Peer-mediated prompting to increase responding and compliance through the use of peer buddies for children with autism spectrum disorders

THESIS
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Abstract

The current study investigated whether pairing a typically developing peer (a peer buddy) with a child who has an ASD and providing individualized training to the peer buddy would increase responding and compliance from the child who has ASD (i.e. peer buddy system) in a summer camp setting. Also, a second purpose was to see if the typically developing peers were able to master and correctly implement the three step process taught during one-on-one training. Using a multiple baseline across participants design, the study examined the effects of one-one training on the fidelity of the peers’ implementation of the intervention, and the effects of the intervention on the responding from the children with an ASD. The peers were able to demonstrate high fidelity for (a) providing a clear instruction and (b) providing a prompt if needed, but they did not demonstrate high fidelity for (c) providing social praise. The responding from the children with an ASD improved after the peers received one-on-one training. This study extended the current literature on the importance of the fidelity of peers implementing the procedures, the necessary training for those peers to maintain good fidelity, and research that peer mediated interventions increase socially desirable response from children with ASD.
Dedicated to the children I work with every day.
Acknowledgments

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Finally, I would like to thank my family for their constant encouragement and support.
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Fields of Study

Major Field: Education
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CHAPTER 1

INTRODUCTION

Children with an autism spectrum disorder (ASD) have many deficits that impact their life. Language delays, gross and fine motor delays, and cognitive delays occur in children with ASD to name some of the difficulties associated with the disorder (Lovaas, Koegel, Simmons, & Long 1973). One of the biggest deficits is the lack of social and communication skills. Children with an ASD show a marked lack of socialization with peers, adults, and even members of their own family. The lack of socialization skills can have a significant impact on their life and well-being, and it can also make it difficult for these children to be taught new skills.

Typical children learn through observation and experience with their environment, and progress through stages of play (Bass & Mulick, 2007). Children on the spectrum have difficulties learning this way, and struggle with progressing through the stages of play. Children with ASD need direct and intensive teaching to learn new skills and maintain those skills (Cohen, Amerine-Dickens, & Smith, 2006; Eikeseth, Smith, Jahr, & Eldevik, 2002; Lovass, 1987). These intense treatments are based on the principles of Applied Behavior Analysis (i.e. Early Intensive Behavior Intervention).
These interventions are typically completed in the home environment and require many hours with a 1:1 behavior aide (Lovass, 1987). These interventions are quite effective at building new skills, but to build up the social skills of a child with an ASD, more interventions may be required.

There are many interventions dedicated to teaching social skills to children with ASD. One way to teach social skills is to teach in a group setting. Most group social skills trainings target specific, discrete behaviors to be taught during sessions (Koening, White, Pachler, Lau, Lewis, Lin, & Scahill 2010; Lopata, Thomeer, Volker, Nida, & Lee, 2008; Weiss & Harris, 2001). Examples of behaviors include greeting others, responding to others, and making eye contact. These are typically taught using a didactic format where an adult leads the discussion with the clients and completes role play activities. In some cases these skills are also discussed and taught to the parents of the children.

Frankel, Myatt, Sugar, Whitham, Gorospe, and Laugeson (2010) completed a study where group social skills training with a group of children with an ASD as well as the parents. Researchers found the children who received the Children’s Friendship Training (CFT), which was a manualized parent-assisted intervention, made significant improvement on the targeted skills at a three month follow up, according to parent measures.

Group social skills trainings can take on many forms. Many group social skills interventions take place in the school setting, as well as in outpatient settings. Barry, Klinger, Lee, Palardy, Gilmore, & Bodin completed a study on the effects of an outpatient clinic-based social skills group intervention for four high functioning children with autism (2003). The children were observed in a play session after each group session
with peers who had received education about ways to interact with children with autism. The children with autism improved on their greetings and play skills during those sessions. Group social skills interventions sometimes make the use of art of music therapy. A study conducted by Gooding (2011) compared the use of a music-based social skills intervention with children who have social skills deficits. He found there were significant improvements in social functioning. Though group social skills programs have shown significant results, the efficacy of such programs are still in question (Koenig, De Los Reyes, Cicchetti, Scahill, & Klin, 2009).

In addition to the many group social skills training, 1:1 training can be implemented by a trained adult to teach social skills to children with autism. In addition to above mentioned home-based therapy, 1:1 interventions can be completed in the classroom (Eikeseth et al., 2002). Mazurik-Charles and Stefanou (2010) completed a study where a trained paraprofessional provided social skills training to children with an ASD in both partially and fully included classrooms. Paraprofessionals play an important role in the lives and education of many students, and are often placed in 1:1 situations with students. This allows for many opportunities to directly work on social skills throughout the school day. The paraprofessionals in this study were trained on the social skills curriculum (using visual cards as prompts and verbal reminders as needed after practicing the skill), and delivered the intervention for seven weeks. Noticeable changes were noted in the short term with the children with and ASD, but long term changes were difficult to detect.

One of the possible limitations is the inability to fade out adult prompting, and this is a problem noted in many other adult-mediated social skills trainings (Weiss &
Harris, 2001). Many studies now emphasize the focus of fading adult prompts to
successfully maintain social interactions. Odom, Chandler, Ostrosky, McConnel, and
Reaney (1992) completed a study where teachers provided prompts to children who
served as peers in a peer-initiated intervention for young children with disabilities. The
teachers taught peers to direct initiations to children with disabilities, provided verbal
prompts for those initiations, and used a system to provide visual feedback to the peers.
The verbal prompts were faded first, and then the visual feedback was faded. After all
adult interactions were faded, social interactions continued at the levels that were found
during intervention. This study shows the importance of fading the adult out of the social
interaction of the children, but it also demonstrates the importance of training a peer to
initiate or mediate the social interactions from children with disabilities.

With this in mind, the research has shifted away from focusing on adults and
investigating the role that peers can play in assisting children with an ASD to learn social
skills. Many peer-mediated approaches have been studied recently, and represent the
largest and most empirically supported type of social intervention for children with an
ASD (Bass & Mulick, 2007). Early research focused on peer modeling and proximity,
and this was shown to not be enough to see increases in social skills with children with an
ASD (Weiss & Harris, 2001). Merely being in a classroom with typically developing
children is insufficient. Peers also need to be trained in how to engage with those who
have disabilities, and play skills need to be explicitly taught to those with disabilities.

One type of intervention that has been examined is Integrated Play Group (IPG).
With this intervention, typically developing peers are taught specific social play skills to
help improve the social skills of children with an ASD (Bass & Mulick, 2007). Children
with an ASD are placed in a small group of trained peers (typically 3-5) with an adult as a facilitator. This approach has been done with children of various ages (3-11). Adult facilitation is faded over time as the peers take on the role of prompting. This approach was used in a study completed by Kamps et al. (2002). They placed children with autism into small groups with trained peers and untrained peers. Greater generalization of social skills was noted for the group with trained peers than untrained peers.

Another popular peer-mediated approach to teaching social skills to children with an ASD is the use of a ‘peer buddy’ system. This approach is an active peer tutor training program, and focuses on assigning a child with an ASD to a typically developing peer who is instructed to stay, play, and talk with the child (English, Goldstein, Shafer, & Kaczmarek, 1997; Kohler, Greteman, Raschke, & Hignam, 2007; Laushey & Heflin, 2000). English et. al did research with this approach in a preschool setting (1997) using a multiple baseline across participants experimental design. They selected five typical peers to train as peer buddies, and four children with disabilities who served as the target children. The training for the peers consisted of sensitivity training and strategy use training. Sensitivity training was done as a group with the peer buddies, who were shown videotape segments in two 20-minute trainings. The videotape segments showed different ways that children with disabilities use to gain the attention of others. After each segment, the trainer led a discussion with the peers on what they thought the child in the tape was trying to do or say. Strategy use training was completed 1:1 with each peer buddy, over the course of five to six sessions. Here the trainer went over the three buddy strategies of “stay with your friend, play with your friend, and talk with your friend.” The target children with disabilities also received a modified version of the strategy use
training (Stay, play, talk). The buddy pairings were assigned for an average of seven days during a twelve week period when data were collected. Data showed an increase in social interactions, across a variety of activities throughout the day.

Laushey and Heflin (2000) completed a similar study that looked at the same peer buddy approach, but this time with kindergarteners and using a reversal experimental design. Two male students with an ASD served as the target children, and the entire class served as peer buddies both to the target children and to each other. Peer buddy assignments were changed daily. During the baseline phase, the class-wide buddy system was not implemented, and data were collected on the target behaviors (asking for an object, getting attention, waiting for turn, looking at person who is speaking). During intervention phases, the class-wide buddy system was implemented after a 10-15 minute didactic training was given to the entire class (including the target children). The training included discussing how everyone is different and going over the buddy rules (stay, play, and talk). Data showed a significant increase in social interactions between the typical peer buddies and children with autism during the buddy system phases over baseline phases.

Kohler et. al (2007) continued the research on the peer buddy approach with one child with an ASD and six of her peers in the preschool setting. The targeted child was placed in three different play groups, each of which contained two of the trained peer buddies. A multiple baseline across subjects design was used for this study, which staggered the training provided to the peer buddies. Training was similar to that used in the other studies, but visual cues were placed in the room as a reminder of the good buddy rules (stay, play, and talk). Data showed that the peers’ social overtures towards
the child with an ASD increased after receiving training, and the overtures from the child with an ASD towards her peer buddies increased as well. Together, these studies provide evidence that the peer buddy approach can increase the social skills of children with an ASD.

