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Effects of peer mediated pivotal response training on social skills for children with autism

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Effects of Peer Mediated Pivotal Response Training on

Social Skills for Children with Autism

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Social Skills for Children with Autism

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by

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Abstract

A multiple baseline design was utilized to determine the effectiveness of peer mediated Pivotal Response Training strategies on the social behaviors of students with a diagnosis of autism. Peer participants, who did not have an autism diagnosis, were selected from a Special Day Class setting and exhibited pro-social behaviors. These peers were trained in providing PRT by the researcher and then asked to implement these strategies in one-on-one play sessions with a peer with autism. The social behaviors targeted for increase among the students with autism consisted of appropriate verbal initiations and appropriate verbal responding. Results demonstrated an increase in appropriate verbal responding but not initiations. Further conclusions suggest peer mediated PRT as a possible effective strategy for increasing pro-social repertoires in students with autism. This study revealed considerations for conducting further investigations on the use of peer mediated PRT for students with social skill deficits with and without autism.

Acknowledgements

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Chapter 1: Introduction

Social skills are crucial to a successful life. High rates of social engagement and peer relationships have been linked to academic success, higher school attendance, and an increased range of interpersonal dynamics including language skills (Farmer et al., 2008; Rotheram-Fuller, Chamberlain, Kasari, & Lock, 2008; Rogers, 2000; Wolfberg & Schuler, 1993). Students with autism, also referred to as ASD often lack various social skills that contribute school success. There is a need for specific training to help students with ASD gain, and improve social skills. One way is Pivotal Response Training or PRT.

This program uses various techniques such as: following the child's lead, praising or reinforcing good try's, and switching up hard and easy activities. All of these examples are used in the PRT package, which helps a child build the foundational social skills in his or her natural environment (Koegel, Koegel, 2006). PRT methods use natural reinforcers, not artificial ones. For example saying, "Hug" gets the child a hug. This is one reason that PRT is effective in teaching skills that generalize (Koegel, Koegel, 2006).

The study presented will elaborate on the effectiveness of PRT strategies used during play activities. The data will demonstrate how peer mediated Pivotal Response Training increases social skills in students with autism. It will demonstrate if there is a functional relationship between the peer mediated PRT and increases appropriate verbal initiation and appropriate verbal responding behavior in student's with ASD.

Problem Statement

Children with autism spectrum disorder (ASD) often lack interpersonal skills, as impairments in social engagement are a core component of the DSM IV-TR's diagnosis (2000). Social play during recess can be aversive to children with autism due to their preference in highly structured, repetitive routines. (Brown & Murray, 2001; Harper, Symon & Frea, 2008; Libby 1998). Observing interactions of students on the playground, one could readily observe children zigzagging while playing a game, talking out a conflict and making a number of choices. Taking part in any of the aforementioned activities may be highly distressing for a child with autism. On the other hand, play provides many rich opportunities for social interactions in order for children to learn about the norms and expectations so they in turn can grasp the significance of play. It is in this unstructured territory where language can be learned and friendships can bloom. Play can be a time when kids smile and laugh, take turns, jump, or play ball with friends. Social engagement through play is the bridge to a world of possibilities and gifts, but crossing that bridge requires specific skills. For some individuals with ASD, this bridge does not even exist, and for others it seems long, shaky, scary and not worth crossing.

Children with autism often prefer play that is rote, familiar, and repetitive; the alternative may be intimidating (Harper, Symon & Frea, 2008). What children with autism may not be aware of is that the risks inherent in social engagement do not outweigh the vast possibilities brought about by it. Research has demonstrated that preschoolers with ASD who do not interact with peers utilize less language overall compared to those who do socially engage (Harper, Symon & Frea, 2008). There continues to be a lack of practical information for educators to use to increase

opportunities for students with ASD in to acquire important social and language skills, such as initiating and responding to social cues and reducing aversion to peer-to-peer interaction during recess or less structured play activities. Therefore, there is a need to develop an enhanced understanding and techniques to assist individuals and students with ASD develop appropriate social skills in various contexts at school such as during play.

Purpose

The purpose of this project is to measure the effectiveness of peer mediated Pivotal Response Training (PRT) in increasing pro-social play behaviors in children with autism. (Harper, Symon & Frea, 2008; Pierce & Schriebman, 1995, 1997a, 1997b). Pivotal Response Training is an evidenced based program utilizing specific strategies such as: cueing a child's attention, providing clear instructions, child choice in the task, providing turn taking opportunities, and direct contingent reinforcers based on a child's attempts to respond (Stahmer et. al, 2010). This project aims to benefit children with Autism, special educators, Para-educators, and Board Certified Behavior Analysts. The teacher researcher will measure the amount of appropriate verbal initiations and appropriate verbal responses exhibited by students with autism in play activities before and after the (PRT) intervention. Project data will show if peer mentors implemented PRT strategies with effectiveness and if the skills generalized without teacher assistance. Results from the research will add further evidence regarding the effectiveness or ineffectiveness of Pivotal Response Treatments.

Research Questions

- Does peer mediated PRT increase initiations and appropriate responding in student's with autism during play activities?

- Can peers trained in PRT implement the PRT strategies effectively during play activities?

Theoretical Model

Applied Behavior Analysis is an extension of behaviorism grounded in the assumption that behavior is influenced by "innate endowment" and environmental influences (Michael, 2004). Applied Behavior Analysis takes a deterministic view and assumes that the majority of observable behavior can be controlled through specific environmental and variable changes. This has led to a robust database of research supporting behavioral techniques based on Applied Behavioral Analysis that are utilized in PRT.

