Social Reinforcement in Early Intervention with Children with ASD

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Reinforcement in EIBI

- Key assumption in behavior analysis: There's always reinforcement
- Early intervention doesn't work without effective reinforcers and appropriate reinforcement contingencies
- Categories of reinforcement:
  - Edible
  - Tangible (e.g., toys)
  - Tokens
  - Embedded in activities
  - Social

Reinforcement: Practical Considerations

- Downside of delivering edible and tangible reinforcers directly:
  - Satiation/habituation
  - Reinforcer consumption interrupts activities
  - Interrupts flow of naturalistic teaching / activities

Early Intervention and Reinforcement

- Solutions:
  - Establish tokens as generalized conditioned reinforcers
    - Allows for reinforcer accumulation
    - Reduces satiation/habituation
    - Limitation: Social/ecological validity
  - Embed teaching in intrinsically reinforcing activities
    - Limitation: Difficult if few activities are preferred
    - Not sufficient if social interactions are not reinforcing

Early Intervention and Reinforcement

- Solutions:
  - Establish social interactions as reinforcers
    - Reduces need for edible and tangible reinforcement
    - Increases generalization and maintenance in everyday environments
    - Facilitates/enables teaching of social skills

The Concept of Social Reinforcement

- "Social" stimuli as contingent consequences

- "…[S]ocial stimuli do not differ from other stimuli in their dimensions. Rather, the difference is one of *origin.* They arise from other organisms, their behavior, or the products of their behavior. Moreover, social stimuli do not differ in their *function* from those of inanimate origin…Social life arises because social stimuli come to exercise these functions."
  - Keller & Schoenfeld, 1950 pp. 352-353.

The Concept of Social Reinforcement

- "Social behavior may be described as behavior for which the reinforcing or discriminative stimuli are, or have been, mediated by the behavior of another organism."
  - Keller & Schoenfeld, 1950, pp. 257-258.
- "Social reinforcement is usually a matter of personal mediation…verbal behavior always involves social reinforcement and derives its characteristic properties from this fact."
  - Skinner, 1953, p. 299.

The Concept of Social Reinforcement

- Social events/stimuli
  - Primary or conditioned reinforcers?
  - Primary reinforcer: A reinforcer whose effectiveness does not depend on contingent relation to another reinforcer
  - Conditioned reinforcer: A reinforcer whose effectiveness depends on a contingent relation to another reinforcer
  - Generalized reinforcer: A conditioned reinforcer based on several (more than one) primary reinforcers.
    - Catania, 1998

The Concept of Social Reinforcement

- Are social interactions inherently reinforcing?
- A better question: Can social stimuli be primary reinforcers?
  - *Yes? No? Maybe...?*
- A key point for our current purposes: It has to "pay off" for the individual to respond to social events/stimuli.

Social Reinforcement and EIBI

- The main idea: Social stimuli have to function as generalized conditioned reinforcers
  - Otherwise, social skills and verbal behavior will not maintain or generalize in appropriate contexts.

Social Competence

- "Social competence may be represented in the success with which young children select and use behavioral strategies that are effective in achieving (their social) goal."
- "…Children "learn the rules" for effective and social behaviors in multiple social contexts from both peers and adults."
  - Odom, McConnell, & Brown, 2008 (pp. 4, 22)

Social Competence

- "It is conceivable that many of the difficulties with…intervention efforts, such as limited generalization and maintenance…may be due to failing to define social responses in relation to the motivational functions of behavior, and failing to understand the complexity of contextual stimulus control."
  - Haring, 1992, p. 308.

Social Competence

- Key aspects of social competence:
  - Social skills occur in the context of activities/environmental contexts
  - Generalization & maintenance
  - Reciprocity

Social Competence

- Take-home point: Social competence is more about being able to learn and adapt than a specific list of skills.
  - (Nevertheless, teaching specific skills can be very important.)

Social Competence and Reinforcement

- Social learning
- Discriminative stimuli in other people's behavior
  - Understanding others' "intentions"
  - Being able to predict what others will do

Social Competence and Reinforcement

- Learning from others
  - Imitation
  - Observational/vicarious learning
- Others' actions become SDs/S-deltas
- Unlikely to generalize without social stimuli functioning as generalized conditioned reinforcers

Social Reinforcement and Verbal Behavior

- Verbal Behavior (Skinner, 1957)
  - Mands vs. tacts/listener responses
  - Mands "benefit the speaker"
    - I.e., communicate wants and needs
    - Are under control of momentary MOs
    - Characteristically reinforced
    - But, the reinforcers can be both social and nonsocial
    - Such as is manding for attention and information

Social Reinforcement and Verbal Behavior

- Verbal Behavior
  - Tacts and listener responses "benefit the listener"
    - Under the stimulus control of nonverbal aspects of the environment
    - Maintained/strengthened by generalized reinforcement
    - Unlikely to generalize and maintain unless social interactions function as conditioned reinforcers
    - Reciprocity of speaker and listener interactions

Social Deficits in ASD

- Social interest and skills varies widely
- Can improve over time
- Yet, "…it is clear that social behavior in the context of autism is rarely normal" (Davis & Carter, 2014, p. 213).
- Deficits in social initiations (Sigman, Mundy, Sherman, & Ungerer, 1986)
- "Adolescents with autism participate in far fewer social activities than their typically developing peers" (Davis & Carter, 2014, p. 222).

Social Deficits in ASD

- DSM-5
  - Deficits in social-emotional reciprocity
  - Deficits in nonverbal communicative behaviors used for social interaction
  - Deficits in developing, maintaining, and understanding relationships

Social Deficits in ASD

- Discuss with your neighbors:
  - Examples of different manifestations of social skills deficits in individuals with ASD
  - Severe skill deficits
  - Mild skill deficits (i.e., "high-functioning" individuals)

Social Deficits in ASD

- Joint attention
  - Deficits in JA often the earliest manifestation of ASD (Gerenser, 2013)

Joint Attention in Typical Development

Social Deficits in ASD

- Social referencing
  - Social behavior (e.g., facial expressions, gestures) of others serves as SD for approach (Pelaez, Virues-Ortega, & Gewirtz, 2012).
  - Could be one way in which social stimuli are conditioned as reinforcers.

Social Deficits in ASD

- "Theory of mind" / Perspective taking
  - Inference that others have private events
  - Inference that stimuli that control others' behavior are different than stimuli that control own behavior
  - Involves complex discriminations of one's own and others' behavior (Spradlin & Brady, 2008)
  - Empathy may partially derive from acquiring a perspective-taking repertoire

The Social Motivation Theory of ASD

- Are deficits (and excesses) in ASD due to reinforcer deficits?
- "Social motivation models…posit that early-onset impairments in social attention set in motion developmental processes that ultimately deprive the child of adequate social learning experiences, and that the resulting imbalance in attending to social and non-social stimuli further disrupts social skill and and social-cognitive development"
  - Chevallier et al., 2012

The Social Motivation Theory of ASD

- Are deficits (and excesses) in ASD due to reinforcer deficits?
- "In the social motivation framework, diminished social interest is thought to deprive the developing child of social inputs and learning opportunities, which, ultimately, leads to diminished expertise in social cognition."
  - Chevallier et al., 2012
- Thus, social skill deficits are thought to be a *consequence* of diminished social motivation.

Social Reinforcers and ASD

- Are social reinforcers effective for individuals with ASD?

- Discuss with your neighbors:
  - Examples of social reinforcers that you have found effective, both "ordinary" (i.e., common), and less common

The Effectiveness of Social Reinforcers

- A multitude of studies have shown social reinforcers (e.g., attention) to be effective with a wide variety of populations in multiple contexts.
  - E.g., social stimuli as reinforcers for vocalizations in 2-3 month infants (Poulson, 1983).
  - Attention the second most common function of problem behavior in FAs (Hanley, Iwata, & McCord, 2003).

The Effectiveness of Social Reinforcers

- Preference and reinforcer assessments to identify social reinforcers
  - Smaby, McDonald, Ahearn, & Dube, 2007
  - Nuernberger, Smith, Czapar, & Klatt, 2012
  - Call, Shillingsburg, Bowen, Reavis, & Findley, 2013
  - Gutierrez, Fischer, Hale, Durocher, & Alessandri, 2013

The Effectiveness of Social Reinforcers

- Kelly, Roscoe, Hanley, & Schlichenmeyer, 2014
  - Paired stimulus preference assessments (using pictures) were more reliable than single-stimulus reinforcer assessments
  - The reinforcers identified included back pats, head rubs, cheek pops, and tickles
  - Compared several pre-assessments to identify potential reinforcers to include in the assessments
    - The most effective reinforcers came from various pre-assessments, and two were included based on previous research

Table 1

Topographies of Attention Included in the Stimulus Array and How They Were Informed from the Preassessment

Roy	Arron	Dee	Mace	Andy
Singing (SSQ)	Clapping (SSQ)	Facial expressions (SSQ)	Back pats (SSQ)	High fives (SSQ)
Hugs (SSQ)	Smiles (SSQ)	Nose beeps (DA)	Hugs (SSQ)	Hand holding (SSQ)
Back pats (DA)	High fives (DA)	Cheek pops (MOM)	Hand holding (DA)	Back pats (DA)
High fives (DA)	Back pats (DA)	Conversation (SSQ, DA, MOM)	High fives (DA)	Shoulder tickles (DA)
Head rubs (PR)	Head rubs (PR)	Head rubs (PR)	Head rubs (PR)	Head rubs (PR)
Tickles (PR)	Tickles (PR)	Tickles (PR)	Tickles (PR)	Tickles (PR)
Praise (PR)	Praise (PR)	Praise (PR)	Praise (PR)	Praise (PR)
Control	Control	Control	Control	Control

Note. SSQ = social stimuli questionnaire; DA = descriptive assessment; MOM = manipulation of the motivating operation; PR = previous research.

