INCORPORATING OBSERVATIONAL LEARNING INTO AUTISM TREATMENT: FROM CONCEPTUAL ANALYSIS TO APPLIED PRACTICE

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21st Annual PENNABA Conference
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Outline- Part 1 (1:30-3:00)

- Rationale for OL
- Define OL
- OL research humans/primates
- Behavior Analysis of OL
- Autism Deficits
- OL Intervention Research
- Research at Alpine- Imitation & Attending

- Break (15 min)

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Outline- Part 2 (3:15-4:45)

- OL Research at Alpine- Discrimination of Contingencies
- Clinical implications- Teach OL
- Attending, Imitation, Discrimination of Contingencies
- Role play
- Develop OL skill acquisition programs
- Design OL research question

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Why Observational Learning?

Definition
Feelings
Treatment
Where?
Why?
How?

Implications …

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What is Observational Learning?

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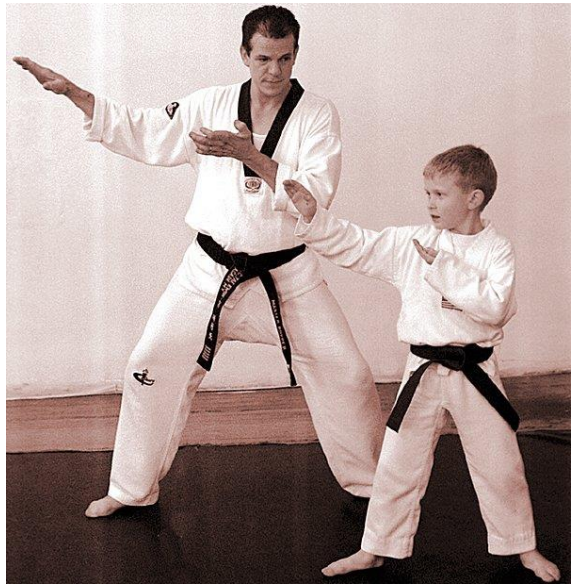
Imitation- the foundation of observational learning

- Imitation: behavior that duplicates some properties of the behavior of a model

(Catania, 2007)



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What’s the difference?

Observational learning requires that learners respond to

Contingencies/

consequences

applied to

others

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Observational Learning

- The acquisition of novel operants as a result of observing contingencies related to the action of others.

(Catania,1998)

- **Observer does not have to contact the contingencies**

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Bandura

- Imitation
- Vicarious Learning
- Delay
- Cognitive Mediation

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Behavior Analysis of Observational Learning

Deguchi (1984)

Fryling, Johnston, & Hayes (2011)

Palmer (2012)

Greer, Singer Dudek, Gautreaux (2006)

Maisa & Chase (1997)

Behavior Analysis of Observational Learning

- Observer attends to a compound stimulus that includes a modeled response and the subsequent consequence (contextual stimuli).
- The modeled response and consequence serve as a compound discriminative stimulus for the demonstration of that response by the observer later in time.
- Imitation of a modeled action is influenced by the history of reinforcement, generalized imitation, and stimulus generalization.

Masia and Chase (1997)

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Time gap?

- Associative learning? (Fryling)
- Stimulus generalization? (Masia & Chase, Deguchi)
- Joint Control? (Palmer)
  - Verbal Rehearsals/Self-echoic (Esch)
- Learning new operants vs Performance ?(Greer)
- Motivation? (Bandura)

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This is discriminative for the observer to attend to the interaction

Teacher asks the model, “What is two plus two?”

The model Responds Correctly, “four”

The teacher praises the model for answering correctly

Compound discriminative stimulus (includes context) for imitation at a later time

The Teacher, three days later asks the observer to add two plus two

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This response is influenced by stimulus generalization, history of reinforcement for imitation, generalized imitation, rule governed behavior, associative responding,joint control, motivation…

The observer says, “four”

The teacher praises the observer for responding correctly

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Minimally observational learning requires

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MOTIVATION

- Questions?
- Discussion.
- Think of a time where you learned via observational learning.
- What stimuli did you attend to while observing?
- What stimuli were in the environment when you engaged in the behavior? Or not?

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- Fear
- Empathy
- Perspective taking
- Conditioned reinforcement via OL
- Peer- yoked contingencies

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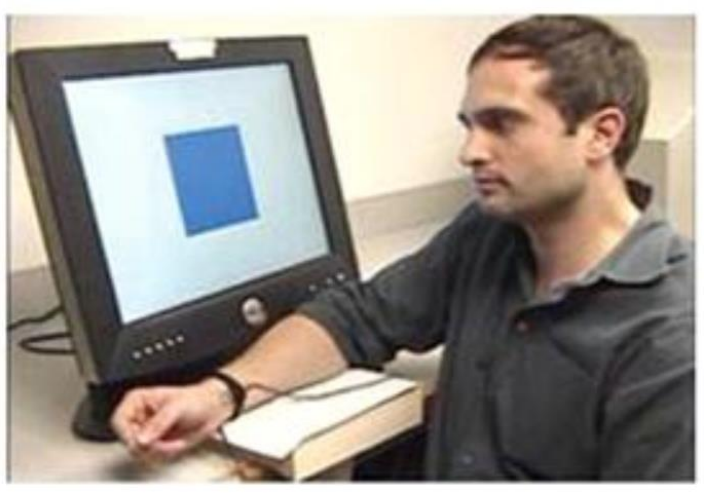
Fear



- Human and primates show learned fear responses to previously neutral stimuli
- Observing CS/US contingency

https://www.youtube.com/watch?v=NL8dnLhcvIo

(Hygge & Ohman, 1978; Olsson & Phelps, 2004;Cook & Mineka, 1990;

Mineka & Cook, 1993)

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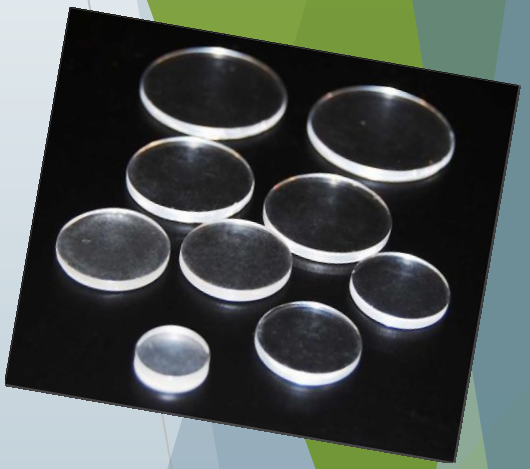
Conditioned Reinforcement



- Previously neutral stimuli can come to function as reinforcers for observers
- Observing CS/US contingency
- Greer & Singer (2004); Greer & Singer-Dudek, 2008)

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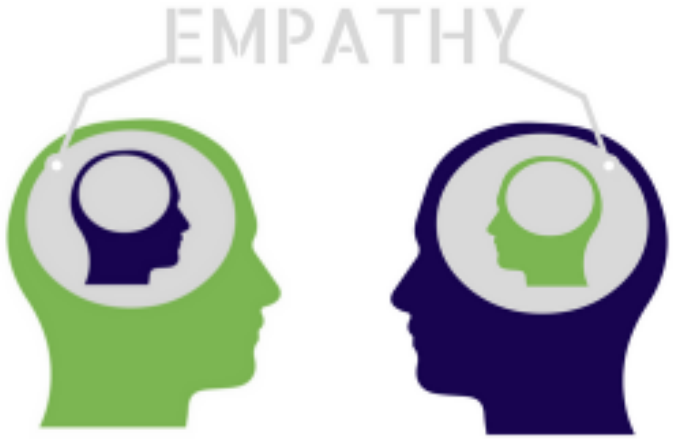
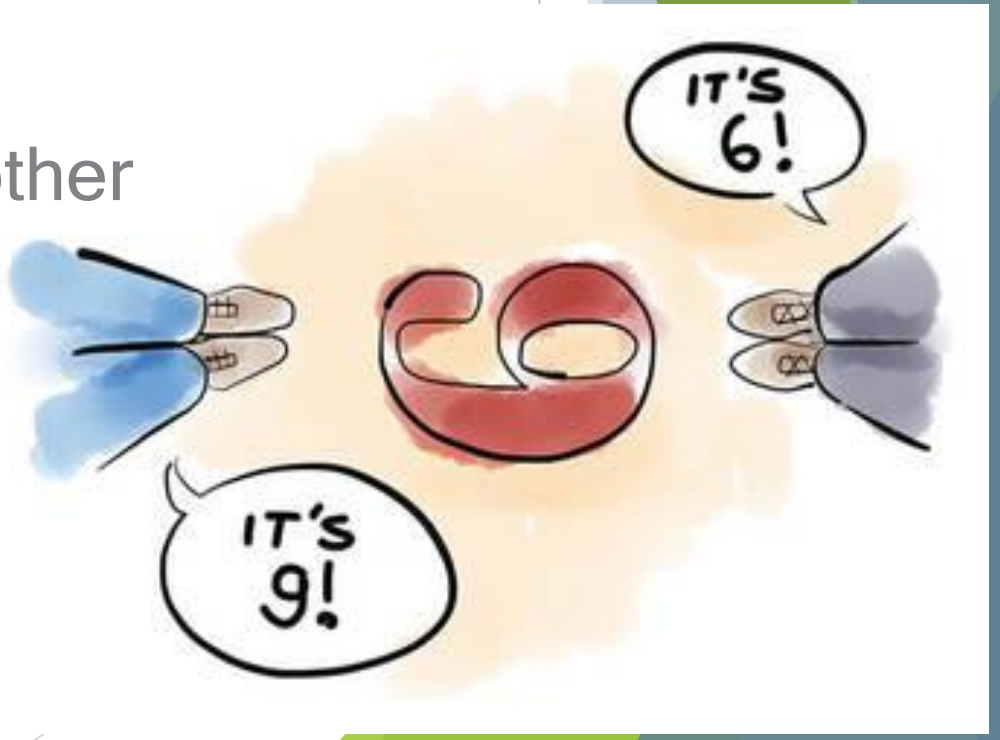
Empathy/Perspective-Taking