The premise of PRT supposes that by targeting specific "pivotal" behaviors through techniques that are grounded in principles of behavior will create numerous untargeted behavioral changes (Koegel & Koegel, 2006). The five pivotal behaviors that have been targeted thus far are motivation, responsivity to multiple cues, self-management, self-initiations and empathy (Koegel, & Koegel , 2006). The goal of this method is to teach children to respond effectively in the natural environment, while reducing teacher driven prompts that reinforce the child's behavior (Cowan & Allen, 2007; Koegel, Koegel, Harrower & Carter, 1999).

Researcher Background

I have been a special education teacher for four years working in Salinas, California. I have a mild/moderate credential and have taught individuals with Autism,

intellectual disabilities, and developmental disabilities for my tenure as a special day

class teacher. Student ages range between four to twelve. I have been supervised by a

Board Certified Behavior Analyst for two years and have had the fortune of receiving

training in applying effective teaching techniques based on principles of Applied

Behavioral Analysis.

Definitions

- **Autism :** A developmental disorder with significant impairments in social and communicative functioning (Cowan & Allen, 2007; DSM-IV-TR, 2000).

- **Pivotal Response Training:** A researched program based on the principles of ABA that targets specific pivotal behaviors, that in effect produces behavioral changes in untargeted behaviors. The pivotal behaviors are: responsivity to multiple cues, self -management, self-initiations and empathy (Koegel, & Koegel, 2011)

- **Initiations:** Any verbal or non-verbal attempt to gain a peer's attention to engage in play (Harper, Symon, & Frea, 2008).

- **Symbolic Play:** Playing with one object as another. Attributing properties to an object that are absent, and referring to absent objects as if they were present (Stahmer, 1995).

- **Joint Attention:** A focused attention between an object and person (Whalen & Shreibman, 2003).

Chapter 2: Literature Review

A systematic search was done using several databases included Academic Search Elite, ERIC, PsycINFO, and PsycARTICLES. The following search criteria/descriptors were: (a) autism, (b) play (c) peer mediated (d) social behavior (e) pivotal response training, (f) special education, Descriptors were used individually and collectively to maximize search potential. References used in the articles were reviewed as well. The literature review will describe Autism, Pivotal Response Training research, as well as Peer Mediated interventions. It will go on to review how (PRT) peer mediated interventions have been utilized for children with Autism in various contexts, such as recess.

Autism is a developmental disorder that has been linked to significant impairments in social and communicative functioning (Cowan & Allen, 2007). Due to these impairments, children with Autism frequently fail at exhibiting the skills necessary to perform successfully in school and other social contexts (Cowan & Allen, 2007). PRT is an evidenced based intervention that has shown effectiveness in teaching individuals with autism new social behaviors as well as enhances their social abilities (Cowan & Allen, 2007; Koegel et. al, 2010; Koegel, Vernon & Koegel, 2009; Stahmer, Schreibman, & Powell, 2006; Whalen; Schreibman, 2003).

Pivotal Response Training

Pivotal Response Training (PRT) is an approach based on the principles of Applied Behavioral Analysis (Koegel & Koegel, 2006). The method produces numerous behavioral changes by targeting specific behaviors. (Koegel & Koegel, 2006). There are specific elements to the PRT approach specifically, cueing a child's attention, providing clear instructions, child choice in the task, providing turn taking opportunities, and direct contingent reinforcers based on a child's attempts to respond (Stahmer et. al, 2010). Another key ingredient to the PRT approach is interspersing maintenance trials, or mixing already mastered tasks, with harder ones as a way to keep the learner engaged (Stahmer et. al, 2010).

The PRT approach has been proven to increase specific social skills in children with autism (Whalen & Shreibman, 2003; Stahmer, 1995). Symbolic play, social initiation and joint attention skills are three crucial social functions that have been cited to play a significant role in social functioning success (Koegel, Vernen & Koegel, 2009; Whalen & Shreibman, 2003; Stahmer, 1995).

Joint attention is a crucial component to developing appropriate social behavior as it is linked to language acquisition and play skills (Whalen & Shreibman, 2003). By definition, joint attention is focused attention between an object and person (Whalen &

Shreibman, 2003). Whalen and Schreibman (2003) found that a targeted PRT

intervention increased joint attention behaviors, such as focused attention, for a group of

children with Autism in varied environments and contexts.

Koegel, Vernon and Koegel (2009) utilized a PRT intervention to increase social

initiation by strategically engraining social interactions with reinforcers to determine if it

increased initiation behaviors in three children with Autism. Using an ABAB design, the

researchers compared a PRT intervention utilizing "embedded social interactions, and

non-embedded interactions" (Koegel, Vernon, & Koegel, 2009). Data after the

interventions demonstrated that the socially embedded intervention had a greater effect in

increasing the children's appropriate social initiation behaviors, like physical orientating

oneself towards the researcher and observable affect, such as smiling. (Koegel, Vernon,

& Koegel, 2009).

Symbolic play, like joint attention, is a necessary component of appropriate social

behavior exhibited by younger children. Problems with symbolic play have been linked

to deficits in language and appropriate social behavior (Stahmer, 1995). Symbolic play

was measured in thirty-second intervals by the experimenter and two observers blind to

the study. Symbolic play was scored based on three criteria. The criteria were using one

object as another, attributing properties to an object that are absent, and referring to

absent objects as if they were present (Stahmer, 1995). After the PRT intervention,

symbolic play behaviors based on the above criteria increased as well as appropriate

initiations to adults, however the skills did not transfer to peers, which may be due to lack of peer training (Stahmer, 1995). In a related study utilizing a Likert rating scale, the effectiveness of a PRT intervention for six children with Autism was measured, comparing their social behaviors with typical children. Post intervention marked an increase in appropriate symbolic play behaviors for students with Autism (Stahmer, Schreibman, & Powell, 2006).