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Head rubs (PR)	Head rubs (PR)	Head rubs (PR)	Head rubs (PR)	Head rubs (PR)
Tickles (PR)	Tickles (PR)	Tickles (PR)	Tickles (PR)	Tickles (PR)
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From Kelly et al., 2014 (JABA)
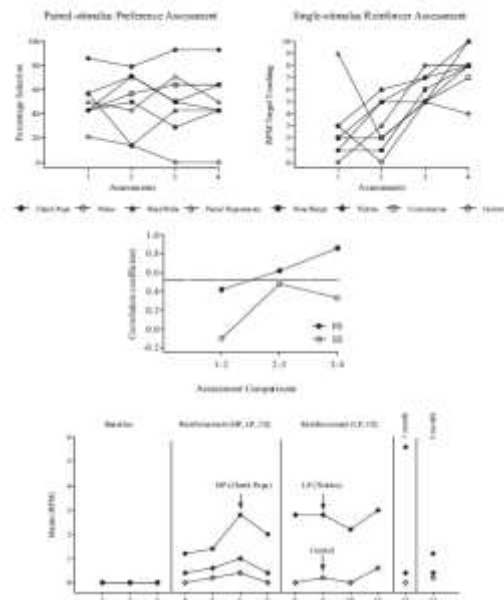
Figure 4 From Kelly et al., 2014 (JABA)

Joint Attention and Social Reinforcement

- Thesis conducted by Kimberly James-Kelly (Fairman)
- Joint attention as key deficit in ASD
- Cognitive vs. behavioral views of joint attention
  - Coordination of attention to an event or stimulus between two or more people for the purpose of sharing
  - Eye contact, gaze shift, pointing, responding to gestures, reciprocal commenting, etc.

Joint Attention and Social Reinforcement

- Categories of joint attention
  - Responses to the JA initiations of others vs. JA initiations
  - "Protodeclarative" vs. "Protoimperative" JA
- The current study focused on protodeclarative initiations
- Previous research has sometimes used intrusive prompting and arbitrary reinforcement
  - Maintenance and generalization of protodeclarative initiations has been inconsistent

Joint Attention and Social Reinforcement

- Current study: Fairman & Ingvarsson (in progress)
  - Participants: Children with ASD for whom some form of social interaction likely functioned as a reinforcer
  - MSWO preference assessment to identify preferred items
  - Items placed on shelves in session room
  - Target behavior: Relevant comment + gaze shift
  - If participant didn't engage in target behavior for 30 seconds, the experimenter modeled the target behavior
  - Naturalistic social consequences
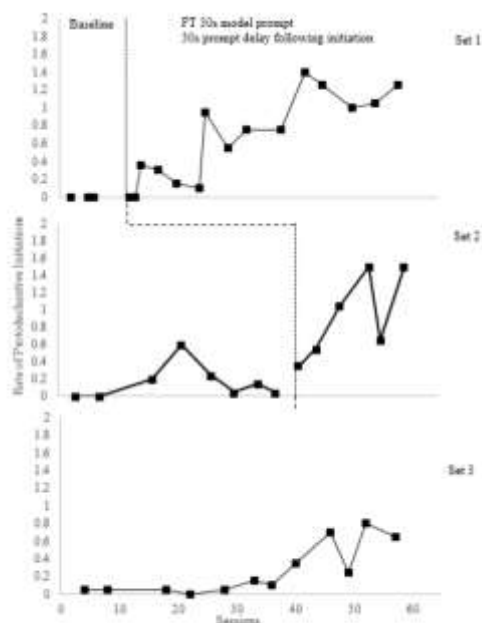
Figure 1. Rate of protodeclarative initiations during baseline and intervention sessions.
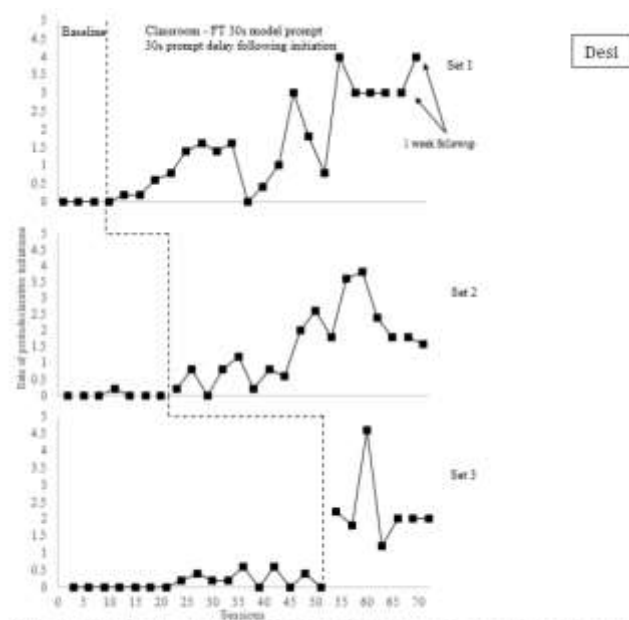
Figure 3. Rate of protodeclarative initiations during classroom baseline and intervention sessions.
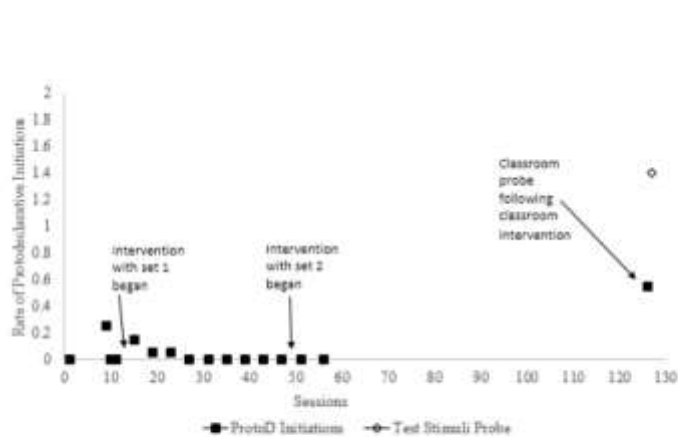
Figure 2. Rate of protodeclarative initiations during classroom probes. Closed squares indicate the rate of protodeclarative initiations during classroom probes (test stimuli not present). The open diamond indicates the rate of protodeclarative initiations during the test stimulus probe (test stimuli were present).

Discussion

- Modeling and naturalistic consequences were sufficient to establish protodeclarative initiations
- Data collection with additional participants is underway
- Long-term maintenance
- Maintenance in absence of prompts
- Future studies should include systematic evaluation the reinforcing properties of attention and social interactions

Establishing Social Interactions as SR+

- Stimuli involved in social interactions as conditioned reinforcers
- Concept of conditioned reinforcement
- Three recommended methods:
  - Stimulus-stimulus pairing
  - Response-contingent pairing
  - Discrimination training
- Test for conditioning: New response method

Stimulus-Stimulus Pairing (SSP)

- Neutral stimulus presented immediately prior to or simultaneously with reinforcing stimulus
- No response requirement (other than attending)
- Multitude of studies have explored SSP to establish speech sounds as conditioned reinforcers

Stimulus-Stimulus Pairing (SSP)

Response-Contingent Pairing (RCP)

- Identical to stimulus-stimulus pairing, except that pairing occurs following a response
- Recommended by Lovaas and others
  - Pairing praise with delivery of primary reinforcers following correct response

Response-Contingent Pairing (RCP)

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Discrimination Training (DT)

- Neutral stimulus established as an SD, signaling the availability of the primary reinforcers
- Responding in the presence of the SD reinforced, responding the presence of the S-delta extinguished/blocked

Discrimination Training (DT): SD Trials

Discrimination Training: S-delta Trials

Previous Research: SS

- Stimulus-stimulus pairing:
  - Research on establishing speech sounds as reinforcers
  - Inconsistent results

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Previous Research: RCP

- Dozier, Iwata, Thomason-Sassi, Worsdell, & Wilson (2012)
  - SSP not effective
  - RCP effective with 4 out of 8 participants in conditioning specific praise statements as reinforcers
- Lepper & Pétursdóttir (in press)
  - Compared RCP and SSP (or RIP)
  - 3 non-verbal boys with autism
  - Conditioning speech sounds
  - RCP resulted in greater increases in target vocalizations
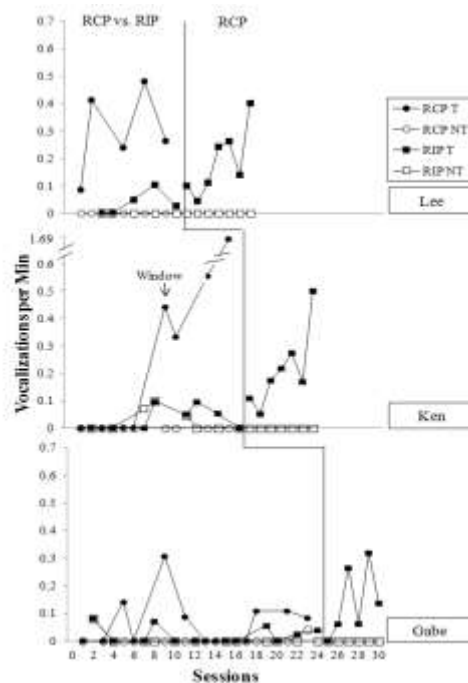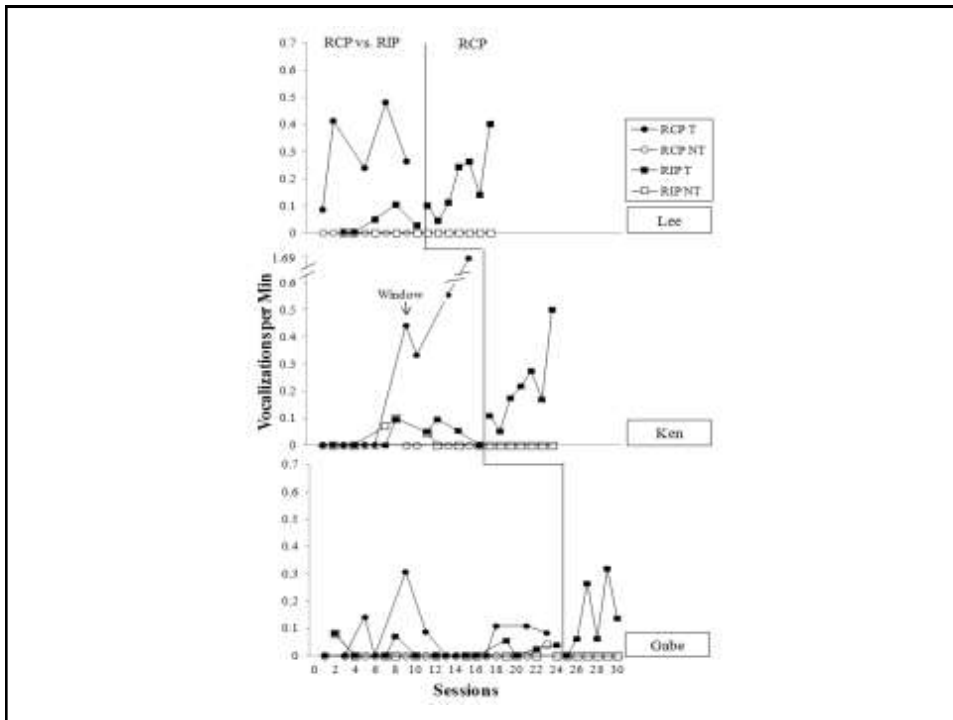
Previous Research: DT

