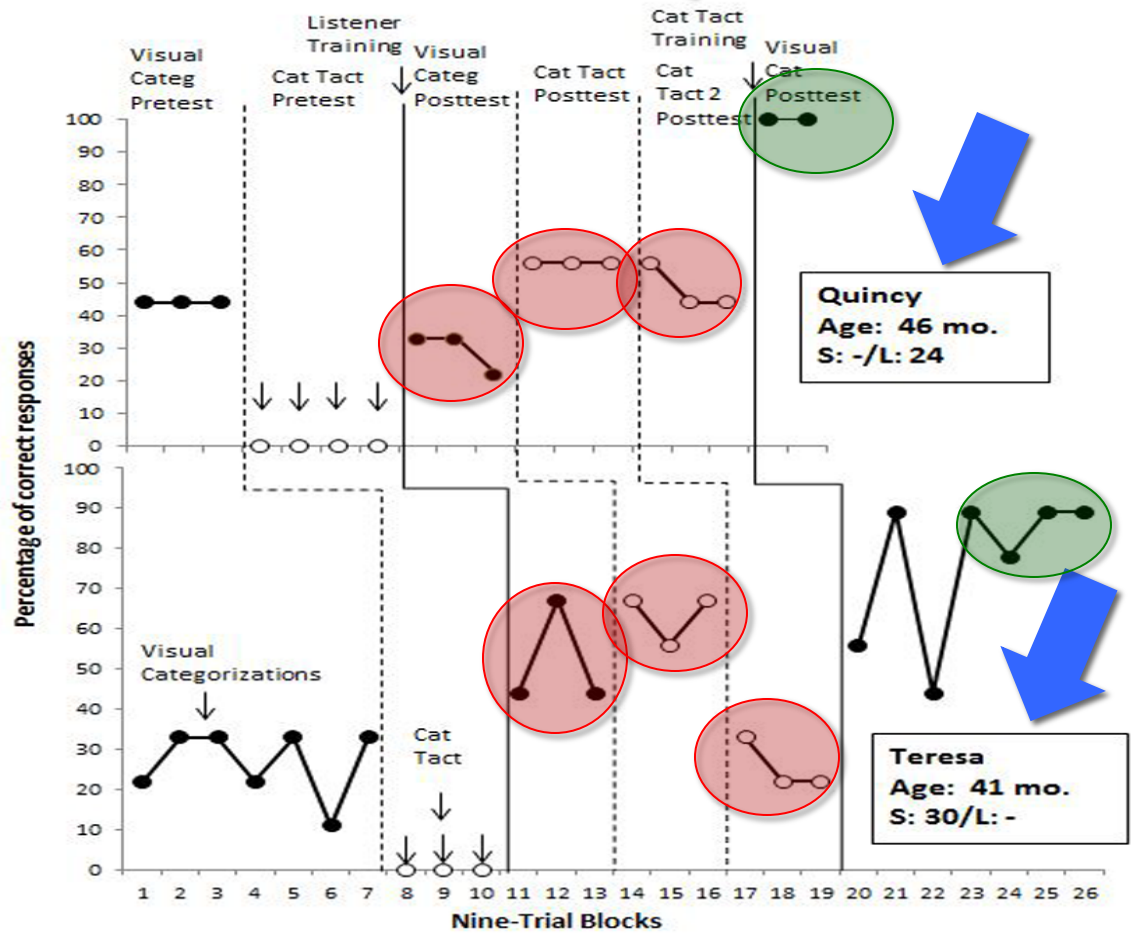


**Work
dog**

Visual Categorization Test







Percentage of correct responses

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26

Nine-Trial Blocks

Quincy
Age: 46 mo.
S: -/L: 24

Teresa
Age: 41 mo.
S: 30/L: -

Visual Categorization

Cat Tact

Listener Training

Cat Tact Training

Visual Categ Pretest

Cat Tact Pretest

Visual Categ Posttest

Cat Tact Posttest

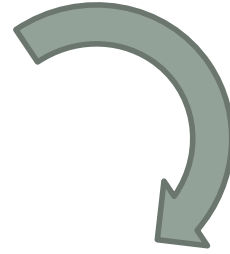
Cat Tact 2 Posttest

Visual Posttest

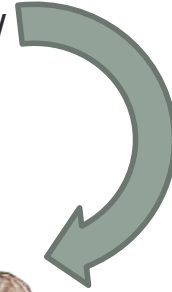
Cat Posttest

	Charli	Marcus	Quincy	Teresa
Chronological age	69	47	46	41
PPVT (Listener) Age	54	49	-	30
EVT (Speaker) Age	65	45	24	-
Vis. Cat. Post	Pass	Pass	FAIL	FAIL
Cat. Tact Post	Pass	Pass	FAIL	FAIL

“Work dog”
(Speaker)



/work dog/



(Listener)



THE EFFECTS OF TACT TRAINING ON THE DEVELOPMENT OF ANALOGICAL REASONING

CAIO F. MIGUEL¹, SARAH E. FRAMPTON¹, CHARISSE A. LANTAYA¹, DANIELLE L. LAFRANCE^{1,3},
KELLY QUAH¹, CAREEN S. MEYER¹, NASSIM C. ELIAS², AND JONATHAN K. FERNAND¹

JOURNAL OF THE EXPERIMENTAL ANALYSIS OF BEHAVIOR

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NUMBER 2 (SEPTEMBER)

The effects of listener training on the development of analogical
reasoning

Establishing Equivalence-Equivalence Analogical Relations via Tact and Listener Training

Maria Clara Cordeiro, Tatiana Zhirnova, and Caio F. Miguel

Department of Psychology, California State University, Sacramento

Van Gogh
Picasso

Socrates
Plato

Van Gogh
Plato



Van Gogh
Picasso

Socrates
Plato

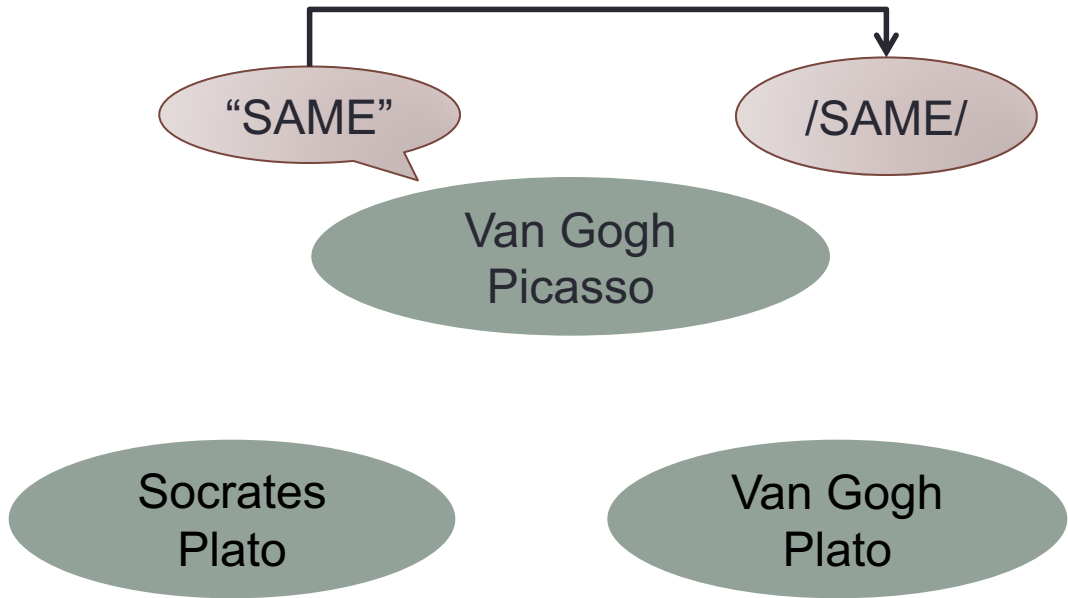
Van Gogh
Plato

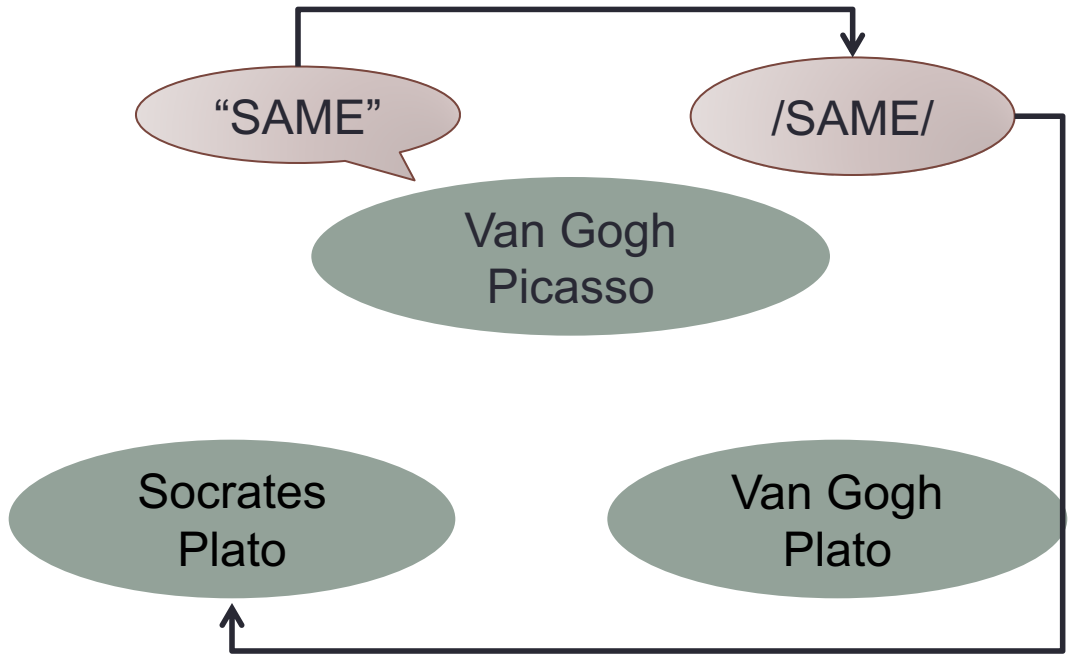
“SAME”

