

EXAMINATION OF A PEER-MEDIATED INTERVENTION AS A METHOD FOR  
THE GENERALIZATION OF SOCIAL SKILLS AMONG YOUTH WITH  
HIGH-FUNCTIONING AUTISM

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EXAMINATION OF A PEER-MEDIATED INTERVENTION AS A METHOD FOR  
THE GENERALIZATION OF SOCIAL SKILLS AMONG YOUTH  
WITH HIGH-FUNCTIONING AUTISM

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## **DEDICATION**

I would like to dedicate this dissertation project to my wonderful and supportive family and friends. To my mom and dad and siblings, Patrick, Katie, and Hannah, for their encouragement throughout this process. To my boyfriend, Daniel, for listening to me and providing me guidance when I didn't think the end was possible. To my running partners, coaches, and mentors for encouraging me to focus on running when I ran and to focus on studying when I studied. This special group has become my team, so I want to dedicate this process to all of my "teammates" for the endless support in helping me balance running and school.

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## **ABSTRACT**

The purpose of this study was to investigate the impact of a peer-mediated intervention on the generalization of acquired social skills for high-functioning youth with social competence deficits. The literature underscores the importance of providing opportunities for students with social competence deficits to engage in social interactions across settings and peers outside the original instructional setting. Initial studies investigating the Social Competence Intervention for Adolescents (SCI-A) program where students with high-functioning autism were taught social skills, have shown promising generalization outcomes (Schmidt, Stichter, Lierheimer, McGhee, & O'Connor, 2011; Schmidt & Stichter, 2012). The current study replicated and extended the work of Schmidt and Stichter (2012) by training peer networks, based on skills and concepts of the SCI-A program, to encourage the generalization of social skills acquired in the SCI-A program. This study used a multiple-baseline across three target students to determine if the peer-mediated intervention would increase overt social interactions. Additional dependent variables included implementation fidelity, social validity, and pre-post measures of social competence. Results indicated that the peer-mediated intervention showed promising generalization outcomes related to increases in appropriate responses and decreases in inappropriate social interactions. Additionally, results indicated high consumer acceptability of the peer-mediated intervention. Finally, results showed that peers' implementation of the strategies taught in the peer training impacted the rate at which target students engaged in social interactions. Implications for peer dynamics are discussed. In addition, considerations for interpretation and future directions of the current study are also discussed.

## **CHAPTER I**

### **LITERATURE REVIEW**

Chapter one provides a rationale for investigating the use of a peer-mediated intervention to promote the practice and generalization of social skills acquired via a group-based social skills training (SST) program for youth with social competence deficits. First, this chapter begins with an overview of characteristics associated with Autism Spectrum Disorders (ASD) followed by the importance of developing social competence within naturally occurring settings. Second, the current state of the literature related to the effectiveness and limitations of SST groups is reviewed, including strategies to promote generalization. Third, previous peer-mediated interventions research and theoretical constructs supporting the role and purpose of typically developing peers is presented. Fourth, a comprehensive review of peer-mediated strategies as a mode for the generalization of SST groups is provided. Finally, this chapter concludes with specific research questions that determined the premise of this investigation.

#### **Statement of the Problem**

##### **Prevalence of Autism Spectrum Disorders**

Over the past few decades the number of individuals receiving clinical or educational services for an Autism Spectrum Disorder (ASD) diagnosis has markedly increased (Rice et al., 2010). In 2012 the Autism and Developmental Disabilities Monitoring (ADDM) Network reported an estimated prevalence rate of 1 out of 88

individuals with a diagnosis of ASD. This prevalence rate reported in 2012 indicated a 23% and 78% increase in comparison to prevalence rates reported in 2007 and 2009, respectively (Center for Disease Control, 2012). Additionally, the ADDM Network also reported changes in specific characteristics of individuals with ASD relative to previous reports. For instance, the prevalence rate published in 2012 identified approximately 62% of individuals with ASD to have average to above average intellectual quotients (IQ > 70) compared to 25% in earlier reports (Center for Disease Control, 2012; Rice et al., 2010).

Although a true increase in prevalence of ASD has yet to be identified, the increase in awareness of individuals with ASD has underscored the need for researchers in special education to develop and evaluate evidence-based social interventions. This issue has become increasingly important since the amendments to the No Child Left Behind Act of 2001 (NCLB), and its emphasis on scientifically based research. Federal initiatives such as NCLB as well as increases in ASD have encouraged researchers to empirically validate practices designed to remediate challenges associated with ASD, including those impacting social competence (Odom, Collet-Klingenberg, Rogers, & Hatton, 2010).

### **Definition of Autism Spectrum Disorders**

According to the proposed revisions to the *Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition*, (DSM-V) ASD is a neurodevelopmental disorder characterized by deficits, delays, or atypical development in (a) social communication and interaction skills, and (b) restricted, repetitive patterns of behavior, interest, or activity (American Psychiatric Association, 2012). Specifically, social communication

and interaction dysfunction refers to the difficulty individuals with ASD have in developing and maintaining relationships, understanding nonverbal communication, and engaging in reciprocal conversations (American Psychiatric Association, 2012). Unusual social behavior observed in early childhood has been positively correlated with short-term, intermediate, and long-term difficulties across educational, psychosocial, and vocational functioning (Gresham, Elliott, & Kettler, 2010; Rao, Beidel, & Murray, 2008).

Additionally, the proposed revisions to the DSM-V have categorized ASD into three levels of functioning based on independent need for supports and services, including: (1) requiring support (high-functioning), (2) requiring substantial support (medium-functioning), and (3) requiring very substantial support (low-functioning) (American Psychiatric Association, 2012). In line with the DSM-V, previous literature has commonly used labels such as low, medium, and high-functioning autism to capture the heterogeneous characteristics associated with ASD (Scheeren, Koot, & Begeer, 2012). Despite attempts to categorize ASD into categories based on cognitive underpinnings or severity of autism symptoms, qualitative differences in social communication and interactions exist across a continuum of developmental and intellectual levels (American Psychiatric Association, 2012). For example, sufficient empirically validated evidence supports the notion that, although high-functioning individuals with ASD tend to demonstrate less severe symptoms of autism compared to their counterparts with intellectual disabilities (i.e., medium to low-functioning), individuals with high-functioning autism (HFA) can remain profoundly impacted by social competence deficits (Scheeren et al., 2012). In other words, despite previous reports that intellectual ability is highly correlated with social and emotional outcomes, a

person's IQ cannot solely predict the degree of social dysfunction (Klin, Jones, Schultz, Volkmar, & Cohen, 2002). Thus, professionals working with individuals with HFA need to target the diversity of social challenges associated with this subpopulation of ASD because this diversity likely dictates the type of social competence intervention necessary and hence the individual's likely responsiveness to that intervention (Scheeren et al., 2012).

### **Types of Social Skill Deficits**

The hallmark characteristic of individuals with HFA includes an array of deficits in social communication and interaction skills such as maintaining eye contact, initiating interactions, responding to initiations, and inferring the interests of others (American Psychiatric Association, 2012). HFA is further characterized by marked differences in the way individuals use such social skills during reciprocal social interactions (Venter, Lord, & Schopler, 1992). In fact, previous studies have found that students with HFA initiate fewer social interactions with their peers than adults when compared to students without ASD; this is especially true in unstructured settings (DiSalvo & Oswald, 2002; Hauck, Fein, Waterhouse, & Feinstein, 1995). Thus, promoting the generalization of social skills across settings and peers is important for developing social competence.

Social competence is defined as a person's ability to: (a) establish and maintain positive interpersonal relationships with peers, (b) recognize when to terminate negative interpersonal relationships with peers, and (c) gain peer acceptance (Gresham & Reschly, 1987; Gresham, Sugai, & Horner, 2001). In addition to interactions with peers, social competence is also defined as a person's ability to effectively use social skills across different social situations (Stichter, Randolph, Gage, & Schmidt, 2007). Social skills are

defined as those specific behaviors used by an individual during a social interaction, whereas social competence involves components of social validity, or bystanders' judgments and perceptions of an individual's performance of social skills (Gresham, 1986). According to Gresham (1986), this performance does not need to be exceptional as long as the person was able to adequately and independently meet his or her needs and wants for a particular social context (Stichter et al., 2007).

The literature has categorized social skills deficits into three types: acquisition, performance, and fluency; and it has highlighted the importance of linking social skills instruction to one or more than one of the above social skills deficits (Bellini, Peters, Benner, & Hopf, 2007; Gresham et al., 2010; Gresham et al., 2001; McConnell, 2002; Odom et al., 2010). The first type of social skills deficit, acquisition, is defined as the absence of knowledge related to performing a social skill in a specific social situation (Gresham, 1986). This is often referred to as the "can't do" problem in that an individual cannot perform the social skill due to lack of understanding, even under optimal conditions. The literature has identified instructional methods for remediating acquisition skills deficits, including direct instruction, modeling, and coaching strategies (Gresham et al., 2010).

The second type of social skills deficit, performance, is defined as failing to perform a known social skill in a specific social situation (Gresham, 1986). This is commonly referred to as the "won't do" problem because although the individual received direct instruction and knows how to perform the social skill, he or she chooses to not execute the skill due to motivational issues rather than acquisition. Instructional methods identified to remediate performance skills deficits include reinforcement-based

interventions and increasing frequency of opportunities for individuals to practice social skills (Gresham et al., 2010).

The third type of social skills deficit, fluency, refers to when a student knows how and wants to perform a social skill but remains awkward in performing the skill in natural settings. Fluency skills deficits may emerge due to a lack of exposure to socially competent peers (Gresham et al., 2001). Instructional methods targeting fluency skills deficits include (a) modeling appropriate social skills, (b) providing ample opportunities to rehearse or practice appropriate social skills, and (c) reinforcing fluid performance of social skills in natural setting (Gresham et al., 2010). Identifying the type of social skills deficits may be fundamental to selecting and delivering appropriate social interventions (Maag, 2006). Unfortunately, due to the heterogeneity of ASD many studies investigating social interventions often fail to link instructional techniques to one of the three social skills deficits (acquisition, performance, or fluency) (Cappadocia & Weiss, 2011; Rao et al., 2008). This omission may negatively impact the development of social competence for students with HFA.

### **Importance of Developing Social Competence**

Due to an increase in social demands during middle school, youth with HFA tend to be aware of their difficulties developing friendships and relating to same aged peers (Attwood, 2005; Carter, Davis, Klin, & Volkmar, 2005). This awareness of social rejection, often leads to reports of loneliness, depression, and anxiety, especially with age (Bauminger, 2002; Bellini, 2004). In addition, youth with HFA are less likely to initiate and maintain reciprocal social interactions with peers, thus limiting the remediation process for acquisition, performance, and fluency of social skills (Gresham et al., 2010;



Hauck et al., 1995). Church Alisanski, and Amanullah (2000) observed an array of atypical social interaction behaviors among youth with HFA. Although these behaviors varied in quality and quantity, youth with HFA would often use awkward body language and gestures; use eye contact inappropriately; interpret social cues inaccurately; and/or engage in strange or annoying behaviors such as making loud noises. Altogether, this unusual or odd social behavior often stood out and led to individuals with HFA to be ridiculed or rejected by peers (Church et al., 2000). If strategies are not in place to remediate social competence deficits at a younger age, then this subpopulation of ASD may have difficulty functioning independently, maintaining employment, and may have persistent difficulties in developing and maintaining meaningful relationships beyond their families as they transition into adulthood (Attwood, 2005).

Generally, students with HFA need targeted instruction in linking emotions to different social situations, recognizing and interpreting social cues and norms, understanding peers' perspectives, and problem solving (Bauminger, 2002). These social challenges could represent core deficit areas of individuals with HFA (Scheeren et al., 2012; Solomon, Goodlin-Jones, & Anders, 2004). The following section provides a brief description of the conceptual models underlying each possible social competence deficit.

### **Overview of Core Social Competence Deficits**

Many conceptual models have attempted to explain the degree of social dysfunction associated with HFA, including weak central coherence, difficulties with theory of mind, and challenges with executive functioning tasks (Bauminger & Kasari, 1999; Klin et al., 2002; Scheeren et al., 2012; Solomon, Goodlin-Jones, & Anders, 2004).