The promising results of clinician mediated PRT has lead to a growing body of research focusing on peers as the implementers of PRT interventions for children with autism (Pierce & Schreibman, 1995; Pierce & Schreibman, 1997a, 1997b; Symon & Frea, 2007). Establishing and maintaining appropriate social behaviors in children with Autism may be remediated through the help of peers (Pierce & Schreibman, 1995).

In Pierce and Schreibman's study (1995) two children with Autism were exposed to a peer mediated PRT intervention to determine if it increased pro-social behavior. Intervention utilized ten peer mediated strategies: ensuring the child was paying attention, providing choices, varying toys, modeling how to play, narrating play, reinforcing attempts, encouraging and extending conversation, taking turns, and helping the child recognize multiple cues. Prior to PRT baseline levels of engagement, such as joint attention and initiation behaviors for each child were below one percent of session intervals observed by the researchers (Pierce & Schreibman, 1995). Clinicians in PRT using written and visual aids for four, thirty-minute classes trained two typical Peers in a

two-week period. According to the author's data, there was an increase in the frequency

of initiation behaviors in both participants during the peer intervention stage. During the

generalization phase, the children with Autism played with untrained peers. One of the

children with Autism's initiation behaviors maintained at the same frequency,

Pierce and Schreibman replicated the study to determine if multiple peer mediated

PRT could increase the language and play skills of children with Autism, and then be

generalized across novel peers, toys or environments (Pierce & Schreibman, 1997a,

1997b). Both studies demonstrated that multiple peer mentoring increased the learners'

complex language, and play during and after intervention. Harper, Symon and Frea,

(2008) used similar methods, utilizing multiple peer mediated PRT, but this time it was

used in a recess environment. Training consisted of six peers for two children with

Autism. Peers were taught PRT for twenty minutes for seven days. A concurrent

multiple baseline demonstrated an increase in initiation and turn taking behaviors for the

learners (Harper, Symon & Frea, 2008).

In summary, PRT has been cited to be a method that can improve the social

behaviors of children with Autism in multiple contexts. Harper, Symon and Frea (2008)

presented a program that may be used quickly and create positive gains for children with

social deficits. It is less stigmatizing for a child with autism to work with a peer trainer,

then have an adult aid stand over and mediate those skills (Harper, Symon and Frea,

2008). Peer mediated PRT has been proven to be effective in increasing initiation,

establishing, and maintaining social behavior with peers and adults.

Chapter 3: Methods

This project used a concurrent multiple baseline design across participants to

analyze the effectiveness of peer mediated PRT strategies and its impact on appropriate

play behaviors for children with autism. The specific behaviors observed were

appropriate verbal initiations, and appropriate verbal responses. The three phases of the

project were: baseline, intervention, and generalization.

Participants and Setting

The setting is an urban elementary school with a high Latino and migrant

population. The classrooms and locations on the grounds will be a Special day class, and

school playground. Prior to participating all students received parent consent and a

detailed explanation regarding the project's intent and duration. Participants were either

elementary students with a diagnosis of ASD and students without an ASD diagnosis but

who were taught in a Special Day Class. All students were selected by the teacher

researcher. The students chosen as peers had been observed to exhibit positive social skill

repertoires during recess and in the classroom. The peer mentor names were then

randomly sorted by name into two categories, untrained and trained peers. The untrained

peers participated only during, baseline and generalization probes, while the trained peers participated during the intervention phase.

Baseline/Generalization Phase Peer 1-

The Baseline/Generalization Phase Peer 1 was a nine year old Hispanic male. He was given a school primary disability of specific learning disability. Baseline/Generalization Peer 1 was matched with Participant 1 during both the baseline and generalization phase.

Baseline/Generalization Phase Peer 2-

The Baseline/Generalization Phase Peer 2 was a Hispanic eight-year-old girl. She was given a primary disability of intellectual disability. Baseline/Generalization Peer 2 was matched with Participant 2 during both the baseline and the generalization phase.

Baseline/Generalization Phase Peer 3-

The Baseline/Generalization Peer 3 was a Hispanic seven-year-old boy. He was given a school primary disability of intellectual disability. Baseline/Generalization Peer 3 was matched with Participant 2 during both the baseline and the generalization phase.

Intervention Phase Peer 1-

Intervention Phase Peer 1 was a nine-year Hispanic boy. He was given a school primary diagnosis of intellectual disability. Intervention Peer 2 was matched with Participant 1 during the intervention phase.

Intervention Phase Peer 2-

Intervention Phase Peer 2 was a Hispanic eight-year-old gird. She was given a school primary diagnosis of specific learning disability. Intervention Peer 2 was matched with Participant 2 and Participant 3 during the intervention phase. Intervention Peer 2 worked with two peers at different times, because a student picked to become a trainer withdrew from the training.

The students with the primary disability of autism picked were observed to have deficits in play skills, particularly appropriate verbal initiation and verbal appropriate responses. They were observed outside on the school blacktop, featuring a basketball court, basketball, hoops and 200 yards of additional black top. The peer trainers received training in the SDC classroom, during morning recess. The SDC classroom featured four rooms: one large room featuring a bulletin board, reading and toy center, three tables for group work. The other three rooms are small with one table for testing and small group instruction. The peer mentors were observed in the classroom during training in PRT and outside during the baseline, intervention and generalization phases. Students with autism were observed outside for all phases.