- Empathy processing plays a role in observational learning- negative consequences
- OL involves perspective-taking (adopt another person's point of view)



(Rak, Bellebaum, & Thoma 2013)

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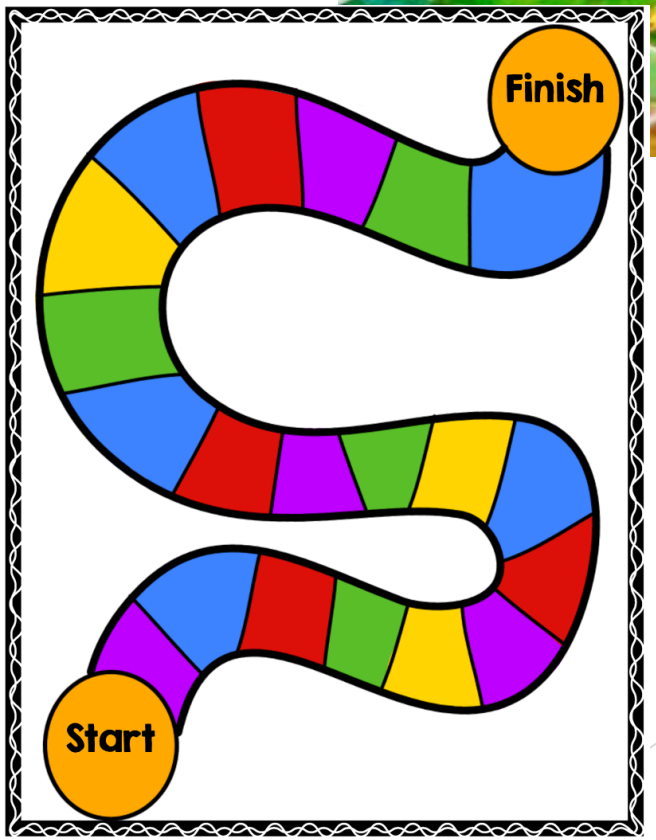
Peer-Yoked Contingencies

- Children learn new responses by observing others when the contingency is yoked
- Yoked-contingency game board
- Davies-Lackey (2005); Rothstein & Gautreaux (2007)



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What About Autism?

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- Deficits in attending (e.g., Donnelly, Luyben & Zan, 2009)
- Deficits in imitation (e.g., Williams, Whiten & Singh (2004) Systematic review)
- Deficits in making discriminations (e.g., Green 2001)
- Motivation? Fear? Empathy? Perspective-Taking? Reinforcement?

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Observational Learning Intervention Research

- Castro & Rehfeldt (2016)
  - Peer vs. Staff models
- Charlop, Shreibman, Tryon (1983)*
  - Receptive labeling task
- Clawson et al., (2014)
  - Video modeling
- Davies Lackey (2005)*
  - Reading dolch words
- Dequinzio & Taylor (2015) *
- DeQuinzio, Tomasi, Taylor (2018)- mastered and unmastered tacts*
  - Discrimination of contingencies
- Egel, Richman & Koegel (1981)*
  - Shape, color, preposition discrimination
- Griffen, Wolery, & Schuster (1992)
  - Preparing recipes
- Leaf et al. (2012) *
  - Shift in preference for toys
- Ledford & Wolery (2013)
  - Academic and social response
- MacDonald & Ahearn (2015)*
  - Assessment and teaching
- Pereira-Delgado and Greer (2009)*
- Peer monitoring / discrimination
- Rothstein, M. B., & Gautreaux, G. G. (2007)
- Rehfeldt, Latimore & Stromer (2003)*
  - Stimulus class formation
- Taylor, DeQuinzio & Stine (2012)*
  - Reading with a monitoring response
- Werts, Caldwell, Wolery (1996)
  - Long response chains

* Participants with autism

Broad Categories of OL Research: Participants with Autism

- Observational Learning as **an independent variable**
- Observational learning as a **dependent variable**
- Induction of Observational Learning **(Both IV and DV)**

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frontiers in Psychology

ORIGINAL RESEARCH
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Observational Learning in Low-Functioning Children With Autism Spectrum Disorders: A Behavioral and Neuroimaging Study

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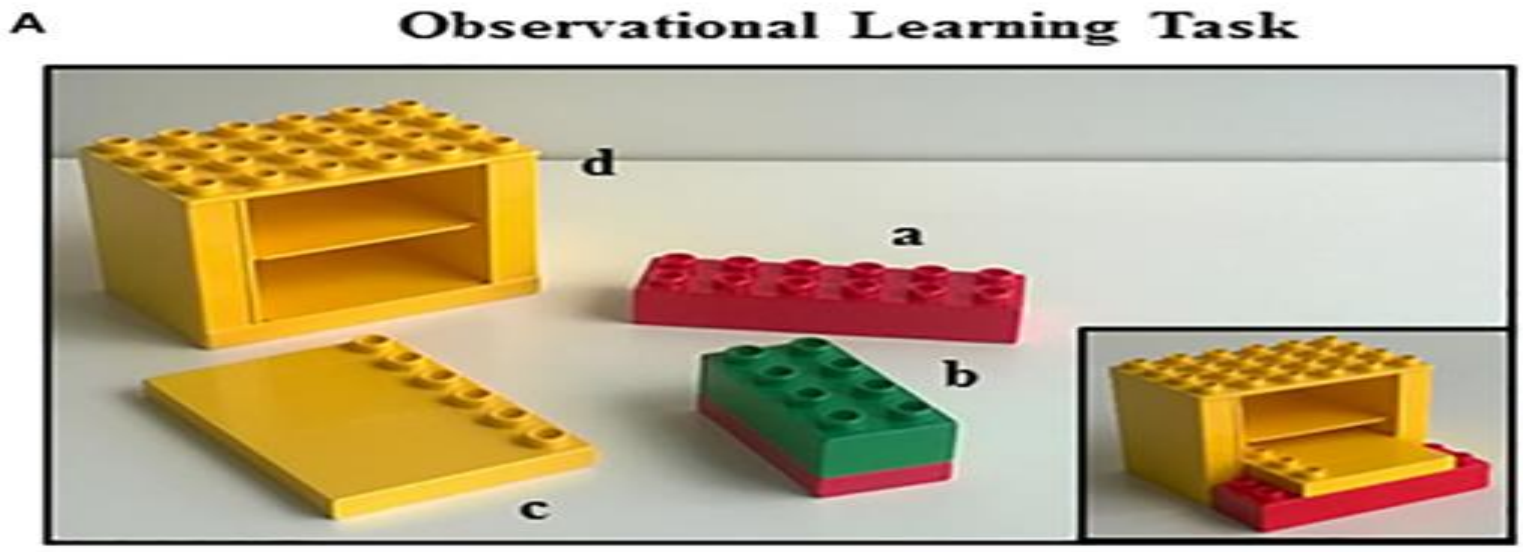


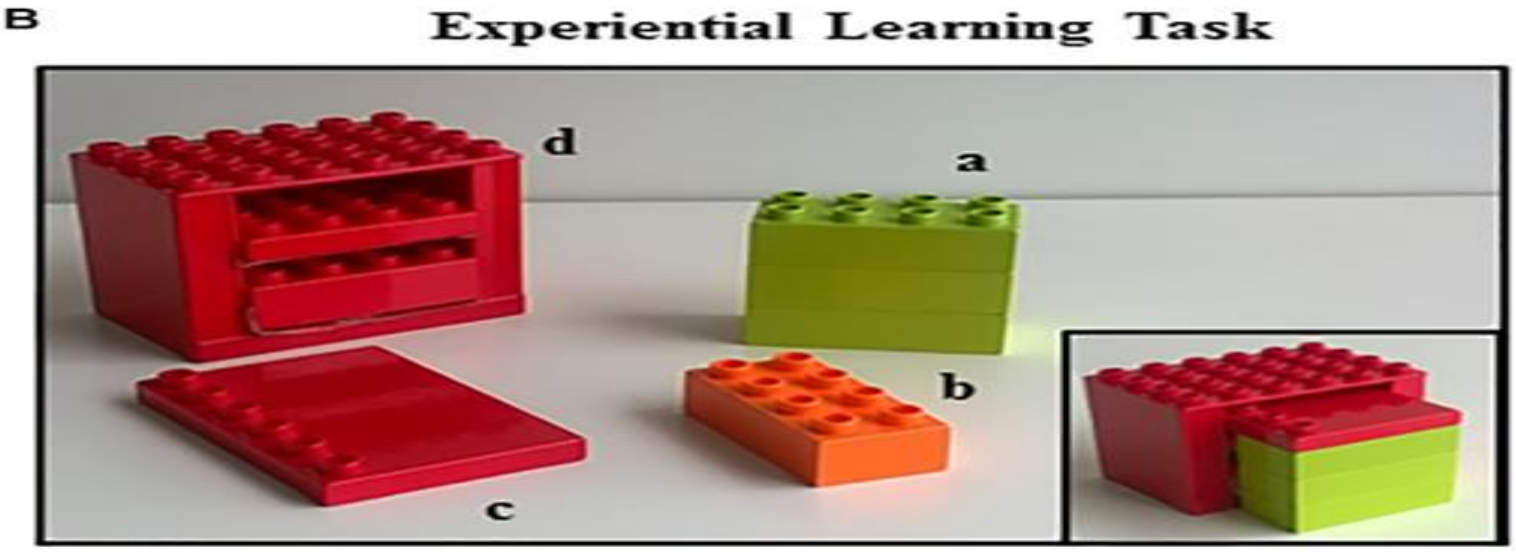


FIGURE 1 | Learning tasks. The Lego® Duplo bricks used in the observational learning task **(A)** and in the experiential learning task **(B)**. In the lower right corner of each figure is represented the final house.