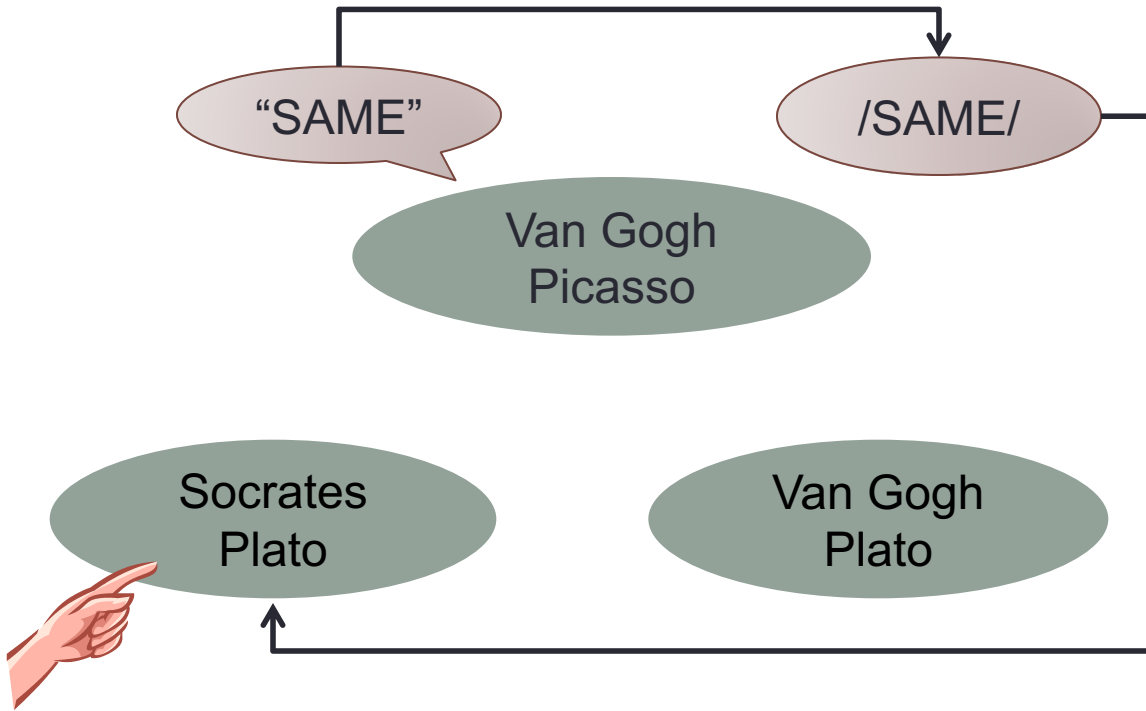
Van Gogh
Picasso

Socrates
Plato

Van Gogh
Plato



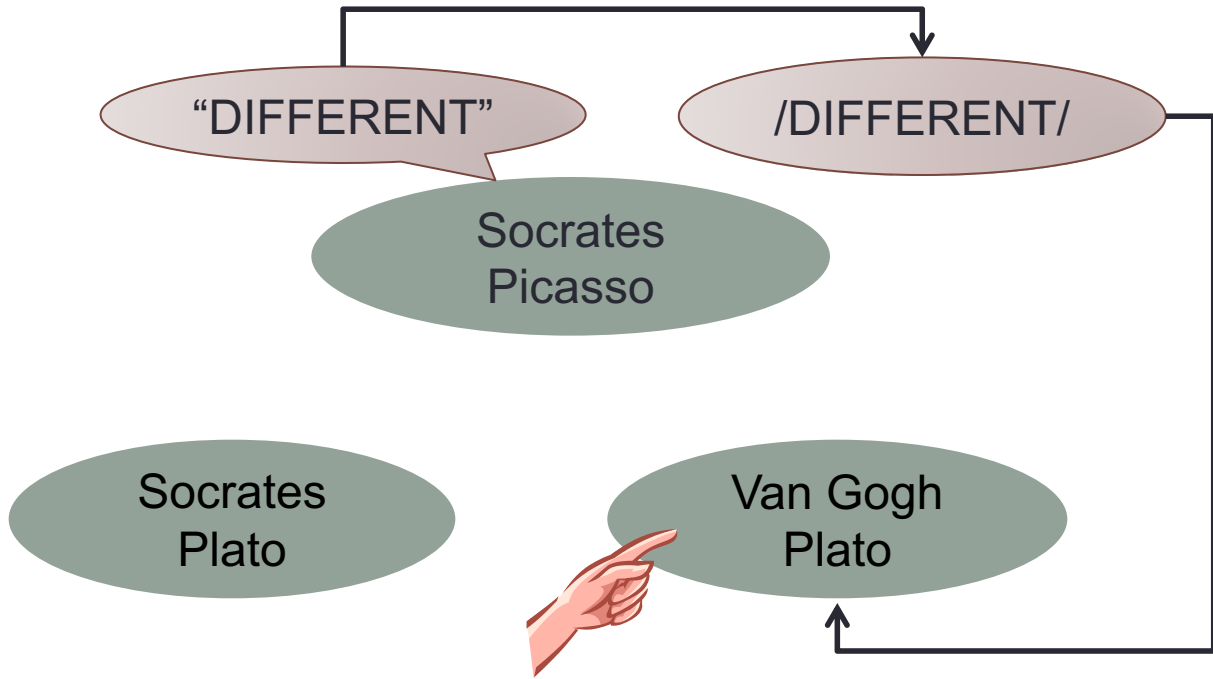




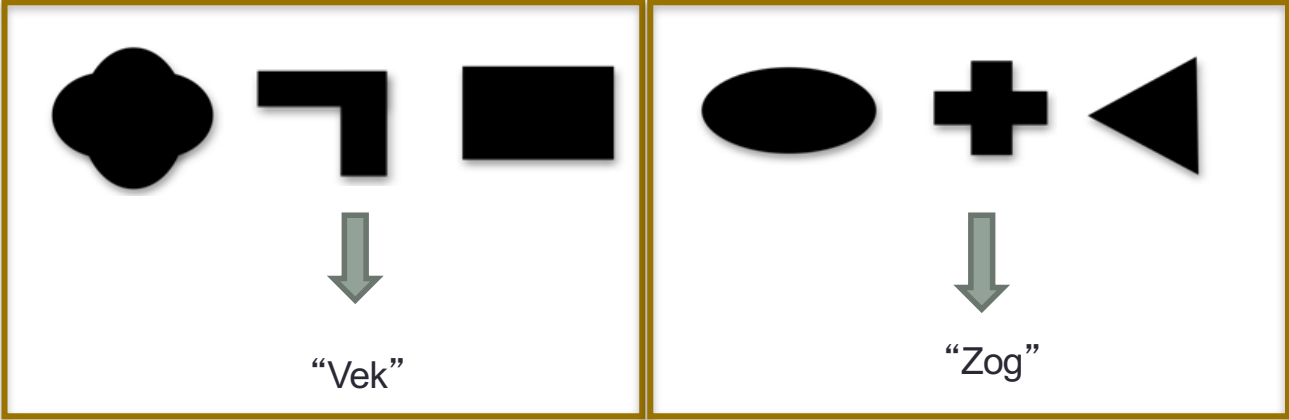
Socrates
Picasso

Socrates
Plato

Van Gogh
Plato

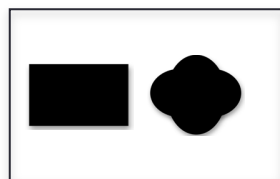


Common Label (Tact Training)