First, weak central coherence also referred to “local-global visual processing” may limit a person’s ability to construct salient features of an environment into a congruent and meaningful whole (Bernardino et al., 2012; Klin et al., 2002). The weak central coherence hypothesis may account for the widely accepted deficit in facial processing associated with individuals with HFA (Bernardino et al., 2012). In other words, weak central coherence has been considered to account for inaccurate making and reading of facial expressions. Previous studies have documented that individuals with HFA tend to focus on either unimportant areas of the face such as the ears, chin, or hairline or a single feature of the face such as the eyes, nose, or mouth rather than scanning the entire face as a unit (Klin et al., 2002; Pelphrey et al., 2002). Thus, this tendency to explicitly separate features from a unit may inhibit global processing, and thus, may limit a person’s ability to accurately read others’ feelings and emotions (Bernardino et al., 2012; Klin et al., 2002).

The second hypothesis, theory of mind deficits, may commonly be referred to as “perspective taking,” “metacognition,” “mindreading,” and “folk psychology” (Baron-Cohan, 2000; Hutchins, Prelock, & Bonazinga, 2012). Theory of mind refers to a person’s ability to construct others’ internal mental states such as their beliefs, desires, intentions, feelings, and emotions, and includes their ability to make inferences based on those internal mental states (Bauminger & Kasari, 1999). Many studies have been dedicated to understanding theory of mind as well as to the development of theory of mind assessments for individuals with ASD (Baron-Cohen, 2000). In general, children with HFA often perform worse than their typically developing counterparts on theory of

mind assessments, and as a result may underline hallmark social behaviors associated with HFA such as failure to respond to social stimuli (Tager-Flusberg, 2007).

The third hypothesis, executive functioning, refers to a variety of self-regulatory cognitive processes that allow a person to appropriately organize, plan, control impulses, and problem solve in order to attain a goal, while at the same time demonstrate flexibility when faced with a challenge (Klin et al., 2002). Previous studies have reported that individuals with HFA often experience difficulty on executive functioning measures, and this replication of impairments in executive functioning may suggest that it could represent a core social competence deficit for this subpopulation of ASD (Ozonoff, Pennington, & Rogers, 1991; Solomon et al., 2004; Stichter et al., 2010). Notably, executive functioning and theory of mind deficits have also explained characteristics associated with other conditions such as Attention Deficit Hyperactivity Disorder (ADHD), and thus may not be specific to ASD (Ozonoff et al., 1991).

Due to an increasing understanding of the different cognitive theories underlying social competence deficits associated with HFA, social skills interventions may be particularly useful when they are tailored towards such cognitive processes (White, Koenig, & Scahill, 2007). For instance, a study by Scheeren et al. (2012) found that the diversity of social communication and interaction behaviors for individuals with HFA were positively correlated with Theory of Mind and executive functioning measures. Thus, the association between different social interactions styles and strengths and weaknesses in core social competence deficits as defined by central coherence, Theory of Mind, and executive functioning may be a logical starting place for interventions (Scheeren et al., 2012). As a result, the literature has identified evidence-based

interventions targeting core social competence deficits as well as improving social interactions for this subpopulation of ASD (Odom et al., 2010; Rogers, 2000).

### **Identifying Evidence-Based Interventions**

The Individuals with Disabilities Education Act of 2004 (IDEA) requires schools to choose interventions based on empirical research and implement these interventions in the least restrictive environment. To aid in this process the U.S. Department of Education funded the National Professional Development Center (NPDC) on ASD to (a) provide a definition of evidence-based practices, (b) establish criteria for identifying scientifically based interventions for children and youth with ASD, and (c) describe how teachers can use evidence-based practices (Odom et al., 2010).

Evidence-based practices are practices shown by high quality research to have meaningful effects of student outcomes (Cook & Odom, 2013). For an intervention to demonstrate evidence it needs to meet one of the following methodological criteria: (a) two independent research groups must have conducted an experimental or quasi-experimental group design study, (b) three different research groups must have conducted at least five single-subject design studies, or (c) a combination of at least one experimental or quasi-experimental group design study and at least three single-subject design studies from three independent research groups (Odom et al., 2010).

Using this definition of evidence-based practices, Odom and colleagues (2010) conducted a broad literature search of studies that included the following criteria: (a) participants included individuals with ASD ages birth to 22 years, (b) results clearly credited gain in target behaviors to the intervention, and (c) research methods demonstrated adequate experimental control to rule out threats to internal and external

validity. From this review of the literature, the NPDC on ASD identified a number of evidence-based strategies designed to teach social interaction skills necessary for building relationships with others. These strategies for promoting social competence that can be divided into two broad categories: adult-mediated and peer-mediated approaches (Laushley & Heflin, 2000; Odom et al., 2010; Rogers, 2000).

First, adult-mediated approaches involve adults providing instructional techniques, prompts, and/or reinforcement directly to the children with ASD for specific social skills. Common adult-mediated interventions include pivotal response training and SST groups (Odom et al., 2010). Second, peer-mediated approaches involve training social competent peers, or siblings, to facilitate play and social interactions with children with ASD (Carter, Cushing, & Kennedy, 2008). Common peer-mediated strategies include peer tutoring and peer networking (Laushley & Heflin, 2000; Rogers, 2000).

This section described the process for identifying evidence-based interventions for students with ASD that led to the current interest in social competence interventions. Adult and peer mediated interventions were designed to facilitate the development of social competence to enable students with ASD to interact more successfully with their peers in naturally occurring settings. The following section describes research and focus specifically on the use of peers as a mode for generalization of social skills in SST groups for children with youth with HFA.

### **Overview of Social Skills Training Groups**

The following section reviews SST groups as an adult-mediated intervention designed to enhance the acquisition, performance, and fluency of social skills for students with a range of social competence deficits. SST groups involve adults teaching small

groups of students with social deficits how to appropriately interact with their typically developing peers (e.g., making appropriate eye contact, initiating a conversation, responding to initiations, etc.) (Odom et al., 2010). Effective SST groups often include direct instruction, modeling, role-playing, shaping, on-going feedback, and reinforcement strategies (Cappadocia & Weiss, 2011; Gresham et al., 2001). Some programs also include instructional methods such as cognitive behavioral interventions, behavior management packages, and parent training components (Cappadocia & Weiss, 2011).

Historically, previous studies have shown that group-based SST programs effectively increase social interactions for children with a range of social and developmental disabilities (Gresham et al., 2001). These findings suggested that more effective group-based SST programs usually incorporate (a) a combination of direct instruction, modeling, and reinforcement procedures and (b) instructional methods that match social skills deficits (Gresham et al., 2001). In addition to developing social skills in children with varying levels of disabilities, previous reviews have also evaluated group-based SST programs to support the core social competence deficits of children and youth with social competence deficits (Cappadocia & Weiss 2011; Cook et al., 2008; Rao et al., 2008; White et al., 2007). Next, a brief summary of group-based SST programs designed to remediate social competence deficits specifically for children and youth with HFA is presented.

First, Ozonoff and Miller (1995) were among the first to researchers to implement a group-based SST program to support core deficit areas for nine adolescents with HFA ages 13 to 14. Ozonoff and Miller (1995) implemented a 14-week SST program composed of two units to address deficits in conversation skills and perspective taking

skills. Results indicated that participants in the SST group performed better on theory of mind measures than the control group, however, these improvements were not significant. Results also showed that participants in the SST program did not improve on parent and teacher ratings of social skills functioning, as indicated on the *Social Skills Rating System (SSRS)*. These limited findings may be due to the small sample size ( $n=9$ ) and the hypothesis that SST programs targeting theory of mind skills may not generalize to global measures of social skills functioning (Ozonoff & Miller, 1995). These seminal findings marked the need for future studies in this area.

Another study by Solomon and colleagues (2004) investigated a 20-week SST program designed to target three core deficit areas (emotion recognition, theory of mind, and executive functioning) for 18 children and youth with HFA ages 8 to 12. This group-based SST program also incorporated a parent-training component. Results indicated that participants in the intervention exhibited improvement on measures of facial expression recognition and problem solving in comparison to a waitlist control group. A limitation to this study was the lack of direct observations for measuring social interactions outside the treatment conditions (Solomon et al., 2004).

Two investigations by Stichter and colleagues (2010; 2012) have evaluated a group-based SST program based on principles of cognitive behavioral interventions and applied behavior analysis for 47 children and adolescents with HFA ages 6 to 15. This SST program was referred to as the social competence intervention for elementary (SCI-E) or adolescents (SCI-A) program and included five units targeting facial expressions, sharing idea, conversation skills, emotion regulation, and problem solving. Results indicated improvements on measures of social functioning as well as executive

functioning and theory of mind for both the SCI-E and SCI-A. Again, these studies reported no results related to generalization of social skills to natural settings outside the intervention (Stichter et al., 2010; Stichter et al., 2012).

While SST groups effectively support the development of social competence for children and adolescents with HFA, research often fails to demonstrate generalized outcomes (Bellini et al., 2007; Stichter et al., 2007). Generalization is defined as the degree to which outcomes of an intervention are transferred to skills, individuals, and settings outside the treatment condition (Gresham et al., 2001). Rao et al., (2008) reported that only three of the 10 reviewed studies programmed for generalization of social outcomes acquired in the SST group (Barnhill, Cook, Tebbenkamp, & Myles, 2002; Barry et al., 2003; Bauminger, 2002). Moreover, only one study reported positive outcomes related to generalization, thus highlighting the need for more research to measure the generalization of social skills to natural settings outside the intervention (Barry et al., 2003; Rao et al., 2008). In a recent review of SST group interventions, Cappadocia & Weiss (2011) also suggested that future research is needed to focus on the generalization of social skills to either one peer or a network of peers across naturally occurring settings.

A recent study by Schmidt and colleagues (2011) measured the effectiveness the SCI-A program on social competence as well as generalization measures for six adolescents with HFA ages 11 to 14. Altogether, results indicated improvement on social competence outcomes for social communication and motivation domains as measured by teacher report; student performance on theory of mind and facial recognition tasks, and executive functioning as measured by teacher report. Additionally, Schmidt and



colleagues (2011) also collected direct observational data to assess the generalization of social skills in the SCI-A program to natural settings. Generally, data showed an increase in social interactions with peers outside the treatment condition for all six participants, thus suggesting a potential for generalization of social skills following the SCI-A program. The SCI-A program was designed to directly teach and provide practice opportunities for use of appropriate conversation skills to enable target participants to interact successfully with their peers in structured settings, which may have promoted the generalization of social skills in unstructured settings. Future research needs to continue to include generalization measures related to SST groups and target the development of social competence in naturally occurring settings (Schmidt et al., 2011; White et al., 2010).

With the exception of promising outcomes by Schmidt et al., (2011), the development of social competence in decontextualized settings without the support of peer-mediated strategies may be contributing to limited evidence of generalization (Carter, Cushing, Clark, & Kennedy, 2005; Rogers, 2000). Therefore, incorporating peers along side SST groups is a promising practice for not only increasing social motivation and interactions but also for promoting the generalization of social skills to natural settings (White et al., 2007). A number of studies have investigated the use of SST groups to increase social interactions with peers by including peers in the social skills training process.

### **Overview of SST Groups with Peer-Mediated Components**

Kamps and colleagues (1992) were among the first researchers to examine the combined use of SST groups and peer-mediated strategies. This investigation employed

a SST program to a first grade classroom, including three students with HFA and sixteen classmates, as part of the general education curriculum. Instruction on specific social skills included: (a) initiating an interactions, responding to initiations, and keeping an interaction going; (b) conversations, greetings, and staying on topic; (c) giving and accepting compliments; (d) taking turns and sharing; (e) helping others and requesting help; and (f) including others in activities. Overall, results indicated improvement in frequency and duration of social interactions during intervention and maintenance conditions; however, social interactions were greater during intervention (Kamps et al., 1992). Although additional research needs to examine the generalization of social skills, these seminal findings underscored the importance of including typical peers and target participants in group-based SST interventions.

Additionally, two recently published studies by Koenig et al. (2010) and White et al. (2010) also investigated a group-based SST program with a peer-mediated component. This 16-week SST program was rooted in applied behavior analysis and cognitive behavioral interventions. The program was delivered to groups of students with HFA and typical peers. Peers served as models and/or tutors for appropriate social skills as well as provided feedback during cooperative group activities. The first study by Koenig and colleagues (2010) indicated improvement on social functioning and competence measures compared to a waitlist control group. The second study by White and colleagues (2010) suggested improvements on social motivation and social communication measures. However, these studies failed to measure the generalization of social skills to unstructured settings, indicating another area for further investigation.

