PEER-MEDIATED SOCIAL SKILLS INSTRUCTION AND SELF-MANAGEMENT STRATEGIES FOR STUDENTS WITH AUTISM

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Increasing socialization opportunities for individuals with autism has been an ongoing educational process. There continues to be a need for a systematic approach to facilitate increases in social skills among students with autism in general education settings. One such model of instruction that has promising results is Pivotal Response Training (PRT) (Koegel & Koegel, 1995). PRT is a comprehensive service delivery model that uses both a developmental approach and applied behavior analysis (ABA) procedures, to provide opportunities for learning within the context of the child’s natural environment (Koegel, Koegel, Harrower, & Carter, 1999). It focuses on providing opportunities for learning social behavior within the context of the individual’s natural environment. The current study utilized peer-mediated PRT combined with self-management procedures, to support the independent use of social behaviors among students with autism. Three elementary-age students with autism from a self contained classroom participated. These students were trained to implement self-management procedures to assist these students. Six elementary-age general education students were trained in PRT. The effectiveness of these treatments in increasing social behaviors was evaluated using a multiple baseline
across subjects designs. Probes were obtained during general education activities (e.g., lunch, gym) and in the school playground to assess generalization effects. Data were obtained via videotaped 10 minute sessions using 10-s partial interval recording. External validity was measured by the Social Responsiveness Scale (SRS) which was completed by the special education and general education teachers. The results of this study demonstrated that peer-mediated PRT combined with self-management procedures increased the social behaviors, maintained interactions, and initiated conversations by students with autism. It also had a collateral effect on the attention behaviors of supported and coordinated joint attention, and the strength of these results suggests that they can be generalized to general education settings (e.g., playground, lunch room, gymnasium).
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A common feature among individuals with autism is a pervasive deficit in appropriate social behavior. Typically developing children incidentally acquire a variety of critical social behaviors that do not need to be explicitly taught. According to social learning theory (Bandura, 1977), children learn from one another, through observational learning and by imitating the behaviors of others. While individuals with autism may acquire limited social responses incidentally, most will not acquire age-appropriate social skills without support. The delays in social behaviors among children with autism seriously restrict their opportunities to acquire these critical skills, and further impede the process of social integration. Because of this, systematic social skills instruction is a critical component of treatment for children with autism. Acquiring appropriate social behaviors is pivotal to leading a conventional life, but for individuals with autism, this will not occur simply by interacting with typical peers. Instead, individuals with autism need systematic instructional support provided by peers and professionals. Students with autism need to be exposed to typical peers in order to develop appropriate social behaviors. However, simply placing typical peers and children with autism together may not be enough to provide the necessary acquisition of those skills (Gresham, 1981). Deficits in social skills prevent children with autism from forming interpersonal relationships with their peers, which is an important skill in human development.

Over the past 25 years, U.S. public schools have been making concerted efforts to include students with autism in their classrooms. The push for inclusion has increased socialization opportunities for these individuals. Nonetheless, there is little evidence of...
any increases in social interactions between students with autism and typical peers without specialized supports in order to succeed in these settings. Numerous studies have shown that children with autism lack the pre-requisite skills for the acquisition of social behaviors; such skills can be taught with explicit instruction and support (Gena, 2006; Mesibov & Shae, 1996; Harrower & Dunlap, 2001; Rogers, 2000; Carr & Darcy, 1990). Many teachers lack the training and skills to facilitate these social interactions, and, as a result, students with autism continue to have significant deficits in social behaviors. There is a great need for a systematic approach to facilitate increases in social skills among students with autism in general education settings.

Social behavior that is taught in less restrictive contexts and more naturalistic manners may be more successful at producing durable changes in behavior (Stokes & Baer, 1977). Failure of generalization and maintenance of social behavior change may in part be due to the highly controlled contexts under which the social skills are initially learned. Pierce and Schreibman (1997) conducted a study for which they used multiple peers trained in PRT to promote the social competency of students with autism. The results indicated that the target student’s social behavior increased with the trained and untrained peers, as did the quantity and quality of language usage. The overall results indicated that using multiple peer trainers may enhance generalization with untrained peers and also with novel settings and novel training stimuli.

Peer-mediated social skills programs have provided promising results for teaching social skills to children with autism in general education settings. “Peer-mediated procedures appear to gain their effectiveness by using typical peers as the
interventionists, thus eliminating the need to develop procedures to transfer learning from adult partners to peer partners” (Rogers, 2000, p. 401). Rogers (2000) pointed out that peer-mediated approaches to increasing social behavior in students with autism are complex to deliver, requiring socially skilled typical peers and precise adult control at training peers, managing and fading reinforcement, and monitoring ongoing child interaction data. This being said, there are many examples of this approach being successfully implemented.

Peer-mediated social skills training can have positive effects in children with autism (Goldstein et al, 1992). Recent research indicated that peer-mediated social skills training increase attending and commenting, play and conversation skills, and social interactions, when typically developing peers had systematic training to correctly implement the teaching procedures with children with autism. These findings suggested that teaching typical peers to interact with children with autism is effective in general education settings. In addition, teaching peers to engage in social/play interactions with children with autism appears to be an effective method for improving social interaction in integrated settings.

Morrison, Kamps, Garcia, & Parker, (2001), investigated the effects of peer mediation and mentoring strategies for improving initiations and social skills for students with autism. The participants consisted of four groups in which one student with autism was paired with two to three typical peers. Data were collected from both live and videotaped sessions while the students played a game or activity. Behaviors tracked included requesting, commenting, and sharing. A counterbalanced reversal design was
used to look at alternating monitoring conditions (peer-monitoring vs. self-monitoring), and compared the effects of teaching social skills and the effects of self-monitoring and peer-monitoring. The findings of this study indicated that training and reinforcing social skills (i.e., requesting, commenting, sharing), accompanied by self-monitoring or peer-monitoring strategies, was an effective package for increasing initiations, specific social skills, and time spent in social interactions for students with autism (Morrison et al., 2001).

