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It is time to play!: Peer implemented pivotal response training with a child with autism during recess.

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It is Time to Play! Peer Implemented Pivotal
Response Training with a Child with Autism during Recess

by

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A thesis submitted in partial fulfillment
of the requirements for the degree of
Masters of Applied Behavior Analysis
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ABSTRACT

Children with autism, by diagnostic criteria, experience a lack of age appropriate play and social skills (American Psychiatric Association, 1994). This study evaluated three typically developing peer's ability to implement Pivotal Response Training strategies during recess with a child with autism in their third grade class. A concurrent multiple probe baseline across peers design was used to assess peers ability to implement Pivotal Response Training strategies with the target child and the effects of intervention on the play and communication behavior of the target child. Generalization measures were taken in an untrained environment. Measures of social validity in the form of peer interviews and teacher questionnaire were completed. Results displayed that peers were able to use Pivotal Response Training strategies during recess with a child with autism. During post-training/intervention and follow-up sessions the child with autism engaged in higher levels of communication to peers, and slightly lower levels of communication to self. The target child also experienced a decreasing trend in levels of solitary play, an increasing trend in levels of play with peer trainers and levels of parallel play remained near baseline levels. Peers were also able to generalize these skills to an untrained environment to an extent.

Chapter One

Introduction

A lack of appropriate play and social skills is one of the diagnostic core components of autism. The *Diagnostic and Statistical Manual of Mental Disorders* (4th ed.; *DSM-IV*; American Psychiatric Association, 1994, p.75) describes the social delays of children with autism as a “qualitative impairment in social interaction”. Features of autism include the failure to develop developmentally appropriate peer relationships and social or emotional reciprocity, as well as impairments in communication, which includes “lack of spontaneous make-believe play or social imitative play appropriate to developmental level (American Psychiatric Association, 1994 p.75).”

A critical component of instruction for students with autism is the promotion of social interaction skills. Many students with autism are taught within inclusive classrooms with their typically developing peers. When students with autism are included in classrooms with nondisabled students, there are opportunities for learning social interaction skills. However, placement alone does not result in an increase in social interaction ability (Bass, & Mulick, 2007). Bass and Mulick (2007) warn that if specific supports are not put in place to aid in socialization when including students with autism in a classroom with typically developing children, the children with autism may experience social isolation. The authors also explain that when peers are used in

interventions with children with autism, then peers can provide the target child with more opportunities to practice these skills in a variety of play activities.

One way to help children with autism improve social and play skills that has been utilized in many studies over the past few decades is through peer mediated interventions. In peer mediated approaches, typically developing children are trained to deliver systematic procedures designed to promote targeted skills by their peers with autism. Another way to help children with autism improve these skills is Pivotal Response Training or (PRT). Pivotal Response Training (PRT) is a naturalistic behavioral intervention that has been successfully used to teach students with autism social and play skills (Koegel, & Frea, 1993; Stahmer, 1995; Thorp, Stahmer, & Schreibman, 1995). A promising approach for promoting the acquisition of play and social skills by students with autism is to combine these two intervention approaches (Harper, Symon, & Frea, 2008; Kuhn, Bodkin, Devlin, & Dogget, 2008; Pierce, & Schreibman, 1995; Pierce, & Schreibman, 1997).

Peer-Mediated Interventions

Peer mediated interventions or peer tutoring refers to the use of typically developing peers to support, prompt, or systematically interact with peers who have disabilities. Peer tutoring has been used in school and therapy settings to improve the social skills of children with autism (Laushey, & Heflin, 2000; Morrison, Kamps, Garcia, & Parker, 2001; Owen-DeSchryver, Carr, Cale, & Blakeley-Smith, 2008; Strain, 1983; Strain, Shores, & Timm, 1977). Training procedures for peer tutors have included the use of scripts and textual cuing (Goldstein, & Cisar, 1992; Petursdottir, McComas, McMasters, & Horner, 2007; Thiemann, & Goldstein, 2004), teaching peers to implement

systematic prompts and praise (Goldstein, Kaczmarek, Pennington, & Shafer, 1992; Strain, Kerr, & Ragland, 1979), training peers to implement naturalistic and incidental teaching (Kohler, & Strain, 1997; McGee, Almeida, Sulzer-Azaroff, & Feildman, 1992), using group oriented contingencies (Kohler et al., 1995) and the creation of integrated play groups and peer networks to support the social interactions of children with autism with typically developing peers (Kamps, Potueck, Lopez, Kravits, & Kemmerer, 1997). Research on the use of peer-mediated interventions and the benefits noted for students with autism and their nondisabled peers are described below. Following that discussion, a description of the use of peer mediated delivery of a specific prompting procedure, pivotal response training, is provided with an analysis of the research that has supported the use of this approach for helping students with autism in their development of peer social and play interactions.

The use of peer-mediated interventions for the instruction of play and social skills for students with autism is a preferred approach to instruction by adults of social skills for several reasons. First, a primary objective of social skills training is to teach the child with autism to interact with typically developing peers. When using peers as the training agent, interaction with peers is immediately occurring. Second, the goal of teaching social skills is to have students with autism use those skills in natural contexts. By having peers teach within the natural context, there is no extra step from learning social skills with an adult and then transferring those skills to interacting with peers (DiSalvo, & Oswald, 2002). Finally, the use of peers for instruction allows students with autism to experience many more instructional trials than would be possible if the classroom teacher was the only intervention agent.

Peer training approaches. Researchers have approached the training of peers in a variety of ways (Laushey, & Heflin, 2000; Morrison et al, 2001; Owen-DeSchryver et al., 2008; Strain, 1983; Strain et al., 1977). In an early study by Strain et al. (1977) general instructions were provided to typically developing peers to get the target child to play with them, and stressed the importance of being persistent. Each of the target children's levels of social behavior increased after intervention, decreased in a return to baseline and increased when intervention was implemented again. Because adults were not involved in the actual play session with the children, there was a presumption that the intervention would generalize to natural play routines. However, because data were not collected outside of the treatment setting, it is unknown if these behaviors generalized to other settings (Strain et al., 1977).

Several years later Strain (1983) conducted a similar study on the use of peers to work with children with autism and measured generalization of these skills to integrated versus segregated setting. This study involved providing a typically developing peer structured information about ways to interact with children with autism such as some verbal play organizers, how to share play items, and how to provide physical assistance related to play. In this study, the peer was instructed to try his best to get the target child to play and to be persistent. All of the target children's levels of positive interaction increased during intervention, and generalization was greater in integrated as opposed to segregated settings. These results display the importance of placing children with autism in an environment that will be supportive of their newly gained skills (Strain, 1983).

Unlike the previous studies that only trained one peer to work with the target child, Laushey and Heflin (2000) trained an entire kindergarten class to stay, play, and talk to a

buddy. Buddy pairs were composed of two children in the class and included target children and their typically developing peers. Results showed that the target children had more appropriate social skills while in the buddy program than when they simply played in the same area as typically developing children. These results clearly display that in order to increase the social interactions between typically developing children and children with autism simply placing these children in the same environment is not enough (Laushey, & Heflin, 2000).

Morrison et al. (2001) also implemented a treatment that involved teaching typically developing peers and target children techniques to improve social skills, such as requesting, commenting, and sharing. Peers monitored their behavior and the behavior of the target children for occurrences of these social skills and delivered rewards for target children's appropriate behavior. Generalization data were collected during lunch and recess. The intervention resulted in target children's increased use of social skills, and while some generalization of skills occurred, generalization did not occur for all students. Additional training may have assisted in the generalization of these skills to new environments (Morrison et al., 2001).

More recently Owen-DeSchryver et al. (2008) provided training to typically developing peers on ways to increase social interactions of students with autism in an inclusive school setting. Peers received training on five central themes about interacting with children with autism during lunch and recess. These central themes involved teaching nondisabled peers when to play with the target child, what to talk about, what to play, how to help him or her learn to play, and what to do if he or she is not responding or engages in unusual behavior. Peer initiations increased for all of the participants after

intervention, and they generalized their skills to untrained peers. This study shows how the use of multiple peers can increase the likelihood of skills generalizing to other people (Owen-DeSchryver et al., 2008).

Some studies have been conducted that involved teaching typically developing children to use prompting and praising procedures with children with autism to promote their use of play and social interaction skills (Goldstein et al., 1992; Strain et al., 1979). As in previous studies by Strain, peers in a study by Strain et al. (1979) were first instructed to attempt to get the target child to play with them and to be persistent. Peers were then provided training to prompt the target child to play and to provide social reinforcement for appropriate play. The results showed that both interventions increased the target child's positive social behavior equally well, but that neither method resulted in generalization outside of the experiment (Strain et al., 1979).

An additional study that looked at prompting and praising procedures was done by Goldstein et al. (1992). During training peers were taught strategies for providing mutual attention to the play activity, making comments on ongoing activities, and acknowledging their partner's communicative behaviors. Following training, peers played with the target children. After the intervention was implemented, the target children exhibited an increase in the frequency of total social behavior. Since no measures of generalization were taken, it is unknown if these skills generalized outside of the training session (Goldstein et al., 1992).

Another approach to the use of peer mediated interventions is the use of scripts or textual cueing by typically developing students to promote the social behavior of their peers with autism (Goldstein, & Cisar, 1992; Petursdottir et al., 2007; Thiemann, &

Goldstein, 2004). Goldstein and Cisar (1992) used sociodramatic scripts to teach children with autism and their typically developing peers' appropriate verbal and non-verbal behaviors to engage in during three different sociodramatic themed play situations. The results of the experiment show that the children were able to learn the three scripts, but only after repeating the same highly structured play activity numerous times. Although some children engaged in social behaviors not directly related to the scripts it is not known if the experiment resulted in any significant changes in social behavior because measures of generalization were not taken outside of the training sessions (Goldstein, & Cisar, 1992).