In summary, this section reviewed literature indicating that SST groups in conjunction with other instructional methods can improve social competence for students at-risk for social isolation, anxiety, and rejection (Bauminger, 2002; Bellini, 2004; DeRosier & Mercer, 2009; Gresham et al., 2001; Rogers 2000). Although previous research has examined various approaches to directly teaching social skills to students with HFA, few studies have empirically validated peer-mediated interventions as a method for generalization of social skills acquired via SST groups within natural settings, indicating an underdeveloped area of research (Cappadocia & Weiss 2011; Rao et al., 2008; White et al., 2007). Literature suggests that one way to provide a learning environment conducive to the acquisition, performance, and generalization of social skills is by increasing practice opportunities with trained peers in natural settings (Rogers, 2000). Thus, the next section provides a comprehensive review of the literature related to the role and purpose of peers in social competence interventions.

### **Overview of Peer-Mediated Interventions**

In addition to directly teaching social skills to students, the second approach designed to promote the acquisition, performance, and fluency of social skills is peer-mediated interventions (Chan et al., 2009). Peer-mediated strategies serve as the umbrella term for a variety of other strategies such as peer modeling, peer initiation training, peer monitoring, peer tutoring, and peer networking. The primary goal of these interventions is to encourage positive social interactions between students with ASD and typical peers within natural settings (National Standards Report, 2009). Peer-mediated interventions represent one of the most empirically supported social skills interventions

for children with ASD (Bass & Mulick, 2007; DiSalvo & Oswald, 2002; Rogers, 2000). The following section describes different types of peer-mediated interventions.

### **Types of Peer-Mediated Interventions**

The use of peers as interventionists originates from the work of Strain and colleagues addressing limitations associated with adult-mediated interventions in structured environments such as dependency on adult-prompting and difficulty generalizing skills to peers within natural settings (Carter et al., 2005). The seminal study by Strain, Shores, and Timm (1977) was among one of the first studies to examine the impact of “peer-delivered social stimuli” on the interactions between children with ASD and their classmates. This study indicated that implementing peer-mediated approaches could create more opportunities for students with ASD to appropriately interact with socially competent peers across a variety of unstructured settings (Bass & Mulick, 2007).

In an initial review of peer-mediated interventions, Odom and Strain (1986) segregated peer-mediated interventions into three types: (1) proximity, (2) prompt and reinforce, and (3) peer initiation training. First, proximity occurs by purposefully selecting typical peers to model appropriate social interactions for students with ASD; however, peers receive no formal training in social or behavioral strategies. Second, prompt and reinforce merely involves training typical peers to prompt and reinforce appropriate social interactions with students with ASD. The third type, peer initiation training, provides typical peers with instruction of strategies to promote social interactions with students with ASD (Odom & Strain, 1986).

Nearly a decade later, Utley, Mortweet, and Greenwood (1997) provided a more extensive review of the different types of previously published peer-mediated interventions. Utley and colleagues (1997) included Odom and Strain's (1986) original types proximity and peer initiation training and added peer monitoring, peer networking, and peer tutoring. The following section further defines and provides empirical support for each type of peer-mediated interventions proposed by Utley et al. (1997).

**Proximity.** Proximity increases the number of opportunities for target children to observe and learn new skills from peer models sometimes this is type is referred to as integrated classrooms or playgroups (Odom & Strain, 1986; Utley, et al., 1997). Proximity interventions do not support specific training related to social or behavioral strategies. Instead, peer models demonstrate socially appropriate behaviors in close physical proximity to target children (DiSalvo & Oswald, 2002). Although many studies have suggested proximity increases social interactions for students with ASD (Carr & Darcy, 1990; Kamps, Kravits, & Ross, 2002; Whitaker, 2004), additional studies comparing proximity to other types of peer-mediated interventions have shown that training peers increase social interactions at higher levels than proximity (Castorina & Negri, 2011; Laushley & Heflin, 2000; Schmidt & Stichter, 2012).

**Peer initiation training.** Peer initiation training involves teaching socially competent peers to initiate specific strategies (e.g., gaining attention, requesting, questioning, responding, commenting, assisting, and complimenting) to facilitate play and social interactions with target children (Bass & Mulick, 2007). In addition, peer initiation training can take the form of peers implementing pivotal response training strategies (Harper, Symon, & Frea, 2008; Kuhn, Bodkin, Devlin, & Doggett, 2008) or

peers using visual scripts (Ganz et al., 2012). Teaching techniques often include one or more of the following: discussing, modeling, role-playing, and visual and verbal prompting, ongoing feedback, and reinforcement strategies (Chan et al., 2009).

Additionally, peers can be trained separately from target participants (Carter, Cushing, Clark, & Kennedy, 2005; Goldstein et al., 1992; Lee, Odom, & Loftin, 2007) or target participants can be included in the peer training process (Banda, Hart, & Liu-Gitz, 2010; Chung et al., 2007; Gonzalez-Lopez & Kamps, 1997; Laushley & Heflin, 2000).

Previous studies investigating peer initiation training have resulted in increased frequency and duration of social interactions including greeting, initiating, responding, making eye contact, and requesting to trained peers as well as decreased inappropriate behaviors such as off-topic comments and restrictive and repetitive behavior (Chan et al., 2009).

However, many of peer-mediated interventions include specific scripts or activities, which may limit generalization of social skills and interactions to untrained peers or settings beyond the intervention (Kahn et al., 2008).

**Peer monitoring.** Peer monitoring involves peer models assisting target children with behavioral and transitional tasks throughout a school day (Utley et al., 1997). For example, a study by Sainato, Strain, Lefebvre, & Rupp (1987) examined the use peers accompanying low-functioning individuals with disabilities from the classroom to the lunchroom. In this study peers provided prompts and reinforcement for appropriate behaviors. The goal of peer monitoring is to reduce the frequency of adult prompting (Utley et al., 1997). Results indicated that peer monitoring increased practice opportunities for functioning independently in natural settings, while at the same time decreased dependency on adult prompts (Sainato et al., 1987).

**Peer networking.** Peer networks have been defined as a group of peers who demonstrate an interest in and understanding of individuals with disabilities to the extent that it positively impacts their lives (Garrison-Harrell, Kamps, & Kravits, 1997). Peer networking strategies aim to create a supportive and accepting environment for individuals with disabilities to learn from and participate with peer models (Utley et al., 1997). Research has identified that effective peer networking includes the following steps: first, adults provide groups of peers with information about disabilities to promote awareness; second, adults teach groups of peers to initiate social interactions with individuals with disabilities; and third, adults instruct groups of peers to serve as models and tutors of appropriate social and play behaviors (Bass & Mulick, 2007).

The goal of peer networking is to promote the development and maintenance of friendships through the use of peer models (Utley et al., 1997). Previous investigations for peer networking have targeted the quantity and quality of social interactions within structures and unstructured contexts (e.g., lunch, recess, transition, etc.) for low functioning children and youth with ASD (Collet-Klingenberg, Neitzel, & LaBerge, 2012; Garrison-Harrell et al., 1997; Haring & Breen, 1992; Kamps et al., 1997). Results of these studies have indicated that increases in the frequency and duration of social interactions across settings as well as peer models acceptance of individuals with disabilities (Collet-Klingenberg et al., 2012; Garrison-Harrell et al., 1997; Haring & Breen, 1992; Kamps et al., 1997).

**Peer tutoring.** Two commonly used peer-mediated intervention for improving academic and social outcomes are peer tutoring and cooperative learning groups (Harrower & Dunlap, 2001; Laushey & Heflin, 2000). Studies that have implemented

peer tutoring methods have noted academic gains including reading and math activities as well as socially engaged time during unstructured activities (Dufrene, Noell, Gilbertson, & Duhon, 2005; Kamps, Barbetta, Leonard, & Delquadri, 1994). Additionally, studies investigating cooperative learning groups, defined as small groups of peer models and students with disabilities working together to solve a problem, complete a task, or accomplish a common goal, have indicated increased academically engaged time among all group members (Dugan et al., 1995).

### **Limitations to Peer-Mediated Interventions Research**

Several research groups have evaluated the effectiveness of different characteristics of peer-mediated interventions, including strategies and instructional methods across different subpopulations of ASD (Bass & Mulick, 2007; Chan et al., 2009; DiSalvo & Oswald, 2002). The following section describes results and limitations to these previous peer-mediated intervention reviews. Wang, Cui, and Parrila (2011) reviewed the effectiveness of peer-mediated interventions for children and youth with ASD. Of the 14 studies, results suggested that younger students benefited more from peer-mediated interventions than older students. Although this finding strongly supports the importance of early intervention, only one study included adolescents whereas 13 studies included participants between the ages of 4 and 10.

Additionally, Zhang and Wheeler (2011) also reviewed the effectiveness of peer-mediated interventions for young children with ASD. Results were similar to Wang and colleagues (2011) in that studies emphasized the importance of using peers to increase social interactions as a part of an early intervention package for children with ASD. Zhang and Wheeler (2011) also reported that previous peer-mediated intervention studies



were more effective at increasing responses than initiations. Given these findings, more research is needed to identify components of peer-mediated intervention such as duration, intensity, type, context, and peer characteristics that are most appropriate for improving initiations among students with ASD.

Despite overwhelmingly positive social outcomes, a number of limitations were indicated. The majority of studies reviewed focused on students with ASD who were low functioning. Of the 42 studies reviewed by Chan and colleagues (2009) only 26 of the 172 participants were described as high functioning. To accurately assess effectiveness of peer-mediated interventions more subpopulations of ASD need to be included. Specifically, future research needs to including not only youth and adolescents with ASD but also focus on strategies for high functioning students with ASD (Chan et al., 2009; Wang et al., 2011).

### **Theoretical Framework**

Peer-mediated interventions are deeply rooted in principles of social learning theory (Sperry, Neitzel, & Engelhardt-Wells, 2010). Social learning theory, or observational learning, supports the use of models as an avenue for the acquisition, performance, and generalization of specific skills (Bandura, 1977; Schunk, 2012). Observational learning distinguishes imitation from modeling. Although imitating behavior has also been identified as mode for learning, modeling involves a series of cognitive processes including attention, retention, rehearsal, production, motivation, and self-efficacy (Schunk, 2012). These cognitive processes often follow the following steps. First, the learner needs to observe the model performing the skill. This requires accurately attending to the salient features of the model in order to retain new information

related to performing the skill. Then, the learner becomes motivated to rehearse and perform the previously observed skill. Finally, the learner's self-efficacy about the skills can impact this performance (Bandura, 2005).

Social learning theory defines self-efficacy as a person's beliefs and thoughts about his or her capabilities to learn and perform a skill. A person can perform a skill across structured and unstructured settings based on his or her self-efficacy about that specific skill (Schunk, 2012). Although observing models, exclusively, has shown to increase motivation to perform the observed behavior, limitations to this approach have also been noted. Observing models without rehearsing or performing the skill may limit maintenance and generalization (Schunk, 2012). Thus, learners need ample opportunity to practice observed behaviors within supportive natural settings. Implementing peer-mediated strategies allows students with ASD this opportunity to practice previously acquired social skills to develop performance and fluency skills deficits (Gresham et al., 2010; Sperry et al., 2010).

Another limitation involves selecting the ideal model for acquisition, performance and generalization of the observed behavior. Social learning theory emphasizes that learning can be optimized when the following guidelines are met: models are the same age and gender as the observer, two to three models are better compared to one model, and models are attended to and perceived accurately by the observer (Garfinkle & Schwartz, 2002; Bandura, 1977; Schunk, 2012). Research supports various reasons why children with HFA are less likely to accurately observe and learn from peer models without remediation. First, individuals with HFA often have difficulty separating salient information from least salient and often have a tendency to focus on the unimportant

features when observing a model (Klin et al., 2002). Second, individuals with HFA tend to engage in fewer social interactions with typical peers because more often not typical peers choose to play and interact with other typical peers, thus resulting in fewer opportunities to attend to peer models (DiSalvo & Oswald, 2002). Third, individuals with HFA are more likely to observe models perceived as similar rather than superior in competence (Schunk, 2012). Additionally, research suggests that observing multiple models instead of one may increase acquisition, performance, and generalization of social skills across the different models due to diversity in social interaction styles (Bellini & Akullian, 2007; DiSalvo & Oswald, 2002; Scheeren et al., 2012).

Social learning theory supports the benefits of including peers in social skills interventions to promote the acquisition, maintenance, and generalization for students with HFA. Given the limited evidence for generalization of social skills following implementation of SST groups, more studies need to address this limitation via peer models. Surprisingly, few group-based SST programs have included a peer component as a method for generalization for students with HFA. The following section provides a review of SST groups that include peer-mediated strategies for the purpose of generalization of social skills.