Chung, Reavis, Mosconi, Drewry, Matthews, & Tassé (2007) conducted a study with four boys with high-functioning autism. They used a peer-mediated social skills training program combined with video feedback, positive reinforcement, and a token system to increase social communication skills. The social skills training occurred over a 12-week period and each session lasted 90 minutes. The results demonstrated that the peer-mediated social skills group combined with video feedback and behavior management was an effective package of intervention for children with high-functioning autism (Chung et al, 2007). Three of the four children showed increases in initiating comments and elaborated contingent response, which are critical skills necessary for effective social communication.

Terpstra, Higgins, & Pierces, (2002), review of PRT interventions demonstrate that language skills, conversation skills, play initiation, and the amount of time children engaged in play interactions increased after peer implemented procedures were employed. The results of these studies showed that peers serving as change agents within the natural environment provided benefit in the development and generalization of social
behavior in children with autism. This was particularly true of the PRT model of intervention, as the changes it produces are generalized to new stimuli as well as to untrained peers.

Although there are a variety of peer-mediated strategies that have shown positive outcomes for increasing appropriate social behaviors in students with autism, the model that shows the most promise is PRT. PRT is a comprehensive service delivery model that uses both a developmental approach and applied behavior analysis (ABA) procedures, to provide opportunities for learning within the context of the child’s natural environment (Koegel, Koegel, Harrower, & Carter, 1999). PRT has been supported by an abundance of research that demonstrates its efficacy. The model in itself was designed to increase specific social behaviors and to promote generalization across developmental areas (Harper et al., 2008; Koegel et al, 2003; Pierce et al., 1995 & 1997). “Because children with autism require treatment for a considerable number of behaviors, investigators have been searching for pivotal behaviors, that when changed, will result in collateral changes in other behaviors as well (Koegel, Koegel, & Schreibman, 1991, p.66)”. Thus, the identification and teaching of pivotal behaviors results in changes in both clusters of behaviors.

Pierce and Schreibman (1995, 1997a, 1997b), described PRT as involving the use of role-play techniques and naturalistic strategies to teach peers how to provide the target children with social reinforcement, including paying attention, letting the child choose toys and activities, varying toys, modeling appropriate social behavior, reinforcing attempts, encouraging conversation, extending conversation, taking turns, providing
narration for play activities, and teaching responsivity to multiple cues. PRT has been shown to be successful in teaching play and conversational skills to children with autism within naturally occurring contexts. The ability to teach children with autism appropriate social behaviors in the context in which they occur allows the skills to be more easily generalized (Carr & Darcy, 1990; Cowan & Allen, 2007; Gresham, 1986; Harrower & Dunlap 2001; Hunt et al., 1990;). As such, these strategies have been instrumental in facilitating the inclusion of children with autism in general education settings.

Another equally important component of social skills interventions includes reinforcement procedures. Token procedures have been shown to be effective in changing behaviors in individuals with autism. A limitation of typical token procedures is that they require an adult to provide the token and secondary reinforcement. As the move toward inclusion of individuals with autism increases, changes to reinforcement procedures are often necessary. As an alternative to teacher delivered reinforcement procedures, self-management procedures have been suggested as an intervention for individuals with disabilities participating in inclusive settings, because they shift the behavior management responsibility from the teacher to the individual with social needs (Dunlap, Dunlap, Koegel, & Koegel, 1991; Sainato, Goldstein, & Strain, 1992). Self-management consists of teaching students to 1) discriminate between appropriate and inappropriate behaviors, 2) evaluate their own behavior, 3) monitor and record their own behavior over time, and 4) provide reinforcement when criteria has been met. Studies that have implemented self-management interventions in inclusive environments have consistently reported favorable results (e.g., Sainto, Goldstein, & Strain, 1992; Stahmer
Given that the nature of self-management procedures requires minimal presence of a treatment provider, it may be applicable for classroom environments. Additionally, self-management skills can be easily generalized to a variety of situations and settings. “The independence that self-management permits for children with autism, and the stimulus generalization it promotes, makes this technique particularly promising” (Koegel, et al. 1992, p. 352). Strain, Kohler, Storey, and Danko (1994) looked at the effects of self-management interventions on the social interactions of three preschool boys with autism. Results indicated that the intervention increased and improved each boy’s social interactions in the preschool classroom and generalized to interactions with siblings and typically developing classmates.

Stahmer and Schreibman (1992) conducted a self-management treatment program for teaching children with autism how to play appropriately in unsupervised environments. Appropriate play increased for the three students who participated, and these increases were maintained at post treatment, and they generalized across settings and toys. By increasing the independence of students with autism, there are increased opportunities for interactions with their classmates without the stigma of having an adult “helper” by their side. Self-management allows students to become actively involved in the intervention process and more involved in their natural classroom environments (Harrower & Dunlap, 2001).

Frea and Hughes (1997) used a combination of functional analysis procedures and self-management with two high school students with mental retardation who participated...
in general education classrooms to access and treat problem behaviors and to increase appropriate social behavior. The functions of the students interfering behaviors were determined, and a functionally equivalent social-communicative response to the problem behavior was targeted as part of the self-management intervention. The results indicated that both of the students showed decreases in inappropriate social responses and increases in the alternative functional responses. This combination of methodologies has been used to teach students with disabilities in inclusive educational settings to self-manage their use of functionally equivalent responses resulting in more functional reinforcement (Frea & Hughes, 1997; Todd, Horner, & Sugai, 1999).