In their 2004 study, Thiemann and Goldstein provided typically developing peers training in appropriate social skills to use with children with autism such as “look, wait and listen”, “answer questions”, “keep talking”, “say something nice”, and “start talking”. Visual supports were added to the interaction that included written phrases that related to the target skill and forms for monitoring their progress. Only two of the target children improved their rates of interaction following peer training alone, but once the textual cues were added to the intervention all of the children improved in the rates of the three targeted social-communication skills (Thiemann, & Goldstein, 2004). Although the experiment increased the children's targeted social-communication skills, this only occurred when numerous textual prompts were added, which is unnatural for typical children's play.

In their 2007 study Petursdottir et al. used Peer-Assisted Learning Strategies for Kindergartners (K-PALS), a program for beginning readers that involves peers using scripted lines to offer assistance with reading partners, with and without the addition of

play related stimuli. The study found that simply being involved in K-PALS did not increase the target child's level of interaction during a free-play session after the activity. When play related stimuli were included in the session and carried over into free play sessions afterwards the target child's level of interactions did increase and when that stimuli was removed from the K-PALS session interactions again decreased. These results again show that simply having children with autism interact with typically developing children does not automatically result in positive changes in behavior (Petursdottir et al., 2007).

In an attempt to use more natural methods of instruction and to promote generalization of skills, researchers have examined the use of naturalistic or incidental teaching (Kohler, & Strain, 1997; McGee et al, 1992). Cowan and Allen (2007) explain that "naturalistic procedures typically take place through loosely structured sessions, which are initiated and paced by the child, take place in a variety of locations and positions, and employ a variety of stimuli" (Cowan, & Allen, 2007, p. 702).

McGee et al. (1992) taught typically developing children to use incidental teaching with children with autism. Peers received instructions to wait for the child to make a request, have the child label the item, and then give the item to the child and provide praise. An experimenter provided picture prompts of each step of the incidental teaching process while the peer interacted with the target child. Target children's use of reciprocal interactions increased after intervention. Because multiple peers were used with each of the target children in the study, they had multiple opportunities at interacting throughout the day (McGee et al., 1992).

Kohler and Strain (1997) conducted an experiment that initially used naturalistic teaching strategies facilitated by the teacher alone and then included peers in naturalistic teaching interactions to teach skills from the Individual Education Plan (IEP) objectives of a preschooler with autism. After naturalistic teaching with the addition of peers was implemented, the target children spent more time interacting with peers, and more time working on the target skills. Findings from this intervention show that the amount of time children with autism spent interacting with typically developing children increased during intervention, but no measures were taken on the quality of those interactions (Kohler, & Strain, 1997).

Another approach to the use of typically developing peers to work with children with autism is the use of peer networks (Kamps et al., 1997). This approach involves the development of a network of students who have agreed to provide assistance to the student with autism. Kamps et al. (1997) conducted a study that involved training typically developing students to work with children with autism in a variety of areas throughout the day including the classroom, recess, and lunch. The intervention increased social interactions for all three target children across settings. By implementing intervention in numerous settings throughout the day the target children's opportunities to interact with peers were greatly increased, and thus improving the probability of these skills generalizing to other settings (Kamps et al., 1997).

A unique approach to the promotion of peer social interactions that involved typically developing peers was the use of group-oriented contingencies to increase the social interactions between children with autism and their peers (Kohler et al., 1995). First, all of the children received social skills training on suggestions for play organizers,

how to provide requests and offers for sharing, and how to provide requests and offers for assistance. Children then received prizes if all the members of their group engaged in the appropriate social skills. After classwide social skills training and the group contingency were implemented all of the subjects exhibited an increase in social exchanges. When intervention was withdrawn each of the target children's levels of social interactions decreased to baseline levels, thus the skills learned during intervention did not generalize outside of the training setting (Kohler et al., 1995).

Peer outcomes. A possible concern that some teachers or families could have about peer mediated interventions is whether participation in the intervention might have a negative effect on the typically developing student. A few studies have documented the benefits of being involved in peer mediated interventions on the typically developing peers (Jones, 2007; Kamps et al., 1998).

Kamps and colleagues (1998) measured the positive peer effects of participating in peer mediated interventions. Students were interviewed or completed questionnaires about their experience in peer-involved or peer mediated programs. The results indicated that most of the peers had positive attitudes towards the children with autism, explaining that they learned a lot from being a part of the intervention. Some of the benefits students experienced included improvements in self concept, more tolerance of others, and friendship. The authors also stated that peers are not only accepting of the children with autism but they are often excited to participate in social activities with them (Kamps et al., 1998).

Jones (2007) also looked at the impact of peer mediated interventions on typically developing peers. The author stated that when peers and children with autism work

together it creates more effective inclusive schools by improving relationships and improving communication between students. During this intervention peers were instructed to try to play close to the children with autism and then to play with them. After the intervention was completed peers were asked questions about being a peer tutor. Each of them enjoyed being a peer tutor and half stated that they noticed a positive change in themselves as a result of being a peer tutor. Parents and teachers also reported that they felt that peer tutoring was a good experience for the children (Jones, 2007).

In summary, there is substantial evidence that peer mediated interventions are a promising intervention approach for promoting the social interactions of students with autism. In addition, there might be benefits to the typically developing student who participates in the intervention. In examining over 20 years of research on peer mediated interventions, there is an increasing emphasis on the design of interventions that are as natural as possible that will yield targeted effects on social interaction skills and the generalization of those skills to nontraining settings. In the following section of this paper, the use of Pivotal Response Training (PRT) to promote the acquisition and generalization of social and communication skills is described. This is a naturalistic intervention that generates greater generalization of targeted skills to nontrained contexts. In addition, there is some evidence that this approach may be used as an effective peer mediated intervention.

Pivotal Response Training

Pivotal Response Training (PRT) is an intervention that is used with children with autism to address the development of “pivotal behaviors” or behaviors that appear to be central to many areas of functioning. It is believed that once improvements in these

pivotal behaviors occur, then the child should also experience positive changes in many other areas of their life. PRT can be implemented by parents, siblings, peers, teachers, and other individuals who interact with children with autism. PRT involves providing clear instructions and questions, interspersing maintenance task with new tasks, providing child choice, using direct and natural reinforcers, and reinforcing attempts (Koegel et al., 1989). Koegel and colleagues have identified three goals of PRT:

1) to teach the child to be responsive to the many learning opportunities and social interactions that occur in the natural environment, 2) to decrease the need for constant vigilance by an intervention provider, and 3) to decrease the number of services that remove the child from the natural environment (1999b, p178).

Increasing motivation is an important component of PRT. Koegel and colleagues (1999a) suggest several ways to increase the motivation of children with autism, such as providing the child choices in selecting items, topics of conversation or toys, and following the child's lead during interactions. Another advised method to increase motivation is to use natural reinforcers, or reinforcers that are a direct consequence of the behavior, while interacting with the child. Interspersing maintenance tasks with new tasks allows the child to experience successes while teaching new skills and is an additional method that Koegel and colleagues advise using to increase motivation. A final technique that they recommend to increase motivation is to reinforce child attempts at the target behavior. (Koegel et al., 1999a; Koegel, Koegel, Harrower, & Carter, 1999b).

Sherer and Schreibman (2005) identify potential child characteristics that would predict the effectiveness of PRT for children with autism. They explained that children

typically respond better to treatment if they have a moderate or high interest in toys, allow other people to be in close proximity to them, have low or moderate rates of nonverbal self-stimulatory behavior, and have moderate or high rates of verbal stimulatory behaviors. Sherer and Schreibman explain that children who possessed these characteristics typically have greater improvements in language, play behaviors, and social behaviors after participating in PRT (2005).

PRT to teach social and play skills. PRT strategies have been facilitated by adults in order to teach social and play skills to children with autism (Koegel, & Frea, 1993; Stahmer, 1995; Thorp et al., 1995). In a study by Koegel and Frea (1993) the authors modified pivotal social behaviors in several children with autism in an attempt to increase their social behaviors. The authors provided training on appropriate and inappropriate instances of the target social behavior. After that the children recorded if their target social behavior occurred during an interval of time while they had a conversation with the therapist. If they succeeded in engaging in the appropriate behavior they were able to play a video game (Koegel, & Frea, 1993). It is unknown if these newly acquired behaviors generalized to peers because generalization data were not collected. Using nondisabled peers for the target children to converse with, as opposed to adults, would have clearly added social validity to this experiment.

Stahmer (1995) implemented an intervention that taught symbolic play skills to children with autism utilizing PRT strategies. An adult therapist implemented components of PRT during play sessions; such as using child preferred toys, modeling appropriate actions, reinforcing approximations, and varying play material. Each of the target children displayed an increase in symbolic play skills after participating in the

intervention (Stahmer, 1995). Although this intervention was successful at teaching symbolic play skills, this study was limited due to the fact that it did not include any measures of generalization with peers, the individuals who the target children should be playing with.

Thorp et al. (1995) examined using PRT to increase sociodramatic play in children with autism. The training of sociodramatic play was similar to the training of symbolic play in the previous study, and both studies based their training on the PRT training manual (Koegel et al., 1989). Role playing, persistence, and make believe transformations increased for all the target children after intervention. For this study, like the previous two studies it is unknown if play skills acquired while working with an adult generalized to play with children because data was not taken on this (Thorp et al., 1995).

PRT implemented by peers. Several researchers have examined using peers to implement PRT strategies with children with autism (Harper, Symon, & Frea, 2008; Kuhn, Bodkin, Devlin, & Dogget, 2008; Pierce, & Schreibman, 1995; Pierce, & Schreibman, 1997). A benefit of peer implemented PRT is that it "...may be a 'looser' intervention, it provides greater choice to peers in terms of interactions" (McConnel, 2002, p.364).