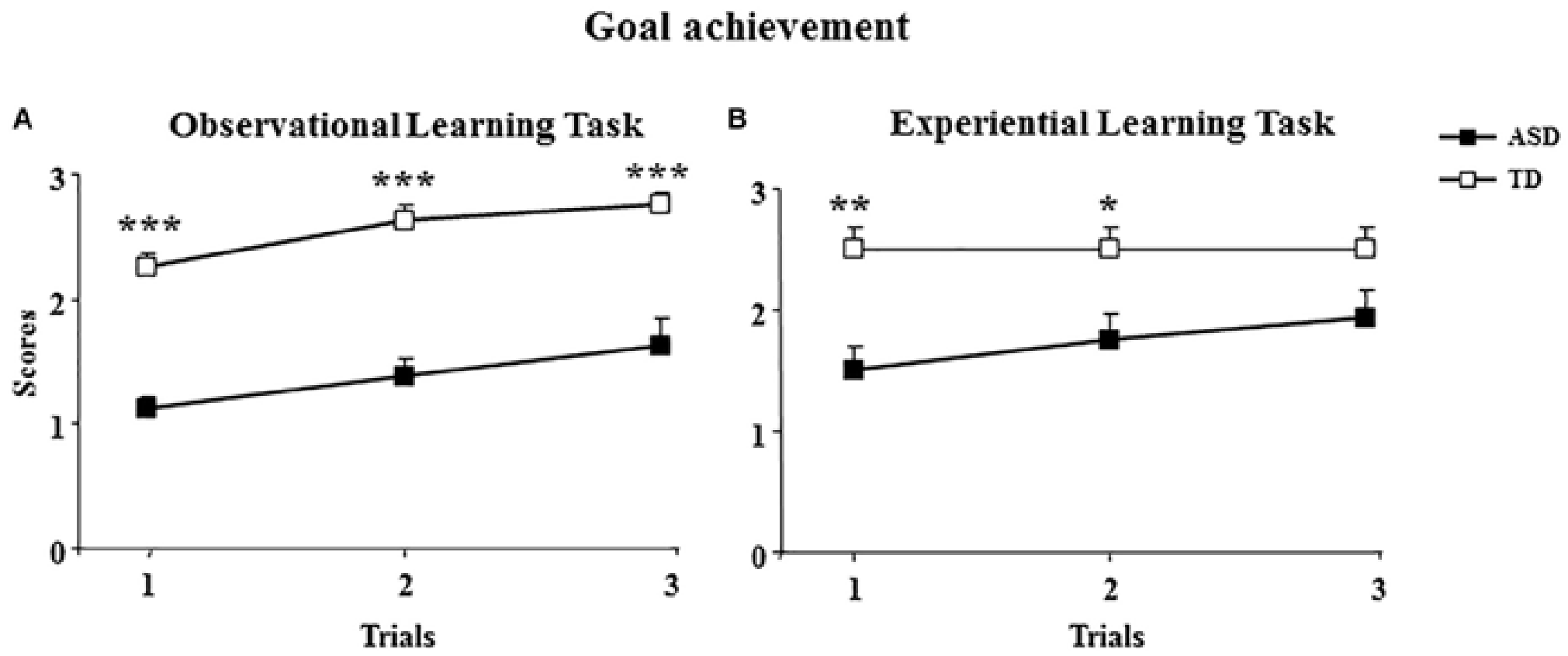
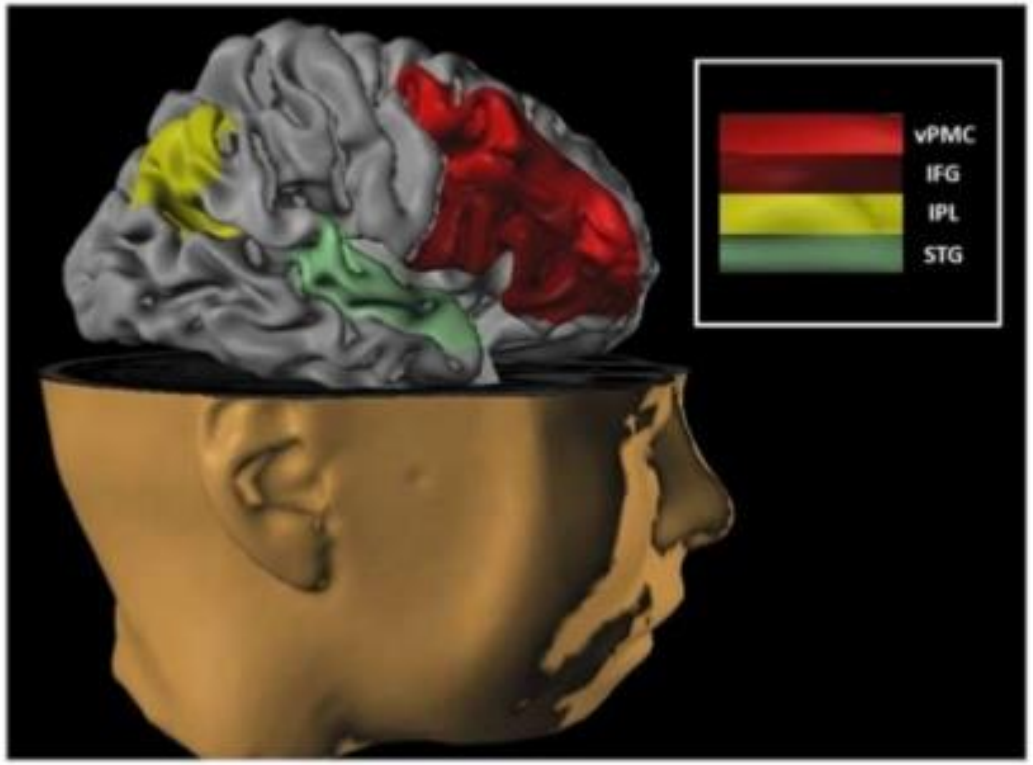


FIGURE 3 | Behavioral results of ASD and TD children. Performance of ASD and TD children in the observational learning task **(A)** and experiential learning task **(B)**. Data are presented as mean ± SEM. Asterisks indicate the significance level of comparisons between groups: $^{*}p < 0.05$, $^{**}p < 0.005$, and $^{***}p < 0.0005$.

Take-Aways

- "Hyperimitation"
- ASD tended to have a "copy-all" approach
- Reproduced the correct, incorrect and useless actions of the actor
- Hyperimitative tendencies positively associated with the thickness of the specific areas belonging to MNS ("Mirror neurons")

'Location' of mirror neurons



vPMC = ventral premotor cortex; IFG = inferior frontal gyrus; IPL = inferior parietal lobe; STG = superior temporal gyrus.

Int Arch Med. 2013; 6: 4

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Research at Alpine Learning Group- Addressing OL Deficits of Autism

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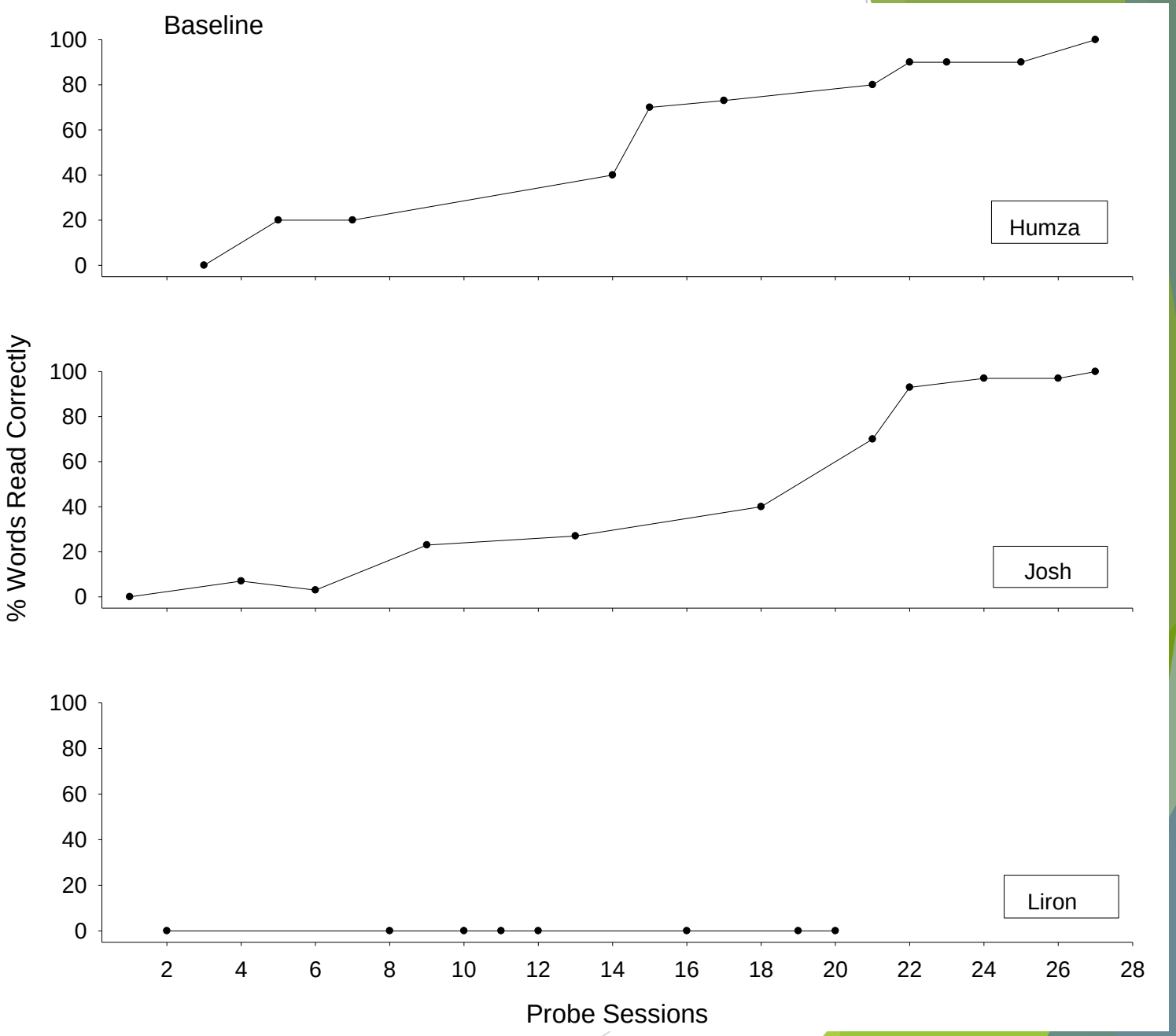

Bridget A. Taylor, 2012

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JOURNAL OF APPLIED BEHAVIOR ANALYSIS 2012, 45, 815–820 NUMBER 4 (WINTER 2012)

INCREASING OBSERVATIONAL LEARNING OF CHILDREN WITH AUTISM: A PRELIMINARY ANALYSIS

BRIDGET A. TAYLOR, JAIME A. DEQUINZIO, AND JAIME STINE

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We evaluated the effects of monitoring responses on the acquisition of sight words with 3 children with autism. In the training condition, we taught participants a vocal imitation and matching response related to a peer's reading response. In another condition, participants were exposed only to a peer's reading responses. Participants read the words more accurately during test sessions when the monitoring response was required. Results and discussion highlight the importance of identifying component responses of observational learning and the need for additional research in this area.