These peer-mediated approaches are typically done in the school settings, but social skills training can occur at summer camps as well. Although there is little research on children with ASD and social learning at camps, Walker, Barry, and Bader (2010) completed a study on perceived social skills improvement for children with an ASD after taking part in a summer camp that had been designed to encourage social skills building and peer interactions. They found that therapists perceived significant improvement in the social skills across all areas, and parents perceived improvement in children’s verbal communication and social interaction skills.

Consistently throughout the literature for peer-mediated social skill interventions, an emphasis has been placed on training the peer. However, little research exists on what specific skills should be taught to peers, and if those peers were able to master the skills taught to them. Most training that occurred for peers contained a didactic portion that taught specific skills, along with practice and role play. The training should take place individually or in a small group in a quiet area away from the class (Sperry, Neitzel, and Engelehardt-Wells, 2010). It is also noted that the person doing the training should identify the specific needs of the child with an ASD, and tailor the training of the peers to those needs (Sperry et. al, 2010).

Although the skills to teach can vary, whether or not the peer is able to master and correctly implement those skills is rarely discussed in the literature. Harper, Symon, and
Frea (2008) included peer fidelity data in the study they conducted using a peer-mediated approach to increase social skills in children with an ASD in a third grade setting. The peers in the study received training that was similar to that used by Speery et al. (2010), that is, didactic training, modeling, and role play. Fidelity of all six peers was fairly high for all five skills taught, ranging from 78-100%. This is a promising result demonstrating good fidelity on the part of the peers.

Thus, research exists which demonstrates that peer-mediated social skills interventions can make a positive impact on social skills of children with ASD, especially in schools. Little research exists, however, on the effectiveness of these interventions in different settings, such as summer camps. There is also little research on whether peers can master the skills taught to them during these interventions. What little research that does exist shows promising results for both peer-mediated interventions working in different settings, and also for demonstrating that peers are able to master and correctly implement the skills that are taught during the intervention.

Purpose of Study

For this study, the investigators examined whether pairing a typically developing peer (a peer buddy) with a child who has an ASD and providing individualized training to the peer buddy would increase responding and compliance from the child who has ASD (i.e. peer buddy system) in a summer camp setting. Also, a second purpose was to see if the typically developing peers were able to master and correctly implement the skills taught during 1:1 training.
Research Questions

This study was conducted and data were obtained and analyzed to answer the following questions:

1. Does providing one-on-one peer training increase the peer’s ability to provide (a) clear instruction, (b) prompting, and (c) social praise to a child with ASD?

2. Does peer prompting increase the number of socially desirable responses by children with ASD?
CHAPTER 2

METHOD

This chapter describes the methods used to answer the following research questions:

1. Does providing one-on-one peer training increase the peer’s ability to provide (a) clear instruction, (b) prompting, and (c) social praise to a child with ASD?

2. Does peer prompting increase the number of socially desirable responses by children with ASD?

Explained here are the participants, setting, experimenter, materials, definition of the dependent and independent variables, experimental design, procedures, interobserver agreement, and procedural integrity.

Participants

A total of six participants, or three dyads, were selected for this study. Each dyad had a typical peer paired with a child with an ASD. The students ranged in age from five to eight years old, and ranged in grade level from kindergarten through second grade. Table 2.1 shows the demographic information for each dyad. The participants selected for this study met the following criteria: they were (a) already enrolled in Buddy camp, (b) taking part in the majority of the camp, and (c) between the ages of five and eight years.
old. All participants with the exception of the child with ASD in Dyad 2 had taken part in buddy camp during previous summers. All the participants with an ASD were verbal.
<table>
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<tr>
<th>Dyad</th>
<th>Gender</th>
<th>Age</th>
<th>Grade Level</th>
<th>Race</th>
<th>Diagnosis</th>
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<td></td>
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<tr>
<td>Peer Buddy</td>
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</tr>
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<td>Grade 2</td>
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</tr>
<tr>
<td>ASD Child</td>
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<td>6</td>
<td>Kindergarten</td>
<td>Caucasian</td>
<td>Autism</td>
</tr>
</tbody>
</table>

Table 2.1. Characteristics of the participants
**Setting**

Buddy Camp was conducted at a church preschool, which has contracted with Nationwide Children’s Hospital: Center for Autism Spectrum Disorders (NCH:CASD) to hold Buddy Camp every summer. Three classrooms were used for the camp, with 10 to 13 dyads per classroom. The participants for this study were in two different classrooms. Dyad 1 was in the second classroom which had 11 dyads consisting of children ranging in ages from five to nine years. Dyads 2 and 3 were in the third classroom, which had 13 dyads consisting of children ranging in ages from five to ten years. No participants were in the first classroom, which consisted of 12 dyads with children ages from three to five years.

Participants attended camp three days a week (Monday, Wednesday, and Friday) from 9:00am to noon. The Buddy Camp day consisted of typical day camp and school activities – circle time, art time, outside recess, story time, as well as special activities that were provided as part of camp, such as visits from zoo animals and a soccer clinic from a college soccer team.

The training for the peer buddies was conducted one-on-one in a quiet area of the preschool (e.g., in the hallway, or on a bench outside the building) when the other students were in circle time.

**Experimenter**

The experimenter was a graduate student at The Ohio State University pursuing a Master of Arts degree in Applied Behavior Analysis. She had been working at NCH:CASD for the past seven years, starting as a behavioral intervention aide and working up to the current position of case supervisor. In addition to her duties as case
supervisor, she is also the research coordinator of summer buddy camp, and has held that position for two summers.

Two other study personnel were trained by the experimenter for data collection purposes. The first was a graduate student completing an internship at NCH:CASD throughout the summer. The second was a clinical psychologist employed by NCH:CASD assisting with summer buddy camp.

**Materials**

Items that are used in a typical classroom setting will be used in this study, such as markers, books, games, and toys. A timer was used by the experimenters during data collection sessions.

The trainer used a script for the didactic portion of the training and the role play scenarios with the peer buddies. The script and role play scenarios are included in Appendices F and G. The trainer followed the script when completing the didactic portion of the training, and followed the role play scenarios during practice. The role play scenarios were completed in random order each time.

**Definition and Measurement of the Dependent Variables**

*Children with ASD.* Behaviors were selected based on the overall goals of Buddy Camp, specifically to improve the ability of children with ASD to respond appropriately to peers in the classroom setting, a skill that is important to transitioning children with ASD into a typical school setting. For children with an ASD, two behaviors were analyzed: (a) complying with a request and (b) responding to calls for attention from a peer.
*Complying with a request* was defined as the child with ASD complying with the request after either (a) a verbal prompt or (b) a verbal prompt combined with a gestural prompt from the peer.

*Responding to calls of attention from a peer* occurred when the child with ASD responded either verbally, visually (by looking at the peer), or by gesture (i.e., the wave of a hand) to the peer’s efforts to gain attention. If the child with an ASD either complied with the request or to the call for attention, the response was scored as appropriate.

Data for the dependent measures were collected during two, 10-minute sessions per day. A trained observer collected the data, by sitting within 3-5 feet of the dyad at the time of collection. The observer used event recording to document the number of opportunities to respond and the occurrences of the target behaviors for the children with ASD. The number of opportunities equaled the sum of the number of occurrences and non-occurrences. The percent of appropriate behaviors were determined by dividing the number of occurrences of the target behavior over the total number of opportunities and multiplying by 100.

*Independent Variable*

The independent variable was peer prompting. Peer prompting was a three step process: (a) provide a clear instruction, (b) providing a prompt to respond if the child with ASD did not respond to the instruction, and (c) provide social praise after the child with ASD responded correctly after being given the instruction, or after either being prompted by the peer or the instructor.

*Overall peer training of all participants*: All participants in the summer Buddy Camp program received the overall peer training, wherein a child with an ASD was
paired with a peer who did not have ASD. The child with an ASD also had a 1:1 behavioral aide who provided prompts and ongoing training for the peers and for the child with ASD, if needed. All the peers went through the overall training prior to the beginning of camp. The training was similar to the training used by English et al. (1997). All peers came to the center where the camp was to be held three to five days before the camp began, and took part in a one hour training put on by camp personnel. The training consisted of going over the book *The Autism Acceptance Book: Being a Friend to Someone with Autism* by Ellen Sabin (2006). The focus of the book is acceptance of children with autism and creating friendship with others. The children were then told that they will earn prizes for “being a good friend.” The peers were also told about autism and that their buddies had autism.

The behavioral aide provided ongoing support for the peer buddy to provide the needed prompts during the target activities. If the behavioral aide noticed that the child with ASD was not participating appropriately in the classroom activity, the aide would prompt the peer to prompt the child with ASD to get back to task. The behavioral aide prompted the peer buddy twice and, if the child with ASD was still not participating appropriately, the behavioral aide prompted the child with ASD directly, bypassing the peer buddy.

If the peer prompted the child with ASD correctly throughout a task, both children earned a token. Once they earned all of their tokens, they used the tokens for a prize out of the “treasure box,” which contained items such as stickers, candy, and small toys.