A series of articles by Pierce and Schreibman evaluated using typically developing peers to implement PRT with children with autism (Pierce, & Schreibman, 1995; Pierce, & Schreibman, 1997). In their seminal article on peer-implemented PRT Pierce and Schreibman provided training to peers on paying attention, providing child choice, varying toys, modeling appropriate social behavior, reinforcing attempts, encouraging conversation, extending conversations, turn taking, narrating play, and

teaching responsively to multiple cues (1995). The results of this experiment showed that peers were able to effectively implement PRT with children with autism. After intervention both target children began to initiate play and conversation with their peers. One limitation of this study was that it lacked measures to promote generalization, such as using multiple peers (Pierce, & Schreibman, 1995).

The limitation mentioned above was addressed in Pierce and Schreibman's follow up study by using three nondisabled peers to implement PRT with each child with autism (1997). Peer training and intervention was implemented the same way as their previous study. After intervention both children displayed an increase in their ability to initiate and maintain interactions with their peers during play, and both were able to generalize these skills to an untrained peer. In both studies peers implemented PRT with the target child in a classroom with no other children present. The contrived settings that these interventions were implemented in are a shortcoming of the studies (Pierce, & Schreibman, 1997).

Kuhn et al. (2008) taught peers in a special education class to facilitate PRT with children with autism. The researchers trained peers within the target child's class that included children with mental retardation, specific learning disabilities, and developmental delays. Peer training consisted of intensive training sessions over several weeks on skills such as paying attention, providing child choice, reinforcing attempts, extending conversation, turn taking, and narrating play. Both target children and peers experienced an increase in social skills after participating in the intervention. A weakness of this study was that no measures of generalization were conducted, therefore it is unknown if these skills generalized to other settings (Kuhn et al., 2008).

A recent study conducted by Harper et al. (2008) addressed some limitations of previous studies by training multiple peers to implement PRT strategies with children with autism in the more natural setting of recess. Peers were trained to gain attention, vary activities, narrate play, reinforce attempts, and take turns with the target children during recess. Both children experienced an increase in social interaction after participating in the study, and these gains maintained during generalization probes. A weak point of this study is that measures of generalization were not taken in any other environments than the training environment; therefore it is unknown if peers used these skills in other locations in addition to the playground (Harper et al., 2008).

Conclusion

Harper et al. (2008) suggested that future research should examine the benefits to nondisabled peers for facilitating PRT with children with autism. Displaying benefits to both peers and children with autism would present a more socially valid intervention. Kamps and colleagues (1998) suggest that future research should be done to find better ways to measure social validity in peer mediated interventions.

Strain and Schwartz (2001) warn that social skills cannot adequately be taught in a contrived setting, they need to be taught in the environment that they will be used. Therefore future research should be conducted that evaluates implementing interventions to improve the social and play skills of children with autism in more natural locations, such as at recess. Doing so will increase the child with autism's opportunities to use their newly acquired social and play skills and may increase the probability that they are able to generalize these skills to other natural play environments.

The biggest problem with having adults facilitate social and play skills training with children with autism is that it is less natural and it could lead to the child being dependent on adults for social interactions (Weiss, & Harris, 2001). Future research need to be conducted to find the more effective ways to facilitate play and social skills by the people who know the most about play, children.

Chapter Two

Method

Purpose

The purpose of the study was to evaluate peers ability to implement Pivotal Response Training (PRT) and examine the effects of peer-implemented PRT on the social and communication behavior of a child with autism. This study was approved by the Institutional Review Board (IRB) at the University of South Florida and the IRB approved consent forms were used to enroll participants. The study extended the literature on PRT in the following ways: 1) by conducting all training sessions in the environment where the skills will be used; 2) by including measures of generalization in untrained environments; 3) by including social validity measures of the benefits of intervention to the target child as well as the peers and; 4) by implementing the intervention in a Waldorf school.

Specifically, the study addressed the following research questions:

1. When provided with training on the use of Pivotal Response Training with a target child with autism, will third grade peers learn the techniques and apply them during recess, and will these skills generalize to an untrained environment?
2. When peers implement Pivotal Response Training with a target child with autism, will that child exhibit increases in play and communication behaviors?

Participants

The participants in this study included an eight year old Caucasian girl diagnosed with mild to moderate autism, and three typically developing classmates who attended a private school. The target child, Eve, was nominated for the study due to her delays in social skills and lack of interaction with her third grade peers.

Eve was diagnosed with an autism spectrum disorder at age four by a developmental pediatrician not associated with this study. She was initially enrolled in a public school special education class for students with varying disabilities from prekindergarten through first grade where she received speech therapy and physical therapy. At the age of four Eve began receiving speech, occupational, and physical therapies from a private therapy center and continued to do so during the time that this study was conducted. At age seven, Eve was enrolled at a private community Waldorf school where she was fully included. During the study, Eve was in a third grade class of 14 students taught by 1 primary teacher and several specials teachers for music, Spanish, German, and handwork. She also received additional academic support from a classroom assistant. At the beginning of this study the assistant worked with Eve the entire school day, but during the course of the study the amount of time the assistant worked with Eve was reduced to half the school day.

Eve spoke in simple sentences, and used language primarily to gain access to items and activities. Eve was working slightly below grade level in the areas of math and handwriting but was above grade level in her reading ability. She engaged in some immediate and delayed echolalia. Socially, Eve rarely initiated interactions with her

peers. During recess she typically wandered around alone, dug in the dirt, and climbed trees.

Three typically developing peers, Jamie, Ashley, and Lily, who are classmates of Eve, were selected to participate in the study. Peers were selected by the criteria suggested by Odom and Strain (1984). Peers eligible to participate in the study were ones that a) attended school regularly, b) interacted with peers in an age appropriate manner, c) were capable of complying with the researchers instructions, d) were able to imitate the behavior of the trainer, and e) had the ability to concentrate on the task at hand for the entire intervention session (Odem, & Strain, 1984). Peers were recruited by asking the teacher which students displayed an interest in interacting with Eve. The teacher nominated three female classmates who were Caucasian females between the ages of eight and nine years old, and had been in Eve's class for a period ranging from several months to a year and several months prior the beginning of the study. Once identified, the researcher asked peers if they wanted to be part of a study to help Eve learn to play. All children expressed an interest in participating in the study. The researcher then provided an IRB approved consent form to the peers' parents by the teacher to explain the study and request permission for the children to participate. Signed consent forms were obtained for all participating children prior to the initiation of baseline data collection.

Setting and Materials

The study took place in a private community school that used the Waldorf curriculum. The Waldorf curriculum is based on the pedagogical principles of Rudolf Steiner and provides an education to meet the needs of each child's capabilities (Suncoast

Waldorf School, 2008). In Waldorf programs, children are provided with ample time to play and engage in movement activities through the day. Play materials that are commonly used in a Waldorf program are bean bags, wooden toys, scarves, and cloth dolls. During outdoor play, children are encouraged to engage in pretend play, organize their own games, and can climb trees and freely explore the environment. Children in Waldorf schools typically are educated with the same peers and teacher from first through eighth grade (Why Waldorf Works, 2009).

The study took place outdoors and within the third grade classroom on the school grounds. Training, baseline, post-training/intervention, and follow-up sessions were conducted in a large meadow behind the school (59.94 x 26.42 m) where children played during recess. The meadow contained two rope swings, shovels, a wagon, and trees that the children were able to climb. Due to the large size of the meadow, the experiment was conducted in a restricted area of the meadow that was designated for the play procedures. Generalization probes occurred in the third grade classroom (8.38 x 4.57m) within the class of fourteen students. The classroom contained desks, chairs, books, art materials, and Waldorf materials such as bean bags, wooden toys, and bees wax.

A training manual was used to train peers. This manual was adapted from similar training materials used by Pierce and Schreibman (n.d.) to train typically-developing peers to use PRT procedures with children who have autism. The manual included written and pictorial explanations of PRT strategies that were written at a level of understanding that was appropriate for early elementary age children. A video camera was used during baseline, intervention, generalization, and follow-up sessions to record the behavior of the target child and peers. A video camera was also used to record the

instructions and interactions that occurred with each peer during training sessions.

Several materials and toys were used during baseline, training, post-training/ intervention and follow-up sessions, including: gnome dolls, wooden animals, tree blocks, and balls.

These are materials that were in the classroom and also available for use during outdoor play.

Design

A concurrent multiple probe baseline across peers design was used to assess each peer's ability to implement PRT strategies with a child with autism and the benefits of intervention to the target child (Kazdin, 1982). Baseline data on the types of interactions that each peer had with the target child were gathered until levels of these behaviors stabilized. Once baseline levels were stable or showed a decreasing trend, peers received individual training on one PRT technique at a time until all six strategies were trained. After the first peer completed training and displayed improvement over baseline during post-training/intervention sessions, the next peer was trained and so on until all of the peers were trained. Data on the peer's use of the PRT intervention and behavior of the target child in interaction with the peer were gathered after peers were trained.

Procedures

Baseline

Before peers were trained on PRT strategies baseline data were collected during recess.

During baseline each peer was asked one at a time to play in a designated area of the meadow, but the peer was not given any prompts to play with the target child. Data collection began when a set of toys were presented to the children and the researcher announced "It is time to play" and ended after seven minutes. The toy set included:

gnome dolls, wooden animals, tree blocks, and balls. Data were collected on peer interactions and the target child's play and communication behaviors until the data were stable or a decreasing trend was evident indicating that social interactions were becoming less frequent over time (see Appendix A for peer data collection sheet; see Appendix B for target child data collection sheet).