Key words: observational learning, autism, monitoring response

Observational learning has been defined as learning that results from observing the responding of others and the consequences of such responding (Catania, 2007). Research has demonstrated that children with autism do not readily learn by observing others (Varni, Lovaas, Koegel, & Everett, 1979), and they show deficits in skills that may be associated with observational learning, such as attending (Patten & Watson, 2011) and imitating (Williams, Whiten, & Singh, 2004). Despite these deficits, only a few studies have attempted to assess or teach children with autism to learn through observation (e.g., Charlop, Schreibman, & Tyron, 1983; Rehfeldt, Latimore, & Stromer, 2003; Werts, Caldwell, & Wolery, 1996), and only one has focused directly on training observational learning repertoires (Pereira-Delgado & Greer, 2009).

Engaging in monitoring responses, such as attending to and imitating the behavior of the model, and engaging in responses that indicate attention to relevant instructional stimuli could potentially facilitate observational learning (Taylor & DeQuinzio, 2012). To date, research has not successfully isolated or assessed the effects of monitoring responses on observational learning.

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doi: 10.1901/jaba.2012.45-815

In this preliminary investigation, we sought to determine if teaching three children with autism to monitor their peers' reading responses would lead to the acquisition of sight words. Monitoring consisted of imitating the peer's response and attending to the instructional materials as demonstrated by a matching response. In one condition, the participant observed a peer reading words presented by a teacher while the teacher prompted the monitoring responses. In another condition, we assessed the acquisition of a different set of sight words when participants were exposed to the instructional interaction between the teacher and the peer but the teacher did not prompt monitoring responses.

METHOD

Participants and Setting

Three children with autism participated: Jack, 4 years 5 months, Eric, 4 years 8 months, and Rebecca, 3 years 8 months. Their age-equivalent scores on the on the Peabody Picture Vocabulary Test were <1.9 years, 2 years, and <1.9 years, respectively. Participants could follow two-step instructions, match words, imitate vocal responses, and label pictures of nouns, and they all had experience with token economies. Two children with autism, aged 4 and 7 years, served as peer models and could read words with clear articulation. All sessions took place in a classroom and were implement-

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What we did

- Multi-element design
- Compared acquisition of sight words in two conditions
- In one condition student is exposed to model reading words and earning reinforcment for reading the words
- In other condition a monitoring response was taught
  - Imitation following the model
  - Matching chip to word card being read
- We tested their acquisition of the words during test sessions ten minutes after OL sessions

*Teacher never states the word in praise statement

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What we found

- Participants acquired the sight words in fewer sessions in the condition where the monitoring responses were required.
- For two of the participants, responding in the exposure condition improved over time, potentially indicating generalization.
- For one participant, responding did not increase in the exposure condition until monitoring was prompted in that condition.

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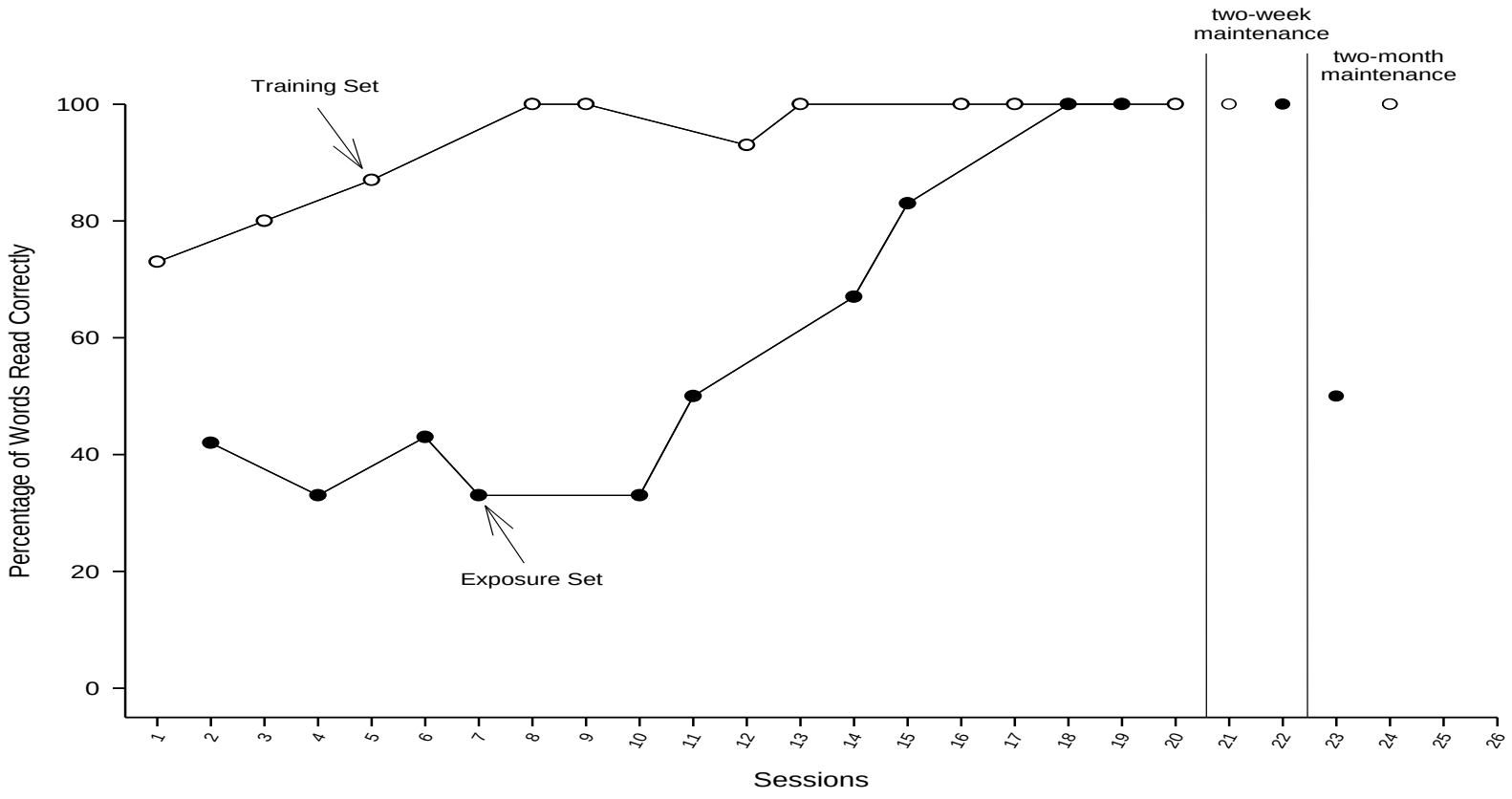
Results

Percentage of Words Read Correctly During Test Sessions

Jack



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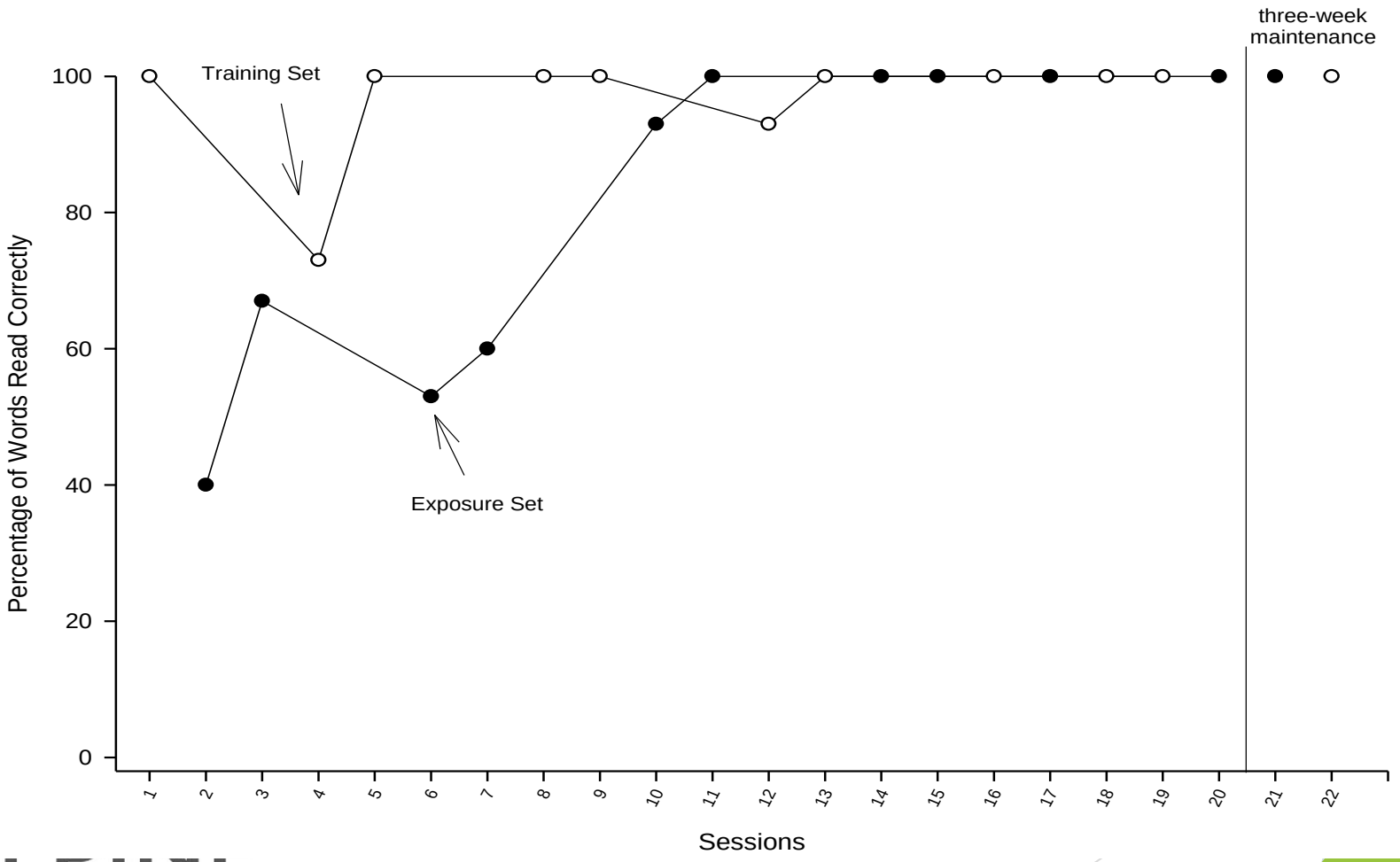
Results