- A handful of studies evaluating DT to establish conditioned reinforcers have been conducted.
  - Lovaas et al. (1966)
  - Isaksen & Holth (2009)
  - Taylor-Santa, Sidener, Carr, & Reeve (2014)
- Comparing DT and SSP
  - Holth et al. (2009) – compared DT and SS
  - Lepper, Petursdottir, & Esch (2013)

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Conditioning Social Stimuli as Reinforcers

- Koelker, Ingvarsson, Ellis, Le, & Anderson
- Comparing a Discriminative Stimulus Procedure and a Pairing Procedure: Conditioning Neutral Social Stimuli as Reinforcers

Conditioning Social Stimuli as Reinforcers

- Lovaas et al. (1966)
  - Discrimination training procedure effective
  - Manipulated establishing operations
  - Stereotypy suppressed through shock prior to study
- Holth (2009) Discrimination training vs Pairing
  - 5 out of 7 children SD procedure more effective
  - 1 out of 7 children Pairing more effective (autism)
  - 1 out of 7 equal (autism)
  - Bias in responding during pretests

Conditioning Social Stimuli as Reinforcers

- Assessments and Posttests
  - Bubba: concurrent operants
  - Jaron: ABA
- Discriminative stimulus procedure conducted first
- Pairing procedure: Number of pairings yoked to number of SD procedure trials
- IV: Discriminative stimulus procedure and pairing procedure
- 2 participants completed entire study

Conditioning Social Stimuli as Reinforcers

- Preference Assessment (not shown)
- Reinforcer Assessment (not shown)
- Response Assessment
  - Find 6 responses
  - Rule out automatic reinforcement
  - Free operant
- Neutral Social Stimuli Assessment
  - Find 2 gestural stimuli
  - Do not already function as reinforcers

Bubba: Response Assessment
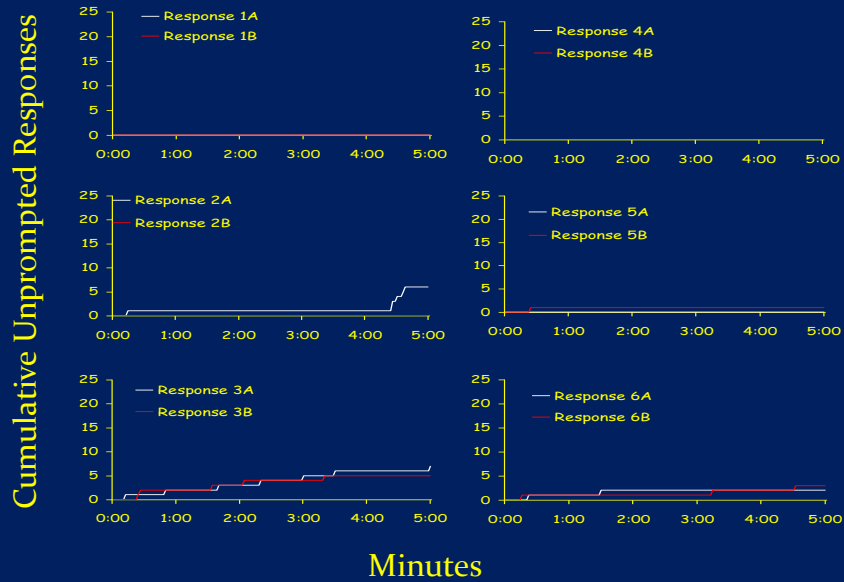
Jaron: Response Assessment
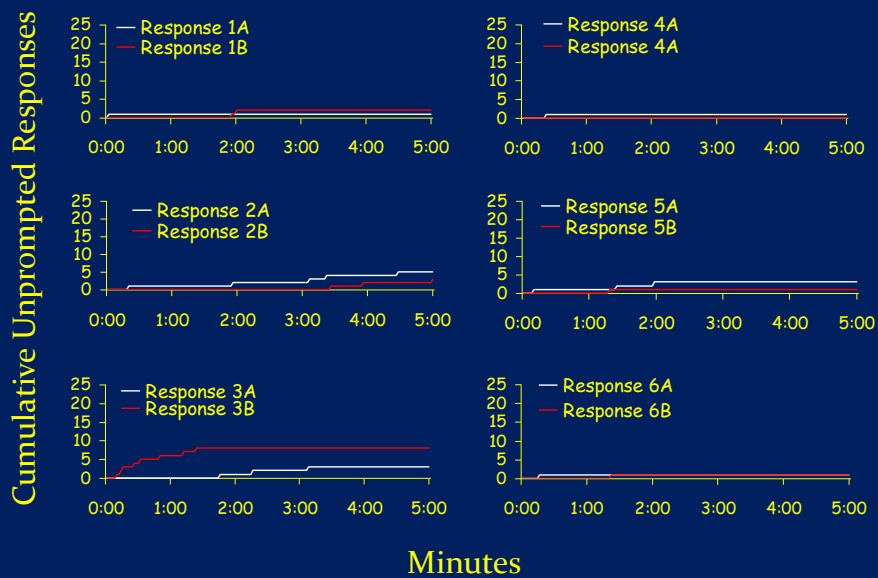
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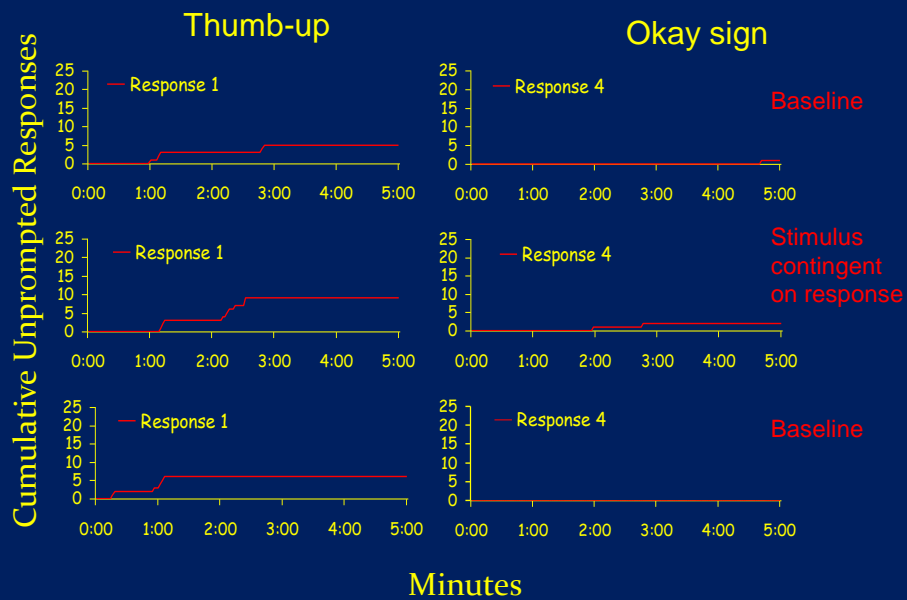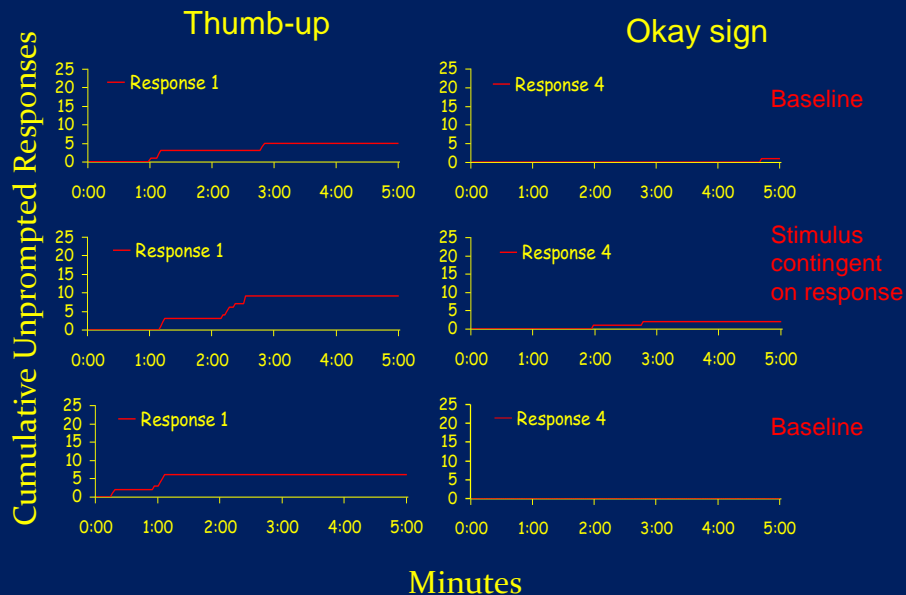
Jaron: Neutral Social Stimuli Assessment
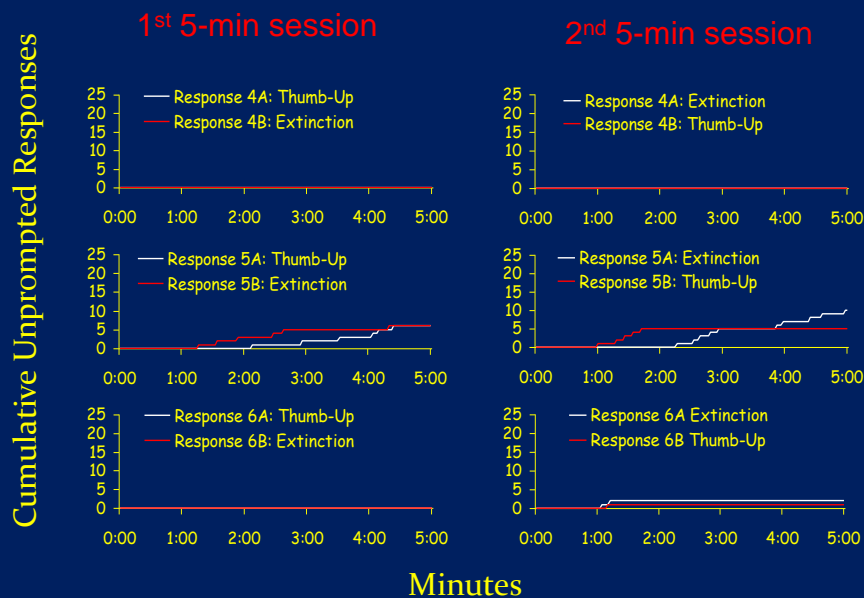
SD Procedure