Peer PRT training

Peer training was based on the manual “Kids Helping Kids: Teaching Typical Children to Enhance the Play and Social Skills of Their Friends with Autism and Other PDD’s” by Pierce and Schreibman (n.d.) with permission from the authors. The manual was adapted from its original version in the following ways: the strategy “use developmentally appropriate language ‘easy sentences’” was removed as an actual strategy, and instead this concept was stressed through all peer training sessions. The strategy “increasing observational learning ‘tell what you are doing’” was also removed as an actual strategy and instead narration of play was stressed while teaching “modeling appropriate and complex play skills ‘show good play’”. The adapted manual was used to provide peers with training on the implementation of the following PRT strategies:

- 1.) *Orient attention “Paying attention”*- gain Eve’s attention before attempting to give a direction.
- 2.) *Enhance motivation by offering choices “Give choices”*- provide Eve with choices between items and activities.
- 3.) *Model appropriate and complex play skills “Show good playing”*- comment on and narrate play (e.g., saying “playing cars is fun” while racing toy cars).

4.) *Encourage conversation* “*Ask your friend to talk*”- get Eve to ask for desired items and activities (e.g., requiring Eve to say “I want the ball” before giving her the ball).

5.) *Teach taking turns* “*Take turns*”- take turns with desired items and activities.

6.) *Reinforce appropriate social behavior* “*Good, nice try*”- providing praise to Eve for engaging in socially appropriate behavior (e.g., while playing catch, saying “nice throw”).

Peer training occurred in the meadow during four, 30-minute sessions over the course of two weeks. During the first session the PRT strategy “orient attention” was taught. During the second session the strategies “enhance motivation by offering choices” and “model appropriate and complex play skills” were taught. During the third session the PRT strategies “encourage conversation” and “teach taking turns” were taught. During the final training session the strategy “reinforce appropriate social behavior” was taught and all six PRT strategies were reviewed. The same set of toys that were available during baseline, post-training/intervention, and follow-up sessions were used during training. Peers were presented with a manual that included written and pictorial explanations of all six PRT strategies. Each strategy was taught one at a time; the researcher first explained the strategy to the peer and then modeled it with the peer, having the peer pretend to be the target child while the researcher pretended to be the peer to model the incorrect and correct use of each strategy. The peer was then prompted to demonstrate the incorrect and correct use of the strategy with the researcher, and feedback was provided on the peer’s performance in the form of praise for correct behaviors and corrective feedback for problem areas. At the end of the session the peer

was asked questions about each of the strategies to make sure that she thoroughly understood the concepts and an opportunity was provided to the peer to ask any questions that they may have. On the final day of training, after all of the PRT strategies were taught, a role play checklist was used to collect data on peers' use of PRT strategies during three role plays. Peers were trained until they met the training criteria of being able to perform all six strategies properly during three separate role plays. The role play checklist displayed that Jamie, Ashley, and Lily were able to use each of the PRT strategies during three consecutive role plays. Jamie was the first peer to participate in PRT training; once she received training on all PRT strategies to criteria she was then able to use the strategies with Eve during recess (i.e., post-training/intervention sessions). These same procedures were repeated with Ashley, and then Lily in a multiple baseline format.

Post-training/Intervention

Once a peer was able to perform all six PRT strategies properly during three separate role plays, the child was asked to use those skills and play with the target child during recess. Post-training/intervention sessions began when the researcher announced "It is time to play." Peers then used PRT strategies while playing with Eve for seven minutes. Each session consisted of one of the peers playing with Eve. For post-training/intervention sessions, similar to baseline sessions, the children were required to play in a designated area of the meadow. Data on intervention sessions were collected two to three times a week during recess, and lasted seven minutes for each peer. Due to the length of recess, Eve only participated in one or two post-training/intervention sessions with peers per recess.

Booster training session

If a peer did not show a marked improvement over baseline during the first three post-training/intervention sessions, a booster training session was provided. During booster training the peer received an additional 30 minute training session that consisted of reviewing and role playing all of the PRT strategies and the peer received feedback on their performance. If a peer was required to participate in booster training, on subsequent post-training sessions they also received post-session praise and corrective feedback on their performance until the peer moved into follow-up.

Due to the fact that Lily's use of PRT strategies during her first three post-training sessions decreased to baseline levels she received a booster training session, post-session feedback, and the opportunity to earn reinforcing items for using PRT strategies during post-training sessions. During the booster training session Lily was informed that if she used the PRT strategies while playing with Eve she would receive a small item. Items included markers, erasers, lip gloss, and playing cards. After each post-training session Lily received feedback about her performance and was able to choose an item if she had used the PRT strategies during the session. When Lily moved into follow-up sessions she did not receive post-session feedback or the opportunity to earn reinforcers.

Generalization

Generalization probes were conducted in the untrained environment of the classroom during indoor free play to see if peers generalized their use of PRT strategies to other environments. Several generalization probes were taken during baseline, post-training/intervention, and follow-up. For measures of generalization peers were not told "It is time to play" and the basket of toys were not introduced. Each peer was asked one

at a time to play with the target child. Data collection began after indoor free play started and peers were asked to play with the target child and the session lasted for seven minutes. During generalization probes no post-session feedback was provided, even if the peer had participated in booster training and was receiving post-session feedback during post-training/intervention sessions at the time the generalization probe was conducted.

Follow-up

Follow-up sessions occurred after a peer met the criterion of using PRT strategies for at least 50% of intervals during a post-training/intervention session for three consecutive sessions. Follow-up sessions were identical to baseline and post-training/intervention sessions for peers who did not receive a booster training session. For peers who received booster training, post-session feedback was no longer provided during follow-up sessions.

Measures

Dependent variables

Baseline, post-training/intervention, generalization, and follow-up sessions were video recorded and analyzed to assess each peer's ability to implement PRT strategies with the target child and the play and communication behavior of the target child.

The main dependent variable was the peer's ability to use each PRT strategy: paying attention, offering choices, modeling appropriate and complex play skills, encouraging conversations, taking turns, and reinforcing appropriate social behavior.

Seven minute recess sessions were analyzed in 15 s intervals, using partial interval recording. The number of intervals that a peer used any of the PRT strategies

was divided by the total number of intervals, 28, and multiplied by 100 to produce a percentage of intervals that the behavior occurred. For example; if the peer used any of the PRT strategies during 15 of the 28 intervals then she did so for 54% of the session.

Video taped seven minutes sessions were analyzed for occurrences of the following behaviors.

- 1.) *Orient attention “Paying attention”* occurred when the peer gained Eve’s attention before attempting to give a direction.
- 2.) *Enhance motivation by offering choices “Give choices”* occurred when the peer provided Eve with choices between items and activities.
- 3.) *Modeling appropriate and complex play skills “Show good playing”* occurred when the peer commented on and narrated her own play (e.g., saying “playing cars is fun” while racing toy cars).
- 4.) *Encouraging conversation “Ask your friend to talk”* occurred when the peer required Eve to ask for desired items and activities (e.g., requiring Eve to say “I want the ball” before giving her the ball).
- 5.) *Teaching taking turns “Take turns”* occurred when the peer took turns with desired items and activities.
- 6.) *Reinforcing appropriate social behavior “Good, nice try”* occurred when the peer provided praise to Eve for engaging in socially appropriate behavior (e.g., while playing catch, saying “nice throw”).

In addition to measuring the peer’s use of PRT strategies, the study included measures of Eve’s play and communication behaviors. Definitions of solitary play and play with peer trainers were derived from Wolfberg and Schuler’s (1993) definition of

isolate play and play with a common focus. The definition of parallel play was derived from Rubin's (1989) definition of parallel play.

The seven minute videotaped sessions were analyzed in 15 s intervals, using partial interval recording to determine the percentage of intervals that the target child engaged in play and communication behavior. These sessions were analyzed to determine the occurrences of the following behaviors as defined by the operational definitions below:

Solitary play- Eve plays independently. During solitary play she may appear to be oblivious or unaware of others (e.g., Eve sits away from peers and digs a hole in the dirt).

Parallel Play- Eve plays beside or in the company of the peer, but does not play with the peer. She uses toys that are similar to those that the peer trainer is using. Eve may seem to be somewhat aware of and attentive to the peer, but does not interact with her (e.g., Eve and the peer both play with blocks near each other but Eve does not speak to, or engage with the peer).

Play with peer trainers- Eve engages in activities involving the peer. This includes turn taking, giving and receiving assistance, and active sharing of materials. Playing with peers involves a common focus or attention on the play (e.g., Eve manipulates a gnome doll and hands it to the peer).

Communication behaviors were measured according to the operational definitions below:

Communication to peer- utterances and vocalizations emitted by Eve that are directed to a peer. This includes singing songs with the peer trainer, answering questions posed by the peer trainer, and any other utterance or vocalization not

directed to self in the form of vocal stimulation (e.g., Eve says “Ball please” when asked by a peer “What do you want?”, or she sings the same song as the peer.)

Communication to self- utterances and vocalizations emitted by Eve that are directed to herself in the form of vocal stimulation. This includes singing songs to herself, repeating lines from television shows and movies, and mumbling to herself (e.g. Eve makes the sound “eeeeee”, or she mumbles songs lyrics to herself.)

Inter-observer agreement

Inter-observer agreement (IOA) was calculated for 80% of baseline, post-training/intervention, generalization, and follow up sessions. To conduct IOA two observers independently viewed videos of peers interacting with Eve for occurrences of the target behaviors for peers and Eve. An agreement of the occurrence of a target behavior was defined as both observers recording that a target behavior occurred within the same interval. A disagreement over the occurrence of a target behavior was defined as one observer recording the occurrence of a target behavior and the other observer not recording an occurrence of a target behavior within the same interval. Inter-observer reliability was calculated by dividing the number of agreements by the number of agreements plus disagreements and multiplying by 100

Peer’s target behaviors. IOA was calculated for the occurrence of each of the PRT skills. IOA for orient attention was an average of 89.63% (range 64 to 100%), enhance motivation by offering choices was a mean of 99.05% (range 89 to 100%), model appropriate and complex play skills was an average of 97% (range 75 to 100%), encouraging conversation was a mean of 97.73% (range 79 to 100%), teaching taking

turns was an average of 97.85% (range 82 to 100%), and reinforcing appropriate social behavior was a mean of 99.43% (range 89 to 100%). IOA for the nonoccurrence of any of the peers' target behavior was an average of 88.65% (range 71 to 100%).