A combined intervention package utilizing PRT strategies and self-management strategies was used in a study by R. Koegel and Frea (1993). In this study the authors improved conversational skills using a pivotal response training approach with two teenagers with autism who were also taught self-management strategies for appropriate social behaviors. Following the training procedures, the student’s levels of appropriate behaviors increased and maintained, as well as generalized to the untreated behaviors.

With the recent push for inclusion of students with disabilities, and the implementation and refinement of the least restrictive environment, there is backing for the efficacy, adaptability, and portability of self-management procedures. Although, there is not an abundance of literature available for its use as being an effective tool for mainstreaming students with autism, the few studies that are available indicate that self-monitoring procedures can be used successfully by students with autism to enhance their social performance in general education.
The prior literature indicates that peer training and reinforcing appropriate social behavior, accompanied by self-management skills, are effective strategies for increasing initiation, specific social behavior, and time spent engaged in social interactions for students with autism. These results support the literature regarding peer mediated procedures for students with developmental disabilities (Goldstein et al., 1992; Harring & Breen, 1992; Strain et al., 1994), and they add to the literature by demonstrating equally effective self-monitoring and appropriate social behavior training as strategies for increasing initiations in school-aged nondisabled peers (Pierce and Schreibman, 1997).

These interventions appear advantageous for a number of reasons. There were consistent opportunities for students with autism to interact with their typical peers using materials that are found in a regular education classroom. Several studies have indicated that students with autism are able to effectively monitor and use appropriate social skills with peers during typical classroom activities, such as games, without the presence of teacher involvement. In addition, training procedures for the peers were systematically implemented. These advantages are viewed as an optimal teaching format for social skills whenever possible; that is; it is considered to be more desirable than (a) independently training peers as social agents or (b) conducting skills training for students with disabilities without the benefits of a nondisabled peer group (Morrison, et al., 2001).

The purpose of this study was to assess (a) the degree to which PRT is effectively implemented by multiple typical peers to increase social behavior in students with autism; (b) the degree to which students with autism were able to accurately provide self-
management for appropriate behaviors; (c) the degree to which the skills will generalize across settings, stimuli, and untrained peers; (d) the changes that will occur in the collateral behavior of attention, and (e) the changes in student behavior that the teachers will observe after implementing PRT and self-management procedures.

CHAPTER 2: METHOD

Participants

Prior to conducting this research study, approval was obtained from the University of Southern Maine (USM) Institutional Review Board (IRB). Upon approval from the IRB, Informed Consent was obtained for all participants via IRB approved permission forms, before proceeding with the study, see Appendix.

Three students with an autism spectrum disorder (ASD) diagnosis were chosen for participation. These students spent at least 20% of their day in general education classrooms, at a public elementary school in an urban city in Maine. Participants were between 8 and 13 years old. Records indicate that the students’ overall cognitive skills on standardized tests were between the average to below average range, as measured by independent evaluators, with all students falling at 70 or above. All three students had comparable language skills and social behaviors as measured by speech and language records. Their adaptive skills were between the average to below average range of functioning as measured by standardized testing.

Peer trainers were selected by their teachers as positive role models. Teachers choose
peer trainers who had a history of displaying positive social skills (e.g., offer help to others, ask others to join in activities, take turns in conversations). The students who were chosen by the teachers also displayed reading skills at or above the third grade level. A total of six peer trainers were selected, two from each of the target students’ general education classrooms.

Setting

Training took place in a self-contained classroom, at the participants school, where they received daily direct instruction. The room was approximately 30 x 30, with two walls that have individual work stations for each of the 4 students who are in the classroom. The center of the classroom had two tables pushed together and is used as a gathering place for the students to eat and play games. In another corner of the room was a group learning area, where morning meeting, social skills instruction and other group activities occurred. The generalization settings were the target students’ general education classrooms, the lunch room, gymnasium, and the school playground. Generalization activities occurred in these locations when they were being used by other students during regularly scheduled activities. Generalization peers were not trained in PRT strategies and were chosen at random from the third, fourth, and sixth grade classrooms.

Apparatus

Training and generalization materials were items that are typically found in classroom settings and that at least two individuals can use together, they include: basketballs, Legos®, wooden blocks, Leap Frog® My Card Games, utility balls, foot balls,
Cranium® Balloon Lagoon game, Milton Bradley® Connect Four game, dinosaurs, Cranium® Cadoo, toy cars, Parker Brothers® Sorry game, action figures, and Playdoh® materials.

The Audio Reinforcement Reminder Tones (ARRT) CD (Pyramid Educational Products, Inc., 2004) was used as part of the self-management procedure for self-monitoring and self-reinforcement. The ARRT is CD with a variety a pre-recorded tones that sound at different intervals. A 1 minute track was selected and the tone at this interval was repeated throughout the track for a continuous reminder for the students to track their own behaviors at the sound of the tone. Three containers with varying point values were available from which target students chose reinforcers, contingent on how many points were earned while using self-management procedures. A Reinforcer Preference Assessment form was completed by the students to determine what reinforcers to include in the containers. Reinforcers included tangibles (e.g., various wrestling figures, Lego® figurines), edibles (e.g., York® peppermint patties, Skittles® candy), and tokens (e.g., bonus points to be added to the target students daily token system).

All training sessions were videotaped. A digital video recorder was used for each of the session as part of the data collection system. Data was coded via the videotapes and the videos were used for the purpose of Interobserver Agreement (IOA).