## **Literature Review**

### **Peer-Mediated Interventions and Generalization of SST Groups**

To this point, no literature review exists addressing peer initiation training as a mode for generalization of social skills acquired via group-based SST programs for children and youth with HFA. Thus, the purpose this section is to provide a critical review of the current literature in the area of peer-mediated interventions and

generalization of SST groups for students with HFA. A systematic search of relevant literature was conducted using the University of Missouri Library EBSCO database. The keywords “autism” “generalization” “peer-mediated” “social skills training” “social competence” “social interaction” were used in different combinations to conduct the search. Known researchers and reference were also included in the search procedures. The search was limited to research conducted from 1977 to present. The search revealed four studies that matched the following criteria: (a) the participants were identified as having HFA; (b) the intervention employed was a group-based SST program designed to support social competence deficits; and (c) the outcomes measured included generalization of target social behaviors using peer-mediated strategies. This section summarizes each of the four studies reviewed (i.e., Barry et al., 2003; Bauminger, 2002; Castorina & Negri, 2011; Schmidt & Stichter, 2012). Table 1 displays characteristics of participants, social interventions implemented, experimental design, target behaviors, and results of included studies.

Group-based SST programs provide the acquisition and performance of social skills in structured settings while peer-mediated interventions provide the generalization of social skills in naturally occurring settings. For the reviewed studies, two of the SST programs were conducted in clinic-based settings (Barry et al., 2003; Castorina & Negri, 2011) and two were conducted in school-based settings (Bauminger, 2002; Schmidt & Stichter, 2012). The settings for assessing the generalization using peer-mediated strategies included recess and afterschool (Bauminger, 2002), lunch and math (Schmidt & Stichter, 2012), clinic-based playgroup (Barry et al., 2003), and home (Castorina & Negri, 2011). The study by Barry and colleagues (2003) analyzed four participants using

a within-subject linear regression and a comparison of pre-post measures. The study by Bauminger (2002) used a multivariate analysis of variance with repeated measures. Castorina and Negri (2011) utilized an experimental design with a control group. The study by Schmidt and Stichter (2012) used a single-subject multiple baseline design across three participants with a comparison treatment component.

In Bauminger's (2002) study, 15 participants with HFA ages 8 to 17 and their assigned peers were recruited to participate in a SST program for three hours per week, spanning seven months. The purpose of this investigation was twofold: first, implement a SST program designed to enhance social skills of target participants, and second, increase social interactions between target participants and peers across natural settings. The SST program was embedded in principles of cognitive behavioral interventions and targeted the following skills: (a) understanding friendships including why it is important to listen to a friend; (b) identifying emotions using facial expressions, gestures, and vocalizations; and (c) initiating conversations, comforting and sharing experiences with a friend.

As part of the SST program, target participants practiced specific social skills with their assigned peer. Following the intervention, direct observational data was collected on the target participants interacting with untrained peers in unstructured settings. Although outcomes revealed improvement in both social skills and interactions with trained peers, this investigation reported minimal change in generalization to untrained peers (Bauminger, 2002). More studies need to investigate whether or not social skills acquired via group-based SST programs can be generalized to social interactions with untrained peers.

Barry and colleagues (2003) investigated a group-based SST group for four children with HFA ages 6 to 9 in a clinical setting. This SST program targeted greeting, conversation skills, and play interactions. This study also assessed generalization of these social skills using 5-minute play observations with one typically developing peer and parent report. Seven peers were trained separately from the SST program in the following initiation strategies: awareness of individuals with disabilities, prompting, ignoring inappropriate behavior, activity suggesting a change in topic during monologue. Results from the SST program indicated significant improvements in greeting and play interactions and a positive trend in conversation skills. In addition, Barry and Colleagues (2003) also found that greeting, conversation skills, and play interactions generalized to the trained peers, whereas only greeting generalized to untrained peers via parent report (Barry et al., 2003). Thus, more research is needed to identify characteristics of peer-mediated interventions that increase the likelihood of generalization of social skills to untrained peers.

Castorina and Negri (2011) examined the generalization of social skills acquired via a SST group using sibling-mediated component. 21 males with HFA between the ages of 8 and 12 were recruited and randomly assigned to one of three groups: sibling, no sibling, or waitlist control. Participants assigned to the sibling group participated in a group-based SST program with their brother or sister. Participants assigned to the no sibling group participating in the same SST program but without their sibling. Following implementation of the SST program the homework data were used to measure the generalization of social skills. Results indicated that participants in the sibling and no sibling group significantly improved from pre to post intervention on social competence

and social skills measures compared to the waitlist control group. However, no significant differences on social or generalization outcomes between intervention groups were noted (Castorina & Negri, 2011). The lack of generalization may have been related to the insensitivity of assessment tools used to measure generalization (Castorina & Negri, 2011).

Schmidt and Stichter (2012) implemented the SCI-A program to three adolescents with HFA ages 12 to 13. The SCI-A program was a group-based SST program rooted in principles of cognitive behavioral interventions. Targeted skills and concepts included recognizing facial expressions, sharing ideas, taking turns in conversations, understanding feeling and emotions, and problem solving. Three matched peers were also recruited and received a separate training from the target participants in the skills and concepts of the SCI-A program. Results showed increased social interactions between target participants and trained peers during proximity conditions and peer initiation conditions; however, greater gains were documented when peers initiated interactions compared to proximity. These findings support more research investigating peer initiation training over proximity as a method for generalization of social skills acquired via SST programs (Schmidt & Stichter, 2012).

**Table 1.**

*Summary of published SST groups research with a peer component*

Citation	Participants	Intervention	Measurements and outcomes
Barry et al., 2003	HFA: 3 boys 1 girl Ages: 6-9 Peers: 4 boys and 3 girls Ages: 7-9	Peer-mediated strategy: Prompting, ignore inappropriate behavior, suggesting topics SST group, skills: • Conversational skills	<i>Social interaction observations:</i> significant increases in greeting and conversations, increasing trend in communication <i>Parent interview:</i> greeting

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		<ul style="list-style-type: none"> <li>• Greeting</li> <li>• Play interactions</li> </ul>	<p>demonstrated significant improvement indicating generalization to other settings. No improvement for conversation and communication skills</p> <p><i>Social Skills Rating System – Parent (SSRS; Gresham &amp; Elliott, 1990)</i>: no change from pre to post treatment</p> <p><i>Self-report – Loneliness scale</i>: no change in social support from teacher, parents, and friends. Change from classmates</p>
Bauminger, 2002	<p>HFA: 11 boys and 4 girls</p> <p>Ages: 8-17</p> <p>Peers: N/A</p>	<p>Peer-mediated strategy: Peer initiation training (participated in SST program)</p> <p>SST program skills:</p> <ul style="list-style-type: none"> <li>• What is a friend</li> <li>• How to listen to a friend</li> <li>• identifying emotions through facial expressions</li> <li>• social initiations and problem solving</li> </ul>	<p><i>Problem-Solving Measure</i>: Significant improvement from pre to post treatment</p> <p><i>Emotion Inventory</i>: progression over time</p> <p><i>Observed Social Interactions</i>: Significant change in social behaviors (eye contact, initiations, responses, expressing interest, sharing experiences)</p> <p><i>Social Skills Rating System – Teacher (SSRS; Gresham &amp; Elliott, 1990)</i>: Significant improvement from pre to post intervention</p>
Castorina & Negri, 2011	<p>HFA: 21 boys</p> <p>Ages: 8-11</p> <p>Peers: 7 (siblings)</p> <p>Ages 11-13</p>	<p>Peer-mediated strategy: Peer initiation training (participated in SST program)</p> <p>SST program skills:</p> <ul style="list-style-type: none"> <li>• eye contact</li> <li>• identifying feelings</li> <li>• facial expressions</li> <li>• conversational</li> <li>• problem solving</li> </ul>	<p><i>Child and Adolescent Social Perception (CASP; Magill-Evans et al., 1995)</i>: No significant difference between intervention groups; significant difference between intervention and control</p> <p><i>Social Skills Rating System – parent and teacher (SSRS; Gresham &amp; Elliott, 1990)</i>: No significant difference for teacher rated; significant difference for parent rated from pre to follow up</p>

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Schmidt & Stichter, 2012	HFA: 3 boys Ages: 13 Peers: 2 boys and 1 girl Ages: 12-13	Peer-mediated strategy: Proximity and peer initiation training (separate training but same skills/concepts as SST program) SST program skills: <ul style="list-style-type: none"> <li>• recognizing facial expressions</li> <li>• sharing ideas</li> <li>• turn taking in conversations</li> <li>• recognizing feelings and emotions</li> <li>• problem solving</li> </ul>	<i>Homework:</i> no different in completion rates between intervention groups <i>Social Validity:</i> high satisfaction rate for intervention groups <i>Observed Social Interactions:</i> Social initiation condition showed more improvement than proximity Most change was reported in response and continuations rather than initiations Performance of trained peer may have impacted outcomes <i>Fidelity:</i> peers' scores ranged from 80% to 90%; training scores were 100%
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## Limitations and Future Directions

The following section discusses limitations and suggestions for future research of the reviewed studies. Of the four studies reviewed, one included fidelity of the peer-mediated interventions including treatment integrity for the training (Schmidt & Stichter, 2012). At present, little research includes fidelity of peer-mediated interventions. In a review of peer-mediated interventions, Chan and colleagues (2009) found that only 14 of the 42 included studies reported treatment integrity, and that more than half of the 14 studies (77%) failed to report fidelity for peers. This failure to report peers implementing components of the peer-mediated intervention makes it challenging to conclude that positive outcomes were due to the intervention because it is not possible to determine the degree to which an intervention was implemented as intended (Carroll et al., 2007).

Odom and colleagues (2010) not only discussed the importance of identifying evidence-based interventions, but also discussed the importance of professionals implementing selected interventions with fidelity. Implementation fidelity is defined as the degree to which the implementer adheres to the components of the treatment program as intended by the program developers (Carroll et al., 2007). Typical peers as interventionist necessitates attention toward programming and reporting implementation fidelity for typical peers. In fact, studies have demonstrated that the performance of the typical peers affects the success of social interactions (Odom & Watts, 1991). Thus, quality indicators in special education research include programming for implementation fidelity (Odom et al., 2005).

Social validity was referred to as either social comparison or subjective evaluation measures (Kazdin, 2011). Of the four studies reviewed, one measured subject evaluation while zero collected social comparison data (Castorina & Negri, 2011). A growing body of research has questioned satisfaction and feasibility of peer-mediated interventions for low-functioning children and youth with ASD, including indirect consumers such as parents and teachers not involved in implementation (Laushley & Heflin, 2000; Lee et al., 2007) and direct consumers such as peers, target students, and teacher involved in implementation (Carter & Pesko, 2008; Dugan et al., 1995; Gonzalez-Lopez & Kamps, 1997; Hughes et al., 2001; Kamps et al., 1998). Inline with previous studies measuring subjective evaluation, Castorina and Negri (2011) also reported high levels of satisfaction for the parents of adolescents with HFA. However, future research efforts may need to focus on what components of peer-mediated interventions are socially valid from anonymous surveys and direct observations of indirect and direct informants (Chan et al.,

2009; Hurley, 2012). Additionally, few studies have evaluated social validity constructs related to measuring social interaction behavior of children and youth with HFA in comparison to typical peers within middle and high school settings (Carter & Hughes, 2005).

### **Summary**

The hallmark characteristics of individuals with HFA include marked deficits in social communication and interactions (American Psychiatric Association, 2012). Researchers in special education must identify and evaluate empirically validated strategies to support these social deficits. If strategies are not in place to remediate social competence deficits at a younger age, then as social demands increase adults with HFA may experience greater difficulty developing and maintaining meaningful friendships with peers (Attwood, 2005). In addition, strategies that increase social interactions may not be enough for the development of social competence; researchers also need to promote the generalization of social skills to different settings and peers with a range of initiation and response styles.

Generally, students with HFA need targeted instruction tailored to their specific social skill deficits (Gresham et al., 2001). Practices that have been identified by the field as an evidence-based for promoting social competence can be divided into two broad categories: adult-mediated (e.g., SST groups) and peer-mediated approaches (e.g., peer initiation training and peer networking) (Laushley & Heflin, 2000; Odom et al., 2010; Rogers, 2000).

While SST groups have effectively supported the development of social competence for children adolescents with HFA, approaches that have taught social skills

in a decontextualized setting generally found these skills did not generalize to naturally occurring settings without specific peer training (Bellini et al., 2007; Rogers, 2000; Stichter et al., 2007). This aside, an initial investigation by Schmidt and colleagues (2011) found promising generalization outcomes for the SCI-A program without peer-mediated strategies – a SST program for youth with HFA that is deeply rooted in principles of cognitive behavior and applied behavior analysis.