Eve's target behaviors. IOA for the occurrence of solitary play was an average of 82.85% (range 61 to 100%), parallel play was a mean of 76.87% (range 57 to 100%), and play with peer trainers was an average of 86.33% (range 61 to 100%). IOA for the occurrence of communication to self was a mean of 86.56% (range 61 to 100%), and communication to peer trainer was an average of 96.38% (range 82 to 100%).

Data collectors

Data collectors were trained prior to coding any of the research study videos by the researcher. Training involved reviewing the operational definitions for each measure and the procedures that would be used to code the videos and ensure independent scoring during the session. The researcher then explained the data collection sheets and how to record data on peers and Eve's target behaviors.

Video segments were developed to be used for training data collectors on the dependent measures. In these video segments, a 10 year old male child was asked to play with his twin three year old sisters and use the PRT strategies. These two segments were shown to the data collectors to prepare them to reliably record data on the peer's target behaviors.

Fidelity of peer training

To assess the degree to which the components of training were implemented with integrity, data were collected on training fidelity. All of the peer training sessions were video recorded. These video recordings were reviewed by observers who completed a

check list of the relevant components of training. Observers used the checklist to see if the training session included: an introduction of the PRT component, explanation of the PRT component, modeling the PRT component, role playing the PRT component with the peer, providing the peer feedback on their performance, asking the peer questions about the PRT component, and asking the peer if they have any questions. The checklist conformed that the researcher used all necessary components of training during each training session with all three peers.

IOA for measures of training fidelity was conducted for 25% of the training sessions. IOA was measured by having two observers independently view the video recorded sessions and record if each component of the session occurred during training. An agreement of the occurrence of a training component was defined as both observers recording that a training component occurred. A disagreement over the occurrence of a training component was defined as one observer recording the occurrence of a training component and the other observer not recording an occurrence of a training component. Inter-observer reliability was calculated by dividing the number of agreements by the number of agreements plus disagreements and multiplying by 100. IOA for measures of training fidelity was 100%.

Social Validity

Peers. Social validity was measured through interviews with peers about their experiences with participating in the intervention after the study was completed.

Interviews were administered by the teacher to each peer individually in order to avoid the possibility of a peer influencing the responding of the other peers (see Appendix C for

peer interview questions). The interview was based on the peer questionnaire presented in Jones (2007).

Teacher. After the study was completed, the teacher was given a questionnaire to complete that posed questions about her views of the intervention procedures and outcomes. The teacher answered questions about her perception of the interactions between the target child and each of the nondisabled peers (see Appendix D for teacher questionnaire).

Chapter 3

Results

Figure 1 presents data on the use of PRT strategies by peers within play sessions. During baseline sessions peers only used a few of the PRT strategies on a few occasions, after receiving training on the strategies they increased the frequency of, as well as the variety of, strategies used. During follow-up sessions one peer's use of PRT strategies maintained above criterion level and another peer's use of the strategies decreased below post-training/intervention sessions but remained above baseline sessions. The data show evidence that peers generalized their use of PRT strategies to the untrained environment of the classroom to an extent.

Peers' use of PRT strategies

Jamie was the first peer to participate in PRT training. In baseline sessions Jamie's use of PRT strategies occurred for an average of 5.5% of intervals (range 0 to 18%) across four sessions. In post-training sessions she used PRT strategies for an average of 45% (range 25 to 57%) of intervals across seven sessions. During follow-up sessions she used the strategies for a mean of 32% (range 21 to 46%) of intervals across three sessions. During generalization probes in the classroom Jamie used PRT strategies an average of 2% of intervals during baseline, 29% of intervals during post-training, and a mean of 45% intervals during follow-up.

Ashley was the next peer to participate in PRT training. She used PRT strategies for an average of 15.3% (range 4 to 25%) of intervals across four sessions in baseline. During post-training sessions with Eve she used PRT strategies for an average of 59.7% (range 54 to 71%) of intervals across three sessions. When Ashley moved into follow-up sessions she used PRT strategies for a mean of 64.33% (range 54 to 71%) of intervals across six sessions. During generalization probes Ashley used PRT strategies an average of 2% of intervals during baseline and a mean of 41% of intervals during follow-up. Due to the fact that Ashley moved from post-training to follow-up in only three sessions, time constraints did not allow for a generalization probe to be conducted during post-training.

Lily was the final peer to participate in PRT training. During baseline sessions Lily used the strategies for a mean of 16.5% (range 7 to 32%) of intervals across six sessions. In post-training sessions she used PRT strategies for an average of 44.5% (range 7 to 71%) of intervals across six sessions. In one follow-up session Lily used the PRT strategies for 82% of intervals. Lily used PRT strategies during generalization probes an average of 4% of intervals during baseline, and a mean of 18% of intervals during post-training. Due to time constraints no generalization probes were conducted between Lily and Eve during post-training after Lily received a booster training session or during follow-up.

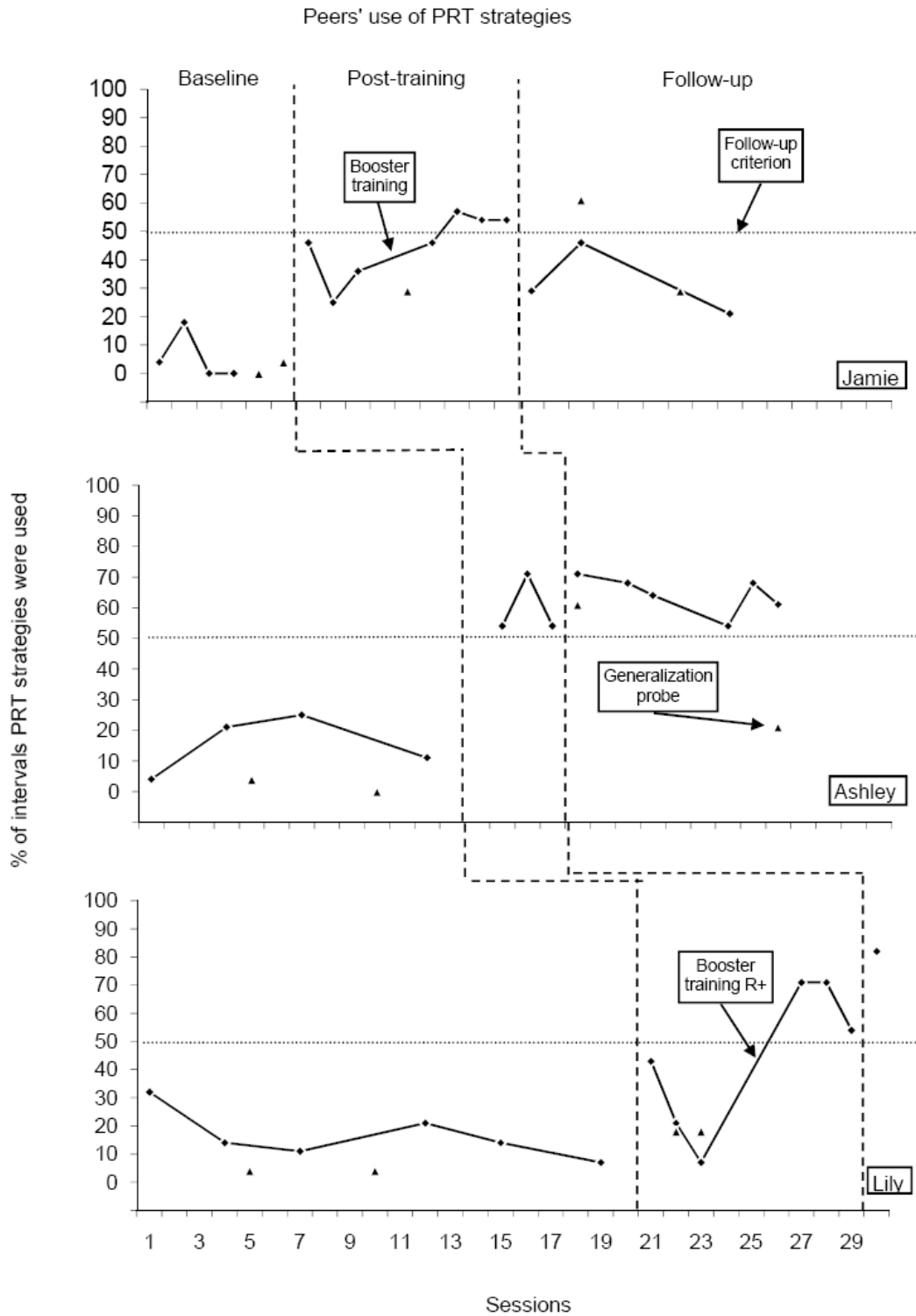


Figure 1. Percentage of intervals that Peers (Jamie: top, Ashley: middle, Lily: bottom) implemented PRT with the Eve.

Eve's Play Behaviors

Figure 2 depicts the play behaviors of the target child during baseline, intervention, and follow-up sessions with peers. Table 1 displays the play behaviors of the target child during generalization probes. During baseline sessions with all three peers Eve engaged in high levels of solitary play and low levels of play with peer trainers. With two of the three peers Eve experienced a decreasing trend in levels of solitary play and an increasing trend in levels of play with peer trainers as sessions progressed. The positive effects of intervention were also seen when peers used PRT strategies in the classroom to an extent.

Solitary play

Eve engaged in solitary play during baseline sessions with Jamie for an average of 58.75% (range 36 to 71%) of intervals, during intervention sessions for a mean of 58.71% (range 25 to 86%) of intervals, and during follow-up sessions for an average of 21.67% (range 0 to 36%) of intervals. In generalization probes Eve engaged in solitary play with Jamie for an average of 100% of baseline intervals, 93% of intervals during intervention and a mean of 51.5% of intervals in follow-up.