Participant 1. Participant 1 was seven years old and three month white male child with a primary diagnosis of autism. Woodcock Johnson academic assessment data had him performing at a five-year old level. According the Vineland Adaptive Behavioral Scale scores gave the child communication skills in the low scoring range, daily living skills in the adequate scoring range but clinically significant scores for internalizing and

externalizing behaviors. (Sparrow, Cicchetti & Balia, 2005). During baseline and

generalization phases of the study, Participant 1 was matched with Baseline/

Generalization Peer 1. During the intervention phase, he was paired with Intervention

Peer 1.

Participant 2. Participant 2 was a seven year and five month Hispanic girl with a

primary diagnosis of autism. Based on data from the Woodcock Johnson academic

assessment, she was performing three years below her age level (Woodcock, McGrew &

Mather, 2006). Her scores on the Vineland Adaptive Behavioral Scale were low in all the

following areas: communication, daily living skills, socialization, motor skills, and

adaptive behavior. (Sparrow, Cicchetti & Balia, 2005).). During baseline and

generalization phases of the study, Participant 2 was matched with Baseline/

Generalization Peer 2 During the intervention phase; he was paired with Intervention

Peer 2.

Participant 3. Participant 3 was a seven year and two month old African American boy

with a school primary diagnosis of Autism. Woodcock Johnson assessment data indicated

his performance to be two and a half-years below his chronological age in all academic

areas. Vineland Adaptive Behavioral Scale scores were all in the low range with the

exception of motor skills, which was in the moderately low range. (Sparrow, Cicchetti &

Balia, 2005). During baseline and generalization phases of the study, Participant 3 was

matched with Baseline/ Generalization Peer 3. During the intervention phase, he was

paired with Intervention Peer 2.

Materials

Materials included: a bouncy ball, soccer ball, basketball and tub. Training cards

based on the Pivotal Response Training manual (Koegel et al., 1989) will be used for the

peer trainers. These cards help teach the PRT method in a way that a child will

understand (Harper, Symon & Frea, 2008). There were five title cards, representing key

components of the PRT that were used during each training day to describe the skills

being taught (see Appendix A). The five title cards were based on the five methods

taught: *Gaining Attention, Changing Activities, Narrating Play,* and *Turn Taking, and*

Reinforcing Attempts. The *Gaining Attention* will feature the words "Get their attention."

It will feature two faces with a line pointing to each other representing eye contact. The

second title card is for *Change Activities* featuring the title "Give Choices." It included

the instructions, "Give choices" along with the picture example of two activities; a

football and a soccer-ball. The *Narrating Play title* card will be called "Talk About It." It

featured the words and a picture of one kid kicking a ball back to a friend, with one child

saying "It's fun playing soccer!" The Take Turns card featured the instructions, "Take

turns." It included a two box picture with one child bouncing the ball saying "My turn."

with the next picture showing the child passing the ball to a another child saying, "Your

turn." The *Reinforcing Attempts* card was called, "Praise Attempts." It featured a picture

of a kid passing a ball to another peer, with the peer saying, "Nice throw!"

Experimental Design

As mentioned above, a concurrent multiple baseline across participants design

(Kennedy, 2005) was used to determine the interventions effectiveness. Unlike ABAB

formation, multiple baseline designs demonstrate an independent variable's impact

without withdrawing and reintroducing it during the study (Kennedy, 2005). It is a tier

based design that allows the researcher to introduce the independent variable to one tier at

a time allowing the researcher to demonstrate a functional relationship in various contexts

by impacting one tier at a time while the others remain stable. Once a functional

relationship is demonstrated the researcher can reintroduce the independent variable to a

different tier, while other tiers remain unchanged (Kennedy, 2005).

Procedures

Prior to collecting data, parents of the peer mentors and the participants were

notified by the peer mentor's classroom teacher. Parents were asked to sign a notice of

consent indicating that they agreed to allow their child's participation in the project.

Baseline

Baseline data was collected for ten-minute observation probes with untrained

peers playing with students with autism for play activities. The play activities consisted

of one untrained peer for each child with autism. They were given a bucket with three different balls: a soccer ball, a bouncy ball, and a basketball. The verbal instruction given by the teacher researcher prior to every play session was "Okay we have three choices you can shoot basketball together, kick the ball back and forth, or bounce the ball back together. If you get tired of one game you can switch another one. Okay. Let's play together." The trained peers did not participate in the baseline condition, and instead received their PRT training in the SDC classroom during afternoon recess in this phase of the study. The teacher researcher used the baseline probes to gather data on appropriate verbal initiation and appropriate verbal responses.

Peer Training

The peer trainers were trained in PRT over seven consecutive school days for twenty minutes, while baseline data was being collected. They were trained in five PRT strategies specifically, gaining peer attention, changing activities, narrating play, turn taking, and reinforcing attempts over specific objectives (Harper, Symon & Frea, 2008; Pierce & Schreibman, 1997a, 1997b). Each of the PRT strategies were taught using visual training cards to teach the method, including a formal introduction and demonstration from the teacher researcher. It was followed by practice sessions with the author and peers. Peers practiced in dyads with the teacher rotating in each group. The session ended with the teacher researcher reviewing the skill and providing visual training cards for the trainers. The last two days consisted of an overview of each of the

strategies on the playground. (Harper, Symon & Frea, 2008). The beginning training

session included an introduction to differences and how to be respectful to individuals

with differences in their behavior. The teacher gave examples of what those behaviors

may look like, for example not making eye contact, or ignoring verbal cues. Again

untrained and trained peers, were screened prior to training, based on teacher researcher's

knowledge of peers social repertoires.

