PEER MEDIATED INTERVENTION
TO IMPROVE SOCIAL COMMUNICATION
IN YOUNG CHILDREN WITH ASD

by

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ABSTRACT

To date, no study has measured the effects of peer-mediated intervention (PMI) on autism symptoms in children under than four years of age. The current study examines the efficacy of the *Stay, Play, Talk* PMI (English, K., Shafer, K., Goldstein, H., & Kaczmerek, L., 1997) on the social communication skills of young children diagnosed with autism. The investigator paired three typically developing children (ages 3-5 years) each with a young child with autism (ages 3-4 years). These dyads played together during two to three, 20-minute weekly sessions for 6-8 weeks. A multiple baseline design across participants was implemented to measure the effectiveness of PMI on young children with autism’s social initiations and responses characterized by non-coordinated gestures, gestures, and words. The investigator coded the frequency of each child’s social initiations and responses to topics/conversations for each 20-minute play sessions. All three children with autism demonstrated increased social responses, though initiations remained variable. Typical peer buddies demonstrated increases in social initiations and responses. Results of this study support the usefulness of this intervention to improve social communication of young children with autism and contribute to limited knowledge of effective early social communication interventions for young children with autism.
DEDICATION

This thesis is dedicated to three incredible “peer buddies.” In spite of their young age, these little clinicians demonstrated incredible understanding of the job set before them, performing this job with great empathy, compassion, and patience. These small clinicians blessed the hearts and minds of three young children with autism, who in spite of their social and language deficits, uniquely received the opportunity to understand the meaning of friendship for the very first time. These little clinicians offer hope to parents and families of children with autism, as they beautifully contradicted the fears of bullying and social isolation that parents and families of children with autism so often face.
ACKNOWLEDGEMENTS

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1: Introduction

Children with Autism Spectrum Disorders (ASD) often experience limitations in their early play skills that later influence their development of language and social relationships. These limitations, including deficits in play skills and joint attention, culminate to produce deficits in social interactions with their peers. Specifically, young children with ASD have reduced social initiations and responses during interactions with peers (McConnell, 2002). Therefore, interventions that target increases in social interactions with peers may lead to more positive social outcomes for children with ASD. Peer Mediated Interventions (PMIs), have been effective in improving social interaction in preschoolers (Chan, J.M., Russell, L., Rispoli, M., O’Reilly, M., 2009), and create natural opportunities for social interactions, specifically social initiations and responses (Theiman & Goldstein, 2004). McConell (2002) found that PMIs increase child initiations more than a child specific intervention in preschool and school aged children. Rather than directly targeting the behaviors of the child with ASD, PMIs focus treatment on the behaviors of the typically developing child, consequentially resulting in changes in the behaviors of the child with ASD. To date, PMIs have been limited in very young children with ASD. The goal of the present study is to examine the efficacy of a PMI called Stay Play Talk (English et al., 1997) on the social initiations and responses of young children with ASD.

Typical Language Development

Typically developing children exhibit social-emotional milestones that are thought to be prerequisites for language. Through social contexts such as play, these social milestones become
evident early on and develop rapidly. Greenspan, Prizant, and Wetherby (2004) described developmental milestones from 4 months to 36 months. At 4 months of age, a child will show interest in watching people’s faces and will smile in response to an adult’s smile. An infant will demonstrate happiness through cooing and babbling by 6 months of age, while communicating unhappiness through crying. By 9 months an infant will exchange smiles and laugh while looking at an adult and exhibit various expressions, sounds, and gestures. The typically developing infant is capable of producing a few gestures in sequence to communicate needs by 12 months of age, as well as participate in social games such as peek-a-boo and patty cake. Sounds such as “ma, ba, da, ga” are produced by 12 months of age. At 15 months of age the infant is able to use pointing or other gestures to draw attention to something of interest, evidencing initiations that will develop into joint attention. By 15 months the infant is able to comprehend at least 3 words, and by 18 months of age the typically developing child is able to request wants verbally such as “want juice.” Babbling becomes more sophisticated at this age, including consonants such as “m, n, p, b, t, d.” The 18 month old will be able to use and understand at least 10 words, show understanding of the names of familiar people or body parts by looking or pointing at them when they are named. By 24 months of age the young toddler is able to use and understand at least 50 words and produce at least 2 word combinations (Greenspan et al., 2004).

**Language in ASD**

A delay in communication is one of the three deficits required for a diagnosis of ASD (DSM-IV-TR; APA, 2000), along with impairment in social interaction and the presence of repetitive and restricted behaviors and interests. Children with ASD may demonstrate an atypical language trajectory with unique production patterns not found in typical development. For
example, the speech of children with ASD is often characterized by echolalia, or imitation of language they have recently heard (Tager-Flusberg & Calkins, 1990). In fact, the verbal productions of two of the children in the current study (TC2 and TC3) were often characterized by echolalia. It is important to note that echolalia can sometimes serve as a communicative function, such as turn taking (Eigsti, Bennetto, & Dadlani, 2007), as was the case with the participants in the current study. In addition to echolalia, children with ASD often invent novel words (neologisms) with a specific idiosyncratic meaning (Eigsti et al., 2007). Differences in linguistic forms are not the only aspects of language unique to ASD, early delays in acquiring language are likely the first noted deficit in children with ASD, as well as the most important prognostic indicator for long term outcomes of individuals with ASD (Lord & Ventner, 1992).

Children with ASD do not develop language and social communication skills at the same rate and level of complexity as their typically developing peers. Parents are often the first to notice delays in communication in their children with ASD. In fact, De Giacomo and Fombonne (1998) found that parental concerns regarding delays in language milestones are often the first deficits noticed in children with ASD, with a speech and language evaluation often being the first stop leading towards diagnosis of ASD. Considering parents’ early concerns regarding language of their children with ASD, it comes as no surprise that Howlin (2003) found that children with ASD often have dramatic delays in acquiring first words. On average children with ASD produce their first words around 38 months, compared to 8-14 months as their typically developing peers. Luyster, Qiu, Lopez, and Lord (2007) found that the MacArthur-Bates Communicative Development Inventory (CDI), a caregiver report questionnaire of early language and social communication for typical children ages 8 to 30 months, was a somewhat
strong predictor of later language skills for 3-year-old children with ASD, indicating the need to target language and social interaction skills early on.

Indicated by retrospective parent reports, Werner, Dawson, Munson, and Osterling (2005) found that children with ASD were characterized by severe symptoms associated with social interaction, including a lack of smiling at people, lack of eye contact, and failure to orient in response to their name than typically developing children (Werner et al., 2005). In fact, these parental reports indicate that deficits in social interactions are evident even as early as 3-6 months. Symptoms associated with social communication, including failure to use reciprocal vocalizations and lack of babbling, are noted as early as 10-12 months.

Early social communication skills are crucial to language development and include the use of gestures, imitation, and play, all noted to be significantly decreased early on in young children with ASD (Eigsti, de Marchena, Schub, & Kelley, 2011). Thus, it is clear that the social and language deficits of children with ASD begin early, warranting the need for early intervention (Werner et al., 2005). Since play skills may be foundational, or at least contextual to language development, a closer look at play skills in children with ASD is needed to consider its impact on acquiring language.

**Play Development in Typical Children**

Bluiett (2011) suggests that pretend play facilitates the typically developing child’s acquisition of social communication and vocabulary. Further, Bluiett (2011) also states that peer interaction resulting from pretend play produces a natural environment within which a child feels free to demonstrate a creative thought process by means of exploring language elements. Kasari, Freeman, and Paparella (2006) explored this idea further by suggesting that pretend play, often created from social initiations and responses for joint attention, directly influences the
development of a child’s language acquisition as early as two years of age. Greenspan, Prizant, and Wetherby (2004) explained that early pretend play is evidenced in a typically developing child by 18 months of age, with pretend play being extended to more than one action by 24 months. Greenspan and colleagues (2004) also explained that toddlers desire to be in close proximity and express interest in playing with other children their age. At 36 months, the typically developing child will demonstrate pretend play with characters, for example, talking for dolls or action figures (Greenspan et al., 2004). Children at this age will show increased social interaction with peers, sharing information such as talking about a favorite toy. However, this accumulation of increasingly more sophisticated play skills and desire to share in play with peers is not evident in the child with ASD.