Previous reviews have indicated that peer-mediated interventions can support the development of social competence (Bass & Mulick, 2007; DiSalvo & Oswald, 2002). For example, Schmidt and Stichter (2012) measured the effects of a peer initiation training, proximity, and peer tutoring to encourage the generalization of social skills following the SCI-A program. However, future research effort may need to analyze the different components of peer-mediated intervention such as duration, intensity, type, context, and peer characteristics that are most appropriate for improving social initiations among youth with HFA (Chan et al., 2009).

### **Statement of Purpose**

Limitations of the reviewed studies, regarding SST groups with peer-mediated components, indicated that while there were advances in programming for the generalization of social skills and interactions to natural settings, this continues to be an area that needs further investigation. This study differed from previous studies investigating the generalization of SST groups for students with HFA (Barry et al., 2003; Bauminger, 2002; Castorina & Negri, 2011; Schmidt & Stichter, 2012) in the following ways. First, it employed a peer-mediated intervention composed of peer-initiation training, peer networking, performance feedback, and prompting strategies. This

combined use of instructional interventions is referred to as the peer-mediated package. The peer-mediated package for the current study served as a comprehensive intervention to encourage the generalization of social skills acquired via the SCI-A program as well as the development of social competence in a natural setting. Second, it used multiple dependent variables including implementation fidelity of peers, social validity measures, and pre-post social competence measures to assess the effectiveness of the peer-mediated package.

The two primary purposes of this investigation included the following. First, this study extended the literature by exploring the relationship between a peer-mediated package and changes in reciprocal social interactions between youth with HFA and peer networks. Changes in overt social interactions were measured by continuous direct observations of target students' initiations and responses. The peer-mediated package was used to encourage performance and generalization of previously acquired social skills presented in the SCI-A program. Second, this study expanded the literature by programming for implementation fidelity of typical peers, social comparison and subjective evaluation data, and pre-post measures of social competence. The use of multiple assessments as secondary measures in this investigation provided an enriched evaluation of the peer-mediated package. Specifically, the following research questions were explored.

### **Research Questions**

1. Following the completion of a SST group (the SCI-A program), what is the relationship between a peer-mediated package and changes in observed social interaction outcomes for target students and peer networks in a social setting?

- a. To what extent does the level of implementation fidelity for typical peers impact changes in observed social interaction outcomes?
  - b. To what extent do social validity measures by direct and indirect consumers of the peer-mediated package determine meaningful changes in observed social interaction outcomes?
2. To what extent do teacher ratings and student performance for social and executive functioning change after target students following the completion of the peer-mediated package?

## **CHAPTER II**

### **METHODS**

This chapter describes the research methodology, design, and procedures involved in conducting this study. First, an overview of the investigation is presented. Then, the process used to select participants is described, followed by a description of the setting. Next, a description of the independent and dependent variables are provided. Lastly, this chapter concludes with a description of the experimental procedures used to conduct this study.

#### **Research Overview**

##### **Restatement of Research Questions**

This study focused on the impact of the peer-mediated package on the social communication and interaction behaviors of three high-functioning middle school students identified with social competence deficits. This study was designed to answer the following research questions:

1. Following the completion of a SST group (the SCI-A program), what is the relationship between a peer-mediated package and changes in observed social interaction outcomes for target students and peer networks in a social setting?
  - a. To what extent does the level of implementation fidelity for typical peers impact changes in observed social interaction outcomes?
  - b. To what extent do social validity measures by direct and indirect consumers of the peer-mediated package determine meaningful changes in observed social interaction outcomes?

2. To what extent do teacher ratings and student performance for social and executive functioning change after target students following the completion of the peer-mediated package?

### **IRB Approval**

To comply with the regulations governing human subject research, the researcher submitted an application to the Institutional Review Board (IRB) of the University of Missouri (project number 1205679). Permission to conduct this study was approved by expedited review on January 4, 2013. Application documents included consent and assent forms and data collection measures (See Appendix A). In addition, an approval letter to conduct this study at the proposed middle school was obtained by the school district on December 28, 2012 and submitted to the IRB. The request for research application ensured minimal risk to participants.

### **Research Methodology**

This investigation was conducted using a multiple baseline single-subject design to examine the relationship between implementation of the peer-mediated package and social communication and interaction behaviors across three target students (Kazdin, 2011). Although the Institution of Education Sciences (IES) recognizes randomized control trials as the “gold standard” in applied research, a recent review of peer-reviewed journals in the area of special education found that 456 of the 1,936 studies employed single-subject designs (Hammond & Gast, 2010). Single-subject research is recognized as a value-added methodology, especially related to the field of special education (Cakiroglu, 2012).



Single-subject research is described as a rigorous, experimental methodology with particular relevance to special education researchers (Horner, Carr, Halle, McGee, Odom, & Wolery, 2005). For example, conducting a single-subject design allows the researcher to target low-incidence, heterogeneous populations (e.g., students with HFA). Additionally, the researcher can analyze each participant's responsiveness to the intervention by using participants as their own control (Kazdin, 2011, Horner et al., 2005). The variability in the social communication and interaction behaviors per target students involved in this investigation necessitated a single-subject design in that the researcher worked with target students with a range of cognitive, social, and communication skills (Horner et al., 2005). The latter section in this chapter, entitled *Design and Procedures*, provides additional information about the experimental procedures used to conduct this study.

### **Participants**

There were multiple groups of participants involved in this investigation. All participants were recruited from a middle school in the Midwest. This section describes the student participants including students with social competence deficits and typically developing peers. In addition, participating teachers, parents, and the lunchroom supervisor involved in the data collection process are also described.

#### **Target Students**

The target students (TSs) were selected based upon the following inclusion criteria: (a) identified as struggling with social communication and interaction behaviors associated with HFA; (b) previously completed the Social Competence Intervention for Adolescents (SCI-A) program in the Fall 2012 semester (Stichter et al., 2012); (c) had an

IQ score of 70 and above; (d) received parental consent and student assent to participate; and (e) ate lunch with typical peers. Students were excluded if they participated in the SCI-A program prior to the Fall 2012 semester or did not express a willingness to participate in this investigation. Four TSs met the above inclusion and exclusion criteria. However, only three male sixth and seventh grade students were included due to an attrition rate of one. The student who dropped out of this study had a history of non-compliance as indicated by his speech language pathologist. On the first day of the study he refused to participate thus no longer meeting the inclusion and exclusion criteria. Descriptive characteristics of the three included TSs and one excluded TS are presented in Table 2.

**Table 2.**

*Descriptive information for target students*

<b>Category</b>	<b>TS1</b>	<b>TS2</b>	<b>TS3</b>	<b>TS4*</b>
Age	11	13	11	12
Gender	Male	Male	Male	Male
Ethnicity	White	White	White	White
Grade	6	7	6	6
Full-Scale IQ	110	86	73	80
ADOS total	1	6	18	10
ADI-R social interaction	17	14	19	21
ADI-R communication	17	15	20	19
ADI-R restricted/repetitive	6	9	12	7
School eligibility label	Behavior Disorder	Other Health Impairment	Autism	Autism
% in general education	> 80%	40 – 79%	< 40%	40 – 79%

*Note.* \*shows attrition of participants

While only one of the three included TSs held a school eligibility label of autism based on the IDEA definition, all three TSs scored in the autism range on the three social domains of the *Autism Diagnostic Interview-Revised* (ADI-R; Lord, Rutter & Le Couteur,

1994) (ADI-R social interactions cut-off = 10; ADI-R communication cut-off = 8; ADI-R restricted/repetitive cut-off = 3). TS3 also scored above the autism cut-off on the *Autism Diagnostic Observation System* (ADOS; Lord, Rutter, DiLavore & Risi, 2003) (ADOS total cut-off = 10). The ADOS and the ADI have been considered to make independent and additive contributions to clinicians' judgments related to diagnosing individuals with ASD (Risi et al., 2006). Additionally, the three included TSs were selected because they met the inclusion and exclusion criteria specific to this investigation. Information regarding ADOS, ADI, and IQ scores were provided by assessments conducted during the Fall 2012 semester to determine eligibility for participation in SCI-A research project (Stichter et al., 2012). Information regarding special education eligibilities and minutes were obtained using TSs' Individual Education Plans (IEP).

At the start of the study, target student one (TS1) was an 11-year-old White male in the sixth grade. TS1 qualified for special education services under the school's eligibility label, behavior disorder. TS1 was included in the general education setting for more than 80% of a regular school day. Specifically, TS1 received specialized instruction for behavior 50 minutes per week; pull out instruction for speech and language 40 minutes per week; and occupational therapy consultation 30 minutes per month.

Target student two (TS2) was a 13-year-old White male and in the seventh grade at the start of the study. TS2 qualified for special education services under the school's eligibility label, other health impairment. TS2 was included in the general education setting between 40% and 79% of a regular school day. Specifically, TS2 received pull out services for math 250 minutes per week, speech and language 40 minutes per week,

skills for success 250 minutes per week, and general academic support 100 minutes per week.

Target student three (TS3) was enrolled in the sixth grade and a 12-year-old White male at the start of the study. TS3 qualified for special education services under the school's eligibility label, autism. TS3 was included in the general education setting for less than 40% of a regular school day. As part of his time in the general education setting, TS3 ate lunch with his typical peers. TS3 was a part of a self-contained social skills program for 1,410 minutes per week. Additionally, TS3 received special instruction for adaptive behavior and community skills 160 minutes per week; adaptive physical education 90 minutes per week; pull out instruction for speech and language 40 minutes per week; and occupational therapy consultation 30 minutes per month.

### **Typical Peers**

The process for selecting typical peers, or peers, was based upon guidelines outlined by Sperry and colleagues (2010). Table 3 provides a summary of the selection process used for this investigation.

**Table 3.**

*Selection process for included typical peers*

<b>Step 1: Nomination Process (n=17)</b>
<ul style="list-style-type: none"> <li>Information about the research project was provided to sixth grade general education teachers and other key stakeholder (i.e., school personnel and parents)</li> <li>General education teachers and other key stakeholders nominated students to serve as typical peers based on the initial eligibility criteria (i.e., strong interpersonal and leadership skills, regular school attendance, compliance with adult directives, well-liked by peers, and follows through with tasks)</li> </ul>
<b>Step 2: Student Assent (n=13)</b>
<ul style="list-style-type: none"> <li>Information about the research project was provided to nominated peers</li> </ul>

<ul style="list-style-type: none"> <li>• Student assent was obtained from nominated peers who expressed a willingness to participate in the research project</li> </ul>
<b>Step 3: Informed Consent (n=12)</b>
<ul style="list-style-type: none"> <li>• Information about the research project was provided to parents of potential peers</li> <li>• Parent consent was obtained to complete <i>Social Responsive Scale</i> (SRS; Constantino &amp; Gruber, 2005) and enroll potential peers in the research project</li> </ul>
<b>Step 4: Notification of Eligibility (n=12)</b>
<ul style="list-style-type: none"> <li>• Students as well as families, general education teachers, and other key stakeholders of included peers who met the eligibility criteria for participation were notified</li> </ul>

The first step of the selection process involved the researcher providing sixth grade general education teachers and other key stakeholders information about the purpose of the research project. General education teachers, school personnel, and parents were asked to nominate students who generally exhibited the following characteristics: (a) strong interpersonal and leadership skills, (b) regular school attendance, (c) compliance with adult interactions and directives, (d) acceptance by peers, and (e) completion of tasks. 17 peers were nominated to participate in this research project based on the initial eligibility criteria.

Second, the researcher met with the 17 peers nominated by general education teachers and other key stakeholders. During this time nominated students were provided with a verbal description of the research project. Peers who expressed an interest in participating and described either a positive or neutral relationship history with TSs were asked to sign assent forms. Out of the 17 nominated peers 13 provided assent for proceeding with the next step of the selection process.

During the third step of the selection process the researcher contacted all the families of the 13 potential peers. The researcher provided a verbal description of the

research project and a letter of consent to the parents. Signed parental consent indicated permission for their child to participate in the research project. Out of the 13 potential peers 12 families provided consent to participate. Additionally, signed consent also provided the opportunity for parents to complete the *Social Responsive Scale-parent form* (SRS; Constantino & Gruber, 2005), which provided a standardized, norm-referenced measure for identifying any social impairments associated with ASD. Results for the SRS were reported as total T-scores, with a mean of 50 and standard deviation of 10. To ensure that potential peers met the eligibility criteria scores needed to indicate a range suggesting an absence of ASD (i.e. T-score of 59 or lower). 11 of the 12 parents reported T-scores of 59 or less (range=37-50; mean=40.09; n=11). One parent failed to return the SRS, however, this peer (Peer 11) was included in the study because he had previous experience as a peer model for students with disabilities during summer camp.