**Dependent Measures**

The target students’ self-management behaviors were scored during 10 minute play sessions during self-management training sessions. Self-management included the use of a self-recording procedure in which students recorded their social behaviors every 1
minute. The students were on a 1 minute fixed interval of reinforcement, for which they circled the number 0 (did not use appropriate behavior) or 1 (did use appropriate behavior) on their token sheet to indicate whether or not they displayed the appropriate behaviors during that interval. The tapes were scored using a 1 minute partial interval recording procedure for treatment integrity to determine the level of the student’s self-reinforcement accuracy. Each student had three appropriate behaviors that they were responsible for monitoring. Students were taught to self-monitor and to self-record the following three target behaviors which were defined using student-friendly vocabulary: 1) initiates conversations was defined as: I started talking to my friends, 2) Initiates Play was defined as: I started playing with my friends, and 3) Maintains Interactions was defined as: I kept playing and talking to my friends. The technical definitions are as follows (definitions adapted from Kohler, Strain, Maretsky, & De Cesare, 1990; Pierce, K. & Schreibman, L., 1995):

1) **Initiates Conversation:** Verbalizations that will not be in direct response to a preceding question or that will occur at least 5s after a preceding verbalization. For example, if a student says “I like to play Mario” it will be scored as initiating conversation.

2) **Initiates Play:** Any verbal or nonverbal initiation of novel play or game. For example, if the target student hands the peer trainer a ball or says “play game”, it will be scored as a play initiation.

3) **Maintains Interactions:** Continued engagement in the same verbal or nonverbal activity as the peer. During intervals of peer initiations, positive responses (e.g.,
complying with request or answering questions) will be scored as maintaining interactions. For example, an interval in which the target child does not allow the peer to take his or her turn will not be scored as maintaining interaction.

The target student and two peers (triads) were videotaped during 10 minute play sessions before, during, and after PRT training. These sessions were video-taped at scheduled times throughout the day. The tapes were scored using a 10-s partial interval recording procedure for the social behaviors (e.g., initiates conversation, initiates play, and maintains conversations).

Tapes were also scored at the same time to measure the changes that occurred in the collateral behavior of the following attention behaviors. The behavior codes were mutually exclusive for each interval (Definitions adapted from Lewy & Dawson, 1992; Pierce, K. & Schreibman, L., 1995). In addition to the measures of social behavior, the students attention behaviors were scored as follows:

1) **Nonengagement**: The student has no clear attentional focus (e.g., staring into environment, stereotypy).

2) **Onlooking**: The student passively watches the activities of a play partner but does not maintain or interact with the partner.

3) **Object engagement**: The student actively engages solely with a toy that he possesses (i.e. manipulates a toy with sustained visual attention) and/or to the materials that are part of the task/activity at hand.

4) **Supported joint attention**: The student is actively involved with a toy that the play partner manipulates to alter the students experience with the object (i.e. target student
laughs at the peer’s action with the toy or reached for the toy) or actively watches the peer’s activities while maintaining an interaction (i.e. watches the peer as he manipulated a car).

5) **Coordinated joint attention:** The student gets actively involved with a person or toy (i.e. the target student and peer will engage in the same activity with alternating periods of eye gaze to the peer).

Generalization measures were obtained with untrained peers, novel stimuli, in general education settings (e.g., lunch room, gymnasium), and on the school playground. This involved having the students attend the regularly scheduled activity for that day, such as lunch, while target behaviors were recorded.

Social validity was measured by the special education teacher and general education teacher for the target students. These teachers completed the Social Responsiveness Scale (SRS) by Constantino (2002). SRS data were gathered at baseline, mid-way into the project, and at the follow-up period. The SRS is a rating scale that takes a quantitative approach to measuring autistic symptomology across the entire range of intensity that occurs in naturalistic social settings (Constantino, et al, 2003).

*Interobserver Agreement*

Prior to collecting data for this study, an observer was trained using 30-minute video-taped segments of students with autism engaged in structured social skills instruction. These videos, while unrelated to the study, were used as a training resource for which behaviors were operationally defined. Two observers collected data on the defined behaviors. The observer obtained a .80 or greater agreement on recording dependent
measures with the experimenter on three consecutive five minute segments of the criterion videotape before moving onto the next phase of the study. An agreement was scored if both observers identified the behavior with the same behavior code; a disagreement was calculated otherwise. Interobserver agreement was calculated by dividing the total number of agreements by the total number of agreements plus disagreements and then multiplying by 100.

Throughout the study, a minimum of 25% of each student’s sessions were scored by two observers. Interobserver agreement was calculated simultaneously but independently by the experimenter and a second observer across all experimental phases. An agreement was scored if both observers identified the behavior with the same behavior code; a disagreement was calculated otherwise. Interobserver agreement was calculated by dividing the total number of agreements by the total number of agreements plus disagreements and then multiplying by 100. Interobserver agreement ranged from a low of 72 to a high of 100% with an overall average of 90%.

Experimental Design

A multiple baseline single case across subjects experimental design was used to evaluate the effectiveness of the study. Following baseline, participants used self-management procedures only. Next, peer-mediated pivotal response training was implemented. This was followed by post peer-mediated pivotal response training. Finally, a combination of self-management and peer-mediated PRT was implemented.
Execution of these phases was staggered across students. Measures were obtained for each student before treatments, during treatments, in generalization settings, and at a 1-month follow-up.