Percentage of Words Read Correctly During Test Sessions

Eric



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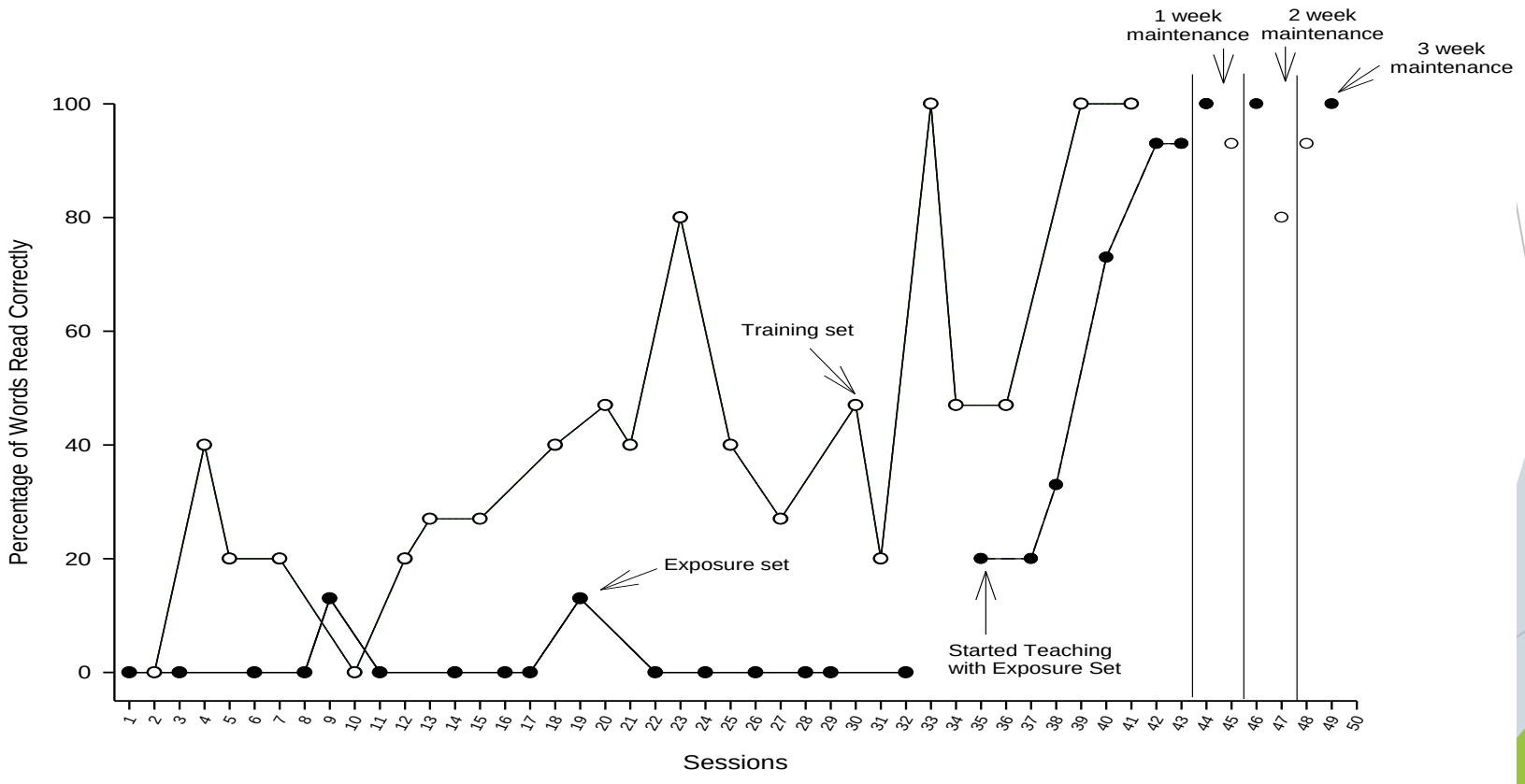
Results

Percentage of Words Read Correctly During Test Sessions

Rebecca



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Questions?

3:00

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Outline- Part 2 (3:15-4:45)

- More OL Research at ALG
- Clinical implications- Teach OL
- Attending, Imitation, Discrimination of Contingencies
- Role play
- Develop OL skill acquisition programs
- Design OL research question

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What about the discrimination of contingencies?

- How do you teach children with autism to understand differential feedback to the model?
  - Pereira-Delgado and Greer (2009)
    - - first to document acquisition of discrimination of contingencies

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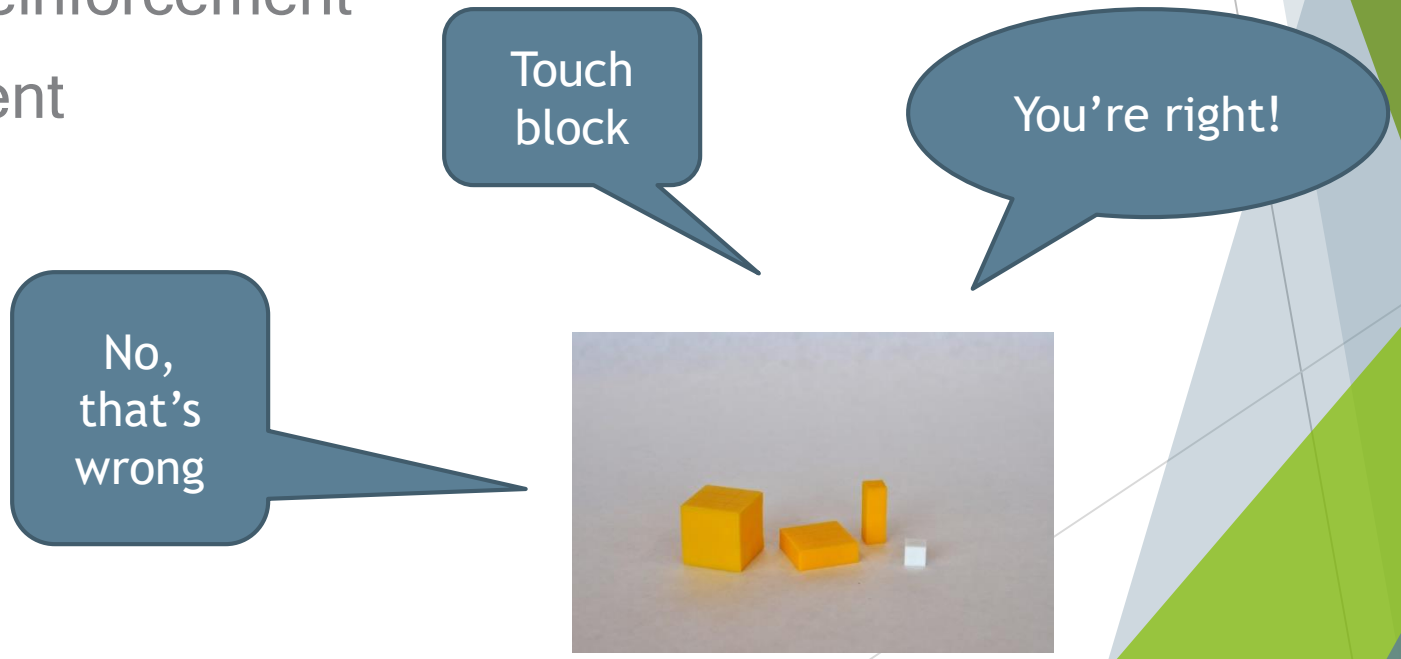
Preliminary assessment

- Will participants imitate modeled responses if a differential consequence is provided: teacher feedback
  - Praise / reinforcement
  - Punishment



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Journal of
Applied Behavior Analysis

JOURNAL OF APPLIED BEHAVIOR ANALYSIS 2015, **48,** 38–51 NUMBER 1 (SPRING)

TEACHING CHILDREN WITH AUTISM TO DISCRIMINATE THE REINFORCED AND NONREINFORCED RESPONSES OF OTHERS: IMPLICATIONS FOR OBSERVATIONAL LEARNING

JAIME ANN DEQUINZIO AND BRIDGET A. TAYLOR

ALPINE LEARNING GROUP

We taught 4 participants with autism to discriminate between the reinforced and nonreinforced responses of an adult model and evaluated the effectiveness of this intervention using a multiple baseline design. During baseline, participants were simply exposed to adult models' correct and incorrect responses and the respective consequences of each. During discrimination training, in the presence of target pictures, we taught participants to imitate the reinforced responses of an adult model and to say "I don't know" when an adult model's response was not reinforced. Test sessions were conducted after baseline, discrimination training, and generalization sessions to measure responding to target pictures in the absence of the model, prompts, and reinforcement. All 4 participants showed acquisition in the discrimination of reinforced and nonreinforced responses of the adult model during test sessions. Generalization to stimuli not associated with training was variable across the 4 participants. Implications for teaching observational learning responses to children with autism are discussed.