*One-to-one peer training for the peers:* In addition to the overall training described above, the peers selected for this study received 1:1 training on the three step
process (see above) to improve their ability to respond appropriately with the children with ASD. The peers received 1:1 training from the experimenter in three, 20-minute sessions, conducted during the course of one week on Monday, Wednesday, and Friday. Each training session consisted of 10 minutes of didactic training, wherein the trainer discussed what the peers needed to do to gain responses, and 10 minutes of role playing between the peer and the trainer. The role play consisted of five scenarios, which mirrored the number of trials per session in the study. Two scenarios were the peer trying to gain attention or greet the child with ASD, and three scenarios were the peer asking the child with an ASD to comply with a request. During the role play scenarios, the trainer provided feedback to the peers. The scenarios are listed in Appendix G.

After the 1:1 training was provided to the peers, the trainer gave a 10-minute follow up session each Friday. In these sessions, the trainer went over the role play scenarios and reviewed the steps with each peer. During this review, the trainer provided feedback for the peers.

Experimental Design

A multiple baseline across participants design will be used for this study (Cooper, Herron, & Heward, 2007). All participants took part in the overall training with the rest of the children in the camp prior to the beginning of camp, in addition to the 1:1 training (See table 3.2 for the phase schedule of each dyad). The peer buddy from dyad 1 received the 1:1 training during week two of camp, the peer buddy from dyad 2 received the 1:1 training during week four, and the peer buddy from dyad 3 received the 1:1 training during week five of camp. No training was provided on week three because the camp was closed for two days due to the July 4th holiday.
<table>
<thead>
<tr>
<th>Week</th>
<th>Dyad 1</th>
<th>Dyad 2</th>
<th>Dyad 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Week 1</td>
<td>Baseline</td>
<td>Baseline</td>
<td>Baseline</td>
</tr>
<tr>
<td>Week 2</td>
<td>Training</td>
<td>Baseline</td>
<td>Baseline</td>
</tr>
<tr>
<td>Week 3</td>
<td>Post-training</td>
<td>Baseline</td>
<td>Baseline</td>
</tr>
<tr>
<td>Week 4</td>
<td>Post-training</td>
<td>Training</td>
<td>Baseline</td>
</tr>
<tr>
<td>Week 5</td>
<td>Post-training</td>
<td>Post-training</td>
<td>Training</td>
</tr>
<tr>
<td>Week 6</td>
<td>Post-training</td>
<td>Post-training</td>
<td>Post-training</td>
</tr>
<tr>
<td>Week 7</td>
<td>Post-training</td>
<td>Post-training</td>
<td>Post-training</td>
</tr>
</tbody>
</table>

Table 2.2. Phase schedule for each dyad.
Procedure

Baseline

During baseline, the data collector prompted the peer to engage in five opportunities that were similar to the role play scenarios practiced during the 1:1 training. Data were collected on the child with ASD as to whether he responded correctly to the instruction given by the peer. No prompting was provided to the peer by the experimenter if they did not complete the three step procedure correctly. The data collector prompted the child with ASD to respond correctly if the child with ASD did not respond after (a) being given the instruction and/or a prompt from their peer, or (b) did not respond in any way within five seconds of the instruction and no prompt from the peer was given.

Training

Data were collected during the role play scenarios during training for the peers; this was done to measure their ability to complete the three steps during training. Although the peers received their 1:1 training, data were continued to be collected as mentioned above in baseline.

Post-Training

Data collection and procedures during this phase were similar to those used during baseline. Data were collected on the child with ASD as to whether they responded correctly to the gains for attention or requests made. No prompting was provided to the peer. The data collector prompted the child with ASD to respond correctly if the child with ASD did not respond after (a) being given the instruction and/or a prompt from their peer, or (b) did not respond in any way within five seconds of the instruction and no prompt from the peer was given.
Interobserver Agreement (IOA)

During the baseline, intervention, and post intervention phases, two observers independently and simultaneously recorded data for each dyad for 31.5% of sessions for dyad 1, 32.1% of sessions for dyad 2, and 32.1% of sessions for dyad 3. Interobserver agreement for the target behaviors for the children with ASD were calculated by counting up the number of agreements of the opportunities and occurrences of behaviors for each scorer. Then the number of agreements was divided by the number of agreements and disagreements and multiplied by 100.

For the three step process completed by the peers, two observers also collected data independently and simultaneously to determine reliability. Interobserver agreement for these behaviors were calculated by dividing the lower percentage of correct responding over the larger percentage of correct responding and multiplied by 100.

Procedural integrity

Procedural integrity of the implementation of the peers’ use of the three step procedure was collected to ensure that the intervention was appropriately administered post training, and to measure what affect the 1:1 training had on the fidelity of the use of the procedure. Procedural integrity was collected for all sessions, during all phases. Data were also collected on the three step procedure used during the role play of the 1:1 training.

Procedural integrity data were collected on their ability to implement the three step procedure after receiving 1:1 training. There were three steps taught: delivering a clear instruction, providing a prompt to respond if the child with ASD did not respond to the instruction, and providing social praise after the child with ASD responded correctly.
to the instruction or after either being prompted by the peer or the instructor. Each step was scored and reported individually. The observer used event recording to document the number of opportunities, and the occurrences of each of the three steps for the peers. The percent of appropriate behaviors were determined by dividing the number of occurrences of the target behavior over the total number of opportunities and multiplying by 100.
CHAPTER 3

RESULTS

Results for the each dyad are detailed in this chapter. Data for responding from the children with ASD and procedural integrity of the skills taught to the peer buddies for each dyad is included. The behaviors addressed for the children with ASD include correctly responding to gains for attention or compliance to a request from their peer buddy. The skills addressed for the peer buddies include (a) delivering a clear instruction, (b) providing a prompt to respond if the child with ASD did not respond to the instruction, and (c) providing social praise after the child with ASD responded correctly. Data for the peer buddies were collected both in the classroom and during training and the results listed here. This chapter also includes data on interobserver agreement.

Interobserver Agreement

Interobserver agreement (IOA) data were collected for each dyad throughout the study. IOA was calculated for both the children with ASD and the peer buddies. IOA was calculated by dividing the number of agreements by agreements plus disagreements and multiplying by 100 to yield a percentage. Across all phases, skills, and dyads, agreement was an average of 98.7 percent (ranging from 75% to 100%). IOA data per dyad are presented in Table 3.1.
<table>
<thead>
<tr>
<th>Dyad</th>
<th>Peer Buddy Data</th>
<th>ASD Child Data</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean = 98.8%</td>
<td>Mean = 100%</td>
</tr>
<tr>
<td></td>
<td>Range = 86% to 100%</td>
<td>Range = 100% to 100%</td>
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<tr>
<td>Dyad 1</td>
<td></td>
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</tr>
<tr>
<td></td>
<td>Mean = 97.5%</td>
<td>Mean = 98%</td>
</tr>
<tr>
<td></td>
<td>Range = 75% to 100%</td>
<td>Range = 80% to 100%</td>
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<tr>
<td>Dyad 2</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Mean = 98.1%</td>
<td>Mean = 100%</td>
</tr>
<tr>
<td></td>
<td>Range = 89% to 100%</td>
<td>Range = 100% to 100%</td>
</tr>
<tr>
<td>Dyad 3</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 3.1. Interobserver agreement (IOA) results across participants
Procedural Integrity

Peer Buddies: Training data

Table 3.2 shows the data for the peer buddies collected during 1:1 training and follow up training on the three steps taught: (a) giving a clear instruction, (b) providing a prompt if needed, and (c) providing social praise.

The peer buddy from dyad 1 gave a clear instruction with 100% accuracy for all role plays during 1:1 training, and during all follow up trainings. She also provided prompts and provided social praise with 100% accuracy for all role plays during 1:1 training, and during all follow up trainings.

The peer buddy from dyad 2 gave a clear instruction and provided a prompt with 100% accuracy for all role plays during 1:1 training and follow up trainings. He provided social praise with 80% accuracy during the first role play of 1:1 training, but reached 100% accuracy with giving social praise for the rest of the role plays during 1:1 training, and throughout the follow up trainings.

The peer buddy from dyad 3 gave clear instruction with 80% accuracy during the first role play of 1:1 training, but reached 100% accuracy during the rest of the role plays during 1:1 training, and throughout the follow up training. She provided prompts with 0% accuracy during the first role play of 1:1 training, but reached 100% accuracy during the remainder of the role plays during 1:1 training, and during the follow up training. She gave social praise with 20% to 40% accuracy during the role plays of the 1:1 trainings. She reached 100% accuracy during the role play of the follow up training.
<table>
<thead>
<tr>
<th>Dyad</th>
<th>Clear instruction</th>
<th>Provided prompt</th>
<th>Social Praise</th>
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<tr>
<td><strong>Dyad 1</strong></td>
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<tr>
<td>1:1 training</td>
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<td>100</td>
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<tr>
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<tr>
<td>Follow up training</td>
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<td>100</td>
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</tr>
</tbody>
</table>

Table 3.2. Percent of correct responding per skill taught to the peer buddies for dyad 1, 2, and 3 during 1:1 training and follow up training.
Peer Buddies: Classroom data

Figures 3.1, 3.2, and 3.3 show the data collected on the three skills of giving a clear instruction, providing a prompt if need, and providing social praise respectively for the peer buddies of each dyad.