**Baseline.** Baseline data were taken in the training setting, in the student’s general education settings, on the school playground, with generalization peers, and with generalization toys and activities. A variety of toys and activities were placed on a table, on the carpet in the corner of the classroom, and/or in the center of the school playground, depending on the baseline setting. Triads (the target student and two untrained peers) were simple told to “play together”. During these sessions the students did not receive any feedback from the experimenter and were allowed to engage in any “free play” they desired, other than something dangerous. Consistent with Pierce and Schreibman’s 1995 study, baseline measures were obtained over a 6-week period with third student, to control for increases in social behavior as a result of history and maturation.

**Treatment**

*Self-management training.* Each of the participating target students was given a protocol describing the self-management procedures and a tracking sheet to record target behaviors. The tracking sheet for recording appropriate target behaviors is presented in Table 2:1. The students were asked to read the protocol aloud to assess reading accuracy and this was followed by a series of fill-in-the blank questions about what they read to ensure they understood the protocol. The protocol included written and pictorial definitions, (e.g., Mayer-Johnson symbols) using language understood by the students
(adapted from Koegel, Koegel, & Parks, 1995). Table 2:2 includes and illustrates the self-management protocol.

Self-management procedures were taught in the following systematic manner:

1) The procedures were explained by experimenter and the use of the ARRT was introduced.

2) The target students explained the procedures to experimenter and were able to identify their own appropriate behaviors (e.g., initiating play with peer, starting a conversation).

3) The procedures, (e.g., identification, recording, and reinforcing of appropriate behaviors) were modeled by experimenter.

4) The target students modeled the procedures and were given feedback.

5) Each target student and the experimenter took data together to determine treatment integrity, and feedback was given to the target students.

Accurate implementation of the self-management strategies was obtained at .85 or better during this phase before moving onto the next phase.

*Peer PRT training.* A manual describing PRT strategies was given to each of the peers who participated in the study. The students were asked to read the manual aloud to assess reading accuracy, and this was followed by a series of fill-in the blank questions about what they read to ensure they understood the manual. The manual described and defined all the PRT strategies that were used, and were in both pictorial and written form (manual adapted from Koegel, et al, 1989). Peer activities included in the manual were:

1) **Paying attention:** Ensure that the target child is attending before delivering a prompt or suggestion.
2) **Child choice:** Give choices between different play activities to keep motivation high.

3) **Vary toys:** Vary toys frequently, according to the target child’s preferences.

4) **Model appropriate social behavior:** Provide frequent and varied examples of appropriate play and social skills, including verbal statements (e.g., say “this game is fun”) and complex play actions (e.g., act out a script with dinosaurs).

5) **Reinforce attempts:** Verbally reinforce any attempt at social interaction or functional play (e.g., while playing catch say “great throw”).

6) **Encourage conversation:** Withhold the desired play object until the target student emits a verbal response related to that object or activity (e.g., require that the target student say “let’s play ball” before allowing him to have the ball).

7) **Extend conversation:** Ask questions or encourage conversation centered around tangible objects in the room (e.g., while playing with play food say, “I like to eat ice cream, do you like to eat ice cream or pizza?”).

8) **Turn taking:** Take turns during play to provide examples of appropriate play to promote sharing and increase motivation.

9) **Narrate play:** Provide descriptions of the play actions and scripts (e.g., while playing with a ball say “I am going to dribble the ball”).

10) **Teach responsively to multiple cues:** Comment on object properties and require the target student to talk about object properties whenever possible (e.g., say “do you want to play with the small, green ball or the big, blue ball?”).
These strategies were taught in the following systematic manner:

1) The strategies were explained by the experimenter.

2) The peer trainers explained the strategies to experimenter.

3) The strategies were modeled by experimenter.

4) The peer trainers role-played the strategies with the experimenter and were given feedback.

5) The peer trainers role-played the strategies with each other and were given feedback.

6) The peer trainers were paired with a student with autism for PRT training and given feedback during the sessions. Accurate implementation of the strategies was obtained at .80 or better during this phase before moving onto Post PRT sessions.

_Post-PRT training_. During Post PRT sessions the procedures remained the same except that the peers were not given feedback.

_Self-management combined with post-PRT training_. During this phase, self-management procedures were re-introduced to the students with autism, while Post-PRT sessions continued as described above.

_Posttreatment and Follow-Up_. Posttreatment assessment was the same as those used at baseline and also included generalization probes in the general education settings and on the school playground. A 1-month follow-up assessment was taken in the training setting, general education setting, and school playground.
CHAPTER 3: RESULTS

Peer-Mediated Interventions. The first set of data that are presented focus on the target social behaviors of: initiating conversations, initiating play, and maintaining interactions.

Baseline. During baseline, students A, B, and C initiated social behaviors at low rates maintained interactions at low to variable rates of responding. Figure 3:1 illustrates all three students depicted within a multiple-baseline across students design. Figures 3:2, 3:3, and 3:4 illustrate student-specific social behaviors. All three students demonstrated consistently low rates of initiating conversations and initiating play behavior. Student A’s maintaining interactions remained low during baseline, whereas, Students B and C did not demonstrate stability.

Self-Management. During the first treatment phase, Student A increased maintaining interactions by 40%, initiating conversations by 16%, and initiating play by 3%. For student B, self-management procedures alone increased maintaining interactions by 31% and initiating conversations by .7%. Initiating play decreased for Student B by 1.7%. Student C’s maintaining interactions behavior and initiating play remained the same during this treatment phase. Initiating conversations decreased by .6% for Student C.

Accuracy of Self-Management. After three self-management sessions, all the target students learned to self-manage accurately over this relatively short period of time. Generally, all the students accurately measured their behaviors at 80% or greater over the course of the study.

Peer Pivotal Response Training. After several weeks of Pivotal Response Training
(PRT), all three target students maintained interactions at an average of 50% or higher than baseline. Initiating behaviors remained relatively the same as in the self-management phase across all three students.