The fourth step of the selection process involved informing the 12 included peers, their families, general education teachers, and other key stakeholders about their participation in this research project, including schedules, incentives, and data collecting procedures. One of the 12 peers (Peer12) left the study during week three due to his unwillingness to participate thus no longer meeting the eligibility criteria for this investigation.

### **Participant Group**

Four peers, or peer networks, were matched with each TS to form three participant groups. The rationale for including more than one peer per TS was three-fold. First, this 4:1 ratio may increase opportunities for target students to practice social skills across multiple peers (Breen, Haring, Pitts-Conway, & Gaylord-Ross, 1985). Second,

distributing the responsibilities of implementing initiation strategies across peers may increase (a) peers' motivation to participate, (b) overall success of the intervention, and (c) meaningful interactions between peers and target students (Sperry et al., 2010).

Third, if one of the peers was absent then the target student had the opportunity to interact with the remaining peers. Descriptive characteristics of participant groups (i.e., TS and peer network) are presented in table 4.

**Table 4.**

*Descriptive information for typical peers and peer networks*

Peer Network	Age	Gender	Grade	Ethnicity	Target Participant	SRS – Parent (T Score)
<b>Group 1</b>						
Peer1	12	Male	6	White	TS1	38
Peer2	11	Male	6	White	TS1	38
Peer3	12	Male	6	White	TS1	40
Peer4	12	Male	6	White	TS1	43
<b>Group 2</b>						
Peer5	12	Male	6	White	TS2	43
Peer6	12	Male	6	White	TS2	39
Peer7	12	Male	6	White	TS2	37
Peer8	11	Male	6	White	TS2	37
<b>Group 3</b>						
Peer9	12	Male	6	American-Indian	TS3	36
Peer10	12	Male	6	Hispanic	TS3	40
Peer11	12	Male	6	White	TS3	n/a
Peer12*	12	Male	6	African American	TS3	50

*Note.* \*shows attrition of participants

The researcher completed grouping procedures prior to the start of the baseline condition. Four peers were assigned a peer network based upon TSs' lunch schedule with peers and peers' academic period in which they received training for peer-initiation strategies. First, participant group one included four typical peers (Peer1, Peer2, Peer3,

Peer4) who were assigned to interact with TS1. All participants assigned to group one were in sixth grade, shared many of the same classes, and knew each other prior to the start of the study. Next, the second participant group included TS2 and four typical peers (Peer5, Peer6, Peer7, Peer8). Although TS2 was in seventh grade, his respective peer network was in sixth grade. Thus, none of the participants assigned to group two knew each other before the start of the study. Finally, the third participant group included TS3 and three typical peers (Peer9, Peer10, Peer11). All participants assigned to group three were in the sixth grade, however TS3 and his peer network were not in the same classes and did not know each other before the start of the study. All participating students (i.e., TSs and peer networks) received a \$25.00 gift card for their participation in the research project.

### **Other Key Stakeholders**

This investigation included the support of parents, teachers, and administrators in determining the effectiveness of the peer-mediated package based on social competence and social validity measures. First, parents of TSs and typical peers were asked to complete satisfaction surveys following the conclusion of the intervention. Second, teachers of TSs were asked to rate assigned TSs' social and problem solving skills before and after the investigation as well as complete social validity measures. Third, a lunchroom supervisor was asked to complete daily ratings related to TSs' social engagement time with respective peer networks. These ratings spanned the entire length of the investigation. The lunchroom supervisor who rated TSs' social engagement time was also asked to complete a satisfaction survey at the end of the study.



Table 5 contains the descriptive characteristics of the three participating teachers who completed the *Social Responsive Scale-teacher form* (SRS; Constantino & Gruber, 2005) and the *Behavior Rating Inventory of Executive Function-teacher form* (BRIEF; Gioia, Isquith, Guy, & Kenworthy, 2000) for TSs in their classrooms. Teacher one was identified as TS1's sixth grade reading teacher and had nearly 20 years of teaching experience in the general education setting. Teacher one knew TS1 for about five months at the start of the study. Teacher two was TS2's seventh grade social studies teacher and had three years of experience in the general education setting. Teacher two had known TS2 for about 15 months prior to the start of the investigation. Teacher three was identified as TS3 special education teacher and did not know TS3 at the start of the study. Teacher three had six years of teaching experience in a self-contained special education setting. Participating teachers completed rating scales regarding TSs' social competence skills and behaviors as part of the pre-post assessments used in this investigation.

In addition to participating teachers, table 5 also shows the descriptive information for one participating lunchroom supervisor. The identified lunchroom supervisor also served as an assistant administrator; however, he was not involved in the approval process for this investigation. The lunchroom supervisor was a male with eight years of experience in education including seven years as a teacher and one year as an assistant administrator. The lunchroom supervisor knew all TSs prior to the start of the study; however, he was not familiar with procedures or conditions for this investigation. The lunchroom supervisor was asked to continuously observe and rate TSs' socially engaged time with peer networks as they ate lunch together.

**Table 5.***Description of the participating teachers and lunchroom supervisor*

Participant	Content Area	Experience	Gender	Ethnicity	Target Participant(s)
Teacher 1	6 <sup>th</sup> grade reading	20 years	F	White	TS1
Teacher 2	7 <sup>th</sup> grade social studies	3 years	F	White	TS2
Teacher 3	6 <sup>th</sup> grade self contained special education	6 years	F	White	TS3
Lunchroom supervisor	Administration	8 years	M	White	TS1, TS2, TS3

**Setting**

This investigation took place in two settings within the participating middle school located in a school district in the Midwest – common area and lunchroom. In 2012-2013 school year the middle school enrolled 775 sixth and seventh graders. Table 6 provides demographic information obtained from the Missouri Department of Education (2013) for the middle school.

**Table 6.***Middle school demographics for 2012-2013*

Grade Levels	Total Enrollment	Free/Reduced Lunch %	Student Ethnicity %				
			<u>Asian</u>	<u>Black</u>	<u>Hispanic</u>	<u>Indian</u>	<u>White</u>
6-7	775	37.7%	5.8%	17.2%	4.3%	0.8%	65.9%

**Common Area**

The peer-training sessions for the peer-mediated package took place in the common area located on the second floor of the middle school. The common area measured approximately 20 feet by 30 feet and was positioned in the center of

surrounding classrooms. The back wall had five computers. The front wall had a computer and projector. Hallways ran along the right and left sides. One round table with five chairs was arranged in the middle of the common area. School personnel chose this setting for the training sessions because no other student or teacher activities occurred in the common area during scheduled training session times.

### **Lunchroom**

Direct observational sessions used to assess the impact of the peer-mediated package on reciprocal social interactions occurred in the lunchroom. Each lunch shift combined a sixth grade team with a seventh grade team. The lunchroom had approximately 30 round tables with eight chairs each, distributed evenly among the seventh and sixth graders. A stage replaced the front wall and two food lines were located near the back wall of the lunchroom. TSs sat with their respective peer networks during their scheduled lunch period at an assigned table near the stage. Peer network 1 and peer network 3 ate lunch from 11:10 to 11:40, whereas peer network 2 ate lunch from 10:30 to 11:00. The lunchroom was selected as the naturally occurring setting for this investigation based upon the following recommendation by Sperry and colleagues (2010): (a) it was a part of target students' daily schedule, (b) it occurred at approximately the same time everyday, and (c) it increased the likelihood of social interactions with typical peers.

### **Independent Variables**

#### **Social Competence Intervention for Adolescents**

The Social Competence Intervention for Adolescents (SCI-A) was a group-based social skills training (SST) program designed to remediate core social competence

deficits associated with students with HFA. The SCI-A program was delivered to TSs during their Fall 2012 semester as part of a larger series of research investigating the impact of the SCI-A program on social competence for youth with HFA (Stichter et al., 2010; Stichter et al, 2012; Schmidt & Stichter, 2012, Schmidt et al., 2011).

The SCI-A program was based on principles of Applied Behavior Analysis (ABA) and Cognitive Behavior Interventions (CBI) (Stichter et al., 2010). According to national initiatives designed to review the research and identify evidence-based practices for students with ASD, the National Autism Center (2008) and the National Professional Development Center on Autism Spectrum Disorders listed ABA (e.g., positive specific verbal praise for appropriate behaviors) as an evidence-based practice (Odom et al., 2010). Additionally, the National Autism Center (2008) also identified CBI as an emerging practice for improving social and communication skills for students with HFA.

The SCI-A program was composed of five units with five to seven lessons each. Each unit was designed to target specific social skills necessary for the development of social competence. Moreover, this intervention employed scaffolding instructional techniques to promote acquisition of social skills, followed by multiple practice opportunities to encourage the transfer of learned skills into natural environments (Stichter et al., 2010). Table 7 provides a description of social skills, lessons, and learning objectives for the SCI-A program.

**Table 7.**

*Social skills, lessons, and learning objectives identified in the SCI-A program*

Unit	Social Skills	Number of Lessons	Learning Objectives
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1	Facial Expressions	5	<ul style="list-style-type: none"> <li>• Discussing importance of facial expressions</li> <li>• Identifying three clues needed to show and read an emotion</li> <li>• Identifying seven basic emotions</li> <li>• Identifying five key facial expressions used to show and read an emotion</li> </ul>
2	Sharing Ideas	6	<ul style="list-style-type: none"> <li>• Discussing importance of sharing ideas</li> <li>• Identifying skills of speaker and listener roles</li> <li>• Identifying types of verbal and nonverbal responses</li> </ul>
3	Turn Taking in Conversations	6	<ul style="list-style-type: none"> <li>• Discussing how to take turns in a conversation</li> <li>• Appropriately using initiations, joiners, responses, continuations, transitions, and small talk</li> </ul>
4	Feeling and Emotions	7	<ul style="list-style-type: none"> <li>• Appropriately staying on topic</li> <li>• Discussing importance of feelings and emotions</li> <li>• Recognizing that emotions have a range of intensity</li> <li>• Regulating emotions and self-control strategies</li> <li>• Reading emotions in one's self and others</li> </ul>
5	Problem Solving	7	<ul style="list-style-type: none"> <li>• Discussing and identifying context, types, and intensities of problems</li> <li>• Reading and responding to various problem situations</li> </ul>

*Note.* Information regarding the SCI-A program was obtained from Stichter et al., 2012

Each subsequent social skill introduced within a unit of the SCI-A program was intendment to build upon the preceding skills and units. Unit one of the SCI-A program focused on recognizing facial expressions; unit two discussed skills and concepts associated with appropriately sharing ideas; unit three focused on reciprocity and turn taking during conversations; unit four discussed understanding and regulating feeling and emotions; and unit five targeted identifying and responding to problem situations.

The SCI-A research project was funded and supported by the Institute of Education Sciences, U.S. Department of Education, through a development grant issued to the University of Missouri (Stichter et al., 2012). Although implementers and

data collectors for the SCI-A program included school personnel and research staff, this investigation did not involve implementation or data collection of the SCI-A program.

### **Peer-Mediated Package**

The peer-mediated package employed in this study was designed to encourage the practice and generalization of social skills acquired via the SCI-A program to a naturally occurring setting. The peer-mediated package was composed of four parts: (1) peer-initiation training, (2) peer networking, (3) visual prompting, and (4) peer performance feedback.

**Peer-initiation training.** The peer-initiation training was referred to as the Peer Buddy Program. The Peer Buddy Program was based on skills and concepts delivered in the SCI-A program as well as principals of social learning theory associated with peer modeling. This study replicated and extended the work of Schmidt and Stichter (2012) in that peer instruction mirrored the social competence skills taught to TSs via the SCI-A program during the Fall 2012 semester. The Peer Buddy Program not only encouraged typical peers to use the same language as the SCI-A program, but it also provided typical peers with initiation strategies to promote positive social interactions in a natural setting.

Specifically, the Peer Buddy Program involved four 40-minute training sessions modified from six 40-minute training sessions conducted in the previous study by Schmidt and Stichter (2012). Training sessions occurred in the common area of the participating middle school, and were implemented to each peer network across their respective baseline condition. Previous peer-mediated interventions have recommended that peer training occurs in two phases – first, a discussion of observable definitions of social dysfunction demonstrated by the target students, and second, instruction on

initiation strategies to promote appropriate social functioning in natural settings (Sperry et al., 2010). In this study, the researcher began each session with an extensive discussion of the atypical social communication and interaction behaviors associated with students with HFA, followed by explicitly teaching initiation strategies used in an effort to remediate these atypical behaviors.