Each training session consisted of the teacher introducing the skills and modeling

them; giving the peers practice time while the teacher pulled out other peer trainers to

practice and assess; and finally a closing opportunity for the teacher to assess students

again and receive a practice card for homework practice. After the first training session,

each class consisted of review and time to practice prior skills.

To teach *gaining attention* skills the teacher introduced the concept while

modeling. For example the teacher would say, "When we play with friends the first

important thing is to make sure they know we are talking to them. We have to gain their

attention." The teacher then taught how to prompt a student to look at them by: first

saying there name and then making sure the peer is looking back at them to receive

instruction. The teacher would let the peers' practice this with each other while the

teacher will work with each individual child to check for accuracy. The teacher would

then model how to prompt the child with autism to look up, when the verbal prompt did

not work. For example, if after giving the verbal prompt there was no response, the

teacher would demonstrate changing the intonation of the voice and increasing physical

proximity. The teacher would then have the peers practice with each other again, while

the teacher worked with each individual child. The session would end with the teacher

allowing the kids to play while the teacher researcher would call out each child to assess

proficiency of the targeted skill by asking each child to name, and demonstrate the skill.

The researcher also gave each child the practice card for homework and gave reminders

of how to execute the procedure. For example "Say friends name and wait for friend to

look back at you, if he/she does not look back try again by getting a little closer and

changing the voice a little.

The second training session consisted of a quick review of *gaining attention*, by

first the teacher modeling it and then having the peers practice. The researcher then

introduced how to *change activities* by teaching how to create an opportunity so that the

child with autism will choose an activity. The peers were then taught how to provide

highly preferred objects by asking, "Would you like to play soccer, or shoot some

hoops?" The session concluded again with free play as the researcher pulled out peer

trainers individually to assess proficiency and to give a practice card called "give

choices" that reviewed the skill featuring the same terms and language used in the

practice session. Peers were instructed to practice the card at home.

The third training session began with review practice of prior skills and went on

to teach about *narrating play*. The teacher modeled how to narrate play experiences as

they happen, "It's fun bouncing the ball. Wow it's really bouncing high!" After the

structured format the students were given the "Talk About It" card and instructed to

practice at home. The fourth training session covered *reinforcing attempts*. The teacher

first reviewed prior concepts then modeled providing praise; for example; "I like how

you are listening to me right now." The teacher would then give the peers' opportunities

to praise their friends while they all play throw the ball for catch together in a circle. The

teacher would then give more thorough explanations into *reinforcing attempts* by

emphasizing that praise is for trying not just perfect success. For example, trying to make

a basketball shot deserves a "Way to go nice try!" not just a shot that goes in the basket.

The teacher would then give more examples of opportunities to praise attempts, such an

attempted kick during soccer, or trying to bounce the ball and other attempts. The training

card, "Praise Attempts" was reviewed by each peer as he/she demonstrated her

understanding of the concept with the teacher researcher.

The fifth session covered *turn taking* after a review of the prior strategies. The

teacher demonstrated how to share an object back and forth, like as in basketball. The

researcher would model turn taking by bouncing a basketball and saying "Your turn" or

"Here you go!" as he passed the ball to a student. Students then practiced with each other.

The teacher then modeled, how to say "My turn." The peers were then given a practice

card with the *turn taking* title, reviewed and practiced examples and were told to review it

for homework.

The final two training days consisted of a brief review of the strategies. It was followed by practice period where two trainers played together one taking the role of the trainer and the other the role of the student for ten minutes and then switching roles for an additional ten-minute period.

Intervention

When the teacher-researcher observed a stable trend in a student with autism's appropriate verbal responding and initiating behavior his/her untrained peer was replaced with a trained peer. Immediately prior to each intervention session, trained peers were given a short review of the five strategies. The review took less then five minutes.

During the intervention, trained peers implemented the PRT strategies as described in the previous section to assist the students with autism in order to increase the targeted play behaviors. The teacher-researcher continued to observe for ten minutes as soon as the peers were prompted to go play.

Generalization Phase

During the generalization phase untrained peers from the baseline phase were trained in the PRT strategies under the same conditions as the trained peers prior to the intervention phase. When the data from the intervention demonstrated a two consecutive day increase the dependent variables for the targeted students with autism, peer trainers from the intervention phase were switched with peer trainers from the baseline phase.

The purpose was to maintain experimental control while demonstrating if the student's

with autism would exhibit the same appropriate play behaviors with novel peers.

Treatment Fidelity

In order to measure the extent to which peers were able to implement the PRT

strategies, data on treatment fidelity was collected. Treatment fidelity data was collected

to determine if the peer trainers could apply four of the five strategies with 80% accuracy

based on a form created by R.L and L.K Koegel (2006). The form was a partial interval

recording form for ten minutes broken into one-minute intervals. There were boxes with

components: child attending, clear opportunity, contingent, contingent on attempts. Child

attending and clear opportunity referred to making sure that the child was paying

attending to the peer trainer, and that stimulus emitted from the peer was clear with ample

time given for the child to respond to the trainer. Contingent referred to reinforcing only

behaviors that related to the task at hand for example if the child said, "let's play on the

basketball", the peer trainer would immediately acknowledge that request. Contingent on

attempts meant that any reasonable attempt to answer questions or comments was

acknowledged by the trainer. The attempts needed to be within the range of the child's

verbal repertoire meaning if the child could say a 6 word sentences, a verbal grunt would

not be an acceptable response.