Key words: observational learning, autism, discrimination of contingencies

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- Sought to extend Pereira-Delgado and Greer (2009)
- Discriminating the contingencies
  - imitating the responses of the model that were reinforced,
  - saying, “I don’t know” when presented with labels that were incorrectly labeled by the model and consequence to the model’s response was “punishment” (“No, that’s wrong”)

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Discrimination of reinforced from nonreinforced responses

- Multiple baseline across participants
- Two Sets of labels unknown/unmastered
- Two conditions
  - Exposure of instruction between teacher and adult model
  - Exposure of instruction with opportunity to imitate the model when CORRECT and praise and prompts for saying, “I don’t know” when the model was incorrect and feedback was “punishing”
- Teacher presented trial to adult and delivered one of two consequences
  - Reinforcement: “Yes!, that’s right” and access to iPad
  - “Punishment”: “No that’s wrong” and no “iPad”

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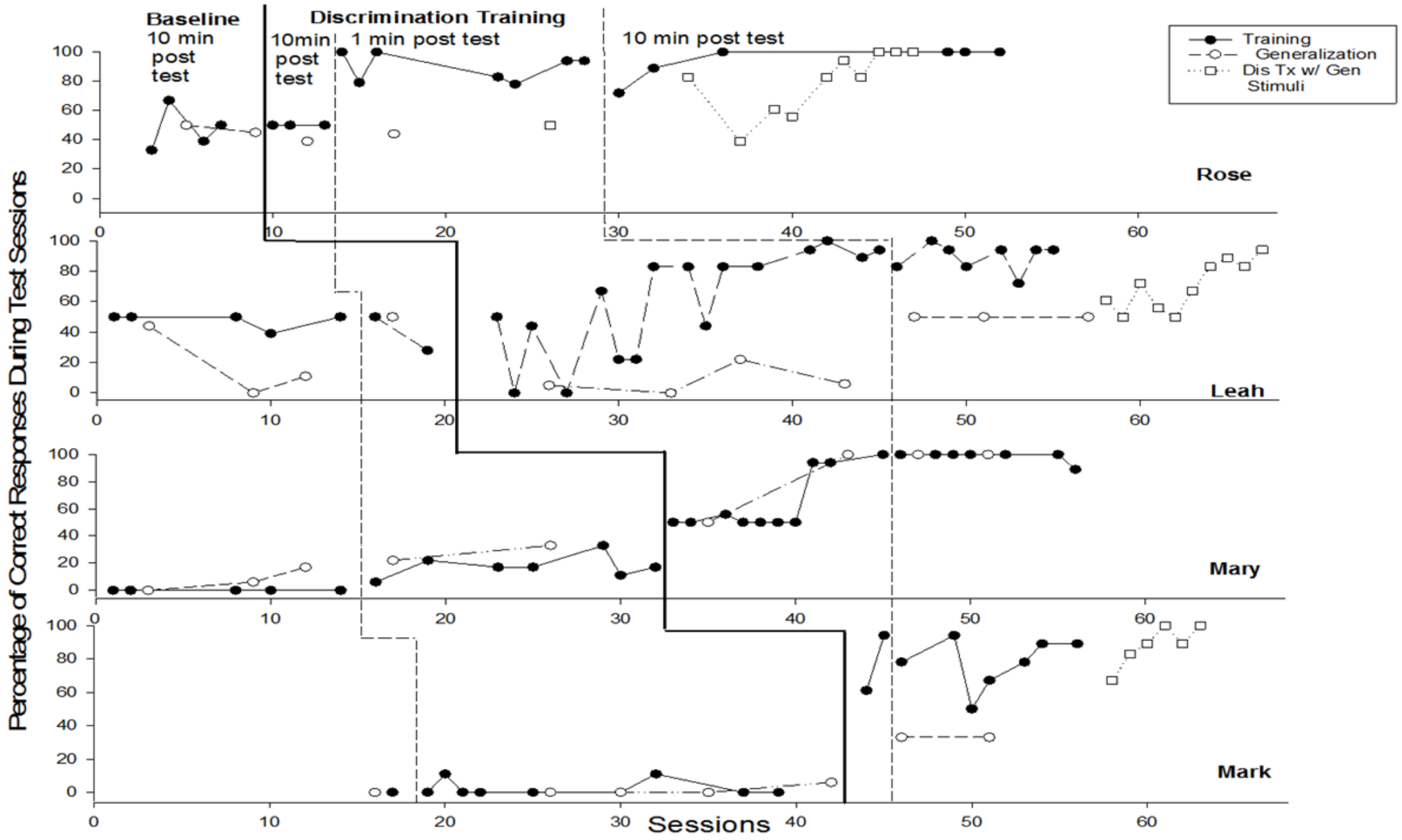
Baseline
10 min post test
Discrimination Training
10min post test
1 min post test
10 min post test
Training
Generalization
Dis Tx w/ Gen Stimuli
Rose
Leah
Mary
Mark
Percentage of Correct Responses During Test Sessions
Sessions

Journal of
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JOURNAL OF APPLIED BEHAVIOR ANALYSIS 2018, **51**, 802–818 NUMBER 4 (FALL)

OBSERVATIONAL LEARNING AND CHILDREN WITH AUTISM: DISCRIMINATION TRAINING OF KNOWN AND UNKNOWN STIMULI

JAIME A. DEQUINZIO, BRIDGET A. TAYLOR AND BRITTANY J. TOMASI

ALPINE LEARNING GROUP

We extended past observational learning research by incorporating stimuli already known to participants into training. We used a multiple-baseline design across three participants to determine the effects of discrimination training on the discrimination of consequences applied to modeled responses using both known and unknown pictures. During baseline, participants were exposed to modeled correct and incorrect picture labels and were observed to imitate modeled responses that were incorrect and followed by negative feedback. During discrimination training, we taught participants to label known pictures regardless of observed responses and consequences. With unknown pictures, we taught participants to imitate correct and reinforced modeled responses, and to say, "I don't know," when modeled responses were incorrect and received negative feedback. Test sessions measured responding to known and unknown pictures and showed acquisition over baseline levels. Generalization to pictures not associated with training was variable. Implications for teaching observational learning to children with autism are discussed.

Key words: autism, discrimination training, observational learning

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Stimulus	Model's Response	Consequence to Model	Error Correction with Rules (Participant)
KNOWN	Correct	"You are right" + Deliver Edible	You Know It She Got it Right Say What You Know
	Incorrect	"I'm sorry that's wrong" + Remove Edible	You Know It She Got It Wrong Say What You Know
UNKNOWN	Correct	"You are right" + Deliver Edible	You Don't Know It She Got It Right Say What She Said
	Incorrect	"I'm sorry that's wrong" + Remove Edible	You Don't Know It She Got it Wrong Say "I don't know"

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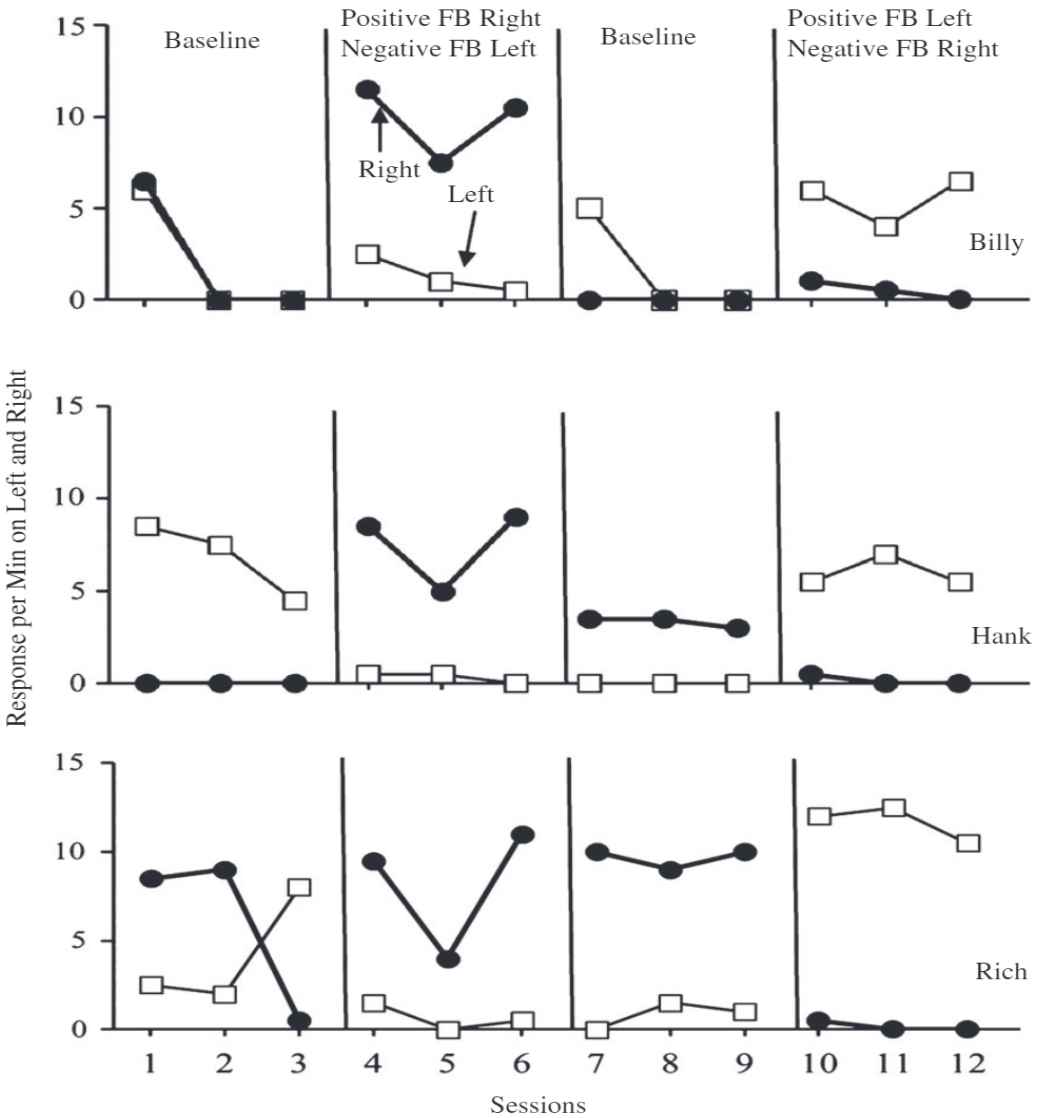

Figure 1. Response per minute on the left and right of the concurrent-operant assessment of feedback during baseline, when positive feedback (FB) was provided for responding on the right and negative feedback was provided for responding on the left, and when positive feedback was provided for responding on the left and negative feedback was provided for responding on the right.