**Post-Pivotal Response Training.** During this phase, maintaining interactions continued to increase for all three students, while initiating interactions remained the same.

**Pivotal Response Training Combined with Self-Management.** When PRT was combined with self-management strategies, Student A’s maintaining interactions increased by an additional 19% from the first treatment phase, and his initiating conversations increased by an additional 14%. Student B’s maintaining interactions and initiating interactions remained the same, while Student C’s maintaining interactions increased by an additional 28% from the first treatment phase and initiating interactions remained the same.

The second outcome data collected in this study include both interfering (i.e., nonengagement, onlooking, and object engagement) and pro-social behaviors (i.e., supported joint attention, and coordinated joint attention). Interfering behaviors were selected for intervention on a student by student basis. For example, Student A engaged in high levels of object engagement whereas student C engaged in both object engagement and onlooking behavior. Both behaviors negatively impacted their social interactions with peers.

During baseline, over 90% of Student A’s behaviors (figure 3:6) were categorized as object engagement (e.g., the absence of joint attention behaviors), then during the self-management only phase, his object engagement dropped to 30%, and his joint attention
behaviors increased from 5% to 58%. When self-management procedures were combined with PRT, Student A engaged in a blend of supported and coordinated joint attention behaviors for more than 81% of the play sessions. At follow-up, Student A maintained joint attention for 85% of the session.

During baseline, Student B’s attention behaviors (Figure 3:7) were primarily focused on object engagement and on looking for an average of 72% of the time, whereas, during the self-management alone phase his average dropped to 32%. Student B’s joint attention behaviors (e.g., supported and coordinated) increased the most during post PRT, with an average of 86% of the time, and remained stable at the follow-up with and an average of attending during the play session for 92% of the time.

During baseline, Student C’s joint attention behaviors (Figure 3:8) averaged 62% of the play sessions. Increases in prosocial attention behaviors were noted during the sixth session of baseline and continued to improve during the baseline phase. This improvement may be the result of Student C’s increased comfort level with the peers, as he exhibits behavioral inhibition, and the probability that he does not have a skill deficit with regard to social behaviors, rather a performance deficit. When introduced to the self-management only phase, these joint attention behaviors increased to 86% of the play sessions. During the combined treatment phase of self-management and PRT, Student C’s pro-social behaviors increased to an average of 93% of the play sessions and were maintained at this level during the 1 month follow-up.

General education teacher’s and special education teacher’s observations were measured by The Social Responsiveness Scale. On this rating scale, the higher the score,
the less developed the social skill. Table 3:1 includes the pre, during, and post intervention ratings. For student A, a comparison of pre- and post-ratings by his special education teacher indicated that all of his social behaviors improved and maintained at the follow-up session. In addition the general education teacher rated his social awareness and social communication behaviors as improving and his social cognition and social motivation were rated as declining.

For student B, the special education teacher rated the majority of his social behaviors as improving during training and maintained at follow-up. The general education teacher rated his social behaviors as fluctuating during training, with several of these behaviors declining at follow-up.

The special education teacher rated three of Student C’s social behaviors as remaining the same throughout the study, and the remaining two as declining during interventions and at the follow-up phase. The special education teacher rated Student C’s social behaviors as fluctuating during training and at follow-up, with several of the behaviors declining.

Generalization Probes. For Students A and C, the social behavior of “maintains interactions” (Figures 3:9 and 3:11) increased across all three generalization settings (gym, lunch, recess). There was a mild increase in “initiating conversations” for student A during gym and lunch. Student B’s (Figure 3:10) social behaviors remained the same in lunch and recess. His supported and coordinated joint attention behaviors increased in gym, similar to that of his peers.
For Students A, B, and C (Figures 3:12, 3:13, 3:14) the interfering behavior (i.e., object engagement) decreased significantly during gym, while the positive attention behaviors of “supported joint attention and coordinated joint attention” steadily increased.

During recess, Student A’s attention behaviors fluctuated midway into the study and toward the end looked similar to the first few months of the study (see Figure 3:12). For Student B, the attention behavior of object engagement increased, while coordinated attention decreased, and supported attention behavior increased steadily (see Figure 3:13). Student C’s attention behaviors remained relatively the same during recess (see Figure 3:14).

During lunch, Student A’s attention behaviors remained relatively unchanged (see Figure 3:12). This may be due in part to Student A’s difficulties around eating (i.e., very limited repertoire of foods that he will eat) and watching others eat (i.e., gags and avoids being near peers who are eating). For Student B, the joint attention behaviors remained relatively the same, while object engagement decreased, but nonengagement increased (see Figure 13). Student C’s attention behaviors changed in that the object engagement decreased and supported joint attention increased (see Figure 14).

**Analysis of Results**

Figure 3:1 and 3:5 illustrate the effectiveness of the intervention package within a multiple baseline across students design. Student by student analysis of these data indicated that Students A (Figure 3:15) and B (Figure 3:16) showed stable levels of interfering and pro-social behavior during baseline and marked improvements in these
behaviors across all phases of the study. Treatment effects with Student C (Figure 3:17) are more subtle. Student C showed highly variable levels of target behaviors during baseline. However, during the intervention phases, he showed slight improvement overall, but perhaps more importantly consistent levels of decreased interfering behaviors and improved levels of pro-social behaviors. Thus, the intervention package appears to have substantially impacted the acquisition and decelerating of target behaviors with students A and B, and the stability of these behaviors with student C.