Each session targeted one of the core deficit area previously identified for students with HFA (i.e., session one – difficulty reading facial expressions; session two – conversational skills and sharing ideas; session three – understanding feelings and emotions; session four – problem solving) (Solomon et al., 2004). This discussion about atypical social communication and interaction behaviors not only included a verbal explanation but also included observable examples and non-examples. Providing typical peers with operational definitions of core deficit areas can help them recognize the occurrence of such behaviors within natural settings (Sperry et al., 2010). In addition, facilitating an extensive discussion rather than providing a brief overview may be more suitable for middle school aged students (Sperry et al., 2010).

Following the discussion targeting one of the core social competence deficits, the researcher provided peers with direct instruction, modeling, and practice opportunities of initiation strategies. Based on previous literature, the Peer Buddy Program explicitly taught seven initiation strategies: (1) modeling appropriate social interactions, (2) providing positive reinforcement, (3) initiating conversations, (4) responding to initiations, (5) assisting others, and (7) inviting others to be a part of the conversation (Bass & Mulick, 2007; Sperry et al., 2010). Although the process for selecting initiation strategies greatly depends on the purpose of the study and characteristics of the target

student (e.g., age, severity of disability, social interaction style), the strategies employed in this investigation were recommended for youth with HFA (Sperry et al., 2010). The specific training session objectives of the Peer Buddy Program are outlined in Table 8.

**Table 8.**

The Peer Buddy Program's training session objectives

Session Number	Session Objectives
Session 1: Introduction and Helping Others Read Facial Expressions	<p><b>Introduction</b></p> <ul style="list-style-type: none"> <li>When participating in teacher-led discussion, students will: <ul style="list-style-type: none"> <li>listen to an introduction of the Peer Buddy Program</li> <li>understand characteristics of kids with social challenges</li> </ul> </li> <li>When participating in a teacher-led discussion, students will: <ul style="list-style-type: none"> <li>discuss skills and concepts related to facial expressions, basic emotions, and the Triangle Scanning Method</li> <li>discuss skills and concepts related to modeling and positive feedback</li> </ul> </li> </ul> <p><b>Modeling</b></p> <ul style="list-style-type: none"> <li>When presented with models, students will: <ul style="list-style-type: none"> <li>describe the facial expression and label the emotion being shown</li> </ul> </li> </ul> <p><b>Practice</b></p> <ul style="list-style-type: none"> <li>When participating in a student-led activity, students will: <ul style="list-style-type: none"> <li>use facial expressions skills and concepts to model emotions and provide positive feedback</li> <li>describe the facial expression and guess the emotion being described</li> </ul> </li> </ul> <p><b>Conclusion</b></p> <ul style="list-style-type: none"> <li>When participating in a teacher-led discussion, students will: <ul style="list-style-type: none"> <li>review previously learned skills and concepts</li> <li>have a chance to ask questions</li> </ul> </li> </ul>
Session 2: Helping Others Share Ideas	<p><b>Review</b></p> <ul style="list-style-type: none"> <li>When participating in teacher-led discussion, students will: <ul style="list-style-type: none"> <li>review schedule and important steps to follow</li> <li>demonstrate an understanding of the Peer Buddy Program, responsibilities within the program, and people with social challenges</li> </ul> </li> </ul>



- demonstrate an understanding of concepts and previously learned skills (facial expressions, modeling, and positive feedback)

Session 3: Helping  
Others Read Feelings  
and Emotions

**Introduction**

- When participating in a teacher-led discussion, students will:
  - discuss skills and concepts related to sharing ideas, including responsibilities of the speaker and listener
  - discuss the skills and concepts related to initiating and responding during conversations, including how to keep a conversation going

**Modeling**

- When presented with models, students will:
  - rate appropriate and inappropriate examples of sharing ideas and turn taking

**Practice**

- When participating in a student-led activity, students will:
  - use facial expressions skills and concepts to gain the other's attention, describe the facial expression and guess the emotion being described

**Conclusion**

- When participating in a teacher-led discussion, students will:
  - review previously learned skills and concepts
  - have a chance to ask questions

**Review**

- When participating in a teacher-led discussion, students will:
  - review schedule and important steps to follow
  - demonstrate an understanding of concepts and previously learned skills (sharing ideas, initiating, and responding)

**Introduction**

- When participating in teacher-led discussion, students will:
  - discuss feelings and emotions, range of emotions, and self-control strategies
  - discuss helping others and asking for help strategies

**Modeling**

- When presented with models, students will:
  - identify feelings and levels of the emotions shown
  - identify how the emotions matches the situation and helping strategies

**Practice**

- When participating in a student-led activity, students will:
  - demonstrate and read varying emotions and levels of emotions

**Conclusion**

- When participating in a teacher-led review, students will
  - review previously learned skills and concepts
  - have a chance to ask questions

#### Session 4: Helping Others Problem Solve

##### **Review**

- When participating in a teacher-led discussion, students will:
  - review schedule and important steps to follow
  - demonstrate an understanding of previous learned skills and strategies (modeling, positive feedback, initiating, responding, helping)

##### **Introduction**

- When participating in a teacher-led discussion, students will:
  - discuss different types and intensities of problems, including the problem solving tree
  - discuss including others and invitation strategies

##### **Modeling**

- When presented with models, students will:
  - identify different types and intensity of problems

##### **Practice**

- When participating in a student-led activity, students will:
  - use problem solving skills and including others

strategy to solve a group problem

**Conclusion**

- When participating in a teacher-led review, students will:
  - review previously learned skills and concepts
  - have a change to ask questions

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*Note.* Session objectives modified from the SCI-A program (Stichter et al., 2012) and peer training program (Schmidt & Stichter, 2012).

Strain and Odom (1986) recommended using five to six 20-minute sessions to reliably teach social interaction strategies to elementary and preschool aged students. However, due to the nature of scheduling and age of participants, this study conducted four 40-minute sessions. Session one involved an introduction to the Peer Buddy Program, a discussion of how to read facial expressions, and instruction on modeling and positive feedback strategies. Session two introduced appropriately sharing ideas and initiation strategies to maintain a conversation. Session three discussed different levels of feelings and emotions and initiation strategies for assisting others. Session four targeted social skills related to problem solving and initiation strategies on how to include others in conversations (Sperry et al., 2010; Stichter et al., 2012).

Peers viewed PowerPoint presentations, video clips, and worksheets to guide discussions related to target social competence deficits and initiation strategies. Moreover, each session followed the same format as recommended by Odom and Strain (1986): (1) a review of the previous session, when applicable, (b) a discussion of target social competence deficit, (c) an introduction of target initiation strategy, (d) modeling and practice opportunities, and (e) on-going feedback. If peers were absent for a training session then they received a handout with an overview of the missed training session. All

PowerPoint presentations used to implement the Peer Buddy Program training sessions are provided in Appendix B.

***Treatment integrity for Peer Buddy Program.*** Treatment integrity was collected for 75% of the Peer Buddy Program training sessions. Data collectors were graduate students at the University of Missouri. All data collectors were blind to the purpose of the study. Data collectors were instructed to rate the occurrence or nonoccurrence of each component of the Peer Buddy Program immediately upon implementation by the researcher. Data collectors circled a *one* if the component occurred and a *zero* if the component did not occur. Overall, treatment integrity scores were 100% for all observed training sessions. The treatment integrity rating sheet is provided in Appendix C.

**Peer networking.** As part of the peer-mediated package, this investigation utilized peer networks. The peer networking approach is described as creating a social support network by grouping multiple peers together to provide support for one target student. The use of this approach differed from previous study by Schmidt and Stichter (2012), which paired one peer with each target student. Previous peer-mediated interventions research has recommended the use of peer networks as a strategy for increasing generalization (DiSalvo & Oswald, 2002). Thus, the purpose of including peer networks was to provide TS with opportunities to practice and generalization social skills taught in the SCI-A Program with several peers who have different social interaction styles. Peer networks were asked to eat lunch with their assigned TSs.

**Visual prompting.** During the intervention condition the researcher provided each peer with a cue cards immediately before the direct observational session. The cue cards were used as a tool to facilitate peers in gaining the attention of their TS and to

structure social interactions. Previous studies have utilized similar support materials ranging from posters to cards on rings to adult prompts (Goldstein et al., 1992, Harper, Symon, & Frea, 2008; Lee, Odom, & Loftin, 2007). Cue cards used in this investigation indicating important steps to follow on the front side and examples of initiation strategies on the backside. Although the previous study by Schmidt and Stichter (2012) did not use visual prompting, the following instructions, adopted from Schmidt and Stichter's (2012) peer training, were provided: (1) sit next to or across from buddy, (2) gain buddy's attention, (3) use a strategy (initiation, assistance, invitation), (4) respond to buddy, (5) repeat steps two through four, (6) remember to model good social interactions, (7) ignore weird and unwanted behavior, and (8) give attention to good and wanted behavior. See Appendix D for an example of the cue card.

**Peer performance feedback.** For this investigation, performance feedback was provided to peers following the third intervention data point. This performance feedback consisted of the researcher briefly meeting with each peer immediately before the direct observational session. Previous studies have investigated the impact of performance feedback on improving implementation fidelity for peers implementing interventions. Results from these studies have shown a drastic change in implementing interventions immediately following performance feedback (Dufrene et al., 2005).

Additionally, based on previous research related to performance feedback for teachers, effective feedback needs to include specific, corrective, and positive attributes related to the teachers' performance (Scheeler, Ruhl, & McAfee, 2004). Thus, the researcher presented each peer with three graphs (1) to show performance of initiation strategies by the peer; (2) to show total performance of initiation strategies by peer

network; and (s) to show performance of assigned TS's social interactions data. Peers were then informed of the goal number of initiation strategies needed per session (i.e., 10 per session) and that meeting this goal would result in improved social interactions for their assigned TS. Lastly, the researcher praised peers for their use of initiation strategies and provided them with an opportunity to ask questions.

### **Dependent Variables**

In line with this investigation's research questions, multiple assessments were employed to measure the impact of the peer-mediated package on TSs' social communication and interactions behaviors. First, to assess changes in overt social interaction outcomes as well as implementation fidelity for peer networks, continuous direct observations were collected. Second, to assess changes in overall social competence, pre-post measures were administered before and after the intervention.

### **Direct Observation**

**Social interaction outcomes.** Continuous measurement of TS behavior was collected using direct observation. For this investigation, the researcher conducted a review of the literature to identify a coding system and target behaviors most reliable in assessing change in participants' social communication and interaction skills. Based on the literature, direct observation strategies appropriate for measuring behavior in natural settings included interval recording and frequency counts (Kazdin, 2011). In fact, previous studies have found that direct observational recording systems that combine interval and frequency measures provided an accurate estimate of percentage of time when brief intervals were used (i.e., 30-seconds or less) (Saudargas & Zanolli, 1990). For the purpose of this study, the researcher developed a direct observational tool to

assess the change in overt social interaction outcomes (i.e., initiations and responses) using frequency counts as well as social engagement using 15-second intervals for a 10-minute observation period (Tawney & Gast, 1984). The direct observational tool developed for this investigation is in the appendix E.

Although operational definitions of social communication and interaction behaviors varied across studies that investigated the impact of peer-mediated interventions, dependent variables commonly measured some form of appropriate and inappropriate initiations and responses by target students. For example, a study by Chung and colleagues (2007) examined the time engaged in appropriate and inappropriate talking as measured by contingent responses, securing attention, initiating comments and request, and changing topic. Target behaviors selected for social interactions and social engagement time were developed based on two previous studies examining the effects of SST groups with typical peers as generalization agents for target students with HFA (Bauminger, 2002; Schmidt & Stichter, 2012).

Bauminger (2002) defined social interactions as the reciprocal process in which target students effectively initiate and respond to social stimuli presented by their typical peers. Bauminger used the following coding scheme for assessing change in overt social functioning for students with HFA: (1) inappropriate and appropriate initiations and responses, and (2) positive, negative, and low-level social engagement. Similarly, Schmidt and Stichter (2012) also measured the appropriateness of initiations and responses by target students. For the purpose of this investigation, appropriate and inappropriate social initiations and responses were coded as a frequency measure in that a tally was made each time the behavior occurred in a 10-minute observation period



(Kazdin, 2011). Additionally, direct observations of TSs time engaged in positive, negative, and low-level social interactions occurred through the use of momentary time sampling. Specifically, target behaviors were coded if the behavior occurred at the moment the 15-second interval ended (Kazdin, 2011). Table 9 provides the operational definitions for target behaviors.