During baseline sessions with Ashley, Eve engaged in solitary play for an average of 41.25%, (range 29 to 71%) of intervals, an average of 44% (range 14 to 64%) of intervals while in intervention session, and in follow-up sessions for a mean of 22.5% (range 7 to 32%) of intervals. While participating in generalization probes with Ashley, Eve engaged in solitary play for an average of 66% of intervals during baseline and a mean of 25% of intervals during follow-up.

Eve engaged in solitary play with Lily during baseline sessions for an average of 59.67% (range 11 to 96%) of intervals, during intervention sessions for a mean of 25.5% (range 0 to 64%) of intervals, and in one follow-up session for 4% of intervals. During generalization probes with Lily Eve engaged in solitary play for a mean of 75% of intervals during baseline and an average of 89% of intervals during intervention.

Parallel play

Eve engaged in parallel play with Jamie for an average of 31.25% (range 7 to 43%) of intervals, for a mean of 38.14% (range 18 to 57%) of intervals during intervention, and for an average of 30% (range 4 to 54%) of intervals during follow-up sessions. In generalization probes Eve engaged in parallel play with Jamie for an average of 2% of intervals during baseline, 14% of intervals during intervention, and a mean of 32% of intervals during follow-up.

During baseline sessions Eve engaged in parallel play with Ashley for an average of 41.75% (range 7 to 75%) of intervals, in intervention sessions she did so for an average of 43% (range 11 to 79%) of intervals, and during follow-up for a mean of 41% (range 18 to 71%) of intervals. While participating in generalization probes Eve engaged in parallel play with Ashley for a mean of 27% of intervals during baseline, and an average of 41% of intervals during follow-up.

Eve engaged in parallel play and with Lily during baseline session for a mean of 25.67% (range 0 to 50%) of intervals, for an average of 33.67% (range 14 to 64%) of intervals in intervention sessions, and for 50% of intervals while in one follow-up session. During generalization probes Eve engaged in parallel play with Lily for an average of 7% of intervals during baseline and a mean of 10.5% of intervals during intervention.

Play with peer trainer

Eve engaged in play with peer trainers with Jamie for an average of 20.75% (range 0 to 36%) of intervals in baseline session, during intervention sessions she did so for a mean of 22.57% (range 0 to 54%) of intervals, and while in follow-up sessions for an average of 59.33% (range 39 to 96%) of intervals. In generalization probes with Jamie, Eve engaged in play with peer trainers for a mean of 0% of intervals during baseline, 0% of intervals during intervention, and an average 30% of intervals during follow-up.

While in baseline sessions Eve engaged in play with peer trainers with Ashley for a mean of 22.75% (range 7 to 68%) of intervals, for an average of 27.7% (range 11 to 43%) of intervals in intervention sessions, and for an average of 50% (range 39 to 61%) of intervals while in follow-up sessions. During generalization probes with Ashley, Eve engaged in play with peer trainers for an average of 21.5% of intervals during baseline and a mean of 52% of intervals during follow-up.

Eve engaged in play with peer trainers in baseline sessions with Lily for an average of 31% (range 7 to 79%) of intervals, during intervention for a mean of 53.5% (range 11 to 89%) of intervals, and in one follow-up session for 54% of intervals. During generalization probes with Ashley, Eve engaged in play with peer trainers for an average of 23% of intervals during baseline and a mean of 14% of intervals during intervention.

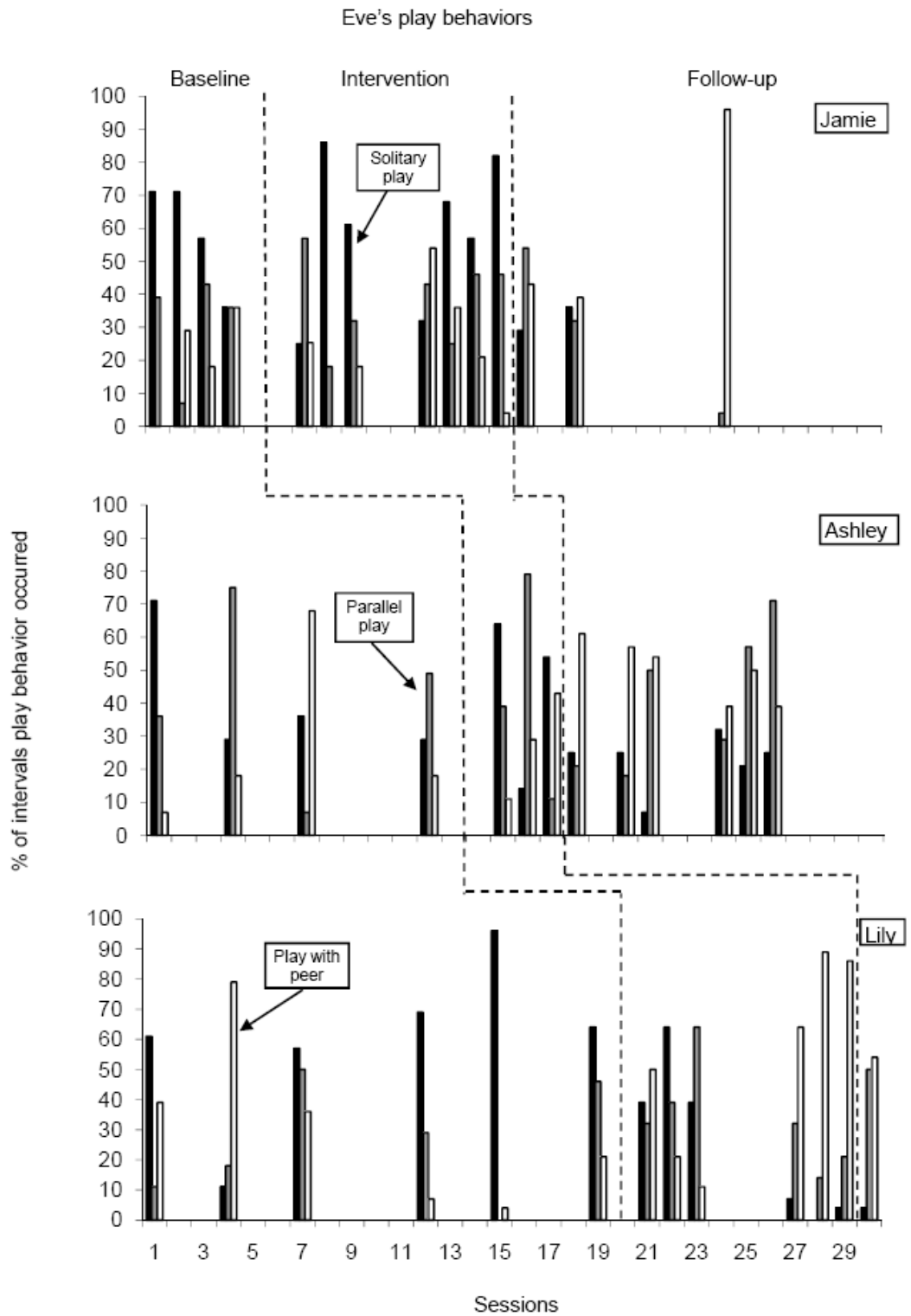


Figure 2. Percentage of intervals that Eve engaged in play behaviors with peers (Jamie: top, Ashley: middle, Lily: bottom).

Table 1: Eve's play behavior during generalization probes

Peer	Phase	Session #	Solitary play	Parallel play	Play with peer
Jamie	Baseline	5	100	0	0
		6	100	4	0
	Intervention	11	93	14	0
	Follow-up	18	57	39	21
		22	46	25	39
Ashley	Baseline	5	43	54	25
		10	89	0	18
	Follow-up	18	46	68	18
		26	4	14	86
Lily	Baseline	5	100	0	0
		10	50	14	46
	Intervention	22	96	0	14
		23	82	21	14

Table 1. Percentage of intervals that Eve engaged in play behaviors with peers during generalization probes (Jamie: top, Ashley: middle, Lily: bottom).

Eve's communication behaviors

Figure 3 provides data on Eve's communication behavior with each peer during baseline, intervention, and follow-up sessions. During baseline Eve engaged in low levels of communication to peers and high levels of communication to self. During intervention and follow-up sessions Eve engaged in higher levels of communication to peers and slightly lower levels of communication to self.

Communication to self

During baseline sessions with Jaime, Eve engaged in communication to self for a mean of 38.5% (range 18 to 79%) of intervals, during intervention sessions for an average of 28.71% (range 4 to 54%) of intervals, and during follow-up for an average of 11.67% (range 0 to 21%) of intervals. During generalization probes with Jamie, Eve engaged in communication to self for a mean of 25% of intervals during baseline, 46% of intervals during intervention, and an average of 30.5% of intervals during follow-up.

Eve engaged in communication to self during baseline sessions with Ashley for an average of 39.25% (range 21 to 61%) of intervals, while participating in intervention session for an average of 18% (range 4 to 43%) of intervals, and for a mean of 7.83% (range 0 to 18%) of intervals in follow-up sessions. During generalization probes with Ashley, Eve engaged in communication to self for an average of 59% of intervals during baseline and a mean of 48% of intervals during follow-up.

During baseline sessions with Lily, Eve engaged in communication to self for an average of 33.67% (range 7 to 46%) of intervals, for a mean of 6.83% (range 0 to 11%) of intervals in intervention sessions, and for 11% of intervals during one follow-up session. While participating in generalization probes with Lily, Eve engaged in

communication to self for an average of 30% of intervals during baseline and for a mean of 41% of intervals during intervention.

Communication to peer

Eve engaged in communication to Jamie during baseline sessions an average of 0 % of intervals, during intervention sessions for an average of 12.71% (range 4 to 25%) of intervals, and for a mean of 23.67% (range 21 to 29%) of intervals in follow-up sessions. During generalization probes Eve engaged in communication to Jamie for an average of 0% of intervals during baseline, 14% of intervals during intervention, and a mean of 27% of intervals during follow-up sessions.