CHAPTER 4: DISCUSSION

The results of this study indicate that PRT combined with self-management procedures were effective in teaching the social behavior of maintaining interactions. Although there is support in the literature for the effective use of PRT (e.g., Harper, Symon, & Frea, 2007; Koegel, Koegel, & Brookman, 1990; Pierce & Schreibman, 1995; Pierce & Schriebman, 1997) and self-management procedures (Koegel, Koegel, & Parks, 1995; Sainta, Goldstein, & Strain, 1992; Stahmer & Schreibman, 1992; Wilkinson, 2008) in increasing the social interactions of students with autism, there were previously no studies that supported this combined approach. In addition, this study demonstrated that when maintaining interactions improved, supported and joint attention behaviors increased.

In the present study, when the students interacted with the trained peers, the interactions appeared natural and age-appropriate, with attention and communication matching the context of the interactions. This was in stark difference to the baseline condition, in which interactions appeared disconnected (e.g., fleeting eye contact) and
communicative exchanges were minimal. These connected interactions and responses allowed more opportunities for the trained peers to keep and maintain the target peers’ attention to the activity at hand.

A third finding of this study indicated that using the natural public school setting helped to promote generalization of these skills in several settings (e.g., gym, lunch). The most consistent findings were that all three students’ joint attention behavior increased during gym. This may be in part due to this being a more structured activity with teacher directed group tasks, whereas recess and lunch are tasks that are completed independently. Other studies corroborate these findings, suggesting that using natural environment teaching may be an especially promising method for children with autism (Gresham, 1986; Hunt, Alwel, Goetz, & Sailor, 1990; Cowen & Allen, 2007).

As with any applied research study, there are several limitations. First, the materials that were available were too varied. Although this allowed the students to make choices as to what they wanted to play with, it impacted the data with regard to certain materials having more motivating attributes. The variable data for Student B’s maintaining interactions can be attributed to the motivating qualities of the activity that was presented. When playing with wrestling action figures, which is a highly preferred activity, Student B’s maintaining interactions remained consistently higher then when he played with other toys (e.g., board games) whereas his interactions were consistently lower. Thus, the reinforcement value of specific toys may have introduced a confound. Future studies should be done using a limited number of activities that have similar qualities. For example, turntaking activities only (e.g., board games, cards) or interactive activities only
(e.g., action figures, cars). By limiting it to activities that have the same reinforcing qualities, data may remain more constant.

The ability to generalize these findings to a wide population is limited due to the small sample size of only three students with a diagnosis of autism. Application of these strategies to a larger number of students with autism, and to diverse population of students (e.g., children with: social anxiety, attention deficit hyperacidity disorder) may allow for wider generalization of the employed techniques.

The age of the peers chosen for the study impacted the quality and quantity of the interactions between peers and target students. The younger peers, even after intense training, engaged less often with the target peer, as compared to that of the older trained peers. The manner in which the younger peers interacted with the target student was less natural (e.g., scripted); whereas the older trained peers used more natural intonations and interactions. Future research should focus on improving the quality and quantity of younger peer’s interactions.

Another limitation of this study was the frequency of the intervention. Given that individuals with autism have significantly impaired social skills, the intervention may have yielded more robust results if it were implemented on a daily basis. Just as academics are part of the daily schedule, social skills instruction should also be part of the daily schedule. Increasing the intervention by 50%, would most likely impact the results of the treatment package. The more practice the target students, as well as the trained peers have the more likely that they will be successful and for social behaviors to change.
The trained peers volunteered as participants in this study, and were not receiving an incentive to do so. It is possible that on some days they may have been less motivated to participate in the study than other days. Future research should consider the possibility of providing the trained peers with reinforcement for implementing the protocol as it was designed. The intrinsic motivation that these trained peers experienced was more obvious in the older students, as they talked about how much they enjoyed seeing the target peers change. As for the younger peers, their experience appeared to be motivated by escaping regular classroom activities that was going on at the time of the play time. The younger students did not mention how much they enjoyed playing with the target students, nor did they talk about how the target student was changing.

Given the complex nature of the social behaviors of initiating, the measurement procedure chosen for these behaviors may not have been the most appropriate. It would be socially awkward for a student to initiate play or a conversation every minute. Once play or a conversation is flowing, it is more natural for this reciprocity to continue than for a student to interrupt the flow and utilize initiating skills. That being said, future research on these two skills should focus on the quality of the interactions rather than the quantity. It would be more socially valid for a student to learn the idiosyncratic characteristics associated with initiating skills, rather than focus on the frequency of utilizing these skills.

The criteria that were used to choose the target students should have had more stringent. Although the student’s records indicated that they had similar skills, there was no assessment to determine if a students exhibited performance or skills deficits with
regard to social behaviors. Future studies should implement assessment procedures that will determine whether a student has skill deficits or performance deficits as part of the criteria for inclusion in the study. All the students chosen for the research study should shave skills deficits if they are to be included in the study.

CHAPTER 5: SUMMARY

Although this study yielded mixed results, utilizing peers as social skills instructors did have positive benefits for these students with autism. These students were able to learn from their trained peers and their social and attention behaviors progressed. The students with autism also developed valuable skills in self-management which could continue to be implemented during other instructional objectives and help the students become more independent learners. This study has also paved the way for future studies to inspire utilizing more robust measures, such as: increased sessions, a measurement of the quality of social skills interactions, additional reinforcement for the trained peers, more stringent parameters around play activities, and including children with a diagnosis other than autism. Taking into considerations all of these suggestions for future research is likely to yield substantial and positive outcomes that will enhance the lives of students with autism and related disorders.
REFERENCES


After I hear each tone I will circle my social behaviors as follows:

- 1 = I **did** use social behaviors during that 1 minute interval.
- 0 = I **did not** use social behaviors during that 1 minute interval.