- Child sat across from researcher at table
- Prompter sat behind child
- Prompter brought child's hands into lap
- Prompter blocked reaching during S-delta periods
  - Faded blocking contingent on independent responding

SD Procedure

- Researcher placed edible on table
- When child oriented eyes the researcher delivered the SD
  - Bubba: Smile
  - Jaron: Thumb-up
- Child allowed to reach for and consume edible only in presence of SD

Bubba: SD Procedure Smile Reinforcer Posttest
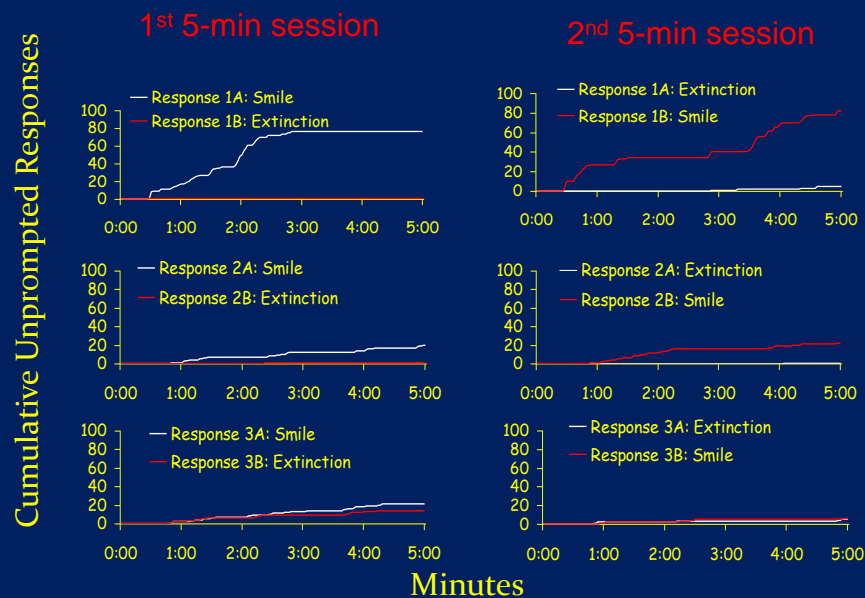
Bubba: SD Procedure Smile Follow-Up
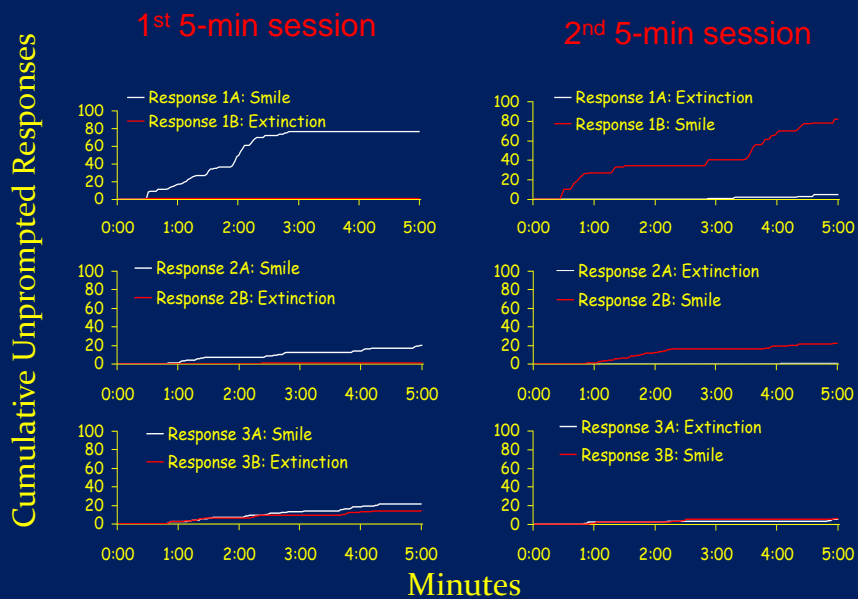
Jaron: SD Procedure Thumb-Up SR+ Posttest 1

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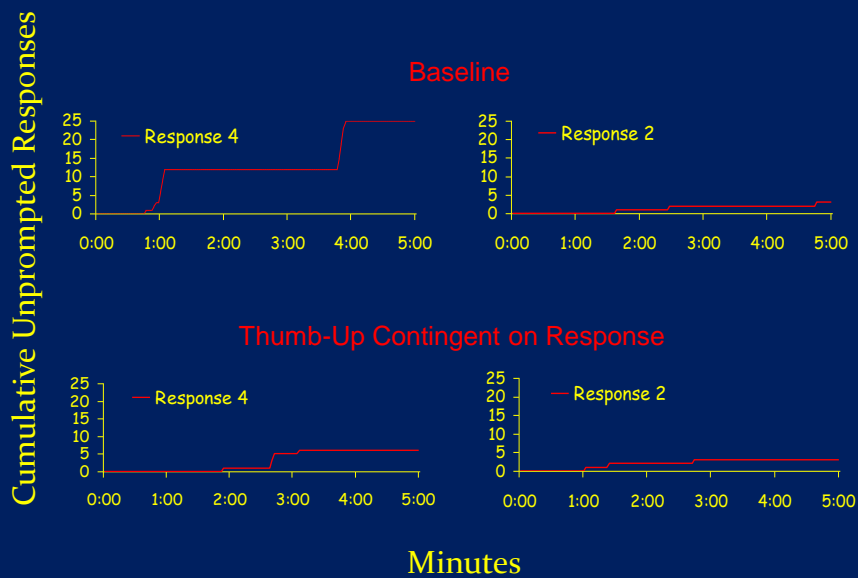
Jaron: SD Procedure Thumb-Up SR+ Posttest 2
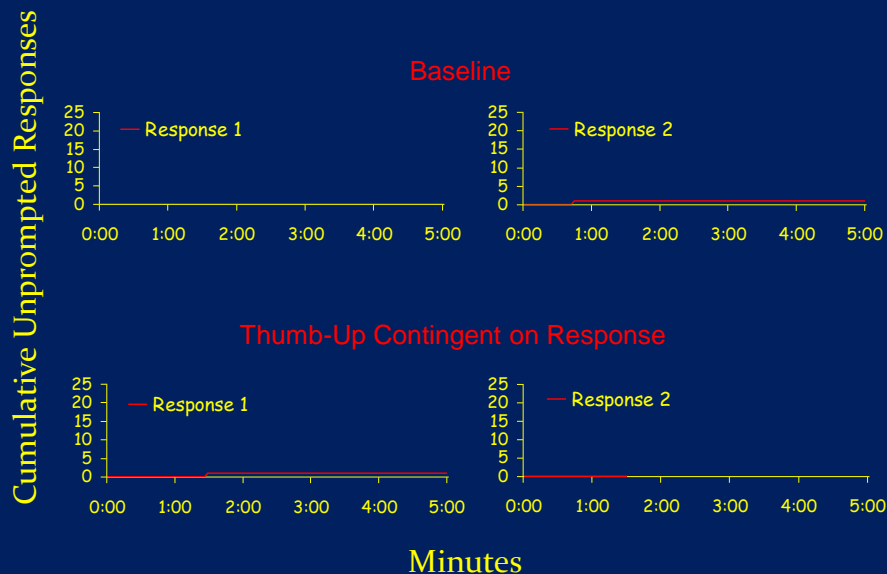
Pairing Procedure

- Child sat across from researcher at table
- Prompter sat behind child
- Prompter brought child's hands into lap
  - Then removed hands
- When child oriented eyes the researcher delivered the NSS
  - Bubba: Thumb-up
  - Jaron: Okay sign
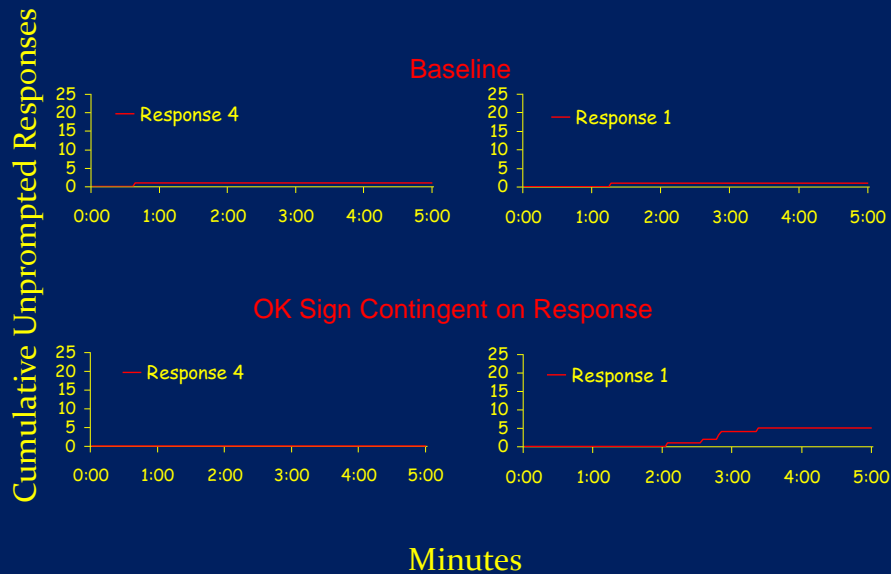- Removed social stimulus
- Researcher placed edible in child's mouth

Pairing Procedure

- Intertrial interval (ITI) averaged 30s
  - Range 25-35 s
- Sessions consisted of 10 pairings or 3 pairings
- Number of pairings and sessions yoked to the SD procedure
- Purpose: Temporally pair social stimulus with delivery of preferred edible that functions as a reinforcer

Bubba: Pairing Procedure Thumbs Up Posttest

Jaron: Pairing Procedure OK Sign Posttest

Discussion

- Bubba
  - SD procedure was effective
  - Smile was conditioned to function as a reinforcer
    - reinforcing effect demonstrated
    - maintained over 8 weeks
    - no programmed maintenance of smile as SD
    - extinguished quicker than during posttest
    - no effect with pairing procedure
- Jaron
  - Neither procedure was effective as conducted in this experiment

Discussion

- Jaron
  - failure to distinguish between contingencies for concurrent operants
  - discrimination repertoire limited
  - limited number of edibles, toys, activities that function as reinforcers
  - weak eye contact
  - only met mastery criterion of 2 programs prior to study: tolerating physical prompting and single-piece insert puzzle
  - stereotypy interference

Discussion

- SD Procedure
  - Demonstrate attending to stimuli in addition to orienting
  - Response requirement
- Pairing Procedure
  - Orienting is all that is required during pairing procedure

Discussion

- Prerequisites?
  - Number of items that function as reinforcers
  - Appropriate mastery criterion for SD procedure?
  - Interfering behavior (stereotypy)
  - Single social stimuli vs. multiple stimuli

Discrimination Training to Establish Rapport

- Lapin, Toussaint, and Ingvarsson (in preparation)

- Study 1: Evaluating the validity of behavioral correlates of rapport

- Study 2: Evaluating the effects of discrimination training on behavioral correlates of rapport

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First steps?