**Play Development in children with ASD**

While the typically developing child’s play skills develop along a rapid continuum, play skills for the young child with ASD are compromised (Kasari, et al., 2006). Researchers have found that repetitive behaviors with objects differentiate children with ASD from typical peers (Ozonoff et al., 2008), and peers with developmental delay (Wetherby, et al., 2004) by 2 years of age. In addition, repetitive behaviors with objects prevent children with ASD from engaging in joint attention (Ozonoff et al., 2008). The restricted and repetitive play with objects demonstrated by children with ASD limits opportunities for social interaction and can result in social isolation. For example, during baseline sessions in the current study, participants with ASD demonstrated repetitive play with toy racecars by moving them repetitively back and forth, or repetitively spinning the wheels of the toy cars closely to their eyes, preventing them from interacting socially with peers. In fact, Werner and colleagues (2005) reported from parent
interviews that a longer attention span for objects occurred more frequently in children with ASD than in typically developing children as young as 3-6 months.

**Joint Attention in Typical Development**

Joint attention, thought to be crucial for development of communication skills and representational thought, each of which are key aspects of language learning, may be defined in the current study as the common focus of at least two individuals upon one toy, idea, or topic of conversation. Meindl and Canella-Malone (2011), describe joint attention as consisting of both initiating and responding, each of which may be coordinated through gaze shifting, gesturing, or vocal communication. Kasari and colleagues (2006) further detailed joint attention as involving shared attention with others through pointing, showing, and coordinated looks between people and objects. Typically developing children use joint attention to share and comment on common objects of interest as they creatively explore their language and play within social contexts. However, children with ASD have deficits in joint attention, often failing to respond to bids for joint attention from their peers, and even less frequently initiating joint attention concerning a toy of their focus. Morales et al., (2000) established that levels of responding to joint attention as early as 6, 8, 10, 12, and 18 months could reflect a positive correlation among later individual differences of vocabulary development in children with ASD. Further, Kasari et al., (2006) found evidence that joint attention skills are deficient in the majority of children with ASD, and is a strong predictor of language and social abilities later in life. Sigman and Ruskin, (1999) also argued that deficits in joint attention function as a precursor to delayed language. Thus, by creating joint attention, a goal in the current study, social interactions will be created and language facilitated.
Peer Mediated Intervention

After their child receives a diagnosis of ASD, parents experience a “life change” that drastically alters the hopes, dreams, and expectations they once had for their child (Altiere & Kluge, 2009). Altiere and Kluge (2009) interviewed 52 parents of children with ASD with the purpose of bringing greater understanding and awareness to the challenges parents face in raising a child with ASD. Among the greatest challenges expressed from parent interviews was the fear that their child would never have the opportunity to experience true friendships, even expressing the fear that their child would grow up in “social isolation” (Altiere & Kluge, 2009). It is the responsibility of the speech language pathologist and other professionals treating children with ASD to consider parental fears and anxieties when choosing treatment strategies. PMIs are one type of treatment approach that meaningfully addresses the fears of social isolation that parents of children with ASD often experience. Traditionally used to target social skills in elementary and school aged children, PMIs are an evidence-based strategy in which typically developing peers take on an instructional role for another child (Webb, Hubbell, & Bedesem, 2012). PMIs involve training a typically developing peer with various types of communication strategies to encourage social interactions and appropriate behaviors. This peer training promotes greater acceptance of a child with ASD, which in turn lessens the fears of social isolation experienced by parents of children with ASD. PMIs have been shown in a recent meta-analysis of the literature to produce increased social interactions of school aged children with ASD in relation to their typical peers (Chan et al., 2009). Studies explain that these social interactions are unlikely to occur in a classroom setting without some form of supportive instruction (Hunt & Goetz, 1997). PMIs offer needed instruction for typically developing children to learn communication
strategies that will increase social interactions with their classmates with ASD (DiSalvo & Oswald, 2002).

In addition to being used with elementary and middle school aged children, PMIs have recently been implemented into preschool programs. Some researchers have found that PMIs elicit increased social interactions among preschoolers with ASD (McConnell, 2006; English, Shafer, Goldstein, & Kaczmarek, 1997) above and beyond child-specific interventions (McConnell, 2006). Three important PMI strategies are shown in the literature to be effective practices in preschool children with ASD. These include peer proximity, peer prompting and reinforcement, and peer initiation. Peer proximity involves directing the peer model to play near the target child, creating more opportunities for the target child to observe targeted behaviors and engage in joint attention (Carter, Cushing, Clark & Kennedy, 2005). Peer prompting and reinforcement involves the peer model being directed to prompt the target child and provide positive feedback for the target child (Kohler, Greteman, Raschke, & Highnam, 2007). And finally, peer initiation involves the peer model being directed to initiate by requesting, asking a question or using instruction for a specific activity with the target child (Lee, Odom, & Loftin, 2007). One type of PMI incorporating all three of these PMI strategies is called Stay Play Talk, (English, et al., 1997).

Stay Play Talk has been effective in improving verbal and nonverbal social interactions in preschool children with ASD (English et al., 1997). The current study adapted the across-the-day PMI model outlined for preschool programs by English and colleagues (1997) to meet the schedules of younger children with ASD. The current study will determine if Stay Play Talk strategies in 3 young children with ASD, (3-4 years old), paired with 3 slightly older typically
developing children (4-5 years old), will improve *social initiations* and *responses* defined at 3 levels of communication: non-coordinated gestures, coordinated gestures, and words.

Hypothesis 1: *Stay Play Talk* provided within a play-date model of delivery, twice weekly, will yield increases in social initiations and responses of young children with ASD.

Hypothesis 2: Typical peer buddies will require fewer adult prompts as the intervention progresses.

Hypothesis 3: The average number of reciprocal interactions per topic will increase as a result of SPT intervention.
2: Method

Participants

Six children were recruited for this study. Three of the children (ages 3 to 4 years) with a diagnosis of autism (target children; TC) were recruited from the University of Alabama Speech and Hearing Center and the University of Alabama’s Autism Spectrum Disorders Clinic (see Table 1). All three target children in the study received their ASD diagnosis through the University of Alabama Autism Spectrum Disorders Clinic which provides a comprehensive evaluation by a multidisciplinary team including a speech language pathologist, clinical psychologist, and a pediatrician. To be included in this study the following criteria were met: 1. TC evidenced social communication deficits on the Autism Diagnostic and Observation Scale (Lord et al., 2000). The evaluation battery consists of the Autism Diagnostic Observation Schedule (ADOS; Lord, Rutter, DiLavore, & Risi, 2002) and the Childhood Autism Rating Scale- Second Edition (CARS2-ST; Schopler, Reichler, & Rothen-Renner, 2010) to measure autism symptoms across all three diagnostic domains: social interaction, communication, and repetitive and restricted behavior; the Mullen Scales of Early Learning (MSEL; Mullen, 1995) to measure children’s developmental skills in the areas of: 1) gross motor, (2) visual reception, (3) fine motor, (4) receptive language, and (5) expressive language, and the MacArthur Bates Communicative Development Inventories (Fenson et al., 2007) to measure early language and gestures. In addition, an adaptive behavior measure and a clinical parent interview were also completed. Three typically developing children, (ages 4 to 5 years) were also recruited. These
“peer buddies” (PB) were recruited from the University of Alabama’s Child Development Research Center. Peer buddies were selected based on the investigator’s observations of the children during free play time with other classmates, and based on the recommendation of classroom teachers. The Investigator asked classroom teachers to recommend students who showed empathy and sensitivity to the needs of others in the class, who were receptive to adult instruction, and who demonstrated flexible play routines. The investigator paired the target children and peer buddies based on gender, and play preferences as indicated from the Child Interest Survey (Appendix A). Participant information is outlined in Table 1 below.