The peer buddy from dyad 1 provided a clear instruction in the classroom with a stable pattern of almost 100% accuracy (showing 80% accuracy one time during baseline) during all phases. The peer buddy from dyad 2 showed a similar pattern, showing almost 100% accuracy (showing 80% accuracy one time during baseline) for all phases. The peer buddy from dyad 3 showed an increasing trend on giving a clear instruction, reaching 100% accuracy during the end of the baseline phase and continuing through the rest of the phases.

The peer buddy from dyad 1 provided a prompt if needed in the classroom with a variable pattern during baseline. During this phase the mean value of providing a prompt if needed was 73.3% with a range of 0% to 100%. The trend stabilized, but was still variable during the training and post-training phases. During training, the mean value of proving a prompt if needed was 83.3% with a range of 50% to 100%. During post-training, the mean value of providing a prompt if needed was 91.5% with a range of 33% to 100%.

The peer buddy from dyad 2 provided a prompt if needed in the classroom with a variable pattern during baseline. During this phase the mean value of providing a prompt if needed was 70.1% with a range of 25% to 100%. The trend stabilized overall, but was still variable during the training and post-training phases. During training, the mean value of proving a prompt if needed was 88.3% with a range of 50% to 100%. During post-
training, the mean value of providing a prompt if needed was 87.5% with a range of 0% to 100%.
Figure 3.1. The percentage of correct responding of the peer buddies to provide a clear instruction during baseline, training, and post-training phases.
The peer buddy from dyad 3 provided a prompt if needed in the classroom with a variable pattern during baseline. During this phase the mean value of providing a prompt if needed was 42.9% with a range of 0% to 100%. The variable trend continued during the training and post-training phases. During training, the mean value of providing a prompt if needed was 71.2% with a range of 33% to 100%. During post-training, the mean value of providing a prompt if needed was 80.5% with a range of 33% to 100%.

The peer buddy from dyad 1 gave social praise in the classroom with a low, stable pattern during baseline. During this phase the mean value of giving social praise was 6.7% with a range of 0% to 20%. The trend remained stable, but the overall percentages increased during the training and post-training phases. During training, the mean value of giving social praise was 23.3% with a range of 0% to 40%. During post-training, the mean value of giving social praise if needed was 19.2% with a range of 0% to 60%.

The peer buddy from dyad 2 gave social praise in the classroom with 0% accuracy during the baseline phase. An increasing trend began in the training phase. During training, the mean value of giving social praise was 20% with a range of 0% to 40%. The overall trend stabilized during the post-training phase. During post-training, the mean value of giving social praise if needed was 28.3% with a range of 0% to 60%.

The peer buddy from dyad 3 gave social praise in the classroom with a low, stable pattern during baseline. During this phase the mean value of giving social praise was 2.5% with a range of 0% to 20%. The trend remained stable during the training and post-training phases. During training, the mean value of giving social praise was 20% with a range of 0% to 40%. During post-training, the mean value of giving social praise if needed was 10% with a range of 0% to 20%.
Figure 3.2. The percentage of correct responding of the peer buddies to provide a prompt if needed during baseline, training, and post-training phases.
Figure 3.3. The percentage of correct responding of the peer buddies to give social praise during baseline, training, and post-training phases.
Children with ASD

Figure 4.4 shows the data for the children with ASD correctly responding to peer buddies attempts to gain attention and make a request.

For the child with ASD in dyad 1, the baseline data consisted of six data points which show an increasing trend with little variability, stabilizing at 80% responding by the end of the study. The mean value of correct responding was 66.7% with a range of 40% to 80%. During the training phase, an upward trend began that continued into the post-training phase. The mean value of correct responding during the training phase was 73.3% with a range of 60% to 100%. During the post-training phase, of which there were twenty-six data points, the mean value of correct responding increased over the baseline and training phases to 87.7% with a range of 60% to 100%.

For the child with ASD in dyad 2, the baseline data consisted of ten data points (no data were collected during the first six sessions due to the peer buddy missing the first week of camp), which show a variable pattern, but stabilizes at 40% responding for the last four data points. The mean value of correct responding was 54% with a wide range of 20% to 100%. During the training phase, data scores increased over baseline overall, and this continued into the post-training phase. The mean value of correct responding during the training phase was 90% with a range of 60% to 100%. During the post-training phase, of which there were twelve data points (due to illness on the part of the child with ASD resulting in missing days at camp), the mean value of correct responding was 86.7% with a range of 60% to 100%.
Figure 3.4. The percentage of correct responding of the children with ASD to their peer buddies’ attempts to gain attention or make a request during baseline, training, and post-training phases.
For the child with ASD in dyad 3, the baseline data consisted of sixteen data points (no data were collected during the sessions seven through twelve due to the peer buddy missing the second week of camp) which show a variable pattern throughout this phase. The mean value of correct responding was 51.3% with a wide range of 0% to 100%. During the training phase, an upward trend began that continued into the post-training phase. The mean value of correct responding during the training phase was 60% with a range of 40% to 100%. During the post-training phase, of which there were six data points (due to illness on the part of the child with ASD resulting in missing days at camp), the mean value of correct responding was 90% with a range of 80% to 100%.
CHAPTER 4

DISCUSSION

This chapter will discuss the results of the study in relation to the research questions, and the previous research. It will also consider the limitations of the study, recommendations for practitioners, and directions for future research.

Research Question 1

Does providing one-on-one peer training increase the peer’s ability to provide (a) clear instruction, (b) prompting, and (c) social praise to a child with ASD?

The results of this study showed that one-on-one training does positively impact the ability of the peer to provide prompts to a child with ASD. There was a change in trend from baseline, to training, to post training for all dyads for two of the three steps of the prompting process. Though the third step of the prompting process did improve overall, there was little change over baseline. The one-on-one training did improve the second step the most out of the three step process.
For the first step in the process, providing a clear instruction, little change was noted among phases of the study. The peers from dyad 1 and 2 started with 100% accuracy during baseline, and continued that level of accuracy throughout the study. The peer from dyad 3 started with lower accuracy with this step during baseline, but increased with time while still in the baseline phase. The peers from all three dyads demonstrated high accuracy for implementing this step, and this data is commensurate with data collected during the role plays from the one-on-one training and follow up trainings, where the peers demonstrated this skill with 100% accuracy. This may show that one-on-one training may not be necessary to improve the fidelity of this step, though it should be noted that after the training was provided, the peers were more consistent with delivering this step in the process. The general training provided to all peers by the camp may be enough to ensure good fidelity for this step. Also, over time at camp, the peer may become more comfortable with their buddy, and this might help increase the fidelity of this step as well.

For the second step, providing a prompt if needed, change was noted during the phases of the study. The overall trend increased for this step for all three dyads, though this data were the most variable of the three steps. This data did not correspond with data collected during the role plays from the one-on-one training and follow up trainings. During trainings, the peers were able to demonstrate this skill at almost 100% accuracy. This result may be due to the fact that this was the only step where there was not a consistent amount of opportunities during classroom sessions. Some sessions only had
one opportunity to provide a prompt to the child with ASD, while other sessions had five opportunities, thus providing more opportunities for a correct response.

The peer from dyad 1 demonstrated high accuracy during baseline with the exception of one session. During the training phase, implementation in the classroom was higher overall, but still variable. During post-training, the peer from dyad 1 showed better fidelity when delivering a prompt when needed, though still variable, the data were more consistent. The peer from dyad 2 demonstrated this skill with variable responding during baseline, where the level of accuracy ranged from 20% to 100%. During the training phase, his accuracy improved, showing 100% accuracy for the last three sessions. While in the post-training phase, this peer demonstrated overall high accuracy for providing a prompt when needed. The peers from dyad 1 and 2 showed improvement for providing a prompt after receiving the one-on-one training. It was also noted, though not captured in the data, that the level of intrusiveness of the prompting increased from both these peers. During baseline, the prompting strategies the peers would provide would usually be a repeated instruction. During training and post-training phases, the peers would repeat the instruction, and provide a form of physical prompting to their buddy (pointing the object needed, tapping their shoulder, starting the activity requested to do). The one-on-one training may have had an effect on the intrusiveness of the prompting that the peers provided.

The data from the peer from dyad 3 were much more variable than the other peers. The range for the data was 0-100%. There was an overall increasing trend that started in baseline, and continued through the training and post-training phases, with the
last four sessions showing 100% accuracy. The consistency of providing a prompt was better during the training phase, and this continued into the post-training phase. It was noted for this peer that the level of intrusiveness of the prompting provided increased as well.

The third step of the prompting process, providing social praise, showed the lowest level of accuracy from all three peers. This data also did not correspond with the data collected during the role plays from the one-on-one training and follow up training. There, the peers were able to perform at 100% from the start, with the exception of the peer from dyad 3 who took time to get to 100% accuracy. The peer from dyad 1 showed an overall increasing trend from baseline to training to post-training, though the data were variable. The peer from dyad 2 did demonstrate this step in baseline, but showed an increasing trend during the training phase, and stabilized overall in the post-training phase. The peer from dyad 3 rarely showed this step in baseline, only exhibiting this step with 20% accuracy for two sessions. She demonstrated higher accuracy during the training phase, but data declined in the post-training phase.