Social Relationships

- Deficits in social communication and social interaction

Overview

1. Operational definition of rapport

2. Conditioning procedure to establish rapport

Importance of Rapport

- Rapport is an important variable in therapeutic context

- McLaughlin & Carr (2005)
  - problem behavior decreases when instructions are delivered from "good rapport" staff
  - may influence the relationship between instructions and compliance

Importance of Rapport

- Rapport building is a meaningful goal for individuals with autism

- Reciprocal engagement in social interactions often selected for improvement

- Interventions focus on improving peer interactions
  - Less attention on improving social interactions between instructor and learner

So…What is Rapport?

- Defined in subjective terms:
  - "Likeability" (Aronson,1984)
  - "Mutual understanding" (O'Toole, 2012)

- Identifying rapport between a dyad has largely focused on subjective rating scales

Measurement of Rapport

McLaughlin & Carr (2005)

Used both subject and objective measures to describe "good rapport" and "poor rapport" dyads

- A) Self-rating made by staff
- B) Rankings made by other staff members
- C) Preference assessments made by individual with disabilities

Example:
Formation of dyads

McLaughlin & Carr (2005)

	Good rapport dyad	Poor rapport dyad
Self-ratings	4 or 5 on rapport scale	0-3 on rapport scale
Peer-ratings	Ranked in the 50th percentile or above relative to other staff	Ranked below the 50th percentile relative to other staff
Preference assessment	Chosen frequently by individual	Chosen rarely by individual

Rapport Likert Scale

Please circle the number that best represents the overall quality of the relationship between you and _____ as of today.

UNSATISFYING   SATISFYING

0--------------------1--------------------2--------------------3--------------------4--------------------5

| The majority of my interactions with this person are awkward, unpleasant, and stressful. I do not feel particularly close to this person, and oftentimes, it is difficult for us to find any "common ground." (Score 0 or 1, depending on the extent to which you find the relationship unsatisfying.) | The majority of my interactions with this person are neutral, that is, not particularly good or bad. While I like this person, I don't feel particularly close or "connected" to this person in any meaningful way. (Score 2 or 3, depending on perceived level of connectedness.) | The majority of my interactions with this person are enjoyable, satisfying, and interesting. Together, we share a warm, open, balanced relationship. I find that we have a lot in common and enjoy each other's company. (Score 4 or 5, depending on the extent to which you find the relationship satisfying.) |

Adapted from McLaughlin & Carr (2005) ; Created by Dunlap et al., (1995)

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Example:
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Preference Assessment

Preference Assessment

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Provided subjective and objective measures to *describe* rapport

Did not provide an operational *definition* of rapport which allows consistent measurement

Extension to correlates

Rapport is a complex interaction which involves three interrelating components (Tickle-Degnen & Rosenthal, 1990):

1. Mutual attentiveness – focusing and attending to others
   1. Body orientation, proximity to others
2. Positivity – mutual friendliness, warmth, caring
   1. Smiles, eye contact
3. Coordination – balance, harmony
   1. Involves both members of a dyad

I. OPERATIONAL DEFINITION OF RAPPORT

Child Participants

Name	Age	Gender	Diagnosis	Language
Cole	8	Male	Autistic Disorder	3-5 word sentences
Zane	6	Male	Autistic Disorder	3-5 word sentences
Tommy	2	Male	Autistic Disorder	1-2 word phrases

Selection of Behavioral Therapists

Behavioral therapists of child participants were recruited to identify high and low rapport therapists

a) Self-ratings made by behavioral therapists
    High-rapport therapist: 4 or 5 on rapport Likert scale
    Low-rapport therapist: 0 to 3 on rapport Likert scale

b) Preference selections by child participant
    High-rapport therapist: selected most often
    Low-rapport therapist: selected least often

Example Formation of Dyad: *Cole*

Staff	Self Rating (Likert 0-5)	Child Rating (# chosen/trials)	Dyad Group
Rick[a]	5	3/3	High- rapport dyad
Stan	5	2/3	___
Jan[b]	1	0/3	Lack-of-rapport dyad
Tessa	2	1/3	___

- Cole & Rick (High-rapport dyad)
- Cole & Jan (Lack-of-rapport dyad)

Dyad Participants

Child Participant	Low-Rapport Therapist	High-Rapport Therapist
Cole	Jan	Rick
Zane	Racquel	Ry
Tommy	Katie	Marcy

Defining Rapport - Method

Experimenter cited following script:

"Interact as you typically would with a child. Do not place demands. This should be a fun 3-minutes".

- Minimum of 30-minutes between high-rapport and lack-of-rapport sessions

- Analyzed in 5-second partial interval recording to capture occurrence and non occurrence of:
  - Child emitted rapport behaviors
  - Mutual rapport behaviors
  - Therapist emitted rapport behaviors

Behavioral Correlates

Child Behaviors

- Child approaches therapist
- Child engages in eye contact towards therapist
- Child body orientation towards therapist
- Child initiated physical contact
- Child smiles

Therapist Behaviors

- Therapist approaches child
- Therapist eye contact towards child
- Therapist body orientation towards child
- Therapist initiated physical contact
- Therapist smiles

Behavioral Correlates

Mutual Behaviors

- Mutual proximity
- Mutual eye contact
- Mutual body orientation
- Mutual physical contact
- Mutual smiles

Conversions

Percentage of intervals with each behavioral correlate:

$$\frac{Intervals\ with\ behavioral\ correlate}{36\ (number\ of\ intervals)}\ x\ 100$$

Example for Cole:

$$\frac{3\ intervals\ with\ approaches}{36\ (number\ of\ intervals)}\ x\ 100 = 8.33\%$$

Cole

Child Emitted Target Rapport Behaviors

Zane
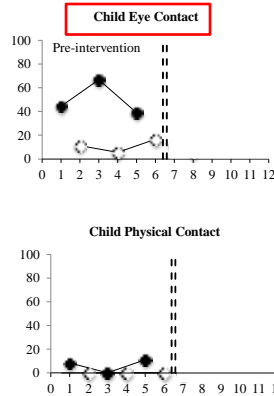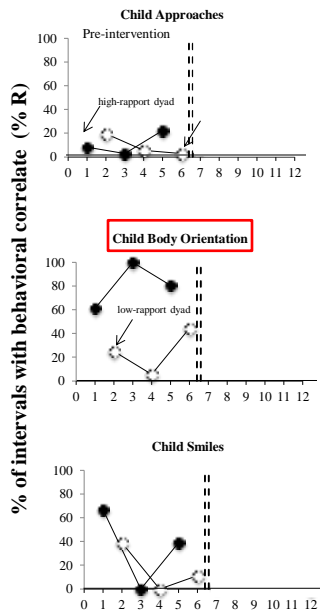
Child Emitted Target Rapport Behaviors

105

Tommy

Child Emitted Target Rapport Behaviors

106

53
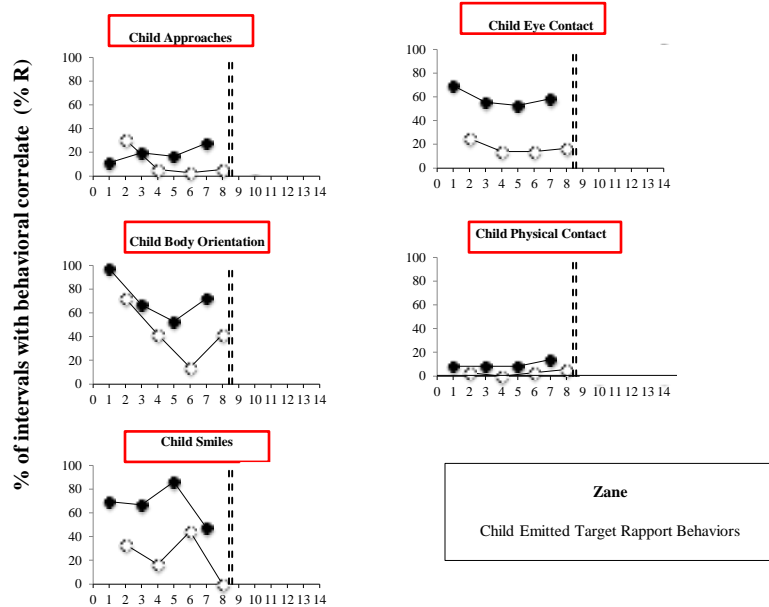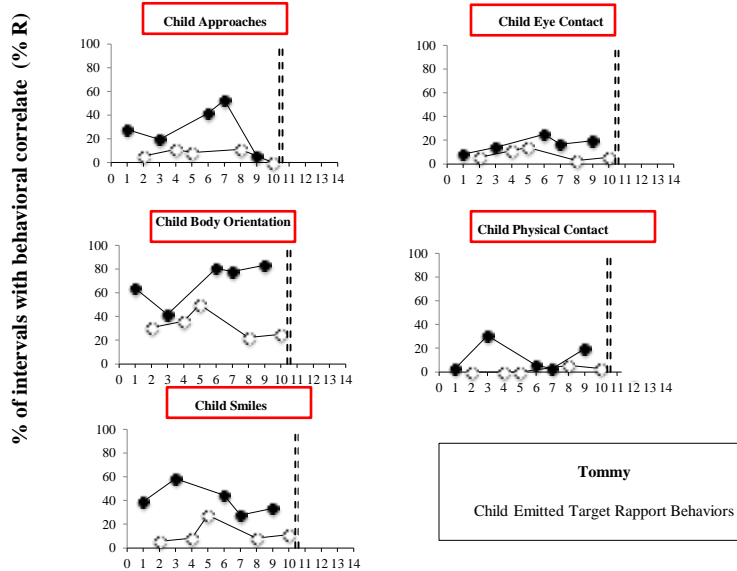
Conversions