Table 1
Summary of Participants

<table>
<thead>
<tr>
<th>Participant</th>
<th>Age</th>
<th>Gender</th>
<th>Total ECI Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>TC1</td>
<td>3:8</td>
<td>Male</td>
<td>47</td>
</tr>
<tr>
<td>TC2</td>
<td>4:4</td>
<td>Male</td>
<td>54</td>
</tr>
<tr>
<td>TC3</td>
<td>3:0</td>
<td>Male</td>
<td>21</td>
</tr>
<tr>
<td>PB1</td>
<td>4:9</td>
<td>Male</td>
<td>49</td>
</tr>
<tr>
<td>PB2</td>
<td>4:9</td>
<td>Male</td>
<td>26</td>
</tr>
<tr>
<td>PB3</td>
<td>4:2</td>
<td>Male</td>
<td>57</td>
</tr>
</tbody>
</table>

Measures

An operational coding manual developed by the investigator was used to precisely code social initiations and responses by levels of non-coordinated gestures, coordinated gestures, and words. The author’s coding manual is detailed later in this paper. In addition to the investigator’s operational coding manual, all participants were administered the Early Communicative Index (ECI; Greenwood, et al., 2006) pre and post intervention. The ECI is a
standardized, play-based monitoring tool for measuring expressive communication in children birth to 42 months (Luze et al, 2004). The ECI is a 6 minute communication sample gathered with a standard set of toys (Fisher Price House or Barn). The ECI is known for its reliability as a growth outcome measure. Administration of the ECI involves avoiding asking questions or giving directions, but rather simply responding to the child’s communication and following his lead. After administration, each minute of the ECI is coded for the child’s use of gestures, vocalizations, single words, and multiple words (ECI; Greenwood, et al., 2006). The ECI was thought to be an appropriate measure for the current study since it measures language in a natural context, as is the case with the Stay Play Talk intervention. Typical buddies scored within normal limits.

**Setting**

Pre-treatment training, assessments, baseline and intervention sessions occurred at the UA Autism Spectrum Disorders clinic with developmentally appropriate toys and activities. The room had a two-way observation mirror, which allowed families to observe the sessions if they chose to do so.

**Experimental Design and Conditions**

A multiple baseline across participants design was employed, in which, if the baseline changes once the intervention is introduced, the effects can be attributed to the intervention and not to extraneous variables (Kazdin, 2003; Kennedy, 2005). Single-subject designs have contributed to knowledge of effective interventions for young children with ASD (Odom et al., 2003) and have been suggested as a sufficient and flexible alternative to group design to determine evidence based practices in speech-language pathology (Byiers, Reichle, & Symons, 2012). Introduction of the treatment was staggered. The interventionist coded social interactions
during baselines sessions, waiting to introduce treatment once these behaviors were observed to be stable. In addition, the PBs level of interest and enthusiasm during baseline sessions was also considered in transitioning from baseline to treatment. Without the Stay Play Talk training, it was apparent that the PBs became easily discouraged in their attempts to play with the TCs. Since the success of Stay Play Talk is largely dependent on the enthusiasm of the PBs, it was vital to introduce the treatment before they became discouraged or lost interest. During each baseline session, the TC and Buddy dyads played with toys such as a farm set or blocks for 15 min. The investigator encouraged the buddies to stay in the same area as their friend. No other prompting or direction was given. After a stable baseline was reached for each dyad, the typically developing children participated in 3, 15 minute pre-training sessions with the investigator. Then, each dyad received 16 twenty to twenty-five minute intervention sessions.

**Buddy training**

After baseline sessions and prior to intervention sessions, the peer buddies participated in three 15-min. pre-training sessions. In these sessions, the peer buddies were taught to *Stay, Play,* and *Talk* to their friends in accordance with English et al. (1997). Since previous studies (Goldstein, 1997) used an “across the day” model, the training for the typical buddy was adapted to fit into the present research design.

**Pre-training session 1.** In the first session, the investigator lead the PB in an interactive conversation about how he would “be like a teacher” for his buddy (TC), and that just as his teacher shows him how to do new things, he would have the important job of teaching his buddy new ways to play and talk. After this conversation the PB was presented with the “Stay” visual prompt, (a board maker image of one child following another child.) The investigator explained to the PB that “a good buddy should always stay with his friend, following him wherever he
goes.” The investigator practiced this concept with the PB until the PB could confidently answer the question, “what should you do if your buddy goes to another part of the room?” with a phrase like, “I should follow (or stay) with (TC’s name) to stay close to him.” The investigator then followed this conversation by saying, “OK let’s practice!” and told the PB that she was going to pretend to be the TC and asked the PB to remember to “stay” with his buddy. The investigator moved to various points in the room with her back facing the PB and waited for the PB to follow her. If the PB did not come to her quickly (which was rarely the case), then the investigator prompted him with a phrase like, “Oh, remember, don’t forget to stay with your buddy!” and gestured or pointed to the “Stay” visuals posted in the room. Once the PB had demonstrated the ability to follow the investigator, the investigator explained to the PB that there were two more things he needed to choose from in order to do a good job “staying” with his friend. These choices include:

1. The PB can bring a toy to share with his buddy when he follows him.

2. The PB can follow his buddy and join in on what his buddy is playing with.

The investigator then practiced the above scenarios until the PB could do them without prompting.

**Pre-training session 2.** In the second pre-training session, the investigator taught the PB the “Play” concept. The session began by reviewing the “Stay” concept through a role playing activity, and then the investigator explained to the PB that once he had Stayed with his buddy by either bringing a toy to the TC or engaging in what the TC was already playing with, that he had another important job to do. The investigator told the PB, “Once you have Stayed with your buddy, your next job is to Play together with your buddy.” The “Play” visual was then presented (a board maker picture of two children taking turns playing checkers) posted next to the “Stay”
visual. The investigator explained to the PB that “Playing together means we should play with the *same* toys.” Once the PB showed good understanding of this concept, then the investigator said, as in the previous session, “Ok let’s practice!” and pretended to be the TC. The investigator prompted the TC if necessary with phrases like, “are you playing with the *same* or *different* toys?” Or, “uh oh, (TC’s name) doesn’t have the same toy as you, what should you do? Always make sure (TC’s name) has the *same* toy to play with so everyone can play together”. The investigator closed this session by confirming understanding of the concepts with questions like, “So what do you need to do to be a good buddy?”, (pointing to the pictures) “What do these pictures mean?”, or , “Once you have *Stayed* with your buddy, what should you do next?”.

**Pre-training session 3.** Finally, in the third pre-training session, the investigator taught the PB the “Talk” concept. This session began with a quick review and role play of the “Stay” and “Play” concepts, and then the investigator explained to the PB that there was one final job that he needed to do in order to be a good buddy. The last thing the PB would need to do after *Staying* and *Playing* with his buddy is to “*Talk*” to his buddy. The investigator explained to the PB that he could talk about what he (PB) was playing with, what he was doing, or what the TC was doing. The investigator explained to the PB that it was important to remember that his job was to talk to his TC, and not the investigator. The investigator then used toys the PB had previously shown interest in to model descriptive talking concerning the toys and actions of the PB. The investigator prompted the PB by saying phrases like, “Let’s pretend you are going to tell (TC’s name)” how to play with this toy/game, what could you tell him?”. The investigator also encouraged the PB to “use your talking to pretend”. The clinician guided the PB to use assign roles and use symbolic substitutions in his play.
**Intervention Sessions**

Once pre-training sessions were complete, the intervention phase began. The intervention phase included 16 intervention sessions, followed by two generalization probes for each pair several months after the intervention. Prior to bringing both children together, the investigator met with the PB for about 5 minutes individually before each session. Once the PB entered the room, the investigator would ask the PB, “Hey, tell me what those three things are that you need to do in order to be a good buddy for (TC’s name).” All PB’s remembered the concepts well and rarely required any assistance with this review. If necessary, the investigator referred to the visual prompts. The investigator then encouraged the PB to choose several activities he would like to play with for the session. The investigator then guided the PB in a short role play or conversation about how these toys could be used to “teach (TC’s name) new ways to play or talk.” Then, the investigator told the PB, “It’s time to go get (TC’s name) to play!” and opened the door so the PB could ask the TC to come play with him. Early in the intervention the investigator prompted the PB to request that the TC come and play with him, but all PB children in the study quickly learned this routine and would go ask the TC to come and play independently. The TC participants always came immediately into the therapy room to play with the PB (typically running in with great enthusiasm). Once both children were in the room, the PB used the Stay, Play, Talk strategies to interact with the TC. The investigator prompted the PB when necessary as described below.
Adult Prompting

Adult prompting was limited by PMI strategies (Odom & Watts, 1991). However, adult prompting was utilized to remind the typical peer to use the *Stay, Play, Talk* (Goldsten, 1997) strategies. Prompts were either visual (gesturing towards one of the posted pictures), verbal, or combined, (visual and verbal). If no social interaction had occurred for 30 seconds, the investigator could prompt as described in the examples below.

Stay prompt:

1. If the TC and PB have not been in close proximity for 30 seconds, then the investigator would prompt the PB to “go stay with (TC’s name).