A noticeable increase in the data for this step was noted after receiving the follow up trainings for the peer from dyad 1, thus follow up trainings may have improved the fidelity of providing social praise. However, this same increase is not noted in the other peers’ data. This may be due to the fact that the buddies from dyad 2 and 3 were not present on the days their peers received follow up training. Therefore, the peers from dyad 2 and 3 were unable to demonstrate the skills immediately after receiving follow up training, unlike the peer from dyad 1 who was able to demonstrate the skills.
One reason that the peers did not perform this step with high accuracy is because typically developing children do not provide praise to each other in high amounts in the natural setting. Children do give instructions to one another, and will follow through when the other child does not comply, but providing social praise may not happen that often.

Another reason why the accuracy of delivering social praise was low was because the peers did not always have to provide a prompt after delivering the instruction. If they did not have to provide the second step, then they may have forgotten to provide the third step of providing praise. The peer from dyad 1 provided social praise 74% of the time following a prompt, while only providing social praise 26% of the time when no prompt was needed. The peer from dyad 2 showed a similar pattern, providing social praise 65% of the time following a prompt, and only providing social praise 35% of the time when no prompt was needed. The same trend did not appear with the peer from dyad 3. She provided social praise 46% of the time following a prompt, and 54% of the time when no prompt was needed. Though overall the accuracy was low, the training and follow up trainings did positively impact the application of this step in the classroom.

These findings support the research that peer training is important to ensure the peers are able to provide the intervention to children with ASD (Harper et al., 2008). This study also extends the research into the importance of the fidelity of peers implementing the procedures, and the necessary training for those peers to maintain good fidelity.

Research Question 2
Does peer prompting increase the number of socially desirable responses by children with ASD?

The results of this study indicated that peer prompting does have a positive impact on the number of socially desirable responses by children with ASD. There was a noticeable change in responding from the children with ASD from baseline, to training, to post-training phases. While the peers’ fidelity increased with two of the three steps of the prompting process, responding from the buddies with ASD increased as well, even without high levels of reinforcement.

The buddy with ASD from dyad 1 had an increasing trend in baseline, which stabilized at 80% responding for the last three sessions. During the training phase, his responding became more variable, but remained at the same level overall. During the post-training phase, responding varied, but remained at a higher level over than compared to baseline and training. His responding was much more consistent, remaining around 80-100% for most sessions. There was a drop in responding after a week break from camp that is noted in the graph, where responding dropped to 60%. His responding rebounded shortly after that. This may suggest that the amount of time at camp and consistency of implementing and intervention may affect the responding of children with ASD, especially in this format. The buddy from this dyad also has a medical disorder that does affect his overall energy level, and this may have had an effect on his responding during certain days at camp.

The baseline data from the buddy from dyad 2 was variable, but did stabilize at 40% correct responding before changing phases. During the training phase, his
responding increased immediately. During the post-training phase, his responding remained high, although a slight downward trend was demonstrated. This may be due in part to other factors that were occurring with the child. During the last three weeks at camp, the buddy from dyad 2 was exhibiting an increased number of challenging behaviors, and was removed from the room on several occasions. It was also noted by camp staff that medications for this child were being changed during this time as well. Though no challenging behaviors were exhibited during sessions were data were collected, this still may have had an impact on responding from the child to his peer. Overall though, even with these challenges, responding remained overall higher than that in baseline.

For the buddy with ASD from dyad 3, baseline data were variable as well, but did stabilize to some extent towards the end of baseline. During the training phase, his responding remained the same as that during baseline for the first three sessions, then increased during the last three sessions. Correct responding then remained high throughout the post-training phase, remaining around 80-100% responding. His responding remained high even with the one week break from camp.

These findings support the research that peer mediated interventions increase socially desirable response from children with ASD (Bass & Mulick, 2007; English et al., 1997; Kamps et al., 2002; Kohler et al., 2007; Laushey & Heflin, 2000). In addition, this study extends the research into the setting of summer camp as a reliable place to implement this intervention.
Each of the participants with ASD was a different age, and had different levels of functioning, including language ability, motor skills, and social skills. Because each participant showed a functional relationship between peer prompting and increased responding to peers, it can be inferred that peer prompting does increase the number of socially desirable responses from children with ASD, particularly when the peer demonstrates higher fidelity in implementing a prompting procedure. It should be noted, though, that responding from the children with ASD increased even though the peers did not provide consistent reinforcement. One reason for this outcome may be that there were many other types of natural reinforcement going on in the setting. Completing the art project, playing a game, or even the attention from the adults while running this study may have been the reinforcement in the environment that helped to increase responding from the children with ASD. These other possible reinforcers in the environment may be why the social praise from the peer appeared to not be necessary to increase responding from children with ASD.

The second step of the three step process, providing prompts to respond if needed, may have been the most important step to increase responding from peers, since the peers were able to give a clear instruction with high accuracy in baseline, and providing social praise was not done with enough consistency to maintain the responding. The second step of the process is the one that changed most throughout the different phases of the study, and may be why responding increased from the children with ASD in this study.

However, there may also be other variables in the environment beyond the intervention that may account for the change in the responding from the children with
ASD. The level of responding from all three children with ASD ended up at about the same level during the post-training phase even with differing levels of fidelity from the peers. The mean of correct responding for all three was between 86% and 90%. One of those variables may be time spent together at camp. The children with ASD may learn to respond to their peer buddy merely because they spend every day together at camp. Another possibility is the reinforcement and prompting from the teachers and behavioral aides throughout the entire camp. One can speculate about other variables, but there is no way to know what effect these variables would have had on the study now. Based on the results of this study, having the peers (a) provide an instruction clearly, and (b) provide a prompt to respond with high fidelity improved the responding from the children with an ASD.

Limitations

Limitations exist in all research, despite many measures taken by experimenters to help alleviate these problems. For this study, a multiple baseline design across participants was used to demonstrate a functional relationship (Cooper, Heron, & Heward, 2007). However, sessions were missed for both dyads 2 and 3. The peers from both dyads were not able to attend camp for six sessions during baseline, and because of this, no data were collected on the children with ASD since they were with different peers. The children with ASD from dyad 2 and 3 missed sessions during the post-training phase due to being sick, therefore no data were collected on the peers since the peers were with different buddies for those sessions. These missed sessions may have impacted
the data. If data were able to be collected during these sessions, a stronger relationship may have emerged from the intervention.

Another limitation was that all the participants with the exception of one have participated in buddy camp in previous summers. In fact, for dyad 1, this was the pair’s third summer matched together at buddy camp. This may account for high scores in baseline for this dyad, as well as the high accuracy for all three peers for the first and second step of the prompting procedure taught to the peers. Having been exposed to this setting, and exposed to the expectations of the camp previously may have increased the accuracy for all the data.

The activities that were being completed during data collection were not controlled for in this study, and this could be a limitation as well. Sometimes, the activity was a game with turn taking abilities, other times the dyad completed an art project with the class, or completed a sports activity outside (i.e. throwing a ball). Some activities may have been more motivating for the participants to engage with, and thus their responding may have increased.

Future Research

Although there are many studies that examine the effects of peer-mediated interventions on social skills for children with an ASD, there are few that look at the fidelity of training for the peers, and the consequential effects on the social skills for children with ASD. Because this study is extending the current research on peer-mediated
interventions, but with a focus on fidelity of peers’ implementation, there are many directions for future research.

Future research needs to be done to determine if peers of different ages are able to correctly implement interventions to increase social skills for children with an ASD. This study looked at children of school age, though many peer-mediated interventions are completed by children of all ages. Future studies should determine if children in preschool, middle school, or of high school age are able to implement these interventions with high fidelity. This will help determine the best age range for the use of this peer-mediated intervention.

Future research also needs to compare the fidelity of peer-mediated interventions taught in group settings or in one-on-one settings. This study compared whether the one-on-one training would increase the fidelity of peer implementation after receiving the group training using single-subject design. Future research may want to directly compare one-on-one trainings versus group trainings for peer-mediated interventions. One-on-one interventions are time consuming for both the practitioner and the student. If group trainings can provide the same outcome as one-on-one training, or better outcomes, then group trainings may be more practical. Future studies may also want to consider using group design models to compare the effects of the different formats of training for implementing a peer-mediated intervention.

Researchers should also investigate the social validity of these interventions, particularly from the point of view of the peers. Some people may feel that these peer-mediated interventions may too much to ask of a child to complete in the classroom.
Unfortunately, social validity was not looked at during this study, but future efforts to complete studies like this should look at social validity measures of those adults training the peers for the intervention, and of the peers providing the intervention to those children with an ASD.

Implications for Practitioners

The results from this study indicate that providing one-on-one training for peers to provide prompting in a peer buddy system improves their ability to implement the prompting procedure, and thus improves the responding of the children with an ASD. This has several implications for practitioners to consider before implementing this intervention in everyday settings.

If implementing this intervention in the future, it would be beneficial to purposefully create situations where this intervention could be carried out easily. For this study, the examiners selected times that were best for the schedule of the daily activities of camp, and may not have been most beneficial for implementing the intervention. Purposely scheduling times throughout the day in which the buddies are able to interact may lead to better outcomes for the children with ASD, as well as better fidelity from the peers.