Acceptable Responses

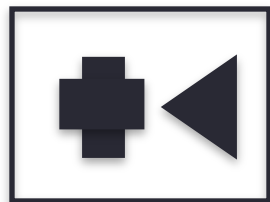
	A	B	C
Class 1			
Class 2			



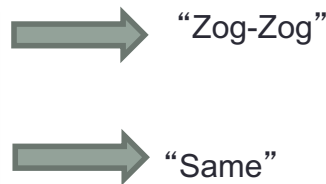
C1A1



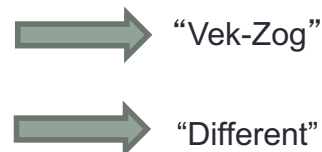
A2B1









B2C2

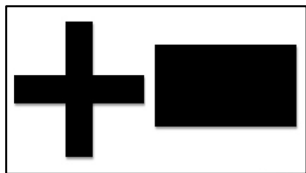


C1B2

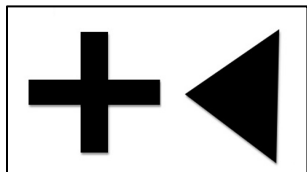


Analogy

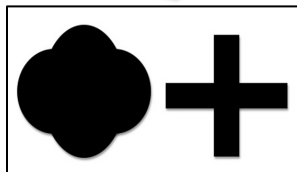
	A	B	C
Class 1			
Class 2			



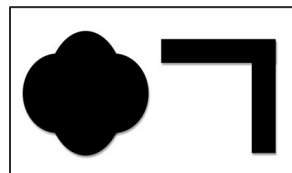
B2C1



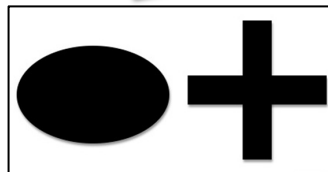
B2C2



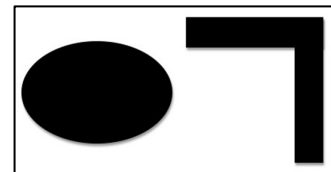
A1B2



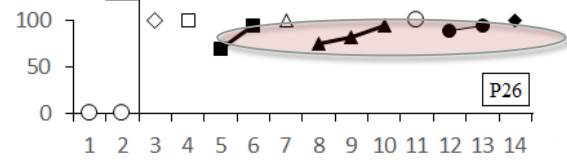
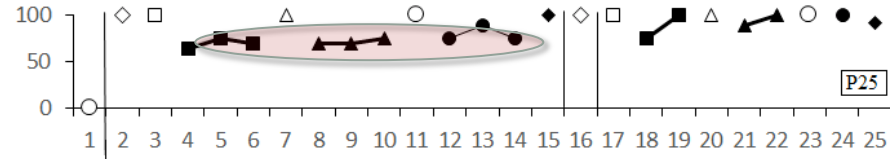
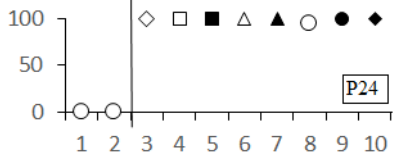
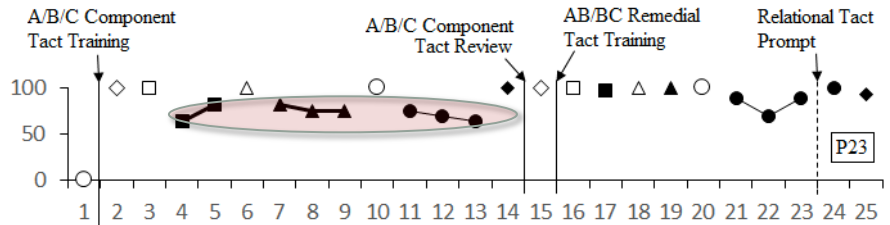
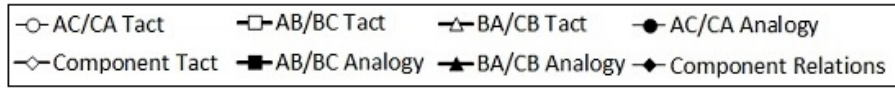
A1B1

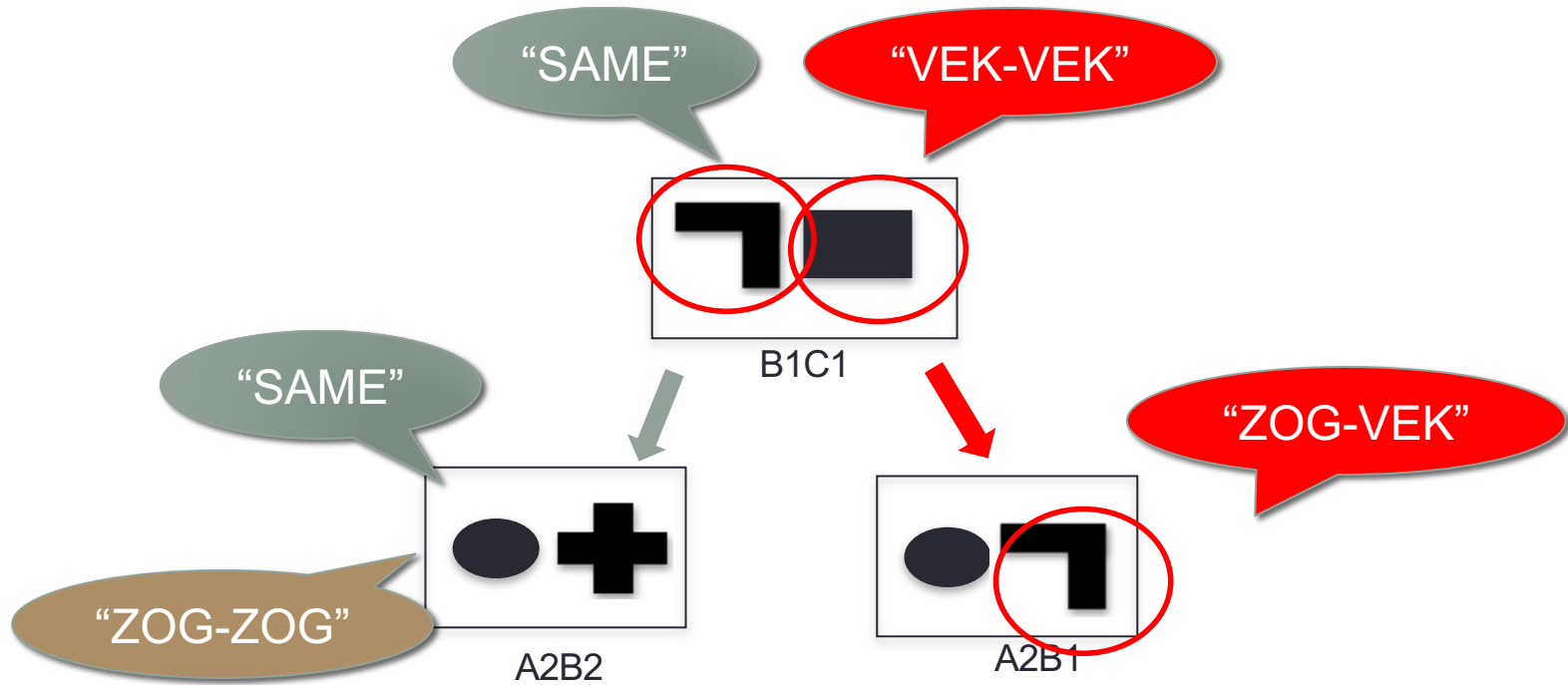


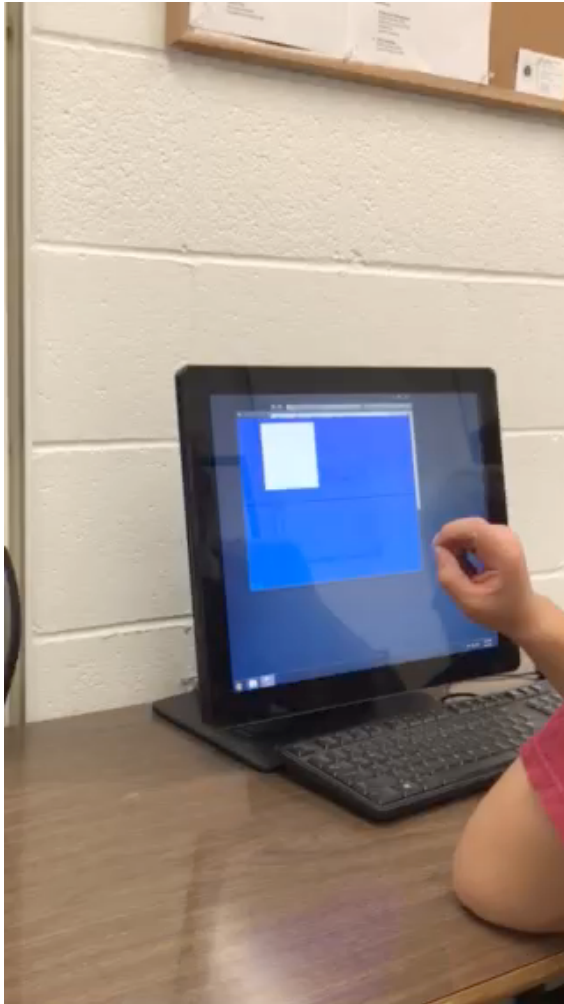
A2B2



A2B1







“Humm. So there... one is a vek and one is a zog
These are both zogs
This is a zog and a vek
So they’re...**this is different and that is different**
So this should go with that”