Play prompt:

2. If the TC and PB were staying together, but not playing together, then the investigator would prompt the PB with a phrase like, “are you playing with the *same* toys? Make sure you play *together*”.

Talk prompt:

3. If the TC and PB were staying and playing together, but had not talked to each other in 30 seconds, than the investigator prompted with a verbal model for the activity, or simply, “keep talking to (TC’s name).

As a reward at the end of each session, the investigator handed a roll of stickers to the PB. The PB was taught to ask the TC which sticker he would like and to get the sticker off of the role for the TC. One PB, (PB1) even independently taught his TC how to ask him for a sticker, and peeled the sticker up halfway to help the TC get the sticker off to give to him.
**Coding**

Frequency of social interactions was tracked using a coding scheme similar to the chart used by English et al. (1997). In order to be coded, all behaviors were required to be judged as intentional for the purposes of initiating or responding to a bid for joint attention or social interaction with a peer. Social *Initiations* represent a bid or request for a social interaction. Examples of social initiations could include asking a peer to play with an activity, (“hey, do you want to play with Connect 4?”) or bringing attention to an activity (“hey, look at this!”). Social *responses* represent behaviors that respond to a social initiation. At the most basic level, a response indicates that a participant engages in an activity that he was asked to play with by his peer. At a more sophisticated level, a response would represent a verbal comment responding to the initiation of a new activity.

Social interactions directed towards the investigator were not coded. Social initiations and responses of the TC and PB were coded and then further detailed using an operational 3 tier coding system developed by the principal investigator. This system involved 3 levels describing communicative behaviors from least to most sophisticated. Level 1 initiations/responses signaled non-coordinated gestures, while level 2 initiations/responses described coordinated gestures, and level 3 initiations/responses described verbalizations. Adult prompts were also coded. Three types of Adult Prompts were differentiated in coding: visual (board maker pictures hung on the walls representing the strategies), verbal prompts, or a combination of visual and verbal prompts. Coding of initiations, responses, and adult prompts are further outlined in the coding manual found in Appendix B.
Reliability coding. The investigator coded all intervention videos. Two reliability coders, another graduate student and a senior undergraduate student, were trained to use the 3 tier system developed by the investigator to code initiations, responses, and adult prompts. During training, the investigator met with the reliability coders to teach and practice the coding definitions. The investigator showed video clips from the intervention videos that showed examples of coded behaviors. Then, the investigator used toys from the interventions to demonstrate various types of social interactions. Coders then coded these videos and role play examples, and discussed any discrepancies with the investigator. Reliabilities coders completed training by reaching 80% or greater reliability on 5 videos. Reliability coders coded 20% of intervention videos, reaching 80% or greater reliability with the investigator.

Pilot Study

A pilot study including a 4-year old boy with ASD and a 5 year old typically developing girl was performed several months prior to the intervention. The pilot study included three baseline sessions, 3 pre-training sessions with the PB and the investigator, and 6 intervention sessions. Increases in total social interactions were noted during the intervention. Several important lessons were learned from the pilot study. It is interesting to note that some activities produced many more social interactions than others. In fact, even in spite of the gender difference with this pair, common interests and play themes occurred throughout the intervention. These common interests and themes resulted in the most social interactions. Both children had a strong interest in the television show “Olivia” and the use of an “Olivia” doll produced many social interactions. The child with ASD often imitated the PB’s utterances regarding Olivia, and even produced novel utterances for the purpose of pretending (by role play) with the PB. Another interesting lesson learned from the pilot study was recognition of the PB’s seemingly natural ability to transition the TC’s repetitive behaviors into more functional
and social behaviors, even without prompt from the clinician. For example, a tub of rice (used in a sensory activity) was of special interest to the TC. The TC repetitively picked up and watched pieces of dry rice fall over and over. Without prompt, the PB picked up some rice and dropped it over a toy barn, saying, “Oh no! It’s snowing! It’s snowing!” The TC then responded with, “Quick put the animals inside so they don’t get cold!” The TC and PB proceeded to take conversational turns while using the toys appropriately, engaging in pretend play for 10 minutes.

This example affirmed the author’s intentions of using a Child Interest Survey (Appendix A), to determine the interests of the pairs and match them based on these interests. In their peer mediated intervention with middle school aged children, Koegel et al., (2012) found increases in social interactions when the ritualistic interests of the children with ASD were incorporated. No doubt, it appears that some typically developing children may have natural skill sets that help them change the repetitive behaviors of their peers with ASD into something more functional and appropriate. Another important lesson learned from the pilot study was in regards to selection of the peer buddy. Although the child selected for the pilot study had incredible language and play skills, it was noted that she sometimes became caught up in her own agenda for her pretend play, and lacked the flexibility to transition to other activities and follow the TC’s lead, which is required in order to stay in close proximity to the TC. In considering PBs for the intervention, it was then decided that classroom observations would be done before choosing the PBs, as well as consult with the classroom teacher to determine which children were able to follow adult instruction and the ideas of other children well.
3: Results

**Early Communicative Index (ECI)**

ECI pre and post intervention scores are presented by dyad indicating changes as broken down by levels of gestures, vocalizations, words, and multiple words. Total communication, calculated by summation of total gestures, vocalizations, words, and multiple words per 6 minute sample improved for all participants, with most dramatic improvements for Dyad 3. All target children showed increases towards more sophisticated levels of communication, using more vocalizations and words than gestures in all cases. A summarization of total ECI scores for all three dyads is outlined in Tables 2, 3, and 4 below.

*Table 2*

*Summary of Pre and Post Total ECI Scores Dyad 1*

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Summation
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**Social Interactions**

Total social interactions, combined initiations and responses, (English et al., 2007), increased for all participants. Total social interactions for target children and peer buddies are outlined in Figures 1 and 2 below.
Figure 1
Figure 2
Hypothesis 1: Target Children

**Initiations target child 1.** TC1’s social initiations were variable throughout the intervention. At the lowest point in the intervention phase, TC1 produced a total of 1 initiation within 15 minutes, and at the highest point, TC1 produced a total of 14 initiations within 15 minutes. Factors contributing to this range are examined in the discussion section of this paper. TC1’s initiations were characterized mostly by a combination of coordinated gestures and words (scored as levels 2 and 3 according to the author’s coding manual).

**Initiations target child 2.** TC2’s social initiations were variable throughout the intervention. At the lowest point in the intervention phase, TC2 produced a total of 1 initiation within 15 minutes, while at the highest point TC2 produced a total of 12 initiations within 15 minutes. TC2’s initiations were mostly characterized by words (scored as a level 3 in the author’s coding scheme).

**Initiations target child 3.** TC3’s social initiations were variable, ranging between 1 and 3 initiations for a 15 minute segment throughout the intervention. TC3’s social initiations were characterized by mostly non-coordinated and coordinated gestures (levels 1 and 2 according to the author’s coding scheme). Target children social initiations are outlined in Figure 3 below.
Figure 3

![Graph showing TC1, TC2, and TC3 Total Initiations over Baseline, Intervention, and 3mF/U periods.](image)
Responses target child 1. The social responses of TC1 improved throughout the intervention. At the lowest point during the intervention, TC1 produced a total of 2 responses within 15 minutes, and at the highest point in the intervention, TC1 produced a total of 24 responses within 15 minutes. TC1’s responses were characterized mostly by coordinated gestures and words (scored as levels 2 and 3 according to the author’s coding manual).

Responses target child 2. TC2’s social responses improved throughout the intervention. At the beginning of the intervention TC2 reached a total of 11 responses within 15 minutes, while at the end of the intervention he reached a total of 33 responses within 15 minutes. TC2’s responses were also mostly characterized by words (scored as a level 3 in the author’s coding scheme).

Responses target child 3. TC3’s responses improved throughout the duration of the intervention. At the beginning of the intervention, TC3 produced between 14 and 34 responses in 15 minutes during intervention sessions, compared to 1 to 6 responses in 15 minutes during baseline sessions. TC3’s level of communication also improved during the intervention. During baseline, TC3’s responses were mostly characterized by non-coordinated gestures, (level 1), while during intervention phase TC3’s responses were characterized by mostly words (level 3). For example, during baseline sessions, TC3 produced a total of between only 2 to 5 level 3 responses within 15 minutes, while during intervention phase TC3 produced up to a total of 25 level 3 responses within 15 minutes. Social responses for target children are outlined in Figure 4 below.
Figure 4

TC 1 Total Responses

Baseline  Intervention  3mF/U

TC 2 Total Responses

TC 3 Total Responses
Hypothesis 1: Peer Buddies

Initiations peer buddy 1. The social initiations of PB1 improved during the intervention, remaining above baseline sessions. At the lowest point, PB1 produced no initiations. PB1 reached a total of 21 initiations in 15 minutes by the end of the intervention. PB1’s initiations were characterized mostly by words (scored as level 3 according to the author’s coding manual).