To better conduct this study in the future, some considerations should be taken. First, the length of time this study was conducted was very short. It would be ideal to conduct this type of research over a longer period of time. This would be difficult to do in a summer camp setting, however, baseline data and maintenance data could be collected
before the start and after the end of camp respectively. Researchers may also want to consider conducting this research in a school classroom, where it would be possible to conduct this research for a longer period of time. Also, to conduct this type of study in the future, there should be better control of the activities completed during data collection sessions. This may lead to a stronger functional relationship between the intervention and outcomes, or it may demonstrate differences in outcomes based on interest level of both children for different activities.

This study shows that providing one-on-one training to peers improves their fidelity of providing the intervention, and appears to increase responding from children with ASD. This intervention can be done in different settings, especially in classrooms, with minimal assistance from adults. This is important because children with an ASD may require a great amount of adult assistance in the classroom, particularly with social skills development. If peers in the classroom are able to provide the intervention on their own, it allows for the adult to fade out of the process quicker, which is more beneficial in the long term. It may also allow the peer and the child with an ASD to form a relationship that may carry on throughout school and into other settings.


Appendix A: Consent Form, ASD Children
CONSENT TO PARTICIPATE IN A CLINICAL RESEARCH STUDY

STUDY TITLE: Peer-mediated prompting to increase responding and compliance in children with autism with peers
(Consent form for child with ASD)

PRINCIPAL INVESTIGATOR: Tracy Gulou, Ph.D., BCBA-D

CONTACT TELEPHONE NUMBER: 614-355-8315 (Monday-Friday 8:00a-6:00p)

SUBJECT'S NAME: __________________________ DATE OF BIRTH: ______________

NOTE: The words “you” and “your” are used in this consent form. These words refer to the study volunteer whether a child or an adult.

1) INTRODUCTION

We invite you to be in this research study because your child meets the criteria to take part in this study. With previous research demonstrating an increase in social skills, investigators working at the Buddy Camp of Nationwide Children’s Hospital: Center for Autism Spectrum Disorders (NCH:CASD) want to examine if peers could be trained to provide prompting necessary for children with an autism spectrum disorder to respond to a request or provide attention. We would like for your child to take part in study along with their peer buddy, and have data collected on their behavior and interactions with their buddy.

Participation is voluntary. Using this form as a guide, we will explain the study to you. If you have any questions about the study, please ask. Once you understand this study, we will ask you to decide whether you would like to participate or not. By signing this form, you agree to be in this study. If you do not want to be involved with this study, all regular and standard medical care will still be available to you here or at another institution. You also have the right to leave this study at any time, even if you agree to join now.

You will be given a signed and dated copy of the consent form.

2) WHY ARE WE DOING THIS RESEARCH STUDY?

For this study, the investigators wish to examine whether pairing a child with an ASD with a typically developing peer and providing individualized training to the typically developing peer buddy can increase responding and compliance from children with an ASD to their peer buddies. This is in addition to the training and activities of Buddy Camp. This study is being completed as part of the thesis requirement for Ohio State University of one of the researchers.
3) WHERE WILL THE STUDY BE DONE AND HOW MANY SUBJECTS WILL TAKE PART?

This study will be done at Nationwide Children’s Hospital: Center for Autism Spectrum Disorders Summer Buddy Camp and we hope to enroll 6 participants (3 dyads).

4) WHAT WILL HAPPEN DURING THE STUDY AND HOW LONG WILL IT LAST?

You are free to allow or disallow your child to participate in the study. The study will take place over the entire span of Buddy Camp, with initial trainings starting on June 13th through the last day of Buddy Camp on August 10th. If you allow your child to participate if they want to, the study will include the following:

(1) Your child’s peer buddy will take part in the initial training and follow up training provided to all peer buddies for camp. Your child will also take part in all provided activities of Buddy camp.

(2) In addition to the above mentioned training, your child’s peer buddy will take part in a 1:1 training with the researcher. The training will be provided for three 20 minute sessions, conducted during the course of one week on Monday, Wednesday, and Friday. The training session will consist of 10 minutes of didactic training, where the trainer will discuss what the peer buddies are to do to gain compliance, and 10 minutes of role playing with the peer buddy and trainer. The role play will consist of five scenarios, two scenarios of which are the peers trying to gain attention or greet the child with ASD, and three scenarios in which the peer buddy is asking the child with ASD to comply with a request. After the 1:1 training is provided to the peers, the trainer will follow up with the peers one time a week (Fridays) for 10 minutes each, after the follow up training with all peer buddies at camp. The trainer will go over the role play scenarios with the peer buddies, and review the steps with each peer.

(3) Data will be collected by trained research personnel. For the children who are peer buddies, data will be collected on their ability to gain attention and compliance from their buddies with ASD. Data will be collected on their ability to follow the steps that will be taught in the 1:1 training. For children with an ASD, there are two behaviors that will be analyzed: complying with a request and responding to calls of attention from the peers. Data will be collected over two 10 minute sessions on Mondays, Wednesdays, and Fridays of camp.

5) WHAT ARE THE RISKS OF BEING IN THIS STUDY?
We believe that there is very little chance that bad things will happen as a result of being in this study. The risks include the potential for the peer buddy to feel overwhelmed with the procedure to prompt their peer with ASD, especially if the children with ASD engage in challenging behaviors, which may also further alienate the child with ASD from their peer buddy. The research team will ensure there is little discomfort or harm to the participants. If any discomfort or harm is observed, the team will address it with the participants. If the harm or discomfort is deemed to be beyond minimal risk, the participant will be allowed to discontinue the study. There may be other risks of being in this research study that are not known at this time.

6) ARE THERE BENEFITS TO TAKING PART IN THIS STUDY?

Possible benefits include the children with ASD potentially increasing their interactions in the classroom with typical peers, and improving their social interactions with others. The peer buddies could potentially learn how to interact with those peers who have ASD. They could also feel more comfortable around those that are disabled, and may have an increase in self-esteem from helping others.

7) WHAT ARE THE COSTS AND REIMBURSEMENTS?

All costs related to the research parts of this study will be covered by the research team.

8) WHAT HAPPENS IF BEING IN THIS STUDY CAUSES INJURIES?

We believe that there is very little chance that injuries will happen as a result of being in this study.

9) WHAT HAPPENS IF I DO NOT FINISH THIS STUDY?

It is your choice to be in this study. You may decide to stop being in this study at any time. If you stop your participation in the study, there will not be a penalty or loss of benefits to which you are otherwise entitled.

If at any time the Principal Investigator believes that this study is not good for you, the study staff will contact you about stopping. If the study instructions are not followed, participation in the study may also be stopped. If unexpected problems come up, the Principal Investigator may decide to stop your participation in the study.

10) OTHER IMPORTANT INFORMATION

If you are an employee of Nationwide Children’s Hospital or the Research Institute at Nationwide Children’s Hospital, your job or performance appraisal will not be affected in any way if you decline to participate or withdraw your consent to participate in this study.

If you are interested, the final study results will be shared with you once they are available. Please provide us with an email or address where we can send these results.

Nationwide Children’s Hospital is a teaching hospital and we are committed to doing research. Doing research will enable us to learn and provide the best care for our patients and families. You may be asked to participate in other research studies in the future. You have the right to decide to
participate or decline to participate in any future studies. We will not share your contact information with researchers outside Nationwide Children’s Hospital.

11) HOW WILL MY STUDY INFORMATION BE KEPT PRIVATE?

Efforts will be made to keep your study-related information confidential. However, there may be circumstances when this information must be released. For example, personal information regarding your participation in this study may be disclosed if required by state law. Your records may be reviewed by the following groups (as applicable to the research):

- PI and study staff
- The Nationwide Children’s Hospital Institutional Review Board (the committee that reviews all human subject research)
- Nationwide Children’s Hospital internal auditors
- The Office for Human Research Protections (OHRP) (the federal government office that oversees human subject research)

If you have a bad outcome or adverse event from being in this study, the Principal Investigator and staff or other health care providers may need to look at your entire medical records. We expect that the results from this study may be published in the future but your identity will not be revealed.

Information collected for this study may include information that can identify you. This is called “protected health information” or PHI. By agreeing to be in this study, you are giving permission to Tracy Gulou and the study staff to collect, use, and disclose your PHI for this research study unless otherwise allowed by applicable laws. Information collected is the property of Tracy Gulou.

The reason why this PHI is collected, and what information will be used is listed below. The PHI will only be shared with the groups listed, but if you have a bad outcome or adverse event from being in this study, the Principal Investigator and staff or other health care providers may need to look at your entire medical records. In the event of any publication regarding this study, your identity will not be revealed.

The PHI collected or created under this research study will be used or disclosed as needed until the end of the study. The records of this study will be kept for an indefinite period of time and your authorization to use or disclose your PHI will not expire.

PHI that may be used or disclosed: E-mail Addresses (for the purpose of contacting you about the study)

12) WHOM SHOULD I CALL IF I HAVE QUESTIONS OR PROBLEMS?

If you have questions about anything while on this study or you have been injured by the research, you may contact the Principal Investigator at 614-355-8315, Monday – Friday, between 8:00a-6:00p.