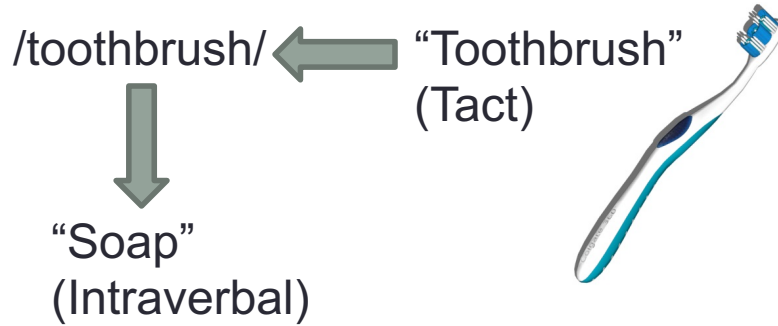
“These are both veks
And then these are both zogs
This is a zog and a vek
So this one should go with that one because **they are both the same**”





“The toothbrush goes
with the soap”

Intraverbal Bidirectional Naming (I-BiN)



/soap/



Training Intraverbal Naming to Establish Matching-to-Sample Performances

Patricia M. Santos¹ • Monica L. Ma¹ •
Caio F. Miguel¹

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2016, 1–18

TRAINING INTRAVERBAL NAMING TO ESTABLISH EQUIVALENCE CLASS PERFORMANCES

MONICA L. MA, CAIO F. MIGUEL, AND ADRIENNE M. JENNINGS

CALIFORNIA STATE UNIVERSITY, SACRAMENTO

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TRAINING INTRAVERBAL BIDIRECTIONAL NAMING TO ESTABLISH GENERALIZED EQUIVALENCE CLASS PERFORMANCES

ADRIENNE M. JENNINGS AND CAIO F. MIGUEL

CALIFORNIA STATE UNIVERSITY, SACRAMENTO

Tact Training 1

2

3

A



A1



A2



A3

[A1] Cardinal
[A2] Yellowhammer
[A3] Mockingbird

B



B1



B2



B3

[B1] Buckeye
[B2] Pine
[B3] Pecan

C



C1



C2



C3

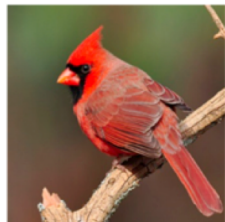
[C1] Black Racer
[C2] Red belly
[C3] Horned Lizard

Table 1

Experimental intraverbal statements

	Antecedent Stimuli	Correct Response
<u>Baseline</u>		
A' B' Bird Tree		
The tree for [A1] is...	[A1] Cardinal	[B1] Buckeye
The tree for [A2] is...	[A2] Yellowhammer	[B2] Pine
The tree for [A3] is...	[A3] Mockingbird	[B3] Pecan
B' C' Tree Reptile		
The reptile for [B1] is...	[B1] Buckeye	[C1] Black Racer
The reptile for [B2] is...	[B2] Pine	[C2] Red Belly
The reptile for [B3] is...	[B3] Pecan	[C3] Horned Lizard
<u>Symmetry</u>		
B' A' Tree Bird		
The bird for [B1] is...	[B1] Buckeye	[A1] Cardinal
The bird for [B2] is...	[B2] Pine	[A2] Yellowhammer
The bird for [B3] is...	[B3] Pecan	[A3] Mockingbird
C' B' Reptile Tree		
The tree for [C1] is...	[C1] Black Racer	[B1] Buckeye
The tree for [C2] is...	[C2] Red Belly	[B2] Pine
The tree for [C3] is...	[C3] Horned Lizard	[B3] Pecan
<u>Transitivity</u>		
A' C' Bird Reptile		
The reptile for [A1] is...	[A1] Cardinal	[C1] Black Racer
The reptile for [A2] is...	[A2] Yellowhammer	[C2] Red Belly
The reptile for [A3] is...	[A3] Mockingbird	[C3] Horned Lizard
C' A' Reptile Bird		
The bird for [C1] is...	[C1] Black Racer	[A1] Cardinal
The bird for [C2] is...	[C2] Red Belly	[A2] Yellowhammer
The bird for [C3] is...	[C3] Horned Lizard	[A3] Mockingbird

Set 1



A1



A2



A3

- [A1] Cardinal
- [A2] Yellowhammer
- [A3] Mockingbird



B1



B2



B3

- [B1] Buckeye
- [B2] Pine
- [B3] Pecan



C1



C2



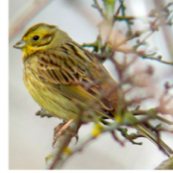
C3

- [C1] Black Racer
- [C2] Red belly
- [C3] Horned Lizard

Set 2



A1



A2



A3

[A1] Cardinal
[A2] Yellowhammer
[A3] Mockingbird



B1



B2



B3

[B1] Buckeye
[B2] Pine
[B3] Pecan



C1



C2



C3

[C1] Black Racer
[C2] Red belly
[C3] Horned Lizard

Set 3



A1



A2



A3

[A1] Cardinal
[A2] Yellowhammer
[A3] Mockingbird



B1



B2



B3

[B1] Buckeye
[B2] Pine
[B3] Pecan



C1



C2



C3

[C1] Black Racer
[C2] Red belly
[C3] Horned Lizard

Set 4



A1



A2



A3

[A1] Cardinal
[A2] Yellowhammer
[A3] Mockingbird



B1



B2



B3

[B1] Buckeye
[B2] Pine
[B3] Pecan



C1



C2



C3

[C1] Black Racer
[C2] Red belly
[C3] Horned Lizard

Set 5



A1



A2



A3

- [A1] Cardinal
- [A2] Yellowhammer
- [A3] Mockingbird



B1



B2



B3

- [B1] Buckeye
- [B2] Pine
- [B3] Pecan



C1



C2



C3

- [C1] Black Racer
- [C2] Red belly
- [C3] Horned Lizard

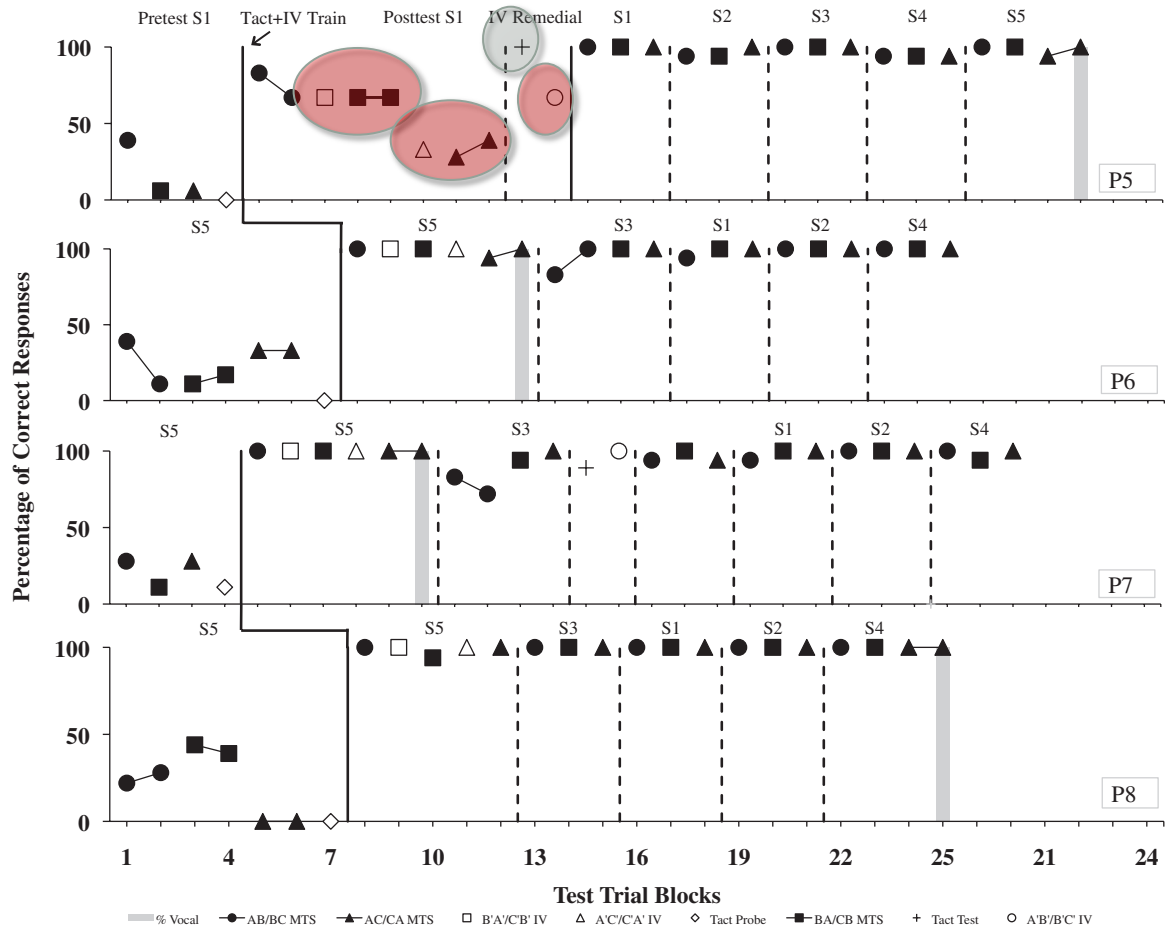
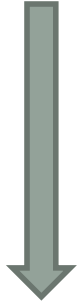


Fig. 4. Percentage of correct responses during MTS tasks, tacts, listener, and intraverbal tests across five sets of stimuli for P5, P6, P7, and P8 (Experiment 1). S refers to the specific set of stimuli and IV stands for intraverbal.