- Average percentage of all behaviors:

$$\frac{sum\ of\ individual\ percentage}{5\ (total\ number\ of\ behaviors)}$$

  – Example:

  $M\% = 8.6\%$

  (8% approaches + 12% smiles + 15% body orientation + 8% eye contact + 0% physical contact)/5 = 8.6%

CHILD BEHAVIORS INDICATIVE OF RAPPORT
(eye contact, smiles, physical contact, orientation, approaches)
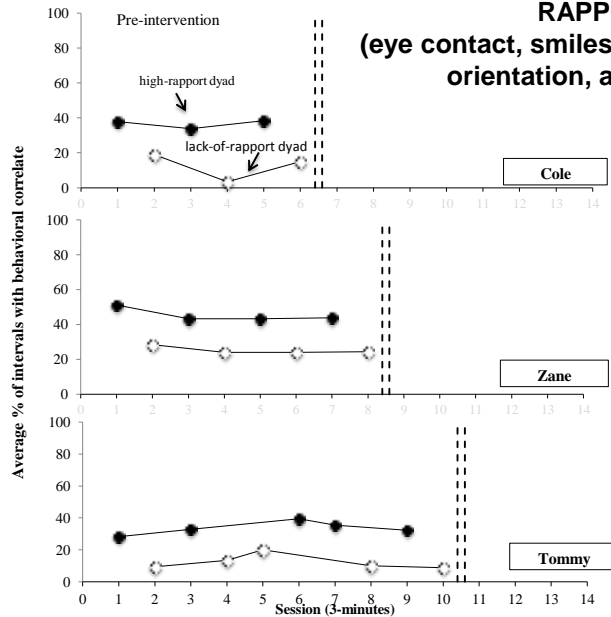
THERAPIST BEHAVIORS INDICATIVE OF RAPPORT
(eye contact, smiles, physical contact, orientation, approaches)
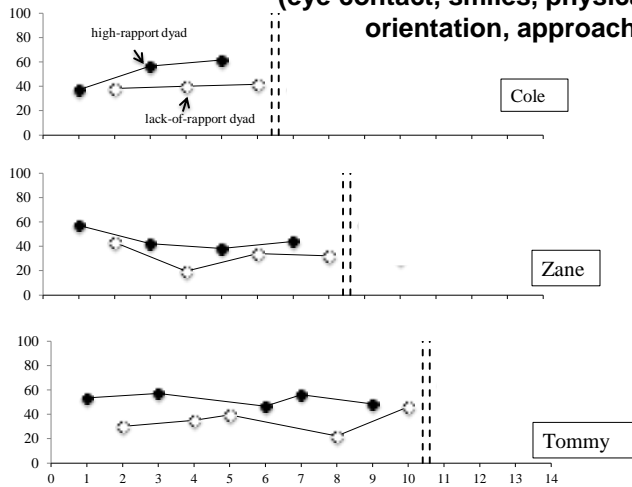
109

MUTUAL BEHAVIORS INDICATIVE OF RAPPORT
(eye contact, smiles, physical contact, orientation, approaches)
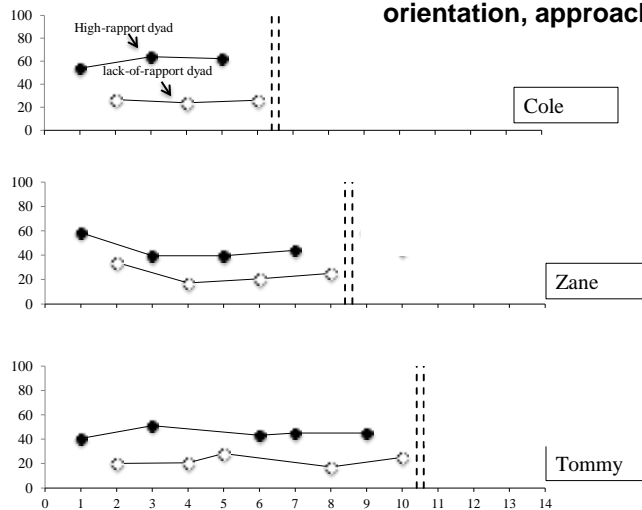
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Defining Rapport - Results

- Eye contact, smiles, physical contact, orientation, approaches all comprise "rapport"

- No individual correlate indicative of rapport
  - *Body orientation generally the highest discrepancy

- Although an interpersonal relationship, child behaviors show larger discrepancy

- Interestingly, staff still demonstrate discrepancy

Objectives

1. Operational definition of rapport

2. Conditioning procedure to establish rapport

ESTABLISHING RAPPORT

Instructional Manuals

Establish a reinforcer by correlating a neutral stimulus with an unconditioned reinforcer through pairing (**classical conditioning**)

"…even if your child does not like social reinforcers such as smiles and praise, by associating them with primary reinforcers (e.g., food, drink, favorite toy, etc.), they will eventually become reinforcing as well"
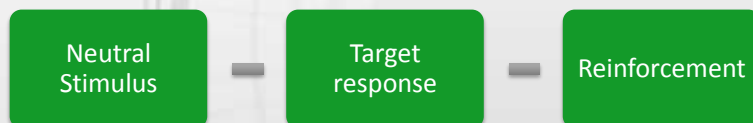
Discrimination Training

- Differs from other conditioning procedures which only involve presentations of the S^D trials

- Requires an observing response for differential responding (Dinsmoor, 1995)

  - May enhance effects of pairing

Operant Discrimination Training

A neutral stimulus (e.g. social attention) is first established as a discriminative stimulus (S^D) for a specific response.
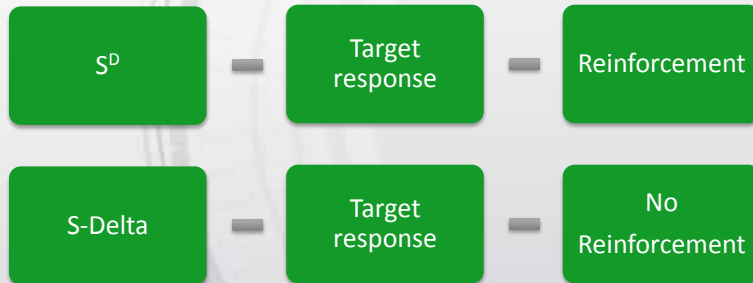
| Neutral Stimulus | — | Target response | — | Reinforcement |

(Holth, Vandbakk, Finstad, Grønnerud, & Mari, 2009)

Operant Discrimination Training

S^D	▬	Target response	▬	Reinforcement
S-Delta	▬	Target response	▬	No Reinforcement

Discriminative stimuli will *then* function as a reinforcer

Purpose:

The purpose was to determine whether an operant discrimination procedure would be effective in:

1. Establishing social interactions as reinforcers for simple target behaviors
2. Increase behavioral correlates of rapport

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The purpose was to determine whether an operant discrimination procedure would be effective in:

1. **Establishing social interactions as reinforcers for simple target behaviors**
2. Increase behavioral correlates of rapport

Method-Participants

Child	Low-Rapport	High-Rapport
Cole	Jan	Rick
Zane	Racquel	Ry
Tommy	Katie	Marcy

Example

Example

Reinforcer Assessment

- Purpose: To determine if target responses would increase with delivery of attention

- Method:
  - Lack-of-rapport therapist physically prompted child to engage in the target response, twice
  - Delivered brief social interaction after each prompted response
  - Response materials always within reach of child
  - Contingent upon independent responses, therapist delivered
  social interaction

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124
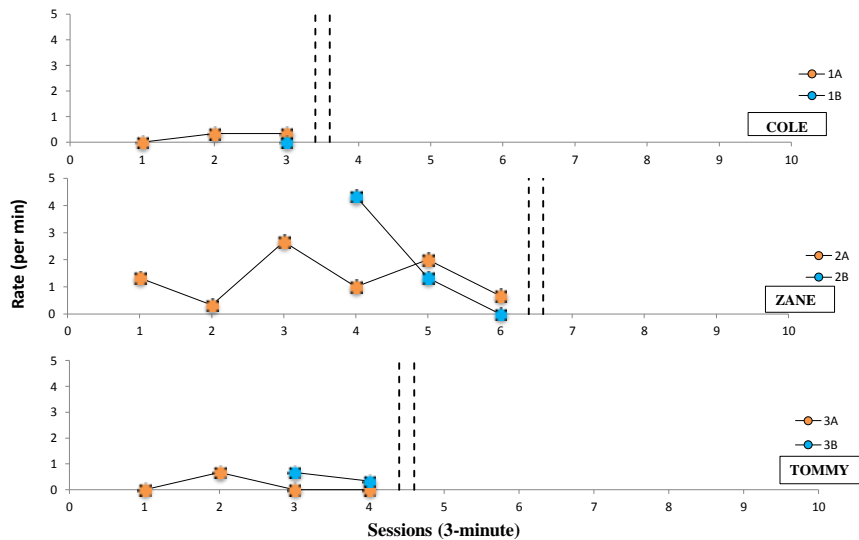
Discrimination Training

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Method-Materials

- Individual treatment rooms (3 meters by 3 meters)
- One table & Two chairs
- 12'' by 16'' brown lunch tray that contained 5 highly-preferred (HP) stimuli
- Several low preferred/neutral toys

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Discrimination Training

Experimental Design:
- Multiple baseline across dyads

Dependent Variable:
- Percentage of correct responses per session
    - S^D trials: child reached for tray of HP stimuli
    - S-delta trials: child did not reach for tray

Discrimination Procedures

- Conducted one-to-three times per day
    - at least 1 hour in between sessions

- Lack-of-rapport therapist sat across from child at table

- The experimenter remained behind child at all times

- 12 S^D trials & 12 S-delta trials interspersed throughout session

Discrimination training: S^D trials

- Therapist placed tray with 5 HP stimuli on table

- Immediately began social interaction (i.e., neutral stimulus)

- Correct response: child reached for tray

- Incorrect response: prompted response to reach for the tray

- Trial terminated after 15-seconds access to leisure items (Cole) or consumption of edibles (Zane & Tommy).