<table>
<thead>
<tr>
<th>Time</th>
<th>I Started Talking to my Friends</th>
<th>I Started Playing with my Friends</th>
<th>I Keep Playing and Talking with my Friends</th>
</tr>
</thead>
<tbody>
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<td>0 1</td>
<td>0 1</td>
<td>0 1</td>
</tr>
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<td>0 1</td>
</tr>
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</tbody>
</table>
Self-Management Protocol

1) Gather Materials:
   - Get tracking sheet and CD player
   - Press play on the CD player

2) Work on 3 social behaviors while playing with your friends:
   - When you play with your friends, work on using these three social behaviors: (1) start talking to your friends, (2) start playing with your friends, and (3) keep playing and talking with your friends.

3) Mark circles on your tracking sheet:
   - Each time the tone sounds, circle your behavior(s) on your tracking sheet.

4) Count up your points:
   - When you are done playing with your friends count up your points.

5) Reward yourself:
   - Match the number of points you earned to the correct container and choose a reward from that container.

Table 3:1
### Special Education Teacher Ratings of Social Behavior as Indicated by Raw Scores on the Social Responsive Scale (SRS)

<table>
<thead>
<tr>
<th></th>
<th>Social Awareness</th>
<th>Social Cognition</th>
<th>Social Communication</th>
<th>Social Motivation</th>
<th>Autistic Mannerisms</th>
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</thead>
<tbody>
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<td><strong>Student A</strong></td>
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<td></td>
<td></td>
<td></td>
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<tr>
<td>Before</td>
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<td>83</td>
<td>73</td>
<td>65</td>
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<tr>
<td>During</td>
<td>62</td>
<td>70</td>
<td>65</td>
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</table>

### General Education Teacher Ratings of Social Behavior as Indicated by Raw Scores on the Social Responsive Scale (SRS)

<table>
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<th>Social Communication</th>
<th>Social Motivation</th>
<th>Autistic Mannerisms</th>
</tr>
</thead>
<tbody>
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<td><strong>Student A</strong></td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Before</td>
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<tr>
<td>During</td>
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</tr>
<tr>
<td>Follow-Up</td>
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<td>67</td>
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### Student B

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<th>Social Cognition</th>
<th>Social Communication</th>
<th>Social Motivation</th>
<th>Autistic Mannerisms</th>
</tr>
</thead>
<tbody>
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<td><strong>Student B</strong></td>
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<td></td>
</tr>
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<td>62</td>
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</tr>
<tr>
<td>During</td>
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<td>69</td>
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</tr>
<tr>
<td>Follow-Up</td>
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<td>65</td>
<td>67</td>
<td>72</td>
<td>69</td>
</tr>
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</table>

### Student C

<table>
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<th>Social Cognition</th>
<th>Social Communication</th>
<th>Social Motivation</th>
<th>Autistic Mannerisms</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Student C</strong></td>
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<tr>
<td>During</td>
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<td>Follow-Up</td>
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<td>56</td>
<td>59</td>
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</tbody>
</table>
Figure 3:3
Figure 3:4

Graph showing the percentage of behaviors across different stages: Baseline, Self-Management, Peer PRT Training, and Post PRT. The x-axis represents sessions, and the y-axis represents percentages.
Figure 3:5

Figure 5

STUDENT A

PERCENTAGE

BASLINE
SELF-MANAGEMENT
PEER PRT TRAINING
POST PRT
PRT & SELF-MANAGEMENT
FOLLOW-UP

CJA
SJA

STUDENT B

PERCENTAGE

SESSIONS

ATTENTION BEHAVIORS

ONLOOKING
SUPPORTED JOINT ATTENTION
OBJECT ENGAGEMENT
COORDINATED JOINT ATTENTION
Figure 3:7
Figure 3:8
Figure 3:9

Gym

Lunch

Recess

Student A - Social Behaviors/Generalization
Student B – Social Behaviors/Generalization
Figure 3:11

Student C - Social Behaviors/Generalization
Figure 3:12

Student A – Attention Behaviors/Generalization
Figure 3:13

Student B – Attention Behaviors/Generalization
Student C – Attention Behaviors/Generalization
Figure 3.15

Student A - (Attention Behaviors) Interfering and Prosocial Behaviors

Sessions

Baseline | Self-Management | Peer PRT Training | Post PRT | Self-Management & PRT | Follow-up

Percentages

1 3 5 7 9 11 13 15 17 19 21 23 25 27 29 31 33 35 37 39

IB

PSB
Figure 3: Graph showing percentages of interfering and prosocial behaviors for Student B across different stages:
- Baseline
- Self-Management
- Peer PRT Training
- Post PRT
- Self-Management & PRT
- Follow-up

The graph includes data points for IB (■) and PSD (△) behaviors across sessions.
Student C - (Attention Behaviors) Interfering and Prosocial Behaviors

Baseline | Self-Management | Peer PRT Training | Post PRT | Self-Management & PRT

Sessions

IB - ■ | PSB - △

Figure 3:17
BIOGRAPHY OF AUTHOR

Kimberly A. Labbe-Poisson, a practicing Certified School Psychological Service Provider, has been working with individuals with developmental disabilities for 14 years. She graduated from high school from St. Dominic’s Regional High School in 1989, earned a Bachelor of Science degree in Early Childhood Special Education from the University of Maine at Farmington in 1993, and earned a Master of Science degree in School Psychology from the University of Southern Maine in 2000. She lives in Lisbon, Maine, with her husband and two children. She is a candidate for the Doctoral degree in School Psychology from the University of Southern Maine, 2009.