“Pine”
(Intraverbal)

“Yellowhammer”
(Tact)



“Horned Lizard”
(Intraverbal)












Of course I talk to myself,
Sometimes I need
expert advice.



The Role of Class-Consistent and Class-Inconsistent Verbal Statements on the Establishment of
Equivalence Classes

Amanda N. Chastain, Svea Love, Shannon Luoma, & Caio F. Miguel

California State University, Sacramento

	1	2	3
A	 Ira	 Kami	 Bawan
B	 Anim	 Sila	 Tala
C	 Hison	 Tupa	 Dilaw










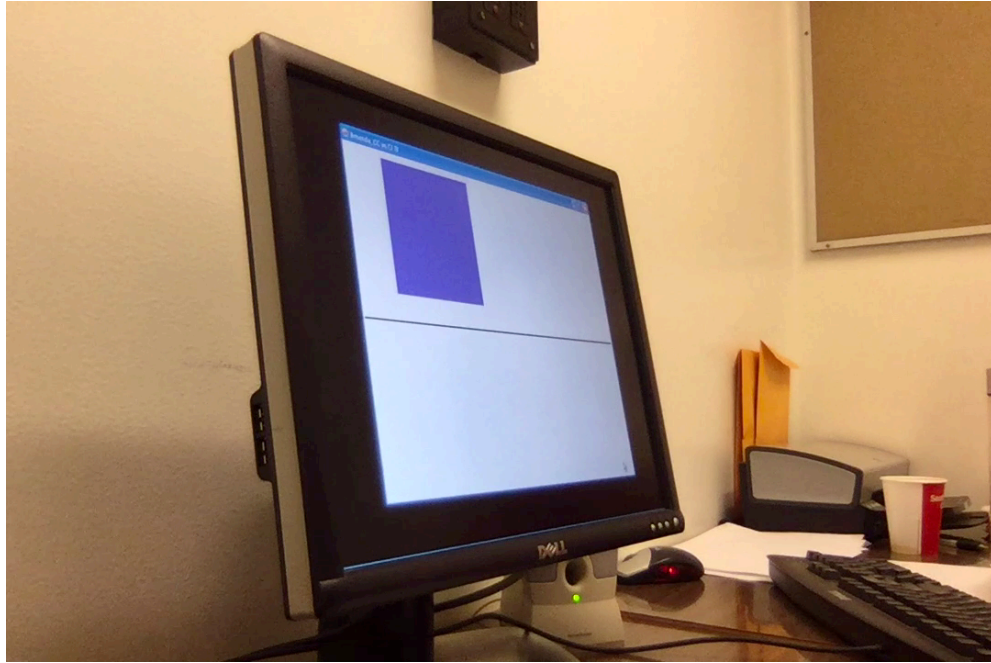
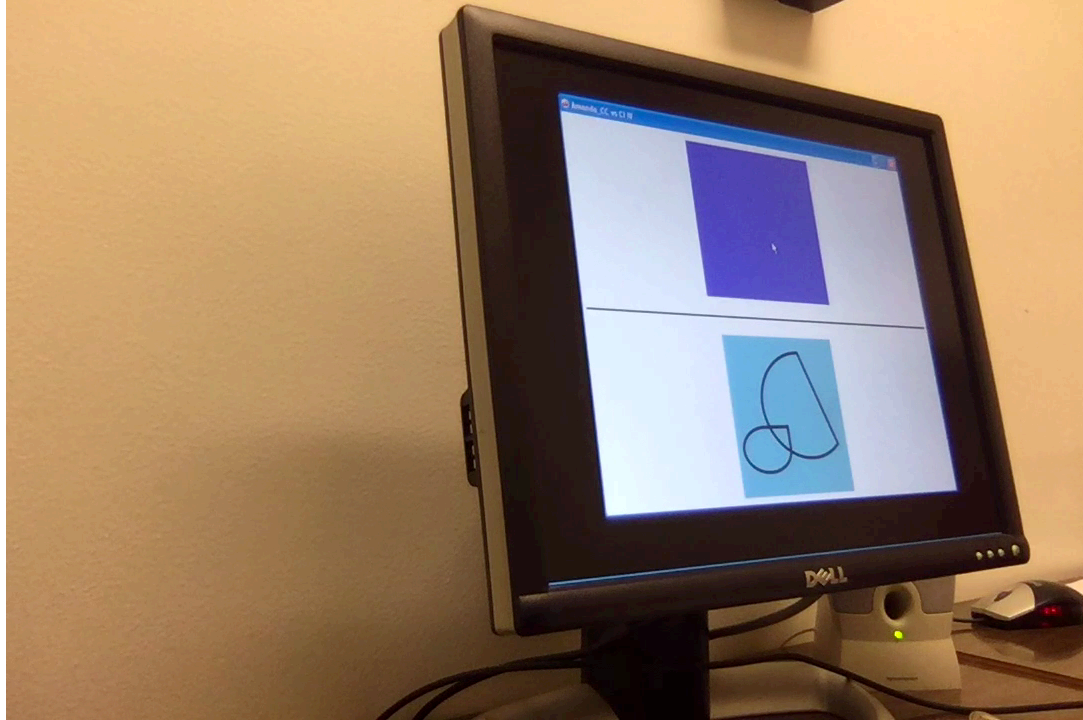

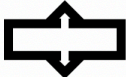







	1	2	3
D	 Masok	 Tallo	 Bilog
E	 Ibon	 Apat	 Haba
F	 Araw	 Ulan	 Irim

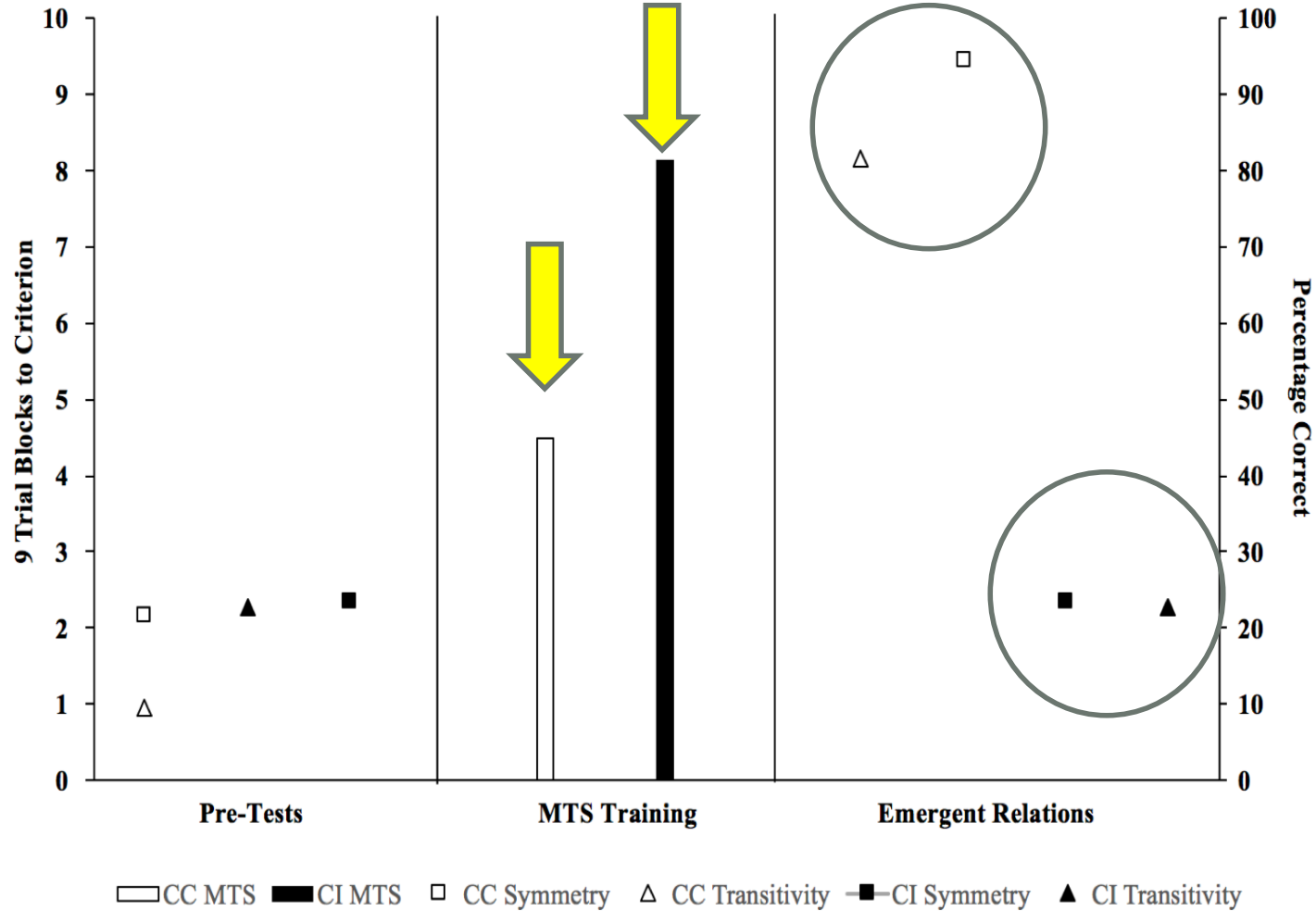
Figure 1. Arbitrary Stimuli for set 1 (top), and set 2 (bottom).