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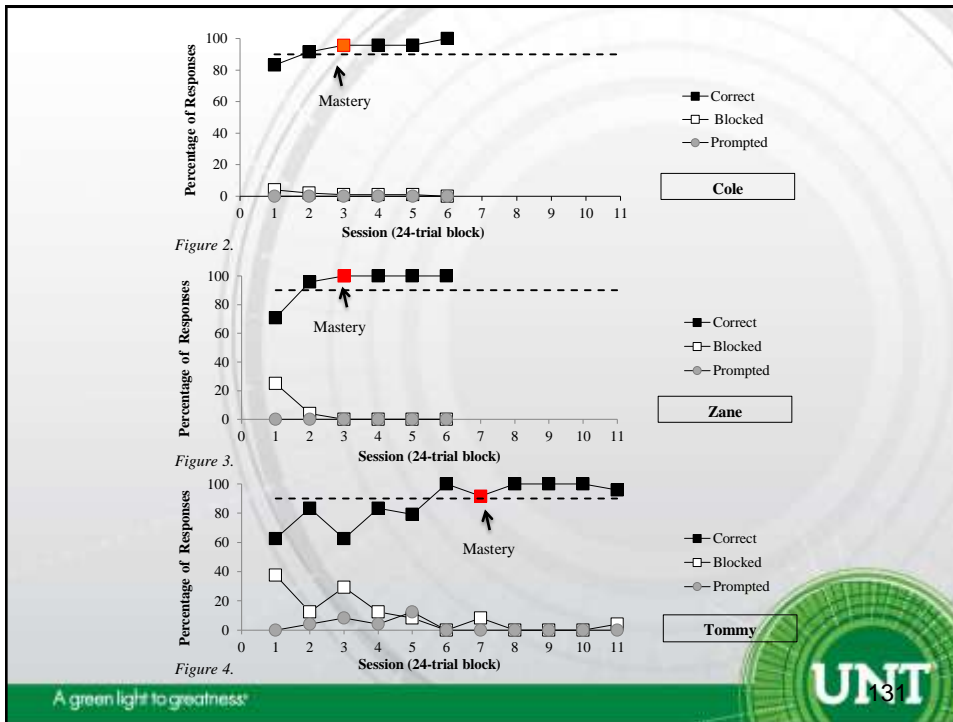# Discrimination training: S-delta trials

- Therapist placed tray with 5 HP stimuli on table

- Immediately turned around so their back was facing child (s-delta)

- Correct response: child <u>did not</u> reach for tray

- Incorrect response: child <u>did</u> reach for tray and response was blocked
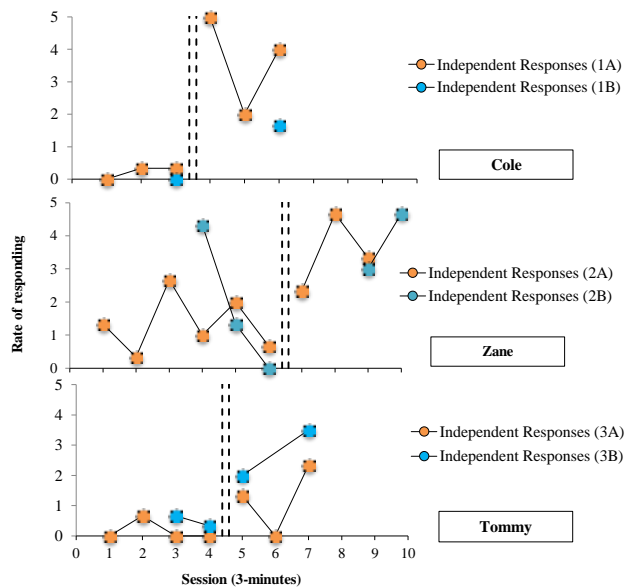
- Trial terminated after 15 seconds had elapsed

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Figure 2.

Figure 3.

Figure 4.

Post-training Procedure

- Once differential responding occurred, we returned to baseline procedures

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Brief discussion

- Lack-of-rapport therapists social interaction served as a neutral stimulus prior to intervention

- During discrimination training, social interaction became discriminative for reinforcement and therefore a conditioned reinforcer

- After discrimination training, rate of independent responses for arbitrary response increased for all child-participants

- **Results suggest that discrimination training was effective in conditioning social interaction as a reinforcer across all three child-therapist dyads**

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Purpose:

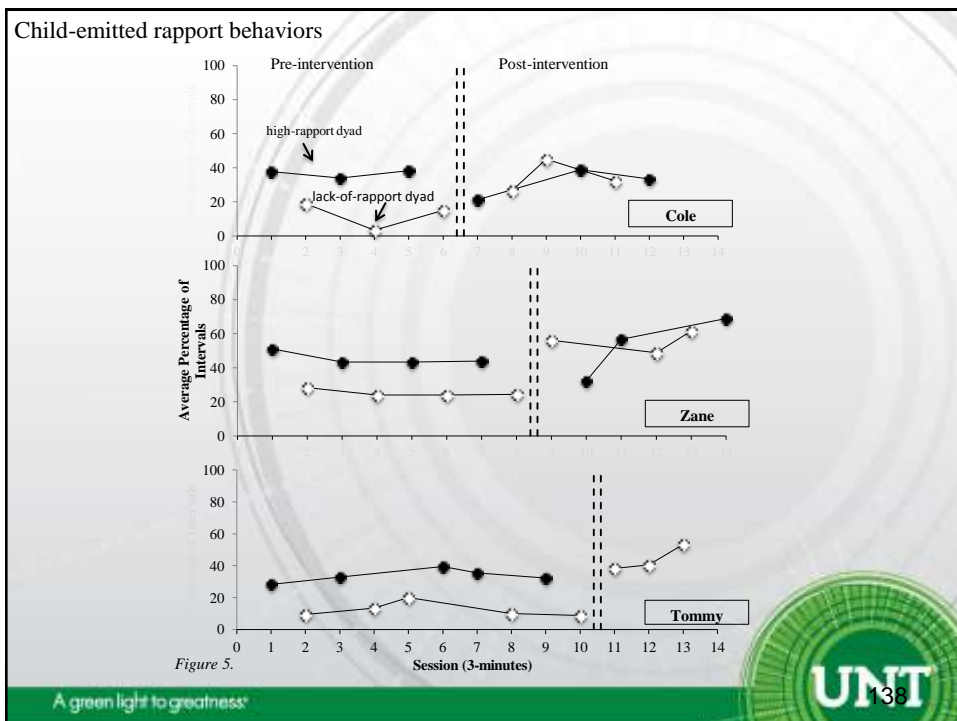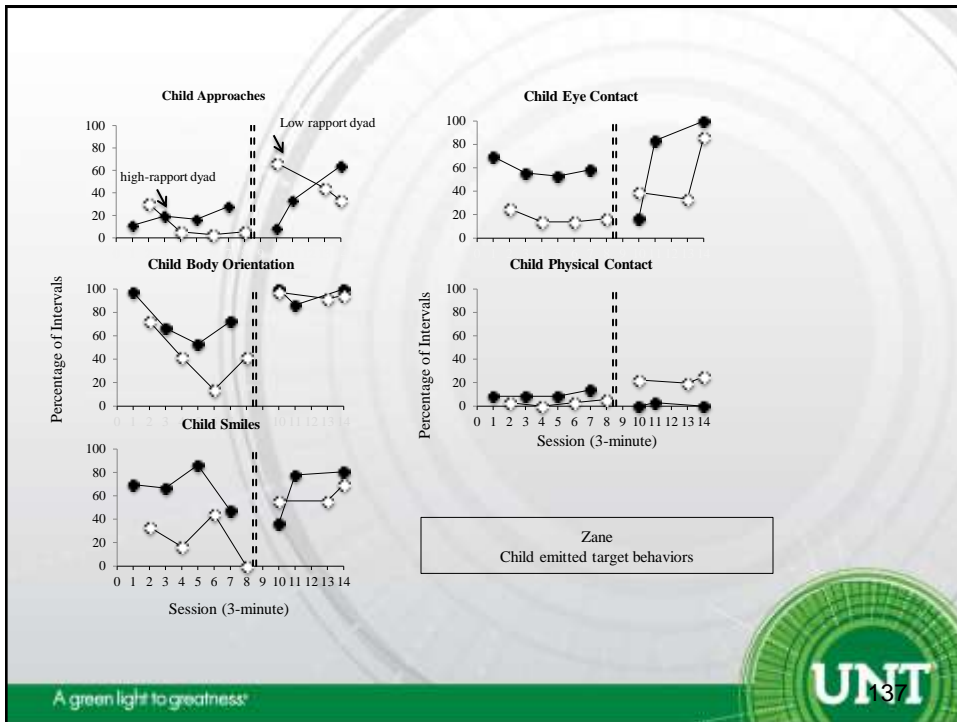The purpose was to determine whether an operant discrimination procedure would be effective in:

1. Establishing social interactions as reinforcers for simple target behaviors
2. **Increase behavioral correlates of rapport**

UNT

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Method

Experimenter cited following script:

"Interact as you typically would with a child. Do not place demands. This should be a fun 3 minutes".

- Minimum of 30-minutes between high-rapport and lack-of-rapport sessions

- All sessions were video-recorded

- Analyzed in 5-second partial interval recording to capture occurrence and non occurrence of:
  – Child emitted rapport behaviors
  – Mutual rapport behaviors
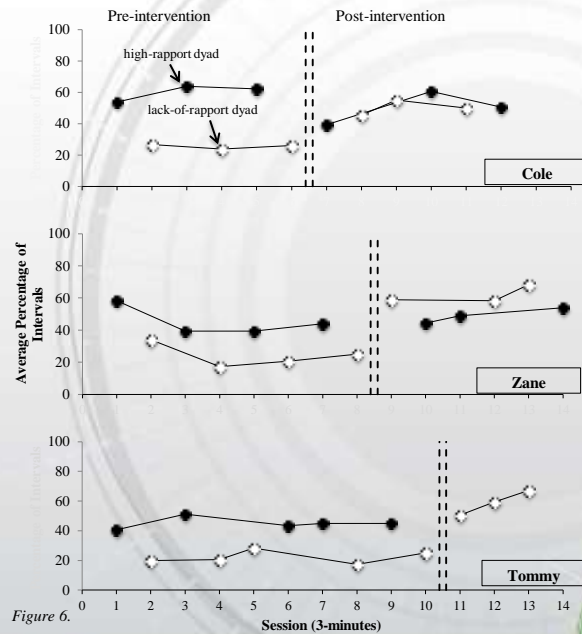 – Therapist emitted rapport behaviors

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Slide 137: Child-emitted target behaviors (Zane) — panels: Child Approaches, Child Eye Contact, Child Body Orientation, Child Physical Contact, Child Smiles. Y-axis: Percentage of Intervals. X-axis: Session (3-minute).