Initiations Peer Buddy 2. The social initiations of PB2 were also variable throughout the intervention. At the lowest point, PB2 produced a total of 1 initiation within 15 minutes, while at the highest point in the intervention PB2 produced a total of 19 initiations within 15 minutes. PB2’s initiations were also mostly characterized by words (scored as a level 3 in the author’s coding manual).

Initiations Peer Buddy 3. PB3’s initiations were variable throughout the intervention. At the lowest point, PB3 produced a total of 1 initiation, while at the highest point PB3 produced a total of 4 initiations. PB3’s initiations were characterized mostly by words (level 3 according to the author’s coding scheme). Peer buddy social initiations are outlined in Figure 5 below.
Figure 5

Baseline | Intervention | 3mF/U

PB1 Total Initiations

PB2 Total Initiations

PB3 Total Initiations
**Responses peer buddy 1.** The social responses of PB1 also improved throughout the intervention. As the lowest point during the intervention, PB1 produced a total of 1 response within 15 minutes, while reaching up to a total of 21 responses within 15 minutes by the end of the intervention. PB1’s social responses were mostly characterized by words (scored as level 3 according to the author’s coding manual).

**Responses peer buddy 2.** PB2’s social responses also improved throughout the intervention. At the beginning of the intervention PB2 reached a total of 3 responses within 15 minutes, while towards the end of the intervention reaching a total of 33 responses within 15 minutes. PB2’s social responses were also characterized by mostly words (scored as level 3 according to the author’s coding scheme).

**Responses peer buddy 3.** Although variable, PB3’s total responses during the intervention phase of the study improved above baseline. For example, during baseline sessions PB3’s total responses ranged from 1 to 10 in 15 minutes. During intervention phase, PB3’s total responses ranged from 11 to 33 in 15 minutes, with responses staying above 15 in the majority of the sessions. The majority of PB3’s responses were characterized by words (level 3 according to the author’s coding scheme). Social responses for peer buddies are outlined in Figure 6 below.
Figure 6

![Graph showing baseline, intervention, and 3mF/U responses for PB1, PB2, and PB3. The graph displays the total responses over time with clear trends.]
Reciprocal Interactions. For the following figures, the TC’s total number of social initiations and social responses were combined, as were the PB’s total number of initiations and responses. These composites are charted on Figures 7 to demonstrate the reciprocal nature of communication among children within each dyad. As the figure illustrates, for the most part, the TCs’ social communication patterns mirrored the PBs’ social communication, indicating reciprocal communication within the dyads.
Figure 7

Baseline

Intervention

PB1 Total SI
TC1 Total SI

PB2 Total SI
TC2 Total SI

PB3 Total SI
TC3 Total SI
Follow up sessions. Three months post intervention, intervention dyads participated in follow-up sessions. Dyads 1 and 2 participated in two follow-up sessions: one with their matched peer and one with a different trained peer. Dyad 3 only participated in one follow-up session with his matched peer. The follow up sessions were 15 minutes long and were modeled after the baseline sessions in this study in that toys were available and no prompting occurred. Toys selected during baseline were used for these sessions rather than the high interest toys and activities indicated by parents of the participants on the Child Interest Survey. Data was similar to baseline sessions, indicating that this age group of PBs may require adult prompts and/or more frequent exposure to maintain use of the Stay Play Talk strategies. It could also be possible that the decreased frequency of the intervention from Goldstein’s (1997) across the day model contributed to less carryover of learned strategies. A lower frequency of initiations and responses in these sessions may also be due to unfamiliarity and novelty of toys presented in the follow-up sessions. That is, toys indicated as specific interest to both children were not available.

Hypothesis 2: Adult Prompts

Adult Prompts for PB1 and PB2 were variable throughout the intervention. Adult prompts decreased for PB3 throughout the intervention. Adult prompts are outlined in Figure 8 below.
Figure 8

PB1 Adult Prompts

PB2 Adult Prompts

PB3 Adult Prompts
Hypothesis 3: Topics

The average number of back and forth reciprocal interactions per topic increased throughout the intervention. Reciprocal interactions represent behaviors that are contingent upon an accompanying response. Thus, one reciprocal interaction represents an *initiation* coupled with an accompanying *response*, or a *response* coupled with another *response* between the members of the dyad. The average number of these back and forth interactions increased dramatically for Dyad 3. Baseline and Intervention average numbers of reciprocal responses per topic are outlined in Table 5 below.

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<td>Dyad 3</td>
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</table>

Table 5

*Average Number of Reciprocal Interactions Per Topic*

Reciprocal Interactions
Early Communicative Index (ECI)

Pretreatment ECI scores appeared to indicate three levels of communication among the three TCs. Before treatment, TC1 used a combination of gestures and words, TC2 used mostly words more than gestures, while TC3 used gestures and vocalizations, with no words in his speech production. Post measures indicate increases in total communication for all participants, with most dramatic increases for TC3. One limitation of the ECI is that it does not measure utterance length. It was observed that TC1 and TC2 increased their utterance length during the intervention, but since utterance length is not a measure of the ECI, pre and post ECI measures for these two participants appear less dramatic as compared to their increases in social interactions as measured by the author’s coding manual. The PBs appeared to have similar increases in utterance length and possibly in language complexity. Mean Length of Utterance, Type Token Ratio, and other options for language sampling should be considered as future measures for all participants to examine possible effects on utterance length and language complexity resulting from the intervention. TC3’s ECI scores indicate dramatic changes in his communication. Pre intervention measures for TC3 indicate that he was not using any words, while post intervention measures reveal not only use of single words, but use of multiple word combinations.
Hypothesis 1: Initiations and Responses

The current study hypothesized that *Stay Play Talk* strategies would increase social initiations and responses in 3 young children with ASD. Increases in total initiations for target children were not observed. This supports current literature that children with ASD have even lower social initiations than they do responses (McConnel, 2006). However, increases in social responses above baselines were observed. Further analyses of *Topics* and selection of stimuli are thought to explain why *initiations* were variable for target children during the intervention, and why *responses* increased. It was observed that as increases in reciprocal interactions occurred, less opportunity for *social initiations* became available. Rather than transitioning to different topics and thus creating new initiations, it was observed that the children maintained increases in reciprocal interactions (often manifested as multiple back and forth *responses*). Thus, rather than creating multiple new social interactions for new topics, it was observed that the participants expanded their social interactions within each topic as the treatment progressed. Expansion of these topics into multiple back and forth responses often resulted in the development of reoccurring play themes unique to each pair. It is also interesting to note that more interactions occurred around topics that both children found interesting on the Child Interest Survey. For example, Dyad 3 enjoyed racing cars, and demonstrated multiple reciprocal interactions that evolved into a theme of going to a NASCAR race. Participants even took turns role playing as various drivers or fans. In another example, Dyad 2 used multiple reciprocal interactions centered on a Batman play theme. The children often took turns playing different roles (Batman or Joker); even expanding this interaction into pretending that one character had been captured, and needed saving by the other character. These examples demonstrate that *Stay Play Talk* may be applicable to the development of pretend play skills. As mentioned above, it is also perhaps
these play themes that resulted in low carryover of social interactions during follow up sessions. It appeared that the high interest toys used during intervention phase of the study became themes that each member of the dyad associated his friendship with. Although not memorized scripts, the reoccurring themes associated with social interactions throughout the intervention were possibly learned routines for both children. It is important to consider that when this factor was removed for follow up sessions, familiarity of learned play routines could have decreased, thus reducing social interactions.

**Hypothesis 2: Adult Prompts**

Adult prompts decreased overall throughout the duration of the intervention, indicating that PBs became less reliant on adult instruction and more confident and independent in utilizing Stay Play Talk strategies (English et al., 2007). For all three PBs, more reliance on verbal and combined verbal and picture prompts were required than reliance on picture prompts alone. Although still faded as the treatment progressed, these results indicate that verbal prompts are the most effective type of prompt creating social interactions using Stay Play Talk strategies for this age group. Variability in adult prompts is contributed to factors related to the behaviors of the TCs. For example, if a TC demonstrated behaviors that resulted in difficulty engaging with the PB, such as repetitive behaviors with objects, extra prompting or encouragement from the clinician to help the PB persist beyond these challenges may have been required.