	1	2	3
A	 Isa	 Kami	 Buwan
B	 Anim	 Sila	 Tala
C	 Hipon	 Tupa	 Dilaw

Average Performance CC vs. CI

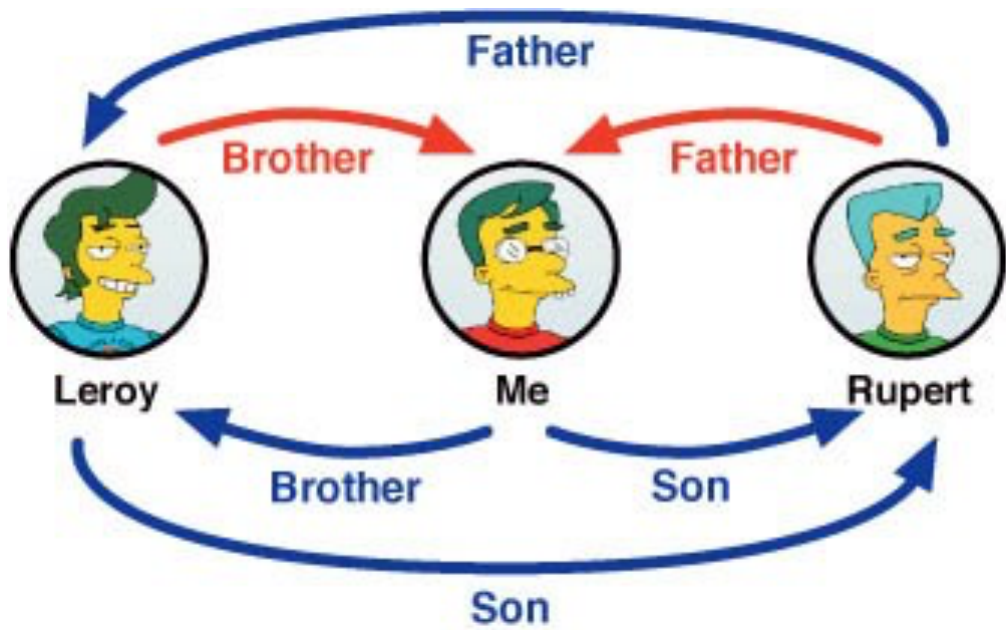


You'll get
burned if you
touch that




Thanks for
the tip, yo!





The role of verbal behavior in the establishment of comparative relations

Jocelyn E. Diaz, Shannon M. Luoma, and Caio F. Miguel 

Investigating the Effects of Verbal Behavior on Emergent Comparative Relations

Shannon M. Luoma & Caio F. Miguel

California State University, Sacramento

“Smaller”



“Bigger”

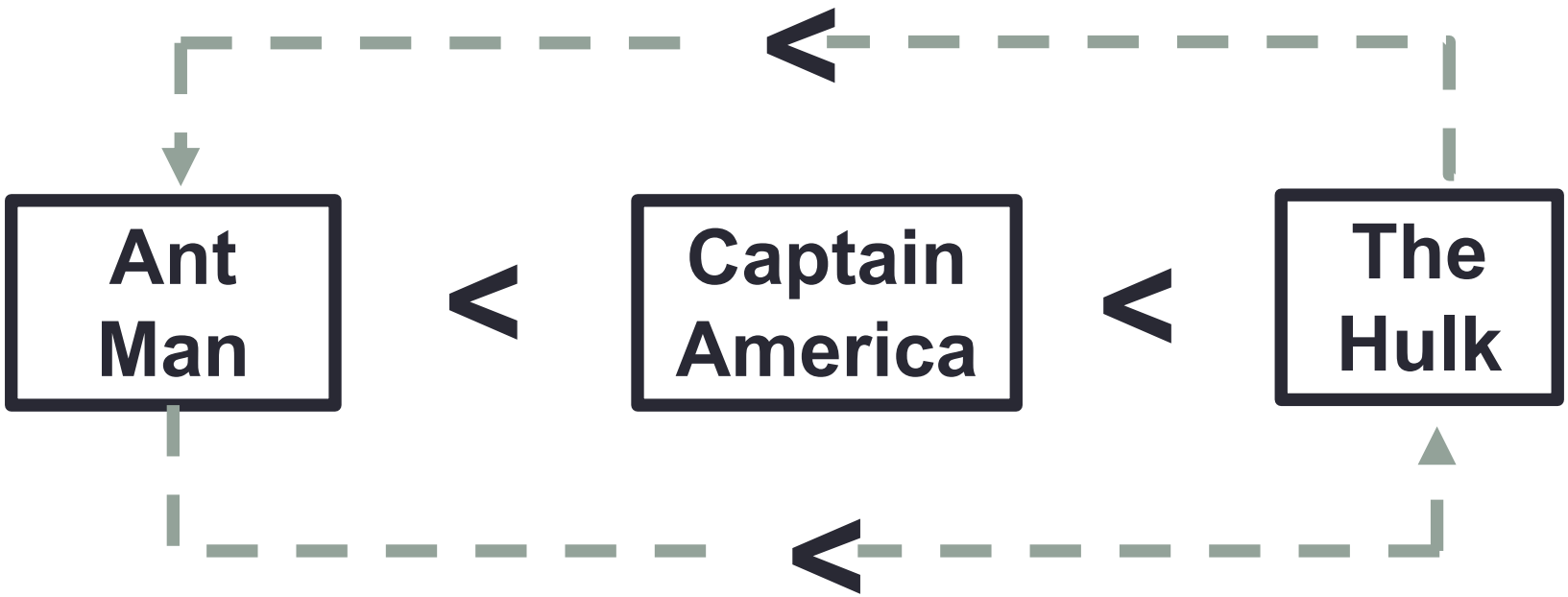


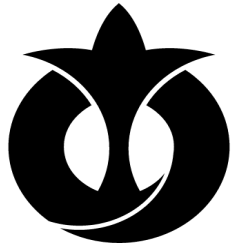
“Smaller”



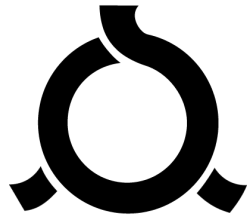
“Bigger”







Small

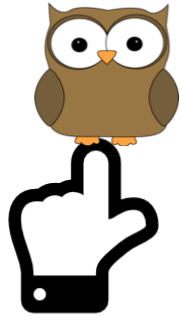
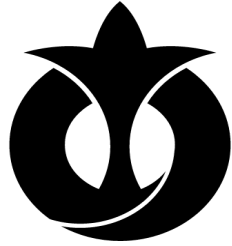


Medium



Big

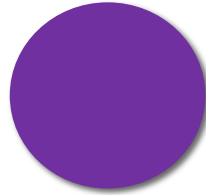
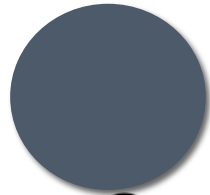
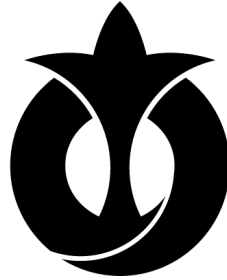
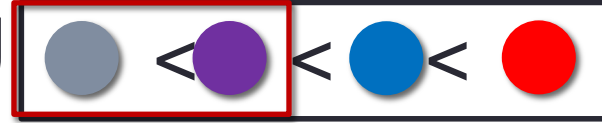
Nonarbitrary MET

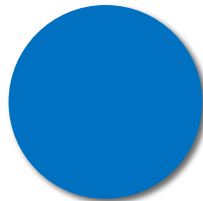
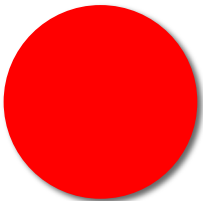
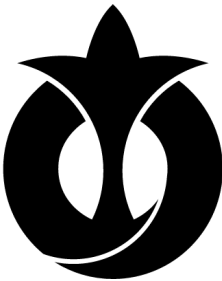




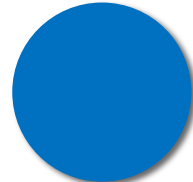
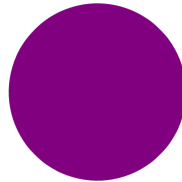
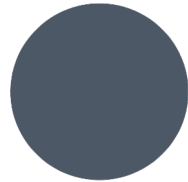
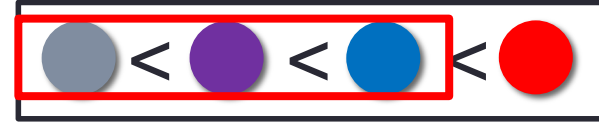


MTS Arbitrary Training

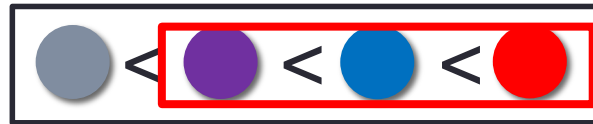
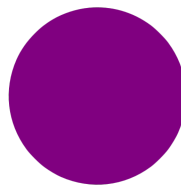
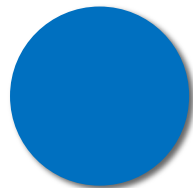
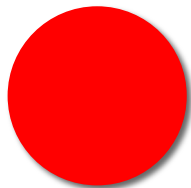




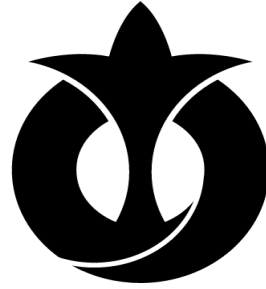
MTS Posttest



**“This is big, so
the answer is
red because it
is the biggest”**



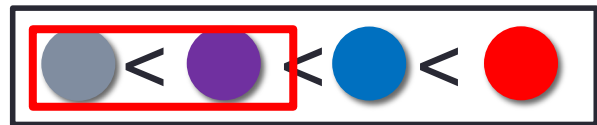
Tact Training



“What is it?”