Dependent Variables

The two dependent variables were a) appropriate verbal initiations and b) appropriate verbal responses. Appropriate verbal initiations was defined as a verbal attempt to gain a peer's attention to initiate in play excluding speech with name calling. For example "You idiot." would not be appropriate verbal initiations (Harper, Symon, & Frea, 2008). An example was if a child with autism faced the peer trainer and said "Let's play soccer.". (Harper, Symon, & Frea, 2008). Appropriate verbal response would be defined as an appropriate verbal attempt to respond to a stimulus within 5 seconds of the stimulus being emitted. The comment would need to be related to the immediate play context and be of a conversational nature. For example if a peer handed the student a ball, and the student with autism said "Thank you." would be marked as an appropriate response. An inappropriate verbal response would be a student commenting with his/her back turned to the peer or talking about something unrelated to the immediate play context. An example of an inappropriate response would be the student singing a song while shooting a basket.

Data Collection

Data was collected on partial interval record sheets, formatted by the teacher researcher. The format consisted of the target behaviors observed in boxes: initiation, and appropriate responses. Underneath each target behavior were 10 small boxes for each minute. If the target behavior occurred in the minute the box got marked. If the behavior did not occur within the minute the box was marked with a minus. If there was no opportunity for the behavior to be emitted the box was marked N/A. Adding the checked boxes and dividing by 10 will then calculate a percent of intervals.

Inter-observer Agreement

To maintain research fidelity Inter-Observer Agreement (IOA) data was taken. One independent teacher assistant and a teacher simultaneously observed the target behaviors during 25% of the video taped sessions. The teacher-researcher was the reliability recorder. The inter-rater reliability was calculated by the formula of agreements divided by the number of agreements plus disagreements and multiplying by one hundred (Kennedy, 2005). The mean inter-observer agreement for appropriate responses was 85 percent (range 70-90 percent) for Participant 1; 90 percent (range 60-100 percent) for Participant 2; and 95 percent (range 90-100 percent) for Participant 3. The mean inter-observer agreement for appropriate verbal initiations was 90 percent (range 66-100 percent for Participant 1; 100 percent (range 100-100 percent) for Participant 2, and 92.5 percent (range 75-100 percent) for Participant 3.

Data Analysis

Dependent variables were observed and marked by the teacher-researcher. Sessions were videotaped and marked on paper consisting of ten boxes for each one minute interval for the appropriate verbal responses and a long box to mark tally's for the appropriate verbal initiations. Appropriate verbal responses were measured by percentage or how many appropriate verbal responses occurred based on partial interval recording data. The appropriate verbal initiations were measured by frequency or how many occurred total within a ten-minute time period. All data was graphically displayed using a multiple baseline design, with two graphs for each dependent variable. The graphs were

stacked in three tiers. Visual analysis of the graph's trend enabled the teacher researcher

to accurately decide when to apply the independent variable to the targeted student, and

enter a new phase of the program.

Chapter 4: Results

The goal of the project was to determine if peer mediated PRT strategies increase appropriate verbal responses and initiations in students with a diagnosis of autism. The researcher's study also determined if peer mentors could implement the PRT strategies with high fidelity and the student's with autism appropriate verbal responses, and initiations would generalize with novel peers. Results for all three participants of the project are presented in multiple baseline graph form. (See Figures 1 and 2)

Participant 1

Verbal Responses. During the baseline phase, Participant 1 emitted appropriate verbal responses at a range of 20-33 percent of interval data collected and an average of 24.7 percent of intervals of data collected. Intervention data showed Participant 1 giving appropriate verbal responses at a range of 70-90 percent and an average of 80 percent during the intervention phase. During the generalization phase Participant 1 gave appropriate verbal responses at a range of 50-80 percent and an average of 70 percent per session.

Initiations. Baseline data gathered showed Participant 1 using appropriate verbal initiations at a range of 0-4 occurrences during the phase and an average of 1.4 occurrences per ten-minute session. Intervention data showed appropriate verbal initiations emitted by Participant 1 at a range of 0-4 occurrences during intervention phase and an average of 2.1 occurrences per ten-minute session. Generalization phase data showed appropriate verbal initiations displayed by Participant 1 at a range of 0-4 and an average of 1.9 occurrences per ten-minute session.

Participant 2

Verbal Responses. During the baseline phase, Participant 2 emitted appropriate verbal responses at a range of 0-20 percent of interval data collected and an average range of 7 percent of intervals of data collected. Intervention data showed Participant 2 engaging in appropriate verbal responses at a range of 40-100 percent and an average of 74.3 percent during the intervention phase. During the generalization phase Participant 2 used appropriate verbal responses at a range of 80-90 percent and an average of 82.5 percent per session.

Initiations. Baseline data gathered showed Participant 2 emitting appropriate verbal initiations at a range of 0-0 occurrences during the phase and an average of 0 occurrences per ten minute session. Intervention data showed appropriate verbal initiations demonstrated by Participant 2 at a range of 0-0 occurrences during intervention phase and an average of 0 occurrences per ten minute session. Generalization phase data showed appropriate verbal initiations emitted by Participant 2 at a range of 0-0 and an average of 0 occurrences per ten minute session.

Participant 3

Verbal Responses. During the baseline phase, Participant 3 displayed appropriate verbal responses at a range of 0-10 percent of interval data collected and an average range of 4 percent of intervals of data collected. Intervention data showed Participant 3 emitted appropriate verbal responses at a range of 40-90 percent and an average of 71.4 percent during the intervention phase. During the generalization phase Participant 2 gave

appropriate verbal responses at a range of 60-60 percent and an average of 60 percent per session.

Initiations. Baseline data gathered showed Participant 3 using appropriate verbal initiations at a range of 0-1 occurrences during the phase and an average of 0.2 occurrences per ten-minute session. Intervention data showed appropriate verbal initiations given by Participant 3 at a range of 2-5 occurrences during intervention phase and an average of 3.4 occurrences per ten-minute session. Generalization phase data showed appropriate verbal initiations emitted by Participant at a range of 1-2 and an average of 1.3 occurrences per ten-minute session.