While participating in baseline sessions, Eve engaged in communication to Ashley for an average of 5.5% (range 4 to 7%) of intervals, during intervention sessions for an average of 38.3% (range 25 to 54%) of intervals, and for a mean of 29.83% (range 11 to 39%) of intervals while in follow-up sessions. During generalization probes Eve engaged in communication to Ashley for an average of 2% of intervals during baseline and a mean of 11% of intervals during follow-up.

During baseline sessions Eve engaged with communication to Lily for a mean of 2% (range 0 to 4%) of intervals, while in intervention for an average of 17.83% (range 0 to 54%) of intervals, and during one follow-up session for 39% of intervals. While participating in generalization probes Eve engaged in communication to Lily for an average of 5.5% of intervals during baseline, and a mean of 12.5% of intervals during intervention.

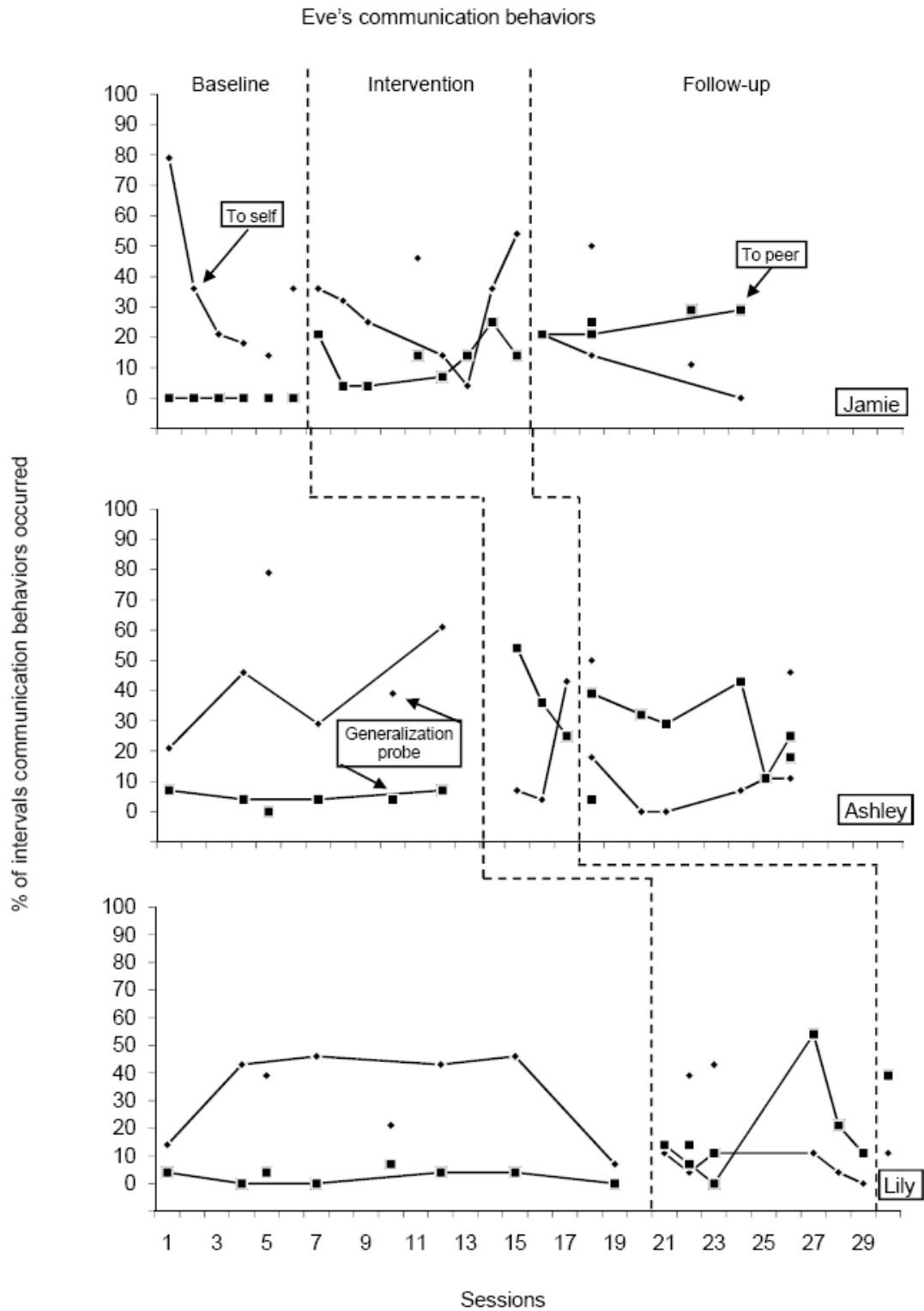


Figure 3. Percentage of intervals that Eve engaged in communication behaviors with peers (Jamie: top, Ashley: middle, Lily: bottom).

Social Validity

Peers

After the study was completed the classroom teacher administered an interview to Jamie and Ashley about their participation in the study. When asked how much they liked PRT, both peers said “I liked it a lot.” When asked if there was anything that they really liked about PRT, Jamie reported that she liked when the researcher pretended to be the target child during role plays in training sessions and Ashley stated that she enjoyed getting to spend time with Eve. When asked how hard it was to do PRT, both peers said “It was ok, not too hard.” When asked what they thought was the hardest part of PRT, the peers reported that it was hard to play with Eve when she was “grumpy” or “did not listen”. When asked if there were any part of PRT that they did not like, both peers said no. When asked what they learned from doing PRT, they said they learned more about Eve and how to get her attention. When asked if and how they thought PRT helped them, Jamie replied that it helped her learn more about Eve, and Ashley said that it helped her see what Eve likes. When asked if they thought that other kids should learn to do PRT, both peers said “yes.” An interview was not conducted with Lily due to time constraints.

Teacher

The classroom teacher filled out a questionnaire about the use of PRT strategies by students in her class. When asked how much of an improvement in interactions she had seen between Eve and Jamie she reported she had seen “a large improvement.” When asked how much of an improvement in interactions she had seen between Eve and Ashley she stated that she had also seen “a large improvement.” When asked how much of an improvement in communication she had seen between Eve and the peers after peers

were trained to use PRT strategies she reported that she had observed “a large improvement.” When asked if she would suggest that other teachers have their typically developing students trained to use PRT strategies to work with children with autism she said “yes.” The classroom teacher was not asked about the level of interactions that she observed between Lily and Eve due to time constraints.

Chapter 4

Discussion

Results from this study provide evidence that elementary school aged students can learn PRT strategies and use them within free play settings with a child with autism. The data presented in this study shows that the training procedures alone were effective enough to teach one peer PRT strategies, the training procedures in addition to one booster training session were necessary to teach another peer PRT strategies, and the training procedure in addition to the booster training session and the opportunity to earn reinforcing items was necessary to teach another peer the PRT strategies. Interviews with peers who had completed the study revealed that they enjoyed learning and using PRT strategies with a child with autism. During sessions that peers used PRT strategies the target child experienced an increasing trend in play with peer trainers, a decreasing trend in levels of solitary play and levels of parallel play remained similar to baseline levels with two of the three peers. After peers began using PRT strategies, the child with autism displayed a slight decrease in verbal behavior to self and an increase in speech to peers.

While participating in baseline sessions, Ashley and Lily showed some use of PRT strategies with Eve. It is important to note that during baseline sessions peers generally engaged in the PRT strategy “teaching taking turns” by throwing a ball back and forth, and “orienting attention” by saying Eve’s name before delivering a direction.

On only one occasion during baseline sessions did a peer use any other PRT strategy, this occurred when Ashley used “enhance motivation by offering choices”.

During post-training sessions prior to receiving a booster training session Jamie used PRT strategies during an average of 35.7% of intervals, but after Jamie received the booster training session her use of PRT strategies increased to an average of 52.75% of intervals. She reached criterion to move into follow-up sessions within four post-training sessions. Ashley did not require a booster training session and reached criterion to move into follow-up in only three sessions. Ashley used PRT strategies during a higher percentage of intervals than the other peers, using PRT strategies for as high as 71% of intervals during some session. She also used multiple PRT strategies during a single interval more often than the other peers. For example Ashley frequently used PRT strategies that easily worked together, such as first using the PRT strategy “orient attention,” then “enhance motivation by offering choices,” followed by “encourage conversation,” and then “reinforcing appropriate social behavior,” all within a 15 s interval. During post-training sessions before Lily received a booster training session she use PRT strategies during an average of 23.67% of intervals, after she received the booster training she use PRT strategies during post-training sessions for an average of 65.33% of intervals and she reached criterion to move into follow-up in three sessions. During each of the three post-training sessions that Lily had an opportunity to earn a reinforcing item, she did so. Because no generalization probes were conducted between Lily and Eve during post-training after Lily received a booster training session or during follow-up, it is unknown if she would have used PRT strategies for a higher percentage of intervals during generalization probes as she did during recess sessions. While all peers

also used PRT strategies during generalization probes in the classroom with Eve, Jamie and Ashley only used the strategies above criterion level once during follow-up.

An important factor to consider when evaluating data collected during baseline sessions is that the structure of baseline sessions created a play situation that was slightly contrived compared to typical recesses, resulting in Eve and her peer's level of interactions to be higher during baseline sessions compared to pre-baseline recesses. Eve's teacher and classroom assistant reported that during recesses prior to baseline sessions, Eve typically played independently and dug in the dirt or climbed trees alone for the entire recess period. Once baseline sessions began, while peers were not directly instructed to interact with Eve, they were asked to play in the same area as her and provided with a set of toys. These were toys that children could access independently if desired, but were not readily accessible (i.e. provided by an adult for the purpose of play) during recess, with the exception of a ball. Eve's increased proximity to peers during baseline sessions within the designated play space resulted in higher levels of interactions than typical recesses.