If you have questions, concerns, or complaints about the research; if you have questions about your rights as a research volunteer; if you cannot reach the Principal Investigator; or if you want to call
IRB #: IRB13-00248
Form Approval Date: 6-12-2012
Study Approval Date: 5-11-2012
Study Date of Expiration: 5-10-2013

someone else - please call (614) 722-2708, Nationwide Children's Hospital Institutional Review Board, (IRB, the committee that reviews all research involving human subjects at Nationwide Children's Hospital).
Subject’s Name __________________________ Date of Birth ______________________

SUBJECT or SUBJECT’S PARENT OR PERSON AUTHORIZED TO CONSENT ON BEHALF OF THE CHILD (SUBJECT TO THE SUBJECT’S GENERAL MEDICAL CARE)

I have read this consent form and I have had an opportunity to ask questions about this research study. These questions have been answered to my satisfaction. If I have more questions about participating in this study or a research-related injury, I may contact the Principal Investigator. By signing this consent form, I certify that all health information I have given is true and correct to the best of my knowledge.

I agree to participate in this study or I give permission for my child to participate in this study. I will be given a copy of this consent form with all the signatures for my own records.

CONSENT SIGNATURES

SUBJECT or SUBJECT’S LEGAL REPRESENTATIVE __________________________ DATE & TIME AM/PM __________________________

SUBJECT or SUBJECT’S LEGAL REPRESENTATIVE __________________________ DATE & TIME AM/PM __________________________
Permission of the second parent not obtained because (select all that apply):
   _____ Not required by the IRB (risk level 1 or 2).
   _____ Other parent is deceased.
   _____ Other parent is unknown.
   _____ Other parent is not reasonably available.
   _____ Only one parent has legal responsibility for the care and custody of subject.

PERSON OBTAINING CONSENT __________________________ DATE & TIME AM/PM __________________________
I certify that I have explained the research, its purposes, and the procedures to the subject or the subject’s legal representatives before requesting their signatures.

IRB Rev. 3/1/12 Page 6 of 6 Initials _______
Appendix B: Consent Form, Peers
CONSENT TO PARTICIPATE IN A CLINICAL RESEARCH STUDY

STUDY TITLE: Peer-mediated prompting to increase responding and compliance in children with autism with peers
(Consent form for peer buddy)

PRINCIPAL INVESTIGATOR: Tracy Guiou, Ph.D., BCBA-D

CONTACT TELEPHONE NUMBER: 614-355-8315 (Monday-Friday 8:00a-6:00p)

SUBJECT’S NAME: ___________________________ DATE OF BIRTH: ______________

NOTE: The words “you” and “your” are used in this consent form. These words refer to the study volunteer whether a child or an adult.

1) INTRODUCTION

We invite you to be in this research study because your child meets the criteria to take part in this study. With previous research demonstrating an increase in social skills, investigators working at the Buddy Camp of Nationwide Children’s Hospital Center for Autism Spectrum Disorders (NCH:CASD) want to examine if peers could be trained to provide prompting necessary for children with an autism spectrum disorder to respond to a request or provide attention. We would like for your child to take part in the additional training if they are the peer buddy, and have data collected on their behavior and interactions with their buddy (both the peer buddy and child with an ASD).

Participation is voluntary. Using this form as a guide, we will explain the study to you. If you have any questions about the study, please ask. Once you understand this study, we will ask you to decide whether you would like to participate or not. By signing this form, you agree to be in this study. If you do not want to be involved with this study, all regular and standard medical care will still be available to you here or at another institution. You also have the right to leave this study at any time, even if you agree to join now.

You will be given a signed and dated copy of the consent form.

2) WHY ARE WE DOING THIS RESEARCH STUDY?

For this study, the investigators wish to examine whether pairing a child with an ASD with a typically developing peer and providing individualized training to the typically developing peer buddy can increase responding and compliance from children with an ASD to their peer buddies. This is in addition to the training and activities of Buddy Camp. This study is being completed as part of the thesis requirement for Ohio State University of one of the researchers.
3) WHERE WILL THE STUDY BE DONE AND HOW MANY SUBJECTS WILL TAKE PART?

This study will be done at Nationwide Children’s Hospital: Center for Autism Spectrum Disorders Summer Buddy Camp and we hope to enroll 6 participants (3 dyads).

4) WHAT WILL HAPPEN DURING THE STUDY AND HOW LONG WILL IT LAST?

You are free to allow or disallow your child to participate in the study. The study will take place over the entire span of Buddy Camp, with initial trainings starting on June 13th through the last day of Buddy Camp on August 10th. If you allow your child to participate if they want to, the study will include the following:

(1) Your child (peer buddy) will take part in the initial training and follow up training provided to all peer buddies for camp. Your child (peer buddy and child with an ASD) will also take part in all provided activities of Buddy camp.

(2) In addition to the above mentioned training, your child (peer buddy) will take part in a 1:1 training with the researcher. The training will be provided for three 20 minute sessions, conducted during the course of one week on Monday, Wednesday, and Friday. The training session will consist of 10 minutes of didactic training, where the trainer will discuss what the peer buddies are to do to gain compliance, 10 minutes of role playing with the peer buddy and trainer. The role play will consist of five scenarios, two scenarios of which are the peers trying to gain attention or greet the child with ASD, and three scenarios in which the peer buddy is asking the child with ASD to comply with a request. After the 1:1 training is provided to the peers, the trainer will write up with the peers one time a week (Friday) for 10 minutes each, after the follow up training with all peer buddies at camp. The trainer will go over the role play scenarios with the peer buddies, and review the steps with each peer.

(3) Data will be collected by trained research personnel. For the children who are peer buddies, data will be collected on their ability to gain attention and compliance from their buddies with ASD. Data will be collected on their ability to follow the steps that will be taught in the 1:1 training. For children with an ASD, there are two behaviors that will be analyzed: complying with a request and responding to calls of attention from the peers. Data will be collected over two 10 minute sessions on Mondays, Wednesdays, and Fridays of camp.

5) WHAT ARE THE RISKS OF BEING IN THIS STUDY?
We believe that there is very little chance that bad things will happen as a result of being in this study. The risks include the potential for the peer buddies to feel overwhelmed by the procedure to prompt their peer with ASD, especially if the children with ASD engage in challenging behaviors, which may also further alienate the child with ASD from their peer buddy. The research team will ensure there is little discomfort or harm to the participants. If any discomfort or harm is observed, the team will address it with the participants. If the harm or discomfort is deemed to be beyond minimal risk, the participant will be allowed to discontinue the study. There may be other risks of being in this research study that are not known at this time.

6) ARE THERE BENEFITS TO TAKING PART IN THIS STUDY?
Possible benefits include the children with ASD potentially increasing their interactions in the classroom with typical peers, and improving their social interactions with others. The peer buddies could potentially learn how to interact with those peers who have ASD. They could also feel more comfortable around those that are disabled, and may have an increase in self-esteem from helping others.

7) WHAT ARE THE COSTS AND REIMBURSEMENTS?
All costs related to the research parts of this study will be covered by the research team.

8) WHAT HAPPENS IF BEING IN THIS STUDY CAUSES INJURIES?
We believe that there is very little chance that injuries will happen as a result of being in this study.

9) WHAT HAPPENS IF I DO NOT FINISH THIS STUDY?
It is your choice to be in this study. You may decide to stop being in this study at any time. If you stop your participation in the study, there will not be a penalty or loss of benefits to which you are otherwise entitled.

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If you are an employee of Nationwide Children’s Hospital or the Research Institute at Nationwide Children’s Hospital, your job or performance appraisal will not be affected in any way if you decline to participate or withdraw your consent to participate in this study.

If you are interested, the final study results will be shared with you once they are available. Please provide us with an email or address where we can send these results.

Nationwide Children’s Hospital is a teaching hospital and we are committed to doing research. Doing research will enable us to learn and provide the best care for our patients and families. You may be asked to participate in other research studies in the future. You have the right to decide to...
participate or decline to participate in any future studies. We will not share your contact information with researchers outside Nationwide Children's Hospital.

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Efforts will be made to keep your study-related information confidential. However, there may be circumstances when this information must be released. For example, personal information regarding your participation in this study may be disclosed if required by state law. Your records may be reviewed by the following groups (as applicable to the research):

- PI and study staff
- The Nationwide Children's Hospital Institutional Review Board (the committee that reviews all human subject research)
- Nationwide Children's Hospital internal auditors
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Information collected for this study may include information that can identify you. This is called “protected health information” or PHI. By agreeing to be in this study, you are giving permission to Tracy Gulou and the study staff to collect, use, and disclose your PHI for this research study unless otherwise allowed by applicable laws. Information collected is the property of Tracy Gulou.

The reason why this PHI is collected, and what information will be used is listed below. The PHI will only be shared with the groups listed, but if you have a bad outcome or adverse event from being in this study, the Principal Investigator and staff or other health care providers may need to look at your entire medical records. In the event of any publication regarding this study, your identity will not be revealed.

The PHI collected or created under this research study will be used or disclosed as needed until the end of the study. The records of this study will be kept for an indefinite period of time and your authorization to use or disclose your PHI will not expire.