Treatment Fidelity

Treatment fidelity data was used to determine how accurately the peer trainers implemented the PRT approach with students with autism. The five PRT strategies observed and marked on the treatment fidelity sheets were: child attending, clear opportunity, contingent, contingent on attempts. All three-intervention phase peer trainers implemented the PRT approach with an average no lower than 70 percent (74.3 percent) and no higher than 82 percent (81.2 percent). Baseline/Generalization phase peers implemented the PRT strategies with an average no lower than 71 percent (71 percent) and no higher than 84 percent (83.6 percent) during the generalization phase. Graphic displays demonstrate similar varied trends in accuracy for peer trainers and students with ASD during both intervention and generalization phases. The exception would be graphic displays showing an upward trend in fidelity implementation for Baseline/Generalization

Phase Peer trainer 3 while Participant 3 maintained a steady trend in appropriate

responding (See Appendix).

Intervention Phase Peer Trainers. The Intervention Peer 1 was scored to apply

the PRT strategies with a range of 70-90 percent and an average of 81.2 percent per ten-

minute session according to data taken. The Intervention Peer 2 was scored to apply the

PRT strategies with a range of 40-100 percent and an average of 74.3 percent per ten-

minute session according to data taken. The Intervention Peer 3 was scored applying the

PRT strategies with a range of 50-100 percent and an average of 76.4 percent per ten-

minute session according to data taken.

Generalization Phase Peer Trainers. The Baseline/Generalization Peer Trainer

1 was scored to apply the PRT strategies with a range of 40-80 percent and an average of

71 percent during the generalization phase, The Baseline/Generalization Peer Trainer 2

was scored to apply the PRT strategies with a range of 70-90 percent and an average of

83.6 percent during the generalization phase. The Baseline/Generalization Peer Trainer 3

was scored to apply the PRT strategies with a range of 60-90 percent and an average of
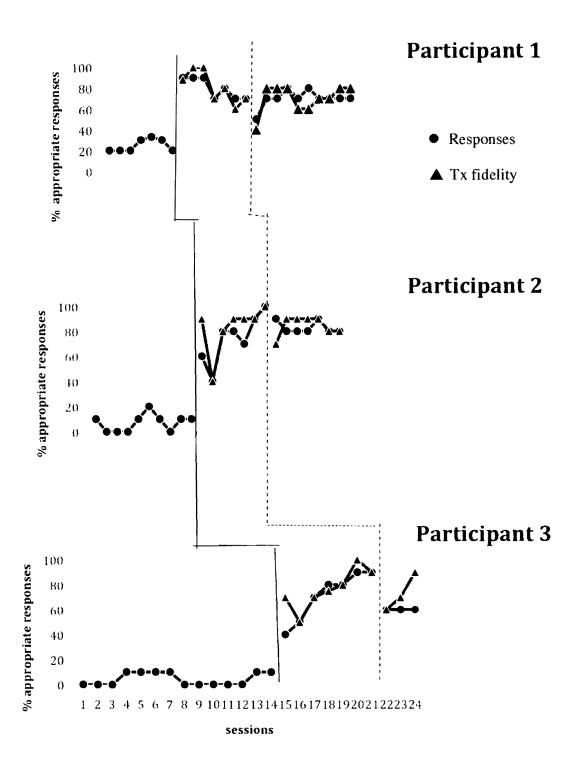
73.3 percent during the generalization phase.

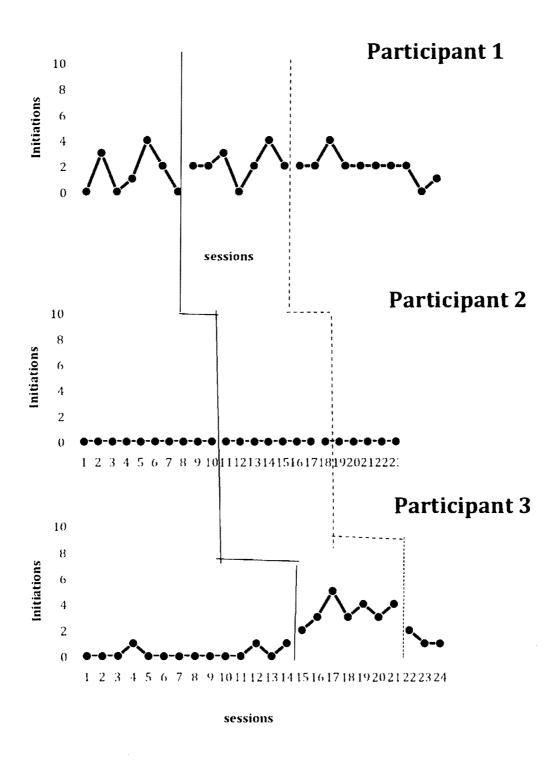**Figure 1. Percentage of appropriate responses and treatment fidelity**

Figure 2. Number of appropriate initiations

Summary

Based on data collected all three participants with autism showed increases in appropriate verbal responses during the intervention phases. For Participant 1 appropriate responses increased sixty percent from the first day of the intervention but then showed a downward trend in accuracy stabilizing at seventy percent during the generalization phase. The graphic display of Participant 2 shows a consistent increasing trend in appropriate responding during the intervention phase and stabilizing trend during the generalization phase. Data of Participant 3 like Participant 2 showed an increasing trend in appropriate responding during the intervention phase however unlike Participant 2 there was a sharp drop in appropriate responding with a stabilizing trend during the generalization phase. Appropriate verbal initiations showed little change during intervention and generalization phases for Participant 1 and Participant 2. Appropriate verbal initiations increased slightly during the intervention phase for Participant 3 however, they decreased back to baseline levels during the generalization phase.