**Hypothesis 3: Topics**

As it became apparent that the treatment yielded increases in reciprocal communication within topics, it also became apparent that some stimuli used in the study yielded more social interactions than others. For example, introduction of novel toys, toys and activities that involved movement or music, and toys that were often used by the TCs in baseline for repetitive
behaviors always produced more social interactions. As was the case with the pilot study, once taught the Stay Play Talk strategies, the PBs were all able to transfer the repetitive behaviors with objects of their TC into something more functional and socially appropriate. When this happened, the most social interactions occurred. Toys involving movement such as a “ball machine” that shoots balls out of a tube produced many interactions. In addition, toys that offered more opportunities for turn taking, such as Connect 4, produced higher social interactions. It is uncertain whether it is the nature of these toys that are associated with higher levels of social interactions, or the simple fact that these toys were enjoyed by both members of the dyad as indicated by the Child Interest Survey.

**Clinical Implications**

From using Stay Play Talk with children under 4, it was learned that even young children can effectively implement peer mediated intervention strategies. In addition, it appeared that the PBs all demonstrated an innate desire and ability at this age to transfer repetitive or inappropriate behaviors of the TCs into play skills that were more interactive and functional. Although some toys appeared to be more conducive to social interactions, it was observed that toys that were of high interest to both children produced the most interactions, and these were unique to each dyad. Thus, the importance of choosing materials that are of high personal interest to each child should not be undermined in clinical practice.

**Limitations**

Limitations of the study included inconsistent attendance for a design modeled after “play dates.” This factor could be removed by using this intervention as a part of home visits with siblings as peer buddies, or as a part of a day care program. Another limitation includes the setting of the study. Although toys were used of special interest to the children to increase
naturalness and carryover, the intervention did not occur in the most natural environment possible such as at home or in a day care.

**Future Directions**

Future directions of Stay Play Talk intervention with this age group could be expanding the target of the intervention to the development of pretend play skills or play themes. It would also be of interest to code repetitive behaviors to quantitatively determine if influence from the PBs strategies did in fact reduce repetitive behaviors as a result of the intervention. Language measures of TCs and PBs that include length of utterance or SALT analyses could be used in future Stay Play Talk studies to determine if length of utterance or other aspects of language complexity improved as a result of Stay Play Talk intervention. In addition, further analyses and measures of the benefits of Stay Play Talk on PBs could be performed. Most notably, it was observed that PBs moved from less altruistic attitudes to more empathetic and relational qualities towards their TCs.
5: Conclusion

In conclusion, *Stay Play Talk* peer mediated intervention shows promise as a reliable intervention for young children with ASD that can be delivered within a natural environment within a typical “play date” with familiar peers or even siblings. All participants showed increases in overall social interactions, as well as reciprocal interaction skills that were not intentionally targeted through the intervention. Gains in responses surpassed initiations, which is consistent with previous literature indicating that children with ASD respond to communication more than initiate. All children enjoyed the intervention, consistently entering the therapy room with great enthusiasm and excitement. PB teachers and parents noted increases in the PBs’ empathy towards other students in their preschool classes. PB3’s teacher noted that she saw increases in PB3’s ability to “be patient, share and put others first.” PB2’s teacher noted that PB2 became “more mature and responsible” after completing the intervention, and that he began asking her if he could help her “do jobs” like put out snack or distribute toys to other preschool classmates. Perhaps most striking were the statements made by parents of TC throughout the intervention. One parent commented, “I never knew he could play with another child in a normal way until now.” Another parent reported, “This is (TC’s) first friend. He talks about him all the time, anytime we drive anywhere close to the autism clinic he begins asking for his *best* buddy.”
References


Appendix A

Child Interest Survey

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<tr>
<td>Singing</td>
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<tr>
<td>Dancing</td>
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Appendix B

Glossary of Terms

**Peer Buddy (PB):** The typically developing participant

**Target child (TC):** The participant with ASD

**Toys:** The objects that either participant is playing with at a given time.

**Topic:** *Topics* are defined as a common set of toy(s) or topics of conversation that social interactions are centered around. An initiation signals a new topic.

**Initiation:** the use of gestures and/or vocalizations that are directed and intended for the purpose of creating joint attention with a buddy. *Initiations* create interactions with a peer such as engagement with a toy. Sometimes this involves bringing toys to a peer and requesting that the peer play with him. Other times it involves going to the peer and creating social engagement by joining in with the toy the peer is playing with. Should you define joint attention and intentional interaction?

- If 30 seconds have passed since the last *Initiation* or *Response*, the next intentional interaction will be considered an *Initiation* even if the interaction that occurs involves the same activities/toys.

- When a peer joins in on a stand-alone toy (such as the Batcave, racetrack, or traintrack), that the other peer is playing with, this is coded as an initiation, regardless of which section/part of the toy that the peer engages in. However, if two peers are playing with the same stand-alone toy, but are engaged on clearly different aspects/parts of that same toy, than the behaviors will not be counted social interactions.

**Response:** the use of gestures and/or vocalizations that are directed and intended for the purpose of responding to an *initiation* for joint attention with a buddy.
- Responses must be a result of the initiation, they are in causal relationship.
- If two responses occur at the same time each is counted as a response.
- Reciprocal responses represent back and forth comments regarding the same topic.

**Social Interactions**: used in this text to refer to either an *initiation* or *response* (or collectively) for the purpose of a social interaction.

- Addressing a buddy by his name is always a social interaction.
- Social Interactions must be clearly directed to the buddy or the buddy’s toys.

**Shared affect**: emotional actions such as giggling/laughing or dancing/jumping excitedly.

**Unintelligible**: If the coder listens to an utterance 3 times and the utterance is not clearly understood, than the utterance should be considered unintelligible.
Appendix C

Coding Manual

The investigator and reliability coder coded the following as outlined below.

1.) Target Child: social initiations or social responses (in the form of gestures and/or verbal productions).

2.) Peer Buddy: social initiations or social responses (in the form of gestures and/or verbal production).

Behaviors that were not clearly intended for the purpose of social interaction that were clearly directed towards the investigator were not coded.

It was required that Initiations and Responses be clearly directed towards a buddy and be consistent with either with Type I or Type II as outlined in table 1 below.

Table 1
Type I and Type II Initiations and Responses

<table>
<thead>
<tr>
<th>Types</th>
<th>Initiations</th>
<th>Responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type I: Object Focused</td>
<td>Communication behaviors that are clearly directed with the purpose of bringing attention to an object.</td>
<td>Communication behaviors that are clearly directed with the purpose of giving attention towards the object that the Type I Initiation attempted to bring attention to.</td>
</tr>
<tr>
<td>Type II: Attention Seeking</td>
<td>Communication behaviors that are clearly directed for the purpose of gaining attention from the buddy.</td>
<td>Communication behaviors that are clearly directed with the purpose of giving attention towards the buddy who performed the Type II Initiation.</td>
</tr>
</tbody>
</table>

Type I and Type II Initiations may occur in isolation without a corresponding response, but responses are dependent upon an initiation and may not occur in isolation. Initiations and Responses were coded contingently within the context of Topics. Once it has been determined that an action would be coded as a Type I or Type II initiation or response, the initiation or
response received a score of 1,2 or 3, with 3 being the most sophisticated mode of communication. This 3-point scale is outlined in Table 2 below:

**Table 2**
*Definitions of Communication Levels*

<table>
<thead>
<tr>
<th>Levels</th>
<th>Level 1</th>
<th>Level 2</th>
<th>Level 3</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Description</strong></td>
<td><strong>Uncoordinated Gesture</strong></td>
<td><strong>Coordinated Gesture</strong></td>
<td><strong>Word(s)/word approximations</strong></td>
</tr>
<tr>
<td><strong>Definition</strong></td>
<td>A gesture without a gaze shift, affect, or verbalization towards the buddy. May involve the presence or absence of an unintelligible vocalization.</td>
<td>A gesture paired with a gaze shift, shared affect, or vocalization oriented towards the buddy.</td>
<td>A word or word approximation directed towards the buddy. May or may not be paired with a gesture or orientation. Word approximations must be clearly understood as approximating adult form within the play context,</td>
</tr>
<tr>
<td><strong>Additional Criteria</strong></td>
<td>Orientation: If a buddy faces his body towards his peer he is considered oriented, even if his peer turns away when this happens. Engaging in an activity with orientation towards a buddy is considered a level 2 social interaction. <strong>Unconventional gestures:</strong> Not all gestures are required to be conventional, such as pointing, reaching, etc. A physical movement directed towards a buddy, such as jumping after told “hey, let’s jump!” is considered a level 2 response.</td>
<td></td>
<td>Sound effects: meaningful sound effects (such as animal noises) are considered words. <strong>Exclamations:</strong> words or short phrases like, “whoa!” or “uh oh!” are considered word(s). <strong>Multiple levels:</strong> in scenarios where a word(s) follows a coordinated gesture (or vice versa) within a 30 second window and no other interactions have occurred, the behavior is counted once with the highest level that occurred.</td>
</tr>
<tr>
<td>Types</td>
<td>Level 1</td>
<td>Level 2</td>
<td>Level 3</td>
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<tr>
<td><strong>Type I</strong></td>
<td>The TC initiates an interaction with his peer by pushing a button on a toy that makes noise, without an orientation towards the peer but with the clear purpose of bringing attention to the common object.</td>
<td>The TC initiates an interaction with his peer by handing him a racecar while looking at him.</td>
<td>The peer verbally initiates an interaction by saying to the TC, “What are you looking for?” or, “Let’s play racecars.”</td>
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<tr>
<td><strong>Initiation</strong></td>
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<tr>
<td><strong>Response</strong></td>
<td>The PB taps on the TC’s arm without looking at the TC, but with the clear purpose of gaining attention from the TC.</td>
<td>The TC waves and looks towards the PB.</td>
<td>The PB says to the TC, “Hey! Look at this!”</td>
</tr>
<tr>
<td><strong>Type II</strong></td>
<td>The TC responds to the PB’s initiation, “Play Thomas?” by putting a Thomas Train on the toy train track without an orientation towards the PB.</td>
<td>The TC responds to the PB’s initiation, “Let’s play batcave” by manipulating a batman toy on the Batcave toy set coupled with orientation towards the PB.</td>
<td>The TC responds to the PB’s initiation, “What are you looking for?” by saying, “I am looking for batman.”</td>
</tr>
<tr>
<td><strong>Initiation</strong></td>
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<td></td>
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<tr>
<td><strong>Response</strong></td>
<td>The PB responds to the TC’s initiation for gaining attention, “Look at this!” by grabbing the object the TC is bringing attention to, but without orientation.</td>
<td>The PB responds to the TC’s initiation for gaining attention, “Hey, look!” by looking towards the TC and reaching towards the TC.</td>
<td>The PB responds to the TC’s verbal initiation for gaining attention, “Look!” by responding with, “That’s a ball!”</td>
</tr>
<tr>
<td><strong>Type II</strong></td>
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<td><strong>Response</strong></td>
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2. The Investigator and reliability coders also coded adult prompts. Adult prompts were only addressed towards the PB. Adult prompts could be either a picture prompt, a verbal prompt, or a combination of a picture prompt and a verbal prompt.

a.) Picture Prompts: The investigator points to one of the three Stay, Play, Talk picture cues hanging on the 4 walls in the room. The investigator is permitted to say, “(PB’s name) look!” in order to bring attention to the visual.

b.) Verbal Prompts: Verbal prompts remind the PB to use the Stay, Play, Talk concepts through verbal reminders such as, “Go Stay with your buddy, make sure we are playing together,” or “Tell (TC) about that!”. Verbal prompts could also involve suggestions to the PB for pretend play ideas or modeling of descriptive talking.

- Verbal prompts are counted as a “stream of speech,” meaning that if the clinician prompts using several sentences or repeats a phrase several times in one stream of speech than the prompt is still only counted as 1 prompt. However, if the adult prompts the PB and 30 seconds passes from the end of the last prompt with no interaction, than the next prompt will be counted as an additional prompt. Greater than 30 seconds breaks this “stream of speech.”

- If the PB asks for clarification about a prompt from the adult than the adult’s response to this question/comment is still coded as 1 prompt. However, if the PB produces an initiation or response to the TC after an adult prompt and then asks for clarification for an adult prompt, than the adult’s the adult’s response would be counted as an additional prompt.

c.) Combined: The investigator gives a verbal prompt, (“Hey (PB) make sure you Stay with (TC))” and points to one of the three Stay, Play, Talk visual cues.
• Environmental arrangement, (moving toys around such that it is easier for the participants to notice the toys, etc.), do not count as adult prompts.

• Compliments like “good job” (or any positive reinforcement like “you’re being a good buddy”) towards the peer or the TC do not count as adult prompts.
August 15, 2012

Angela Barber, Ph.D.
Department of Communicative Disorders
College of Arts & Sciences
The University of Alabama

Re: IRB Protocol # 11-013-ME-R1
“The Effects of Peer Mediated Play Intervention on the Communication and Repetitive Play of Young Children with Autism Spectrum Disorders”

Dr. Barber:

The University of Alabama Medical IRB recently met to consider your renewal application. The IRB voted to approve your protocol for a period of one year.

Your application will expire on August 9, 2013. You will receive a notice of the expiration date 90 days in advance. If your research will continue beyond this date, complete the renewal portions of the FORM: IRB Renewal Application. If you need to modify the study, please submit FORM: Modification of An Approved Protocol. Changes in this study cannot be initiated without IRB approval, except when necessary to eliminate apparent immediate hazards to participants. When the study closes, please complete the FORM: Request for Study Closure.

Please use reproductions of the IRB approved stamped consent form to obtain consent from your participants.

Should you need to submit any further correspondence regarding this application, please include the above application number.

Good luck with your research.

Sincerely,

John C. Higginbotham, Ph.D., MPH
Medical IRB Chair
The University of Alabama
IRB Project #: 11-913-ME-R

UNIVERSITY OF ALABAMA
INSTITUTIONAL REVIEW BOARD FOR THE PROTECTION OF HUMAN SUBJECTS
REQUEST FOR APPROVAL OF RESEARCH INVOLVING HUMAN SUBJECTS

I. Identifying Information

<table>
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<tr>
<th>Principal Investigator</th>
<th>Second Investigator</th>
<th>Third Investigator</th>
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<tbody>
<tr>
<td>Names:</td>
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</tr>
<tr>
<td>Angela Barber</td>
<td>Rachel Saffo</td>
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<tr>
<td><a href="mailto:aberber@bama.ua.edu">aberber@bama.ua.edu</a></td>
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Title of Research Project: The Effects of Peer Mediated Play Intervention on the Communication and Repetitive Play of Young Children with Autism Spectrum Disorder

Date Submitted: 7/24/12
Funding Source: None

Type of Proposal: [ ] New [ ] Revision [ ] Renewal [ ] Completed [ ] Exempt
Please attach a renewal application
Please attach a continuing review of studies form
Please enter the internal IRB #: on the top of the page

UA faculty or staff member signature:

II. NOTIFICATION OF IRB ACTION (to be completed by IRB):

Type of Review: [ ] Full board [ ] Expedited

IRB Action:
[ ] Rejected Date: __________
[ ] Tabled Pending Revisions Date: __________
[ ] Approved Pending Revisions Date: __________
[ ] Approved-this proposal complies with University and federal regulations for the protection of human subjects.

Approval is effective until the following date: 8/9/13

Informs approved: [ ] Research protocol (dated __________)
[ ] Informed consent (dated __________)
[ ] Recruitment materials (dated __________)
[ ] Other (dated __________)

Approval signature: ___________________ Date: __________
The Effects of Peer Mediated Play Intervention on the Communication and Repetitive Play of Young Children with Autism Spectrum Disorder

Parent Consent for Children with Typical Development

You and your child are being invited to participate in a research study being conducted by Dr. Angie Barber, an assistant professor in the UA Department of Communicative Disorders.

What is this study about?
The primary goal of this study is to see whether a peer buddy treatment called Stay Play Talk will increase communication and play skills in young children with Autism Spectrum Disorder (ASD). A peer buddy will play with a child with ASD to help improve his or her social and communication skills.

Why is this study important- What good will the results do?
Recent studies have shown that peer buddy treatments help autism symptoms (Chan et al., 2009), though no studies have looked at the effects of peer buddies on autism symptoms in children under 4. The current study would help us understand the effects of peer buddies on young children with ASD.