Child-emitted rapport behaviors

Figure 5. Panels: Cole, Zane, Tommy. Pre-intervention / Post-intervention. high-rapport dyad, lack-of-rapport dyad. Y-axis: Average Percentage of Intervals. X-axis: Session (3-minutes).

Figure 6. Mutual rapport behaviors

Figure 7. Therapist-emitted rapport behaviors

Jan's results
(Cole)

Main Findings

1. Lack-of-rapport dyads showed significantly lower and differentiated behaviors compared to high-rapport therapist
   – Suggests target behaviors are indeed behavioral correlates of rapport, some more indicative than others

2. Child participants' responses increased when (previously non-preferred) therapists' social interactions was delivered contingently
   – Operant discrimination procedure conditioned attention as a reinforcer for all three participants

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Main Findings

3. Following operant discrimination training, lack-of-rapport behaviors increased to levels similar to high-rapport dyad
   – Suggests discrimination training may be a useful procedure in conditioning social stimuli and enhancing rapport

4. Social validity measures indicate that the intervention was perceived to be meaningful, effective, and easily understood by participants

Limitations

- Recording method of rapport behaviors may not be practical
  – Fifteen behaviors every five seconds

Future Directions

- Rapport is a reciprocal process involving both members of the dyad.

- Evaluate maintenance of reinforcing effects of social interaction over extended periods of time (post-pairing)

- Continue to examine optimal method to condition social reinforcers

Follow-up Study

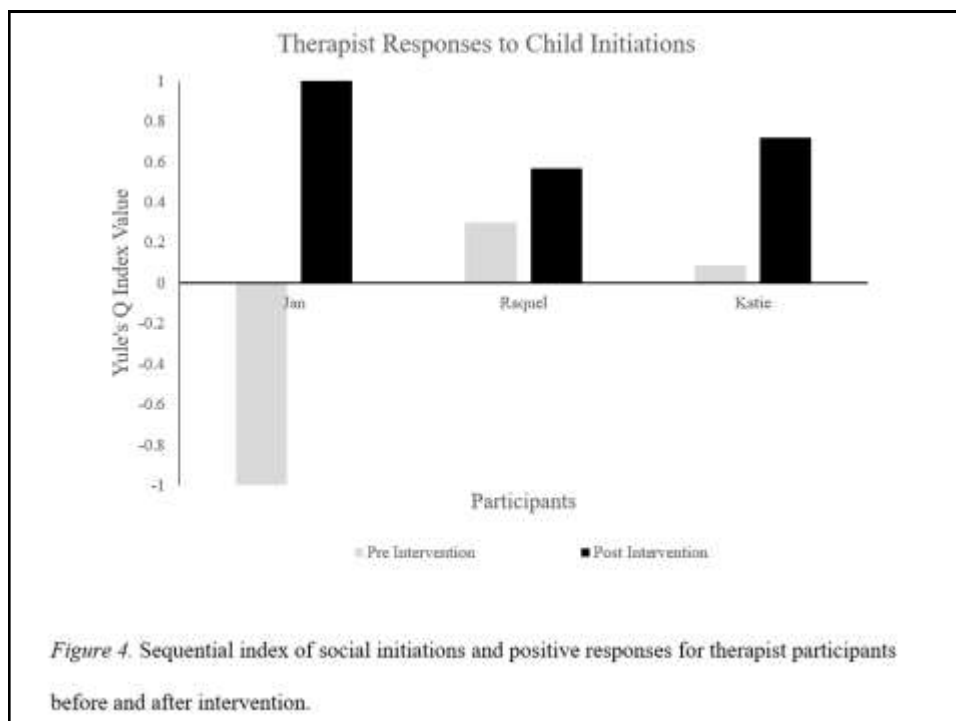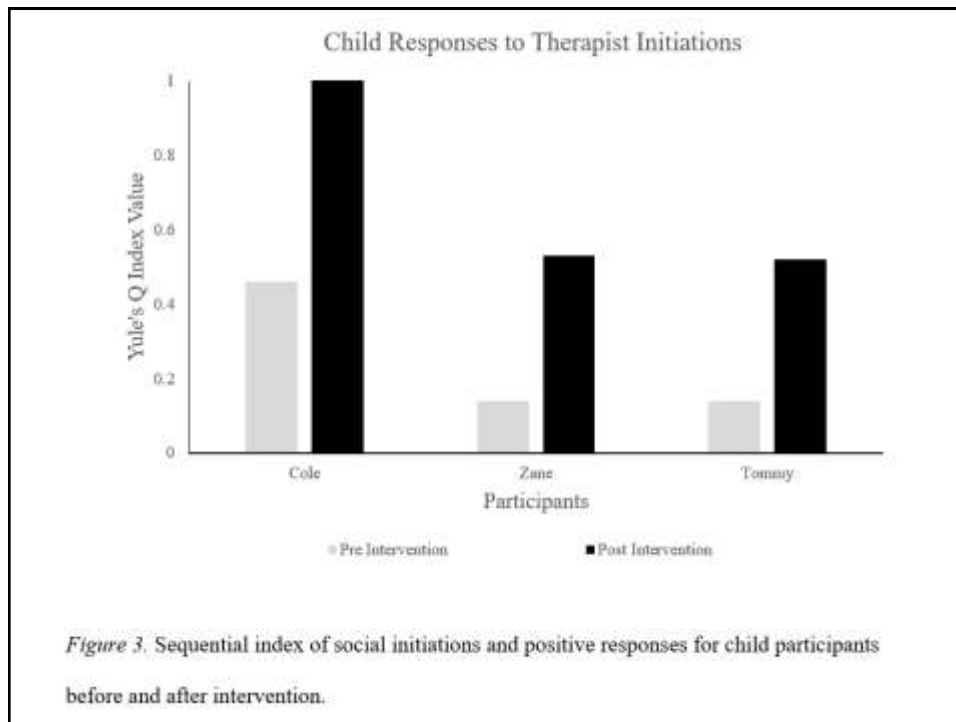- Cortez & Toussaint (in preparation)
- Conducted an analysis of sequential correlations between social initiation and positive social responses of both therapists and children
- Collected data from video recordings of the sessions from Lapin et al.
- For the dyads that initially had low rapport, both therapists' and children's positive responses to the other's initiations increased following the intervention.

Figure 3. Sequential index of social initiations and positive responses for child participants before and after intervention.

Figure 4. Sequential index of social initiations and positive responses for therapist participants before and after intervention.
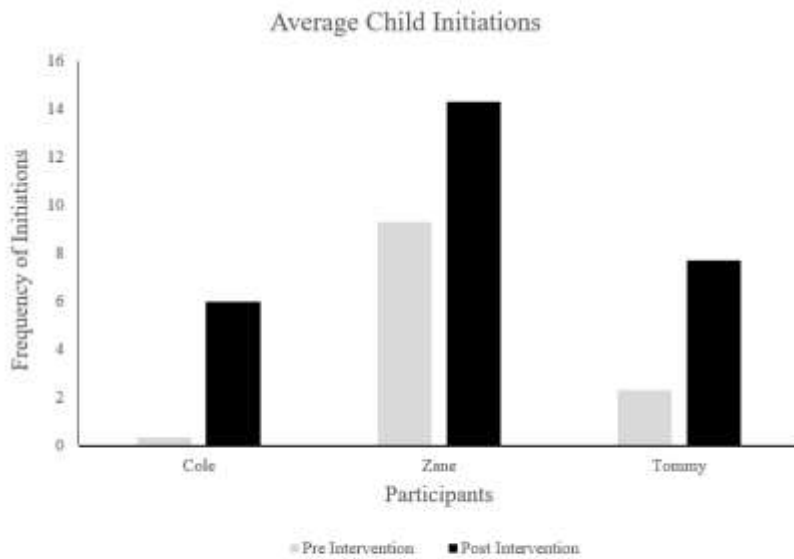
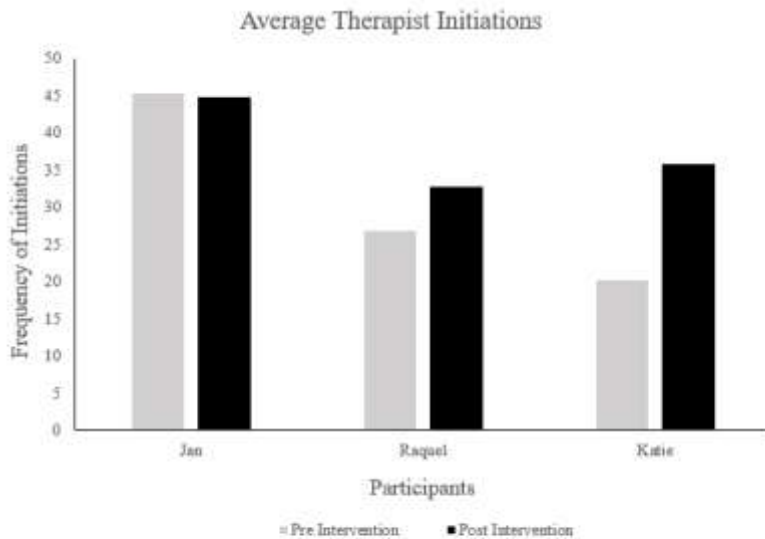*Figure 5.* Average frequency of social initiations emitted by child participants before and after intervention.

Figure 6. Average frequency of social initiations emitted by therapist participants before and after intervention.

Take-Home Point

- Focus on social reinforcement from early on in training might improve outcomes
- Ideas for programs (based mostly on the work of Per Holth):
  - Establishing eye-gaze as reinforcer
  - Establishing specific social stimuli as reinforcers
  - Toy activation program
  - Envelope program
  - Book presentation task
  - Modeling protodeclarative initiations

Role-Play

- With your neighbor, role-play the following procedures to establish praise (and/or other social actions) as reinforcers:
  - Stimulus-stimulus pairing
  - Response-contingent pairing
  - Discrimination training

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