Chapter 5: Discussion

This study examined the effectiveness of peer mediated PRT strategies in occasioning appropriate verbal initiations and responding for students with an autism diagnosis during structured play. It also observed the extent that peer mentors could implement the PRT strategies with a high degree of fidelity.

The results show that the three participants with an autism diagnosis increased appropriate social responding, however there was little to no change in appropriate verbal initiations. Graphic displays (See Figures 1 and 2) and averages of appropriate responses by the Participants with autism and Peer Trainers suggest a relation between the Peer Trainers implementation of the PRT strategies and an increase in appropriate responding. The current study adds to the literature that peer mediated PRT may increase social skill behavior in students with autism (Pierce & Schreibman, 1995; Pierce & Schreibman, 1997a, 1997b; Symon & Frea, 2007). It also adds to the literature regarding accuracy of peer mentors in implementing the PRT strategies and its relation to increasing pro-social behaviors.

Limitations

There were several limitations of the study. The first limitation relates to the small sample size (n=3), which is an inherent characteristic of single subject research. As such inferences regarding the effects of this approach for all children with autism cannot be made. Rather further research will need to be conducted in order to replicate the findings of the current study before such inferences can be made. Second, the play itself was highly structured, with the students being prompted to play three particular games.

Therefore, the current study does not address how peer mediated PRT impacts social skills in more naturally occurring unstructured play environment. Lastly, IOA on the treatment fidelity data was not collected.

Implications for Research

Future research should address the fidelity of implementation among teachers in training and observing peer trainers to apply PRT. In particular, future studies should examine how peer mediated strategies can increase social play in more unstructured environments, such as play and transitions from work to non directed time in school. Future research should also address peer mediated PRT for students with social deficits with and without an autism diagnosis, to see if the strategies are relevant to various populations.

Given that the current study was conducted in a more contrived play scenario, future research should examine peer mediated PRT interventions in looser play structures, such as recess and non-directed tasks. Research should examine how student peers implement PRT when there is greater variability and change in the tasks. Additionally, research will need to address the extent to which social deficits and targeted social skills change during less contrived social contexts. Lastly, future research should investigate strategies for enhancing the treatment fidelity of peer mentors in implementing peer-mediated interventions, such as PRT.

Implications for Practitioners

The teacher researcher of the present study plans to utilize the results and practices of the peer mediated PRT to help inform his teaching practice, particularly in

teaching peers how to play appropriately during recess. The teacher plans to share the data from the project. The purpose will be to educate other professionals regarding peer mediated and teacher directed PRT strategies as a means of developing student's with appropriate social repertoires for students with autism or those lacking the appropriate skills.

Teachers implementing peer mediated PRT may find that the strategies can be taught in short periods of time. The PRT strategies in the study were taught in seven consecutive school days in thirty-minute segments during recess. One issue that teachers should consider includes selecting peers that will be motivated to be trained during or after school. In the current study, peers who were motivated to participate and be trained during the recess period were identified, however there were times when peer trainers were anecdotally observed to make comments such as "When will this be over so I can go to recess?" This was due to the fact that training took place during recess time, a preferred activity for the training peers, and thus could have negative ramifications if the training is paired with lack of access to a more preferred activity to the peer trainers. Overall this did not appear to impact engagement for the peer trainers in the activity. Still Teachers may need to implement trainings at other times during the school day, and with a lack of staffing arranging training may be a challenge. Teachers may find it difficult to ensure adequate coverage for their other students while conducting training of the peer trainers. Overall, the peer training was easy to implement, and there were very little materials needed to teach the strategies. The procedures in the study took place with

peers during school hours, demonstrating that similar projects utilizing PRT can be applied with little materials, which is applicable in a school setting.

Conclusion

The study found that peer mediated PRT increased appropriate verbal responding in three students with autism during structured play. Appropriate verbal responding increased for all participants with autism during intervention and generalization phases. Data presented showed that the peer mediated PRT did not contribute to increases in appropriate verbal initiations. Results from data collected show a possible functional relation with the implementation of the PRT strategies by the peer trainers occasioning appropriate responding in the students with autism participating in the study.

The study provides further evidence supporting peer mediated PRT as an effective intervention in increasing appropriate social repertoires in students with autism. The study adds to other studies regarding fidelity of implementation of peer mediated PRT and its implications on effective results. Fidelity implementation data revealed that that students with disabilities could learn to implement PRT with fidelity in a short period of time, adding to the literature that peer mediated PRT may be utilized by individuals of different ages, skills and abilities for students with autism.

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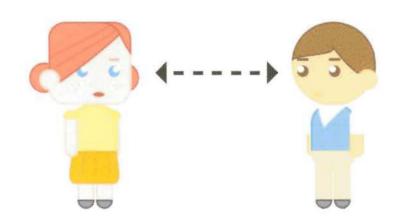autism: are they effective at enhancing multiple social modalities?

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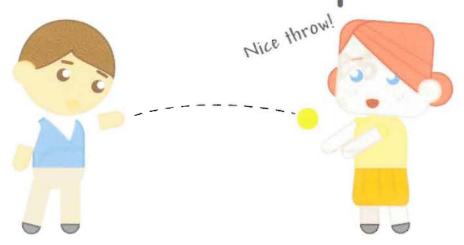
Appendix A

Get Their Attention

Talk About It

WOW Nice Kick!

Praise Attempts

Nice throw!

Take Turns

My Turn!

Your Turn!

Give Choices

Give your friends choices