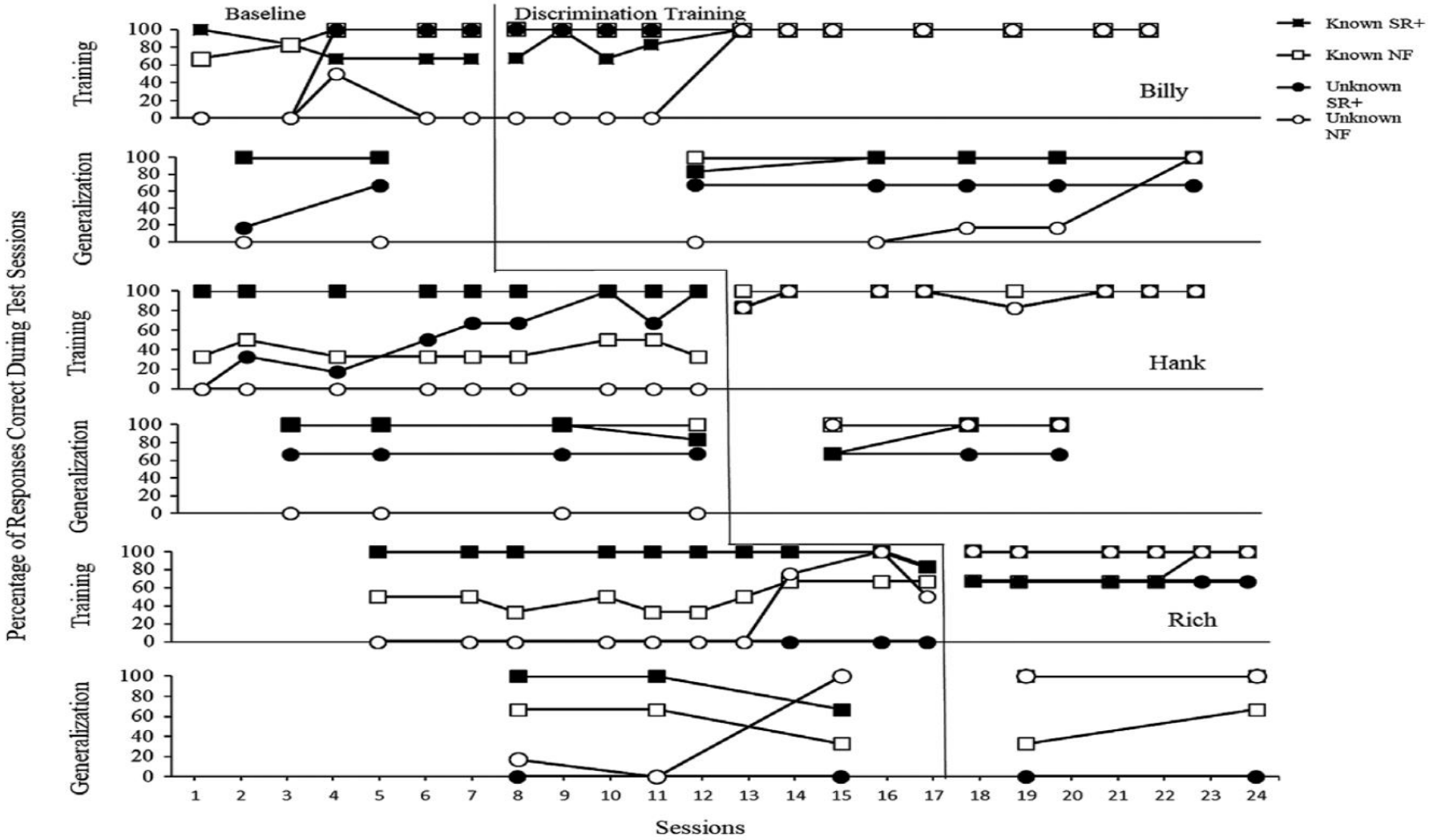

Figure 2. Percentage of responses correct to training stimuli (top panels) and generalization stimuli (bottom panels) during test sessions on known/reinforced trials (solid squares), known/negative feedback trials (open squares), unknown/reinforced trials (solid circles) and unknown/negative feedback trials (open circles) for Billy, Hank, and Rich.

Questions?

T1 E1 A1 C3 H4

Clinical Applications- Teach OL

- Monitor environmental events, discriminate modeled behavior + consequences+ respond later in time absence of the model
- Peer tutoring=learn to discriminate contingencies
- Yoking contingencies=MO

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Attending/ observing

Imitation

Discrimination of contingencies

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Attending / Observing behavior

- Makes eye contact with adults (reinforcer is functional)
- Visually tracks adult's actions (tacts actions as occurring)
- Looks at peers when instructed
- Visually tracks peer's actions (tacts actions as occurring)
- Increase duration of looking for longer and longer periods of time (with and without distractor stimuli)
- Tacts instructional stimuli observed during and after lesson

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Attending / Observing behavior

- Observes multiple actions at the same time
  - Tacts actions after viewing
  - Tacts actions after increased interval of time

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Imitation

- Imitation of motor movements (gross, fine, facial)
- Imitation with objects
- Imitation of vocalizations / words / sentences
- Imitation of vocalizations / words / sentences with movements
- Imitation of a completed action
- Imitation of a sequence
- Block imitation,etc.

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Expanding Imitation Training

- Generalized motor, object, and vocal imitation
  - Adult
  - Peer
- Imitation of a group
- Imitation of actions that lead to a desired outcome
  - Operation of toys
  - Access to tangible
- Retention of modeled actions
  - Increased delays in time

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OL Paradigm-ALG

- Instructor sits across from model and observer.
- Presents mastered and unmastered stimuli
- Delivers appropriate consequence to model
- Teaches observer using rules and discrimination training to imitate and say “I don’t know” or some other response
- Test later on

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Questions?

Your Turn!

- Role play- groups of 3-4 people
- Roles: Teacher, Model, Observer (Student), Data Collector
- Identify targets (get creative!)
- Mastered and unmastered
- Divide into correct/incorrect
- Arrange trial order
- Conduct OL session
- Train the discrimination using rules and differential reinforcement
- Post-test in absence of the model

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Research Projects- Additional OL Variables

- OL of long response chains
- Learning social responses
- Effects of self-echoic responses
- Model shifts responding

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Use of Video and Verbal Coaching

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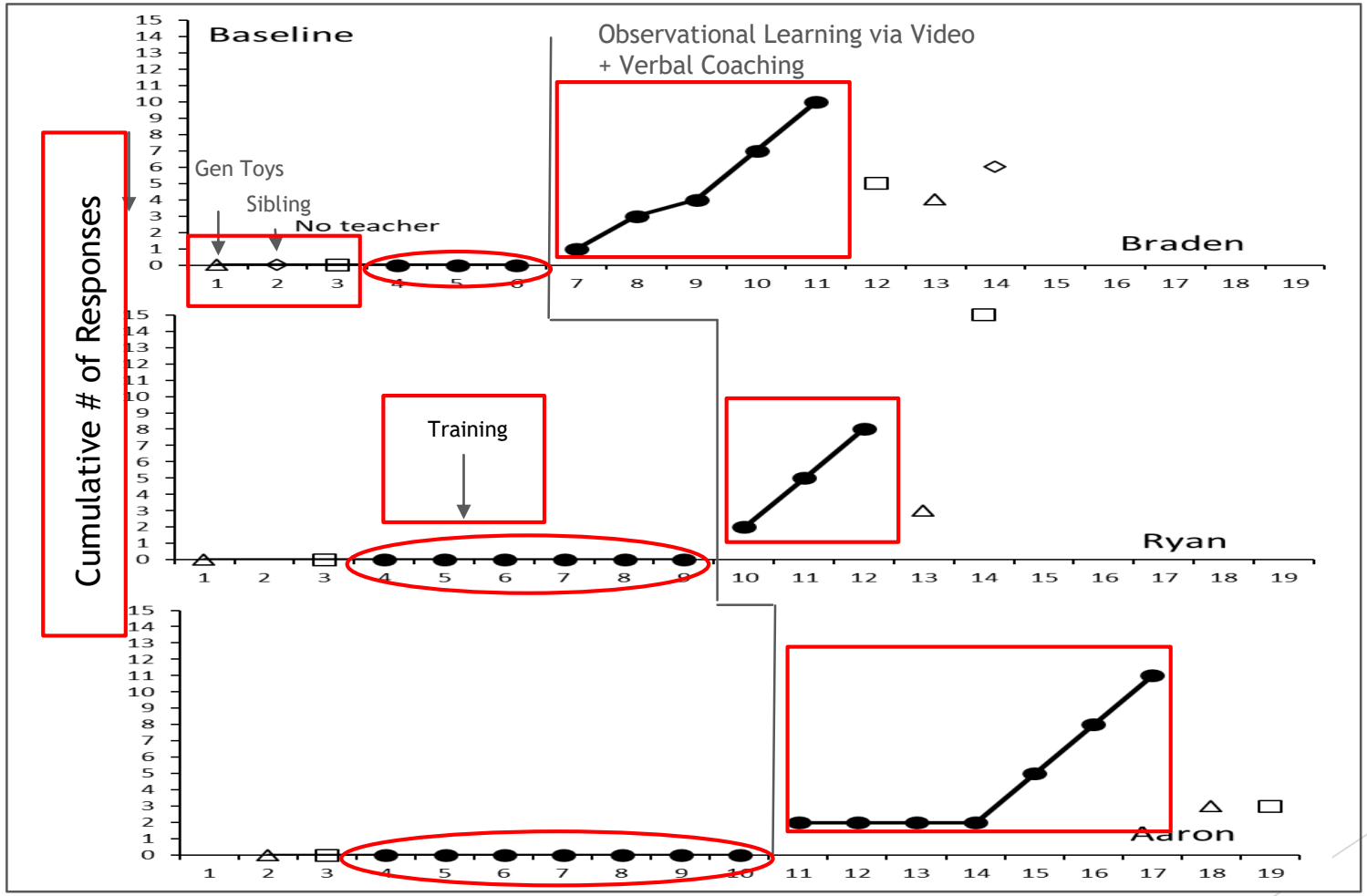