Why has my child been asked to take part in this study?
Your child has been asked to take part because he/she does not have a developmental delay and is 3 years old.

How many other people will be in this study?
Eight children with ASD and 8 peer buddies will be asked to take part in the study.

What will my child and I be asked to do in this study?
- First, your child will receive a brief language screener to measure his language understanding and use.
- Second, you will be asked to complete a child interest study, which will help us choose toys and materials your child enjoys and will help us match your child to a child with ASD who has similar interests.
- Third, your child will be “matched” to child with ASD based on gender and similar interests.
- Fourth, your child will receive a 5-10 minute training to learn the Stay Play Talk treatment and will be given pictures to take home to remind him or her about the study.
- Finally, you will be asked to take part in bi weekly play sessions for 8 weeks during which your child and his peer buddy will simply play together. Each
session will be videoed so that eye gaze and communication skills of the child with ASD can be coded.

- You may observe all of the play sessions from inside the preschool room at the UA Speech and Hearing Center or through a two-way mirror.

**How much time will it take to complete this study?**
The Language Screener will take about 10 minutes to complete and will be completed before and after the treatment occurs. The Stay Play Talk training will take about 10 minutes. Each treatment session will last 20 minutes and will occur twice weekly for 8 weeks. This study will involve about 10 total hours of your and your child’s time.

**Where will the study take place?**
The UA Speech and Hearing Center Preschool classroom

**Will my child be compensated for being in this study?**
Your child will receive his/her choice of a bottle of bubbles or a container of play dough at the end of the study. You will receive a $50 gift card for completing in this study. You will receive the gift card even if you are unable to complete the intervention for an unforeseen reason.

**Will being in this study cost me anything?**
Participating in this study will not cost you any money.

**Can the researcher take my child out of this study?**
Your child will only be removed from the study if he seems upset by taking part or if you choose to remove him/her from the study yourself.

**What are the benefits that may happen to my child if he/she is in this study?**
We think that children with ASD will show an increase in communication while playing with his/her peer. However, no treatment gains are promised. Your child may also have fun playing with his “buddy.”

**What are the benefits to scientists or society?**
We hope that this study will show that children with ASD can learn communication and play skills from their peers. Results could help us to better understand the effects of early treatment in autism.

**What are the risks (dangers of harm) to my child if he/she is in this study?**
There are no expected risks for taking part in this study.

**How will my child’s privacy be protected? What will happen to the information the study keeps on my child?**
Identification numbers will be used in place of names so that all information on your child will be private. All study information and videotapes will be locked in a file.
cabinet. Unless you give permission for your child’s videotaped sessions to be used for educational purposes, the videotapes will be destroyed at the conclusion of the study.

**What are my child’s rights as a participant?**
Taking part in this study is your child’s free choice. You and your child may choose not to take part at all. If your child starts the study, he/she can stop at any time. Leaving the study will not result in any loss of any benefits you and your child would otherwise receive.

The University of Alabama Institutional Review Board (IRB) is the committee that protects the rights of people in research studies. The IRB may review study records from time to time to be sure that people in research studies are being treated fairly and that the study is being carried out as planned.

**What do I do if I have questions or problems?**
If you have questions about the study right now, please ask them. If you have questions about the study later on, please call Dr. Angie Barber at (205) 348-2010. If you have questions about your child’s rights as a person taking part in a research study, you may call Tanta Myles, the Research Compliance Officer at UA at (205) 348-8461 or toll-free at 1-877-820-3066.

You may also ask questions, make suggestions, or file complaints and concerns through the IRB Outreach website at [http://osp.ua.edu/site/PRCO_Welcome.html](http://osp.ua.edu/site/PRCO_Welcome.html) or email us at participantoutreach@bama.ua.edu.

After you participate, you are encouraged to complete the survey for research participants that is online at the outreach website or you may ask the investigator for a copy of it and mail it to the University Office for Research Compliance, Box 870127, 358 Rose Administration Building, Tuscaloosa, AL 35487-0127.

I have read this consent form. I have had a chance to ask questions. I agree to take part in it.

__________________________
Child’s Name

__________________________
Signature of Research Participant’s Parent/Guardian

__________________________
Date

__________________________
Investigator

__________________________
Date

Would you be interested in being contacted to participate in future research projects?

_____ Yes  _____ No

UNIVERSITY OF ALABAMA IRB
CONSENT FORM APPROVED: 8/25/12
EXPIRATION DATE: 8/24/13
The Effects of Peer Mediated Play Intervention on the Communication and Repetitive Play of Young Children with Autism Spectrum Disorder

Parent Consent for Children with ASD

You and your child are being invited to participate in a research study being conducted by Dr. Angie Barber, an assistant professor in the UA Department of Communicative Disorders.

What is this study about?
The primary goal of this study is to see whether a peer buddy treatment called Stay Play Talk will increase social skills in young children with Autism Spectrum Disorder (ASD). A child with typical development will play with a child with ASD to help improve his or her communication and social skills.

Why is this study important- What good will the results do?
Recent studies have shown that peer based treatments have helped to decrease autism symptoms (Chan et al., 2009), though no studies have looked at peer buddy treatments in children under 4. The current study would help us to better understand early treatment in young children with ASD.

Why has my child been asked to take part in this study?
Your child has been asked to take part because he/she has an ASD and is between the ages of 2 and 4.

How many other people will be in this study?
Eight children with ASD and 8 peer buddies will be asked to participate.

What will my child and I be asked to do in this study?
- First, your child will receive a test of his/her social and communication skills. As a part of this test, you will be asked some basic questions about your child.
- Second, you will be asked to complete a child interest survey on your child, which will help us choose toys and materials he/she likes for the intervention.
- Third, your child will be “matched” to a peer buddy based on gender and toy/play interests.
- Fourth, you will be asked to take part in bi-weekly play sessions for 8 weeks during which your child and his peer buddy will simply play together. The peer buddy will be taught how to “Stay with your friend, Play with your friend, and Talk to your friend.”
- You may watch all of the treatment sessions from inside the preschool room at the UA Speech and Hearing Center or through a two-way mirror.

UNIVERSITY OF ALABAMA IRB
CONSENT FORM APPROVED: 5/5/12
EXPIRATION DATE: 6/9/13
• Each session will be recorded so social and communication behaviors may be coded at a later time.

**How much time will it take to complete this study?**
The communication test will take 1 hour to complete and will be completed before and after the treatment occurs. Six, 20-minute observations of your child playing will be completed before the treatment begins. Each treatment session will last 20 minutes and will occur twice weekly for 8 weeks. This study will involve about 12 total hours of your and your child's time.

**Where will the study take place?**
The UA Speech and Hearing Center

**Will my child be compensated for being in this study?**
Your child will receive his/her choice of a bottle of bubbles or a jar of play dough at the completion of the study. You will receive a $50 gift card for completing this study. You will receive the gift card if you are unable to complete the entire study for an unforeseen reason.

**Will being in this study cost me anything?**
Participating in this study will not cost you any money.

**Can the researcher take my child out of the study?**
Your child will only be removed from the study if he seems upset by participating or if you choose to remove him/her from the study yourself.

**What are the benefits that may happen to my child if he/she is in this study?**
We think that children with ASD will show an increase in social and communication skills while playing with his/her peer. However, no these gains are not promised. Your child will also have a chance to play with a "peer buddy" twice weekly for 8 weeks.

**What are the benefits to scientists or society?**
We hope that this study will demonstrate that children with ASD can learn communication and play skills from their peers.

**What are the risks (dangers of harm) to my child if he/she is in this study?**
There are no expected risks associated with this study. However, your child's participation is voluntary and you may withdraw him/her from the study at any time. Your child will receive a reward whether or not he/she completes the entire study.

**How will my child's confidentiality (privacy) be protected? What will happen to the information the study keeps on my child?**
Numbers will be used in place of names for so all of your child's information will remain private. Videotapes and test scores will be locked in a file cabinet. Unless you give your
permission for researchers to keep videotapes of your child for educational purposes, the videotapes will be destroyed at the completion of the study.

What are my child’s rights as a participant?
Taking part in this is your child’s free choice. You and your child may choose not to take part at all. If your child starts the study, he/she can stop at any time. Leaving the study will not result in any penalty or loss of any benefits you and your child would otherwise receive.

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______________________________
Child’s Name

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Signature of Research Participant’s Parent/Guardian Date

______________________________
Investigator Date