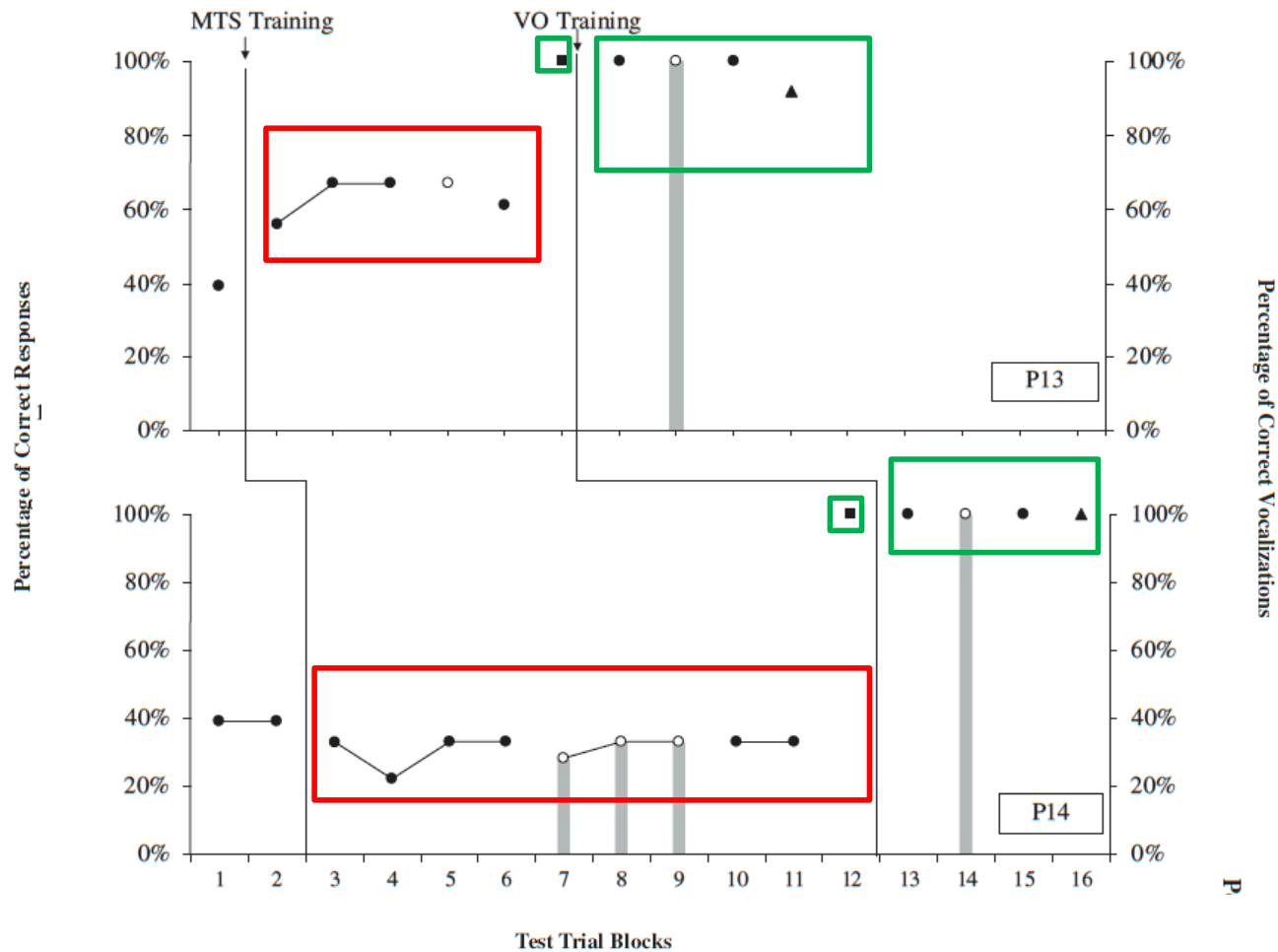
“Small”

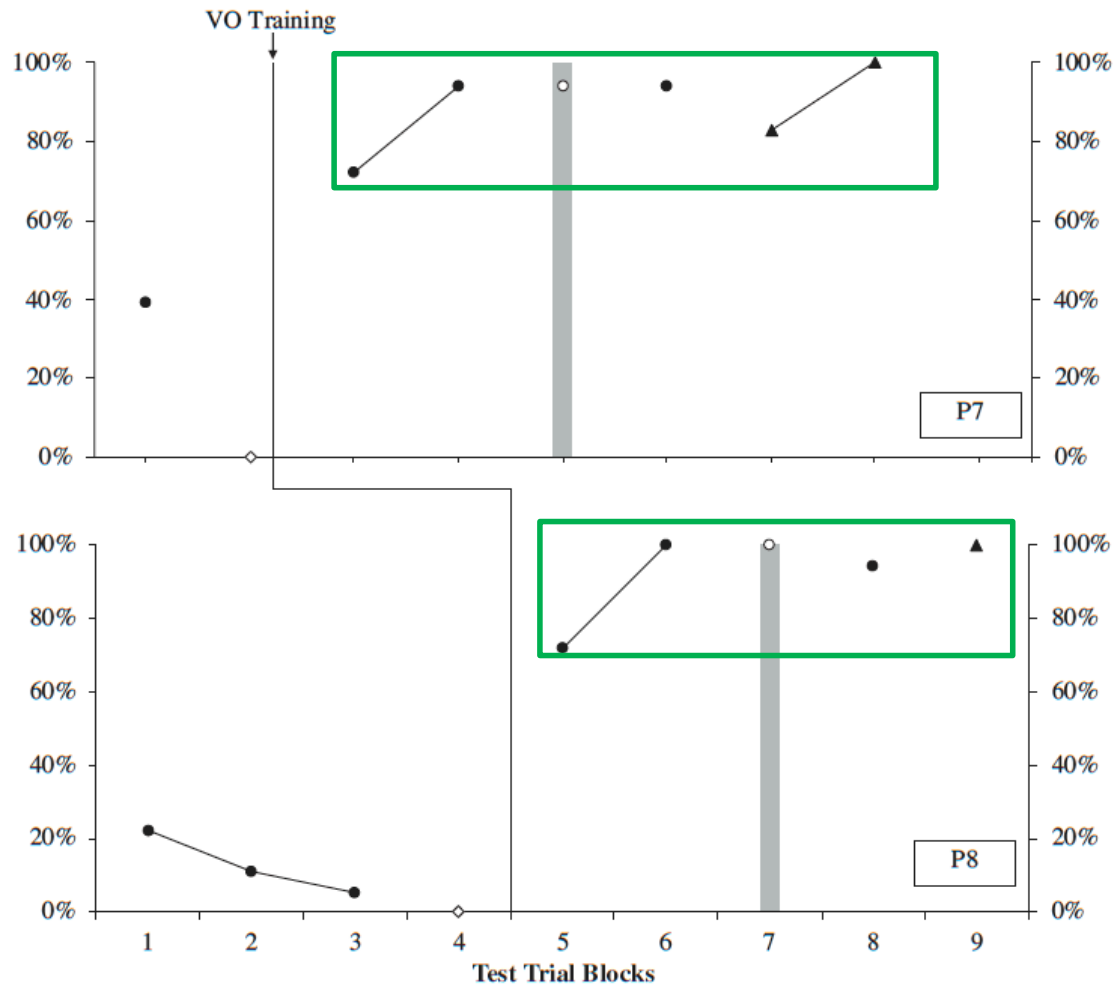
Intraverbal Training



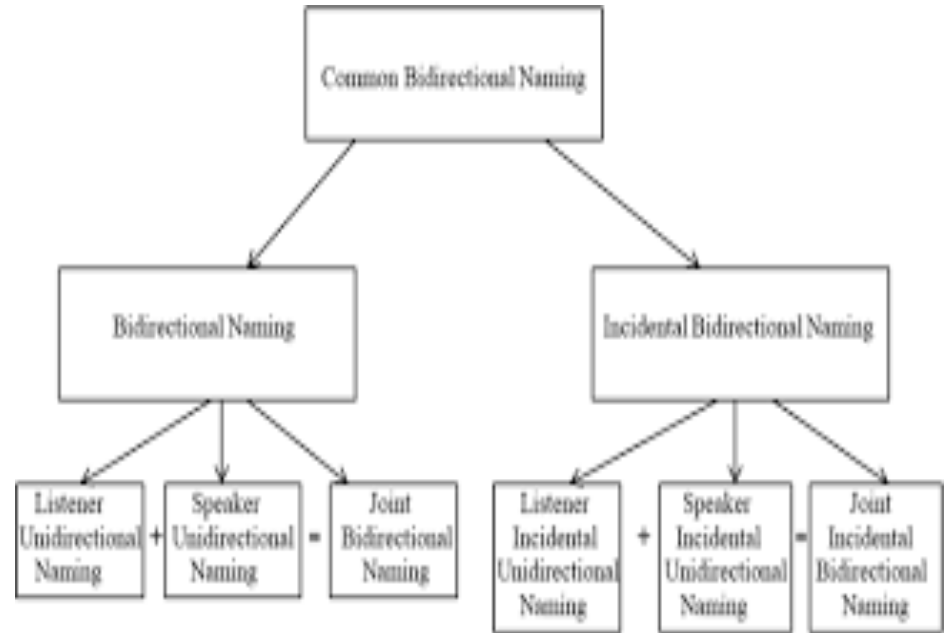
“Grey is
smaller
than
_____”