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Effects of Self-Echoic Responses

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Self-Echoic Responding

- Verbal rehearsals /"Self echoic"
- NTP engage in verbal rehearsals to facilitate recall of those responses later on (e.g., Bebko & Ricciuti, 2000).
- Esch et al., (2010) NTC use self-echoic responses to recall information
- Children with autism do not use self-echoic responding as much as their age-matched TDP.
- Self-echoic repertoire should be useful

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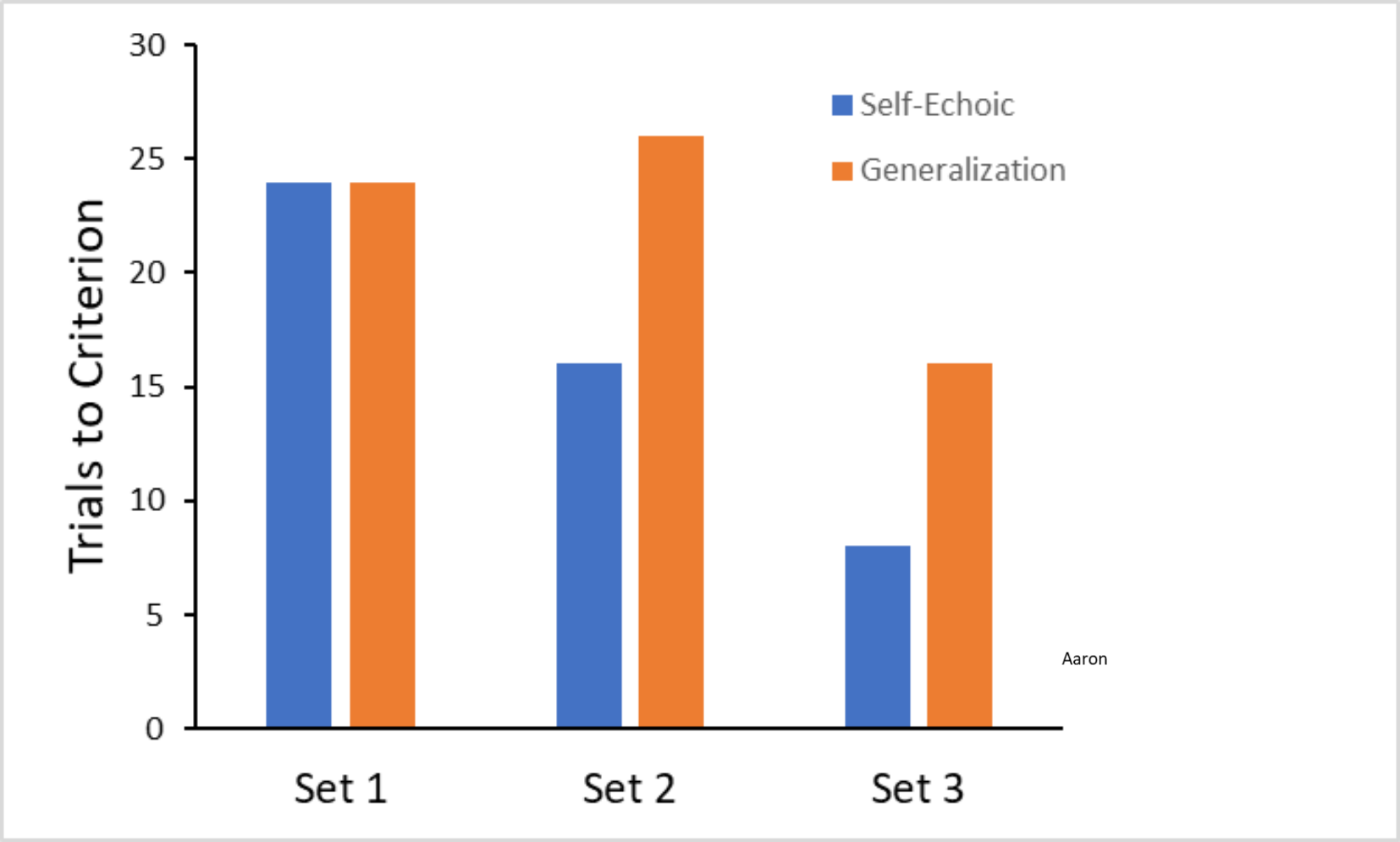

Aaron

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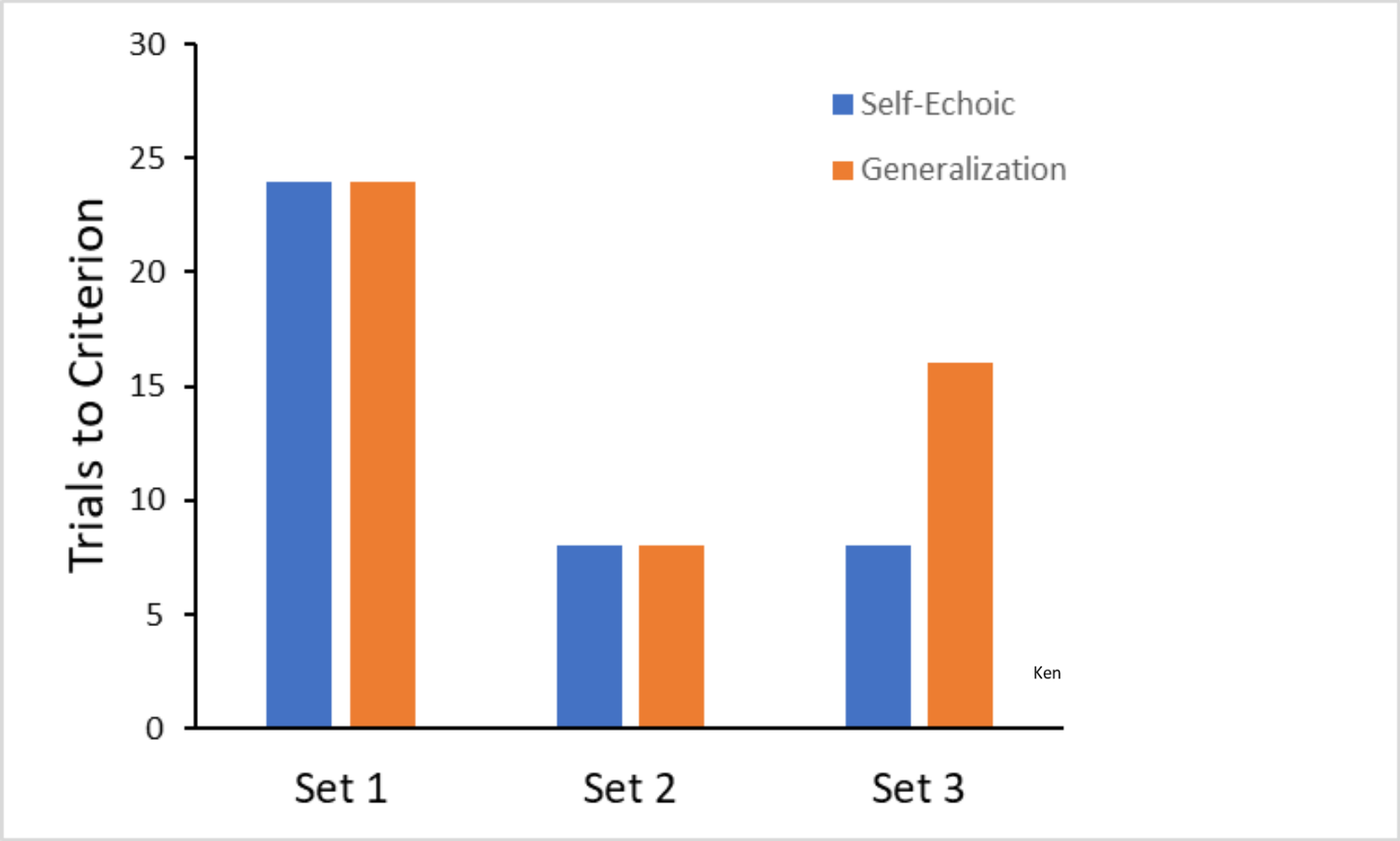

Ken

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Model Shifts Responding

Phase	Training	Generalization
1. Baseline- Exposure No training	2 Correct- No TX	2 Correct- No TX
	2 Incorrect- No TX	2 Incorrect- No TX
2. Discrimination Training	2 Correct, teach Imitation	2 Correct- No teaching
	2 Incorrect, teach IDK	2 Incorrect- No Teaching
3. Shift	**2 correct- continue to imitate**	2 Correct- No teaching
	2 Incorrect shift to correct- response should change from IDK to imitation	2 **Incorrect shift to correct- response should change from IDK to imitation** - No Teaching
4. Rules + Differential Reinforcement	**Use rules and differential reinforcement to teach shift to correct**	No teaching

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Future Directions

- Develop protocols that lead to more efficient learning
- Procedures for more “challenged” learners and older learners
- Expand the responses targeted – complex social responses
- How do we empirically evaluate procedures to assess component responses while controlling for certain variables? (e.g., adult model versus peer model)
- Further refine a behavior analysis of OL (e.g., role of verbal behavior- rehearsing rules?, role of ‘self echoic’ - rehearsing content?)

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YOUR TURN!

- Plan a research study
- Research question
- IV
- DV
- Experimental design
- Share

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Thank you!

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