PHI that may be used or disclosed: E-mail Addresses (for the purpose of contacting you about the study)

12) WHOM SHOULD I CALL IF I HAVE QUESTIONS OR PROBLEMS?

If you have questions about anything while on this study or you have been injured by the research, you may contact the Principal Investigator at 614-355-8315, Monday – Friday, between 8:00a-6:00p.

If you have questions, concerns, or complaints about the research; if you have questions about your rights as a research volunteer; if you cannot reach the Principal Investigator; or if you want to call
someone else - please call (614) 722-2708, Nationwide Children’s Hospital Institutional Review Board, (IRB, the committee that reviews all research involving human subjects at Nationwide Children’s Hospital).
Subject’s Name __________________________ Date of Birth ____________________

SUBJECT or SUBJECT’S PARENT OR PERSON AUTHORIZED TO CONSENT ON BEHALF OF
THE CHILD (SUBJECT TO THE SUBJECT’S GENERAL MEDICAL CARE)

I have read this consent form and I have had an opportunity to ask questions about this research study. These questions have been answered to my satisfaction. If I have more questions about participating in this study or a research-related injury, I may contact the Principal Investigator. By signing this consent form, I certify that all health information I have given is true and correct to the best of my knowledge.

I agree to participate in this study or I give permission for my child to participate in this study. I will be given a copy of this consent form with all the signatures for my own records.

CONSENT SIGNATURES

SUBJECT or SUBJECT’S LEGAL REPRESENTATIVE DATE & TIME AM/PM

SUBJECT or SUBJECT’S LEGAL REPRESENTATIVE DATE & TIME AM/PM
Permission of the second parent not obtained because (select all that apply):
____ Not required by the IRB (risk level 1 or 2).
____ Other parent is deceased.
____ Other parent is unknown.
____ Other parent is not reasonably available.
____ Only one parent has legal responsibility for the care and custody of subject.

PERSON OBTAINING CONSENT DATE & TIME AM/PM
I certify that I have explained the research, its purposes, and the procedures to the subject or the subject’s legal representatives before requesting their signatures.

IRB Rev. 3/1/12 Page 6 of 6 Initials ______
Appendix C: IRB approval letter
June 12, 2012
Tracy Guiou
Psychology

Study ID: IRB12-00248
Study Name: Peer-mediated prompting to increase responding and compliance in children with autism with peers

Dear Dr. Guiou,

The response to modifications requested, submitted on 6/8/2012, for the above study has been reviewed by the Institutional Review Board on 6/12/2012 - STUDY APPROVED.

Date of Approval: 5/11/2012
Date of Expiration: 5/10/2013

This approval is for one year only. A Continuing Review Report must be approved before this study can proceed beyond the date of expiration. Please be aware that all changes to the research protocol consent form, or any other aspect of this study must receive prospective IRB approval. IRB policy requires that provisions are made for assent of subjects age nine and older.

The Federalwide Assurance number assigned to the IRB at Nationwide Children's Hospital, Inc. is FWA00002860.

If we can provide additional assistance, please do not hesitate to call this office at ext. 22708.

Sincerely,

Alexander Rakowsky, MD, Chair
Institutional Review Board

Important Warning: If the reader of this message is not the intended recipient you are hereby notified that any dissemination, distribution or copying of this information is STRICTLY PROHIBITED.
Appendix D: Recruitment Email
Dear Parent/Guardian,

I am writing to let you know about a research study being conducted as part of our summer Buddy Camp offered through Nationwide Children’s Hospital: Center for Autism Spectrum Disorders. I am contacting you because your child is currently enrolled to attend our Buddy Camp.

For this study, we wish to examine how a child with an autism spectrum disorder (ASD) might benefit from being paired with a typically-developing peer (“buddy”), who has received prior training in how to help children with ASD gain such skills as attending to their peers and engaging in activities with their peers. The training provided to the “buddy” is in addition to the general peer training offered by the Buddy Camp. This study is being completed as partial fulfillment of the thesis requirements for one of the researchers, who is currently a graduate student in the department of Special Education at The Ohio State University.

Your child may be eligible for this study if they are between the ages of 5 to 8 years old, and are attending Buddy Camp from July 18th-August 10th.

It is important to know that any participation in this study is strictly voluntary. If you should decide not to participate, that decision will have no effect on your enrollment in our Buddy Camp or any other relationship you have with Nationwide Children’s Hospital as a patient.

If you decide that you are interested having your child participate, or in learning more about the study, please respond to this email or contact me by phone at 614-355-8315.

You do not have to respond if you are not interested in this study. Thank you for your time and consideration.

Sincerely,

Janette Long
Case Supervisor
Nationwide Children’s Hospital
Center for Autism Spectrum Disorders
Phone: 614-355-8315
Appendix E: Data collection sheet (Experimenter and Interobserver)
**Phase:**
| BASELINE | TRAINING | POST TRAINING | FOLLOW-UP |

**Session Type:**
| CLASSROOM | TRAINING ROLE PLAY | FOLLOW-UP ROLE PLAY |

---

**Session 1 (Time : to : )**

ASD responds correctly

**Peer Buddy**
1. Peer gave clear instruction
2. Peer followed through with instruction (provided prompt)
3. Peer provided social praise to

---

**Session 2 (Time : to : )**

ASD responds correctly

**Peer Buddy**
1. Peer gave clear instruction
2. Peer followed through with instruction (provided prompt)
3. Peer provided social praise to
Appendix F: Peer Training Script
Training Script

Day 1

We’re going to talk today about how to help your friend. There are 3 important things you need to do.

1. The first thing is **Speak clear and loud.** What is the first thing? ______________
   a. When you are asking your friend to do something, or trying to get their attention, speak loud and clear. For example, say ‘Hey (buddy)’ or ‘(buddy), give me a crayon please.’ Talking like this will help your friend understand what you want or need. Remember, rule number one is speak clear and loud!
   b. You try, tell me to give you this (object)

2. The second rule is **help them if they need it.** What’s rule number two? ______________
   a. Sometimes our friends don’t understand or don’t know how to do what you asked. When that happens, you can help them or show them how. First, you can try repeating what you said. If your friend still doesn’t answer, then you can tap them on the shoulder.
   b. You can also point to the object you want, or you can show them what you want. Let’s practice, I will show you how (show child, then have child try).

We have learned two rules so far. They were, **speak clear and loud** and **help your friend when they need it.** Let’s repeat the rules to help you remember! Rule one is ____________ and rule two is ____________. Here’s the last rule!

3. **Tell them good job!** What is the third and last rule? ______________
   a. Remember to tell your friend that they did a good job. When they answer you or give you something you asked for, you can say ‘great job’ or ‘thanks so much.’ There is so much you can say to make your friend feel good. What makes you feel good? (have them say praise statements).
   b. Great job telling me things that make you feel good. Let me practice with you on how to **tell your friend good job.**

Let’s say all of our rules together. Remember, there were three rules. I will tell you them again, then you say them. **Speak clear and loud, help them if they need it,** and **tell them good job.**

You tell me now! 1. ______________, 2. ______________, 3. ________________. You are doing so great, you are going to be an amazing buddy!

Day 2

We’re going to keep talking about how to help your friend. Let’s try to remember what we talked about last time.
1. Remember there are 3 things we do to help our friends answer us. The first one is speaking clear and loud. What does this mean? (Discuss).
2. The second thing we do is help them if they need it. How do you help your friend? (Discuss)
3. The third thing is to tell you friend they did a good job. How do you tell them? (Discuss)

Day 3

Today is the last day we are going to talk about how to help our friends. What are the 3 things we do to help our friends answer us?

(Discuss, ask leading questions if needed)

Role Play Script

We have learned a lot about how to help our friends. We are now going to pretend. *(We are going to pretend again like we did yesterday, you did such a great job!)* I am going to be your “buddy” and you get to be the teacher/helper. The whole time I want you to think about the rules I taught you! Tell me the rules one more time! ________________
______________ ______________. Amazing! Ok, here we go, time to (play) pretend.
Appendix G: Role-play scenarios
Role play scenarios

1. **Saying ‘Hi’**
   a. Peer says ‘hi’ to trainer.
   b. Trainer responds back correctly with ‘hi’
   c. Peer praises trainer.
2. **Look at this**
   a. Peer says to trainer ‘Hey (name), look at this’ and points to object.
   b. Trainer does not respond.
   c. Peer should repeat the instruction, or prompt trainer to respond.
   d. After prompting, trainer responds appropriately by looking at object.
   e. Peer praises trainer.
3. **Give me a crayon**
   a. Peer asks trainer to hand crayon over.
   b. Trainer does not respond (keeps coloring).
   c. Peer should repeat instruction, and/or prompt trainer to respond/hand over crayon.
   d. After prompting, trainer responds appropriately by handing over crayon.
   e. Peer praises trainer.
4. **Give me high five**
   a. Peer asks trainer to give ‘high five’
   b. Trainer responds by giving peer ‘high five.’
   c. Peer praises trainer.
5. **Come over here**
   a. Peer is five feet away from trainer, and asks trainer to ‘come over here’
   b. Trainer does not respond.
   c. Peer should repeat the instruction, or prompt trainer to respond.
   d. After prompting, trainer responds by coming over to peer.
   e. Peer praises trainer.