The average percentage of intervals that Eve engaged in solitary play remained the same from baseline to intervention sessions with Jamie and increased slightly with Ashley. The average percentage of intervals that Eve engaged in solitary play with Lily decreased slightly during intervention sessions before Lily received the booster training session but decreased much more afterwards. The average percentage of intervals that Eve engaged in solitary play decreased during follow-up sessions with all three peers. The researcher noted that peers behavior differed during intervals recorded as solitary play during baseline and post-training/intervention sessions. In baseline sessions while

Eve engaged in solitary play, peers typically also engaged in solitary play. During post-training/intervention sessions when Eve engaged in solitary play, peers were usually attempting to use the PRT strategy “model appropriate and complex play skills.” Data collectors reported that as intervention sessions progressed Eve began to engage in more appropriate play with toys during intervals recorded as parallel play and play with peer trainers, and also began imitating the play of her peers. For example, peers sometimes used one gnome doll to represent a mother and another smaller gnome doll to represent a baby, by putting the smaller gnome doll in the larger gnome doll’s arms, and without prompting from peers Eve also began engaging in this behavior.

During sessions with both Jamie and Ashley the average percentage of intervals that Eve engaged in parallel play increased during intervention sessions, but then returned to baseline levels during follow-up sessions. With both Jamie and Ashley the mean percentage of intervals that Eve engaged in play with peer trainers increased slightly during intervention sessions, but increased more during follow-up sessions. During sessions with Lily, the average percentage of intervals that Eve engaged in parallel play and play with peer trainers increased during intervention sessions and remained high during one follow-up session. It is noteworthy that the type of play activities differed during intervals that Eve engaged in play with peer trainers during baseline sessions and intervention sessions. For example, while in baseline sessions, play with peer trainers were typically recorded when Eve and the peer threw a ball back and forth or when the peer pushed Eve on a swing. After peers received training on PRT strategies play with peer trainers were often recorded when Eve and the peer appropriately played with the same toys, and took turns with materials.

The most notable area of Eve's target behaviors that changed after peers began using PRT strategies during recess were her communication behaviors. With all peers the average percentage of intervals that Eve engaged in communication to self decreased slightly during intervention sessions compared to baseline sessions. During follow-up sessions with Jamie, Ashley, and Lily this slight decreasing trend continued. While in intervention sessions with all peers the average percentage of intervals that Eve engaged in communication to peers increased. During follow-up sessions with Jamie and Lily this increase continued. Eve's communication to peers decreased during follow-up sessions with Ashley compared to intervention sessions, but remained well above baseline sessions. During intervention sessions Eve engaged in communication to peers in order to gain access to desired items and activities, to answer questions, and to make novel demands. For instance, during a session with Ashley, Eve told her peer to "make happy face" and then smiled at Ashley.

Similar levels of Eve's target behaviors occurred in generalization probes. Although Eve engaged in higher levels of communication to self during generalization probes compared to recess sessions. A potential explanation for this event is that because peers were trained to use PRT strategies with a specific set of toys, and only some of these toys were available in the classroom, they may have experienced difficulties generalizing these strategies to other toys available in the classroom, and thus had problems engaging Eve in play. Future studies should include a wider variety of toys during training sessions.

Due to the fact that generalization measures were not conducted between peers and novel children with autism it is unknown if peers in the present study would have

generalized the use of PRT strategies to play interactions with other children and thus is a limitation of this study. Future research should include measures of generalization that involve novel children with autism.

In this study, two peers received both a booster training session and post-session feedback when they failed to improve over baseline sessions. The booster training session alone or the post-session feedback alone might have been enough support to help peers use PRT strategies more effectively with Eve during recess, and therefore the other component of training may be unnecessary. Future research should be conducted to evaluate the benefits of including post-session feedback alone compared to a booster training session alone to analyze the benefits of both training components.

Future research should be conducted to examine utilizing typically developing peers to facilitate PRT strategies with children with autism in other locations, such as afterschool programs, in home play dates, and summer camps. Children are typically provided extended durations of free play time in these locations and therefore peers would potentially have more opportunities to use PRT strategies with a child with autism than peers in the present study. Another potential area of research could evaluate teaching PRT strategies to siblings of children with autism and measuring their abilities to use those strategies at home and in the community with their sibling with autism.

This study provides data that indicate the PRT training procedure is effective in changing the behavior of peers toward their classmate with autism during free play situations. Moreover, these changes in peer interactions resulted in changes in the communication and peer play behavior of a child with autism. While this experiment was conducted in only one classroom, that uses a program curriculum that is not

commonly implemented in elementary schools, the results of the study suggest that PRT might be an effective procedure for promoting peer interactions within inclusive programs. It is also encouraging to note that in this study, changes in peer interactions during free play resulted in positive changes in the communication behavior of the child with autism. In future studies, it would be of interest to examine the effects of teaching all students in the classroom the use of PRT strategies to promote the social and communication behavior of their classmates with disabilities.

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Appendices

Appendix A: Peer Data Collection Sheet

Session date: _____ Peer initials: _____ Data recorder name: _____

	15 s	30s	45 s	60s
1	O C M Ta Tu R+ none	O C M Ta Tu R+ none	O C M Ta Tu R+ none	O C M Ta Tu R+ none
2	O C M Ta Tu R+ none	O C M Ta Tu R+ none	O C M Ta Tu R+ none	O C M Ta Tu R+ none
3	O C M Ta Tu R+ none	O C M Ta Tu R+ none	O C M Ta Tu R+ none	O C M Ta Tu R+ none
4	O C M Ta Tu R+ none	O C M Ta Tu R+ none	O C M Ta Tu R+ none	O C M Ta Tu R+ none
5	O C M Ta Tu R+ none	O C M Ta Tu R+ none	O C M Ta Tu R+ none	O C M Ta Tu R+ none
6	O C M Ta Tu R+ none	O C M Ta Tu R+ none	O C M Ta Tu R+ none	O C M Ta Tu R+ none
7	O C M Ta Tu R+ none	O C M Ta Tu R+ none	O C M Ta Tu R+ none	O C M Ta Tu R+ none

- 1.) O = *Orient attention "Paying attention"*: occurs when the peer gains the target child attention before attempting to give a direction.
- 2.) C = *Enhance motivation by offering choices "Give choices"* occurs when the peer provides the target child with choices between items and activities.
- 3.) M = *Modeling appropriate and complex play skills "Show good playing"* occurs when the peer comments on and narrates his or her own play (e.g., saying "playing cars is fun" while racing toy cars).
- 4.) Ta = *Encouraging conversation "Ask your friend to talk"* occurs when the peer gets the target child to ask for desired items and activities (e.g., requiring the target child to say "I want the ball" before giving her the ball).
- 5.) Tu = *Teaching taking turns "Take turns"* occurs when the peer takes turns with desired items and activities.
- 6.) R+ = *Reinforcing appropriate social behavior "Good, nice try"* occurs when the peer provides praise to the target child for engaging in socially appropriate behavior (e.g., while playing catch, saying "nice throw").
- 7.) None = no occurrence of any of the six PRT strategies

_____ % of intervals that peer used a PRT strategy

Appendix B: Target Child Data Collection Sheet

Session date: _____ Peer initial: _____ Data recorder name: _____

	15s	30s	45s	60s
1	S P T Cs Cp	S P T Cs Cp	S P T Cs Cp	S P T Cs Cp
2	S P T Cs Cp	S P T Cs Cp	S P T Cs Cp	S P T Cs Cp
3	S P T Cs Cp	S P T Cs Cp	S P T Cs Cp	S P T Cs Cp
4	S P T Cs Cp	S P T Cs Cp	S P T Cs Cp	S P T Cs Cp
5	S P T Cs Cp	S P T Cs Cp	S P T Cs Cp	S P T Cs Cp
6	S P T Cs Cp	S P T Cs Cp	S P T Cs Cp	S P T Cs Cp
7	S P T Cs Cp	S P T Cs Cp	S P T Cs Cp	S P T Cs Cp

Play:

- _____ % of intervals with solitary play (S)
- _____ % of intervals with parallel play (P)
- _____ % of intervals with play with peer trainer (T)

Communication:

- _____ % of intervals with communication to self (Cs)
- _____ % of intervals with communication to peer (Cp)

Appendix C: Peer Interview Questions

- 1.) How much did you like “It is time to play”?
 - a.) I liked it a lot.
 - b.) I liked it.
 - c.) I liked it a little bit
 - d.) I did not like it.

- 2.) Is there anything that you really liked about “It is time to play”? If so, then what?

- 3.) How hard was it to do “It is time to play”?
 - a.) It was really hard.
 - b.) It was hard.
 - c.) It was ok, not too hard.
 - d.) It was not hard at all, it was easy.

- 4.) What do you think the hardest part was about “It is time to play”?

- 5.) Were there any parts of “It is time to play” that you did not like? If so, what?

- 6.) What did you learn from doing “It is time to play”?

- 7.) Has doing “It is time to play” helped you in any way? If so, then how?

- 8.) Do you think that other kids should learn to do “It is time to play”?

Appendix D: Teacher Questionnaire

- 1.) How much of an improvement in interactions have you seen between the target child and peer 1 after peer 1 began using PRT?
 - a.) A large improvement
 - b.) Some improvement
 - c.) No improvement
 - d.) Less interactions then before

- 2.) How much of an improvement in interactions have you seen between the target child and peer 2 after peer 2 began using PRT?
 - a.) A large improvement
 - b.) Some improvement
 - c.) No improvement
 - d.) Less interactions then before

- 3.) How much of an improvement in communication have you seen in the target child after peers started using PRT?
 - a.) A large improvement
 - b.) Some improvement
 - c.) No improvement
 - d.) Less communication then before

- 4.) Would you suggest that other teachers have their typically developing students trained on PRT strategies to work with children with autism?
 - a.) Yes
 - b.) No