“Purple”





- Our failure to replicate Dougher et al. could have been due to procedural variations (instructions, think aloud protocol)
- Verbal behavior aided in their non-verbal performance




The Psychological Record

<https://doi.org/10.1007/s40732-020-00408-z>



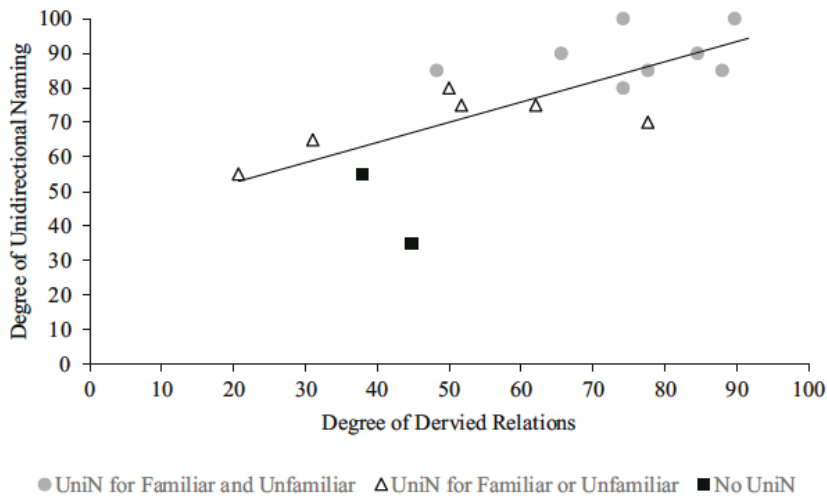
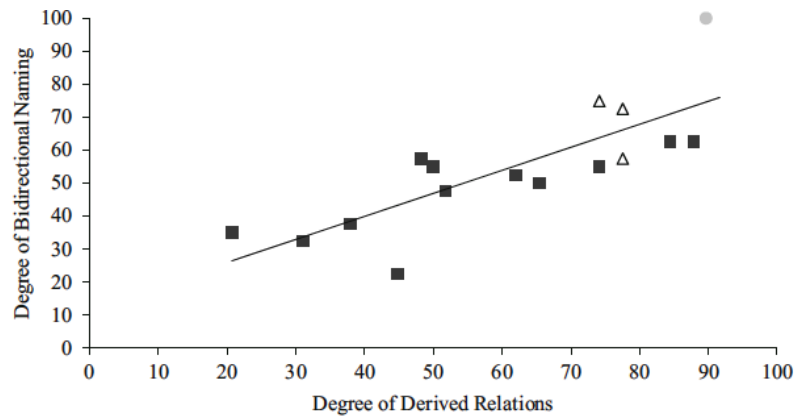
ORIGINAL ARTICLE

Descriptive Analyses of Relations among Bidirectional Naming, Arbitrary, and Nonarbitrary Relations

Georgette A. Morgan¹  · R. Douglas Greer¹ · Daniel M. Fienup¹

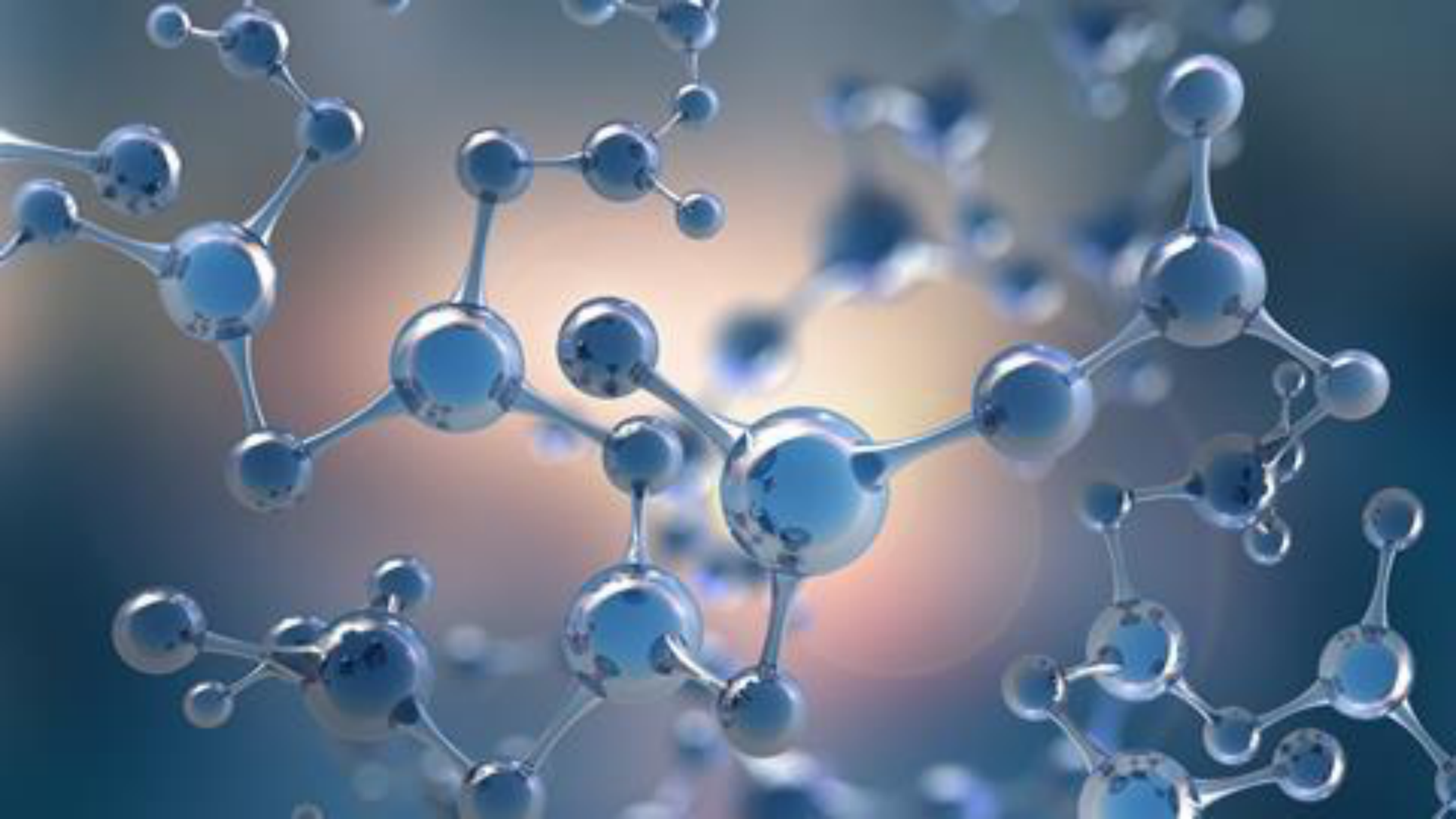


Check for
updates



Previous

research has shown that naming repertoires likely facilitate participants' demonstrations of categorization (Miguel et al., 2013; Lee et al., 2015; Miguel et al., 2008), and the data within these studies support this research by demonstrating strong correlations between BiN and derived relational responding.



Problem-Solving, Bidirectional Naming, and the Development of Verbal Repertoires

Caio F. Miguel
California State University, Sacramento

We often solve problems by engaging in mediating strategies, such as talking to ourselves. In order to accurately use and respond to these strategies, we must “understand” or react appropriately to the products of our own verbal behavior. The term bidirectional naming has been used to describe the integration of both listener and speaker behaviors that leads to speaking with understanding. The current paper describes a series of studies that show that in the absence of either speaker or listener behaviors, participants often fail to solve problems in the form of matching-to-sample and categorization tasks. It is proposed that to solve these tasks participants must either react to their own speaker behavior or engage in covert imagining. It is hoped that the current paper stimulates research on the role of covert behavior in the development of problem solving skills.

Keywords: covert behavior, naming, private events, problem solving, verbal behavior



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