**Table 9.**

*Definitions of observed social interaction outcomes by target students*

Behavior	Operational Definition
<b>Social Interaction</b>	
Appropriate Initiation	<p>The target student begins a new social sequence by providing a verbal and/or nonverbal behavior directed towards a peer. Behaviors must be on-topic and relevant to the context, with no other conversation taking place prior to the initiation. However, an exception includes appropriately interrupting or providing a continuation of a previous sequence by a change in topic. Initiation behaviors include:</p> <ul style="list-style-type: none"> <li>• Greeting</li> <li>• Asking a question</li> <li>• Making a comment</li> <li>• Sharing materials</li> <li>• Assisting</li> <li>• Saying a peer's name</li> </ul>
Inappropriate Initiation	<p>The target student begins a new social sequence by providing a verbal and/or nonverbal behavior directed towards a peers. Behaviors do not meet the definition of appropriate social interaction in that initiation behaviors are off-topic, irrelevant to the context, or inappropriately interrupting.</p>
Appropriate Response	<p>The target student responds verbally and/or nonverbally to social stimuli (i.e., initiations) directed towards him/her by a typical peer. Behaviors must be on-topic and relevant to the preceding initiation. Responding behaviors include:</p> <ul style="list-style-type: none"> <li>• Making eye contact when name is called</li> <li>• Following directions or a request</li> <li>• Answering a questions</li> <li>• Commenting back</li> <li>• Nodding head</li> </ul>
Inappropriate Response	<p>The target student responds verbally and/or nonverbally to social stimuli (i.e., initiations) directed towards him/her by a</p>

## **Social Engagement**

### **Positive**

typical peer. However, the behaviors do not meet the definition of appropriate social response in that behaviors are off-topic, irrelevant to the preceding initiation, use inappropriate volume/tone and/or body control/proximity, or the target student does not respond to a initiation by a peer.

The target student exhibits one or more of the following verbal or nonverbal social behaviors that lead to effective social process with typical peers (i.e., reciprocal social interactions). Behaviors that serve to start or maintain social interactions include:

- Eye contact only, eye contact combined with a smile, or smile only with no eye contact
- Expressing verbal or nonverbal affection (e.g., your nice, I like you, hug, etc.)
- Sharing experiences with peer or asking about their experiences (e.g., what did you do over the weekend?)
- Sharing objects (e.g., offers sandwich to peer)
- Talk that reflects interest in another child's interests, ideas, hobbies, mood, etc. (e.g., what's your favorite food, are you sad today?)
- Greeting (e.g., saying hello to peer, responding to a greeting)
- Giving help (e.g., Can I help you take your tray up)

### **Negative**

The target child exhibits one or more of the following unpleasant social behaviors that operate to stop or decrease the likelihood of development of adequate social interactions. Behavior include:

- Physical or verbal aggressiveness towards peer (e.g., yelling, screaming, making fun of peers, hits, pinches, etc.)
- Temper tantrum – general expression of anger in an extreme way
- Teasing – dragging peers into fights or conflicts
- Controlling – dominating peers without respecting their needs
- Avoidance – avoiding social overtures and not responding
- Looking away – actively looks away from peer

### **Low-level**

The target child exhibits one or more of the following behaviors that indicate social intention, but with minimal social enactment, such as close proximity to children without initiating a positive or negative social interaction. Behaviors include:

- Looking in the general direction of peer but not

- establishing eye contact or smiling
- Close proximity (sits/stands within 3 feet) and not responding or initiating
- Nodding head “yes” or shaking head “no”
- Idiosyncratic language – using utterances with no clear meaning
- Imitating the peers talk or activity
- Repetitive behavior with no clear communication intent
- Functional communication to fulfill his/her own need but no social intention (e.g. I need a napkin)

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*Note.* Definitions modified from Bauminger (2002) and Schmidt and Stichter (2012)

**Implementation fidelity for peer networks.** Direct observation was also used to assess implementation fidelity for peer networks. Implementation fidelity for peer networks was defined as the extent to which peers implemented initiation strategies acquired in the Peer Buddy Program. The benchmark for implementation fidelity was based on a local data determined by 80% of peers’ average rate of initiation strategies. Peers from group one served as local data because it was the first peer network to receive intervention. First, the peers’ average rate of initiation strategies was calculated for the first three intervention data points (i.e., before peer performance feedback occurred) by adding the total number of implemented strategies and dividing this sum by the total number of direct observational sessions. The calculated mean performance rate for peers was 3.9 strategies per minute (range = 2.4 – 6.1). Next, two benchmark criteria were created based on the 80% standard and the number of peers per network. Thus, a benchmark of 3.1 strategies per minute was used for peer networks with four peers (i.e., groups one and two), and a benchmark of 2.3 strategies per minute was used for group three because this group only had three peers.

To determine performance of implementation fidelity for peer networks, direct observations using operational definitions for initiation strategies (See Table 10) were

collected. Data collectors used frequency counts to record the number of times a strategy occurred within a 10-minute observation period. If implementation fidelity was low and stable or trending downward, performance feedback was implemented. Low implementation fidelity was defined as data points falling below the benchmark for three consecutive sessions. It was not necessary for peers to use every strategy during an observation period. The direct observational tool developed for this investigation is in the appendix E.

**Table 10.**

*Definitions of observed initiation strategies by peer networks*

Behavior	Operational Definition
Greeting	The typically developing peer welcomes the target student with a friendly gesture (i.e., wave, high five, fist pump) or verbal message (i.e., “hi” “how are you” “What’s up?”)
Initiation	The typically developing peer begins a new social sequence by providing an appropriate verbal and/or nonverbal behavior (e.g., question, comment, etc.) directed towards a target student. Examples: <ul style="list-style-type: none"> <li>• I like your shirt, I have one just like that</li> <li>• What is your favorite TV show?</li> <li>• What are you eating for lunch today?</li> <li>• I see you are eating PBJ, that is my favorite</li> </ul>
Response	The typically developing peer appropriately responds verbally and/or nonverbally to social stimuli (i.e., initiations) directed towards him/her by a target student
Assistance	The typically developing peer gives or asks for help from the target student. Examples: <ul style="list-style-type: none"> <li>• Can I help you clean up your trash</li> <li>• What if you called your mom?</li> <li>• Here is a napkin</li> </ul>

*Note.* Definitions adopted from the work of Strain (1987)

***Direct observation training.*** The researcher and two gradate students in the college of education at the University of Missouri, who were blind to the study

conditions, were trained to observe and code direct observational sessions. Training occurred prior to collecting data for TSs and peer networks. All data collectors practiced coding target social interaction and social engagement behaviors as well as peer initiation strategies using videos of typically developing high school students eating lunch. Training continued until data collectors obtained an interobserver agreement level of 80% or higher for two consecutive videos. Data collectors received \$25.00 gift cards for their participating in data collection.

### **Pre-Post Measures**

In addition to the continuous measurement of direct observation, this study also used pre-post measures. All pre-post measures employed in this investigation served as supplemental measures related to the impact of the peer-mediated intervention on social competence deficits. Moreover, pre-post measures were useful in providing additional descriptive information about TSs' social and executive functioning skills before and after participating in the peer-mediated package. According to Kazdin (2011) the use of pre-post measures is an acceptable strategy as long as the primary outcome measures are continuous. The following social competence measures were selected based on previous research addressing social competence deficits for adolescents with HFA (Solomon et al., 2004; Stichter et al., 2012).

**Social Responsive Scale.** The teacher version of the *Social Responsive Scale* (SRS; Constantino & Gruber, 2005) was administered to assess overall social functioning and social abilities for TSs. The SRS is a standardized 65-item rating scale used to measure the severity of social deficits associated with ASD. For this investigation, identified general and special educators of TSs reported scores in the following domain

areas: (a) social awareness, (b) social cognition, (c) social communication, (d) social motivation, and (e) autistic mannerisms. In addition, items were also rated on a four-point Likert scale and summed together to calculate the Total Score. All scores were reported as standard scores; lower scores on the SRS demonstrate more appropriate social abilities. Teacher participants were asked to complete measures once prior to the start of the study and again following the completion of the study.

**Behavior Rating Inventory of Executive Function.** The teacher version of the *Behavior Rating Inventory of Executive Function* (BRIEF; Gioia et al., 2000) was administered to measure problem solving skills for TSs. The BRIEF is a standardized 86-item assessment that measures the different areas of executive functioning, including inhibit, shift, emotional control, initiate, working memory, plan and organize, organization of materials, and monitor. Items were rated on a three-point Likert scale. Scores were converted to T scores; higher scores indicate a greater executive functioning deficit. Higher internal consistency ( $\alpha=0.80-0.98$ ) and retest reliability ( $r_s=0.88$ ) were found for the teacher version of the BRIEF. Teacher participants completed the BRIEF before and after TSs participation in the Peer Buddy Program.

**Delis-Kaplan Executive Function System.** The researcher administered the *Delis-Kaplan Executive Function System* (D-KEFS; Delis, Kaplan & Kramer, 2001) to assess TSs' performance on executive functioning skills such as cognitive flexibility, problem solving, and inhibition. The D-KEFS is a standardized assessment comprised of multiple subtests. This investigation employed the five of the nine subtests, including: (1) Color-Word Inference, (2) Trail Making, (3) Design Fluency, and (4) Verbal Fluency. Specifically, these subtests of the D-KEFS have been used in recent research examining

social competence in youth with HFA (Solomon, Bauminger, & Rogers & 2011; Stichter, Herzog, McGee, & Leinert, 2012). In addition, each subtest of the D-KEFS has shown acceptable test-retest reliability and validity. TSs completed the D-KEFS at two assessment times – before and after their participating in the Peer Buddy Program.

### **Social Validity**

Kazdin (2011) described social validity as a multi-faceted construct that measures the extent to which (a) consumers perceived an intervention as acceptable, and (b) meaningful change in target behaviors occurred. To evaluate social validity for this investigation the following constructs were addressed: expert evaluation, social comparison, and consumer evaluation. The researcher conducted a review of the literature addressing previous social validity measurements for peer-mediated interventions to identify measurements appropriate for this study (Carter & Pesko, 2008; Hurley, 2012). This section describes the measurements used to assess the different constructs of social validity.

**Expert evaluation.** Direct observational rating probes were used to determine an expert evaluation of the peer-mediated package on TSs’ social communication and interaction behaviors. The lunchroom supervisor, who was blind to the conditions of the study, was asked to observe and complete daily rating probes of TS behavior using operational definitions and examples for socially engaged time (See table 11).

**Table 11.**

*Target behaviors definitions and examples for direct observational rating probe*

Target Behavior	Definition	Examples
Negative	Target student engages in unpleasant social behaviors	<ul style="list-style-type: none"> <li>Physical or verbal aggressions (e.g., hitting, yelling)</li> </ul>

	(verbal or nonverbal) that either stop or decrease social interactions with peers	<ul style="list-style-type: none"> <li>• Making fun of others (e.g., “you have an ugly shirt”)</li> <li>• Avoiding and not responding to peers (looks away)</li> </ul>
Positive	Target student engages in appropriate social behaviors (verbal or nonverbal) that lead to effective social interactions with peers	<ul style="list-style-type: none"> <li>• Eye contact and/or smile</li> <li>• Greeting</li> <li>• Affection</li> <li>• Sharing (e.g., “what did you do this weekend?” “would you like some chips?”)</li> </ul>
Low-Level	Target students engages in minimal social behaviors (verbal or nonverbal) with peers without initiating positive or negative social interactions	<ul style="list-style-type: none"> <li>• Looking in general direction of peers but never establishing eye contact</li> <li>• Functional communication (e.g., Nodding “yes” or “no”)</li> <li>• Unclear utterances with not communication intent</li> <li>• Repetitive behavior</li> </ul>

*Note.* Definitions modified from Bauminger (2002)

The development of the direct observational rating probe used in this investigation was based on Daily Behavior Ratings (DBRs) literature. DBRs are described as an assessment method that combines the strengths of rating scales and direct observations (Chafouleas, Kilgus, & Hernandez, 2009). Previous research has suggested that DBRs are an effective measurement of non-social target behaviors such as academic engagement, off-task, and disruptive behaviors. In addition, DBRs for academic engagement have shown to be strongly correlated with social skills ( $r = -0.87$ ,  $p < 0.01$ ) and problem behaviors ( $r = -0.68$ ,  $p < 0.01$ ) as indicated by the *Social Skills Rating System* (SSRS; Gresham & Elliott, 1990) (Chafouleas et al., 2009).

This study modified constructs of DBRs to serve as the direct observational rating probes for expert evaluation. According to Kazdin (2011), expert evaluation often draws on expertise to determine important skills and behaviors for a particular context. For this reason the lunchroom supervisor served as the “expert” for social interaction behaviors



between TSs and peer networks while eating lunch together. The rating probe involved the lunchroom supervisor quantifying operational definitions for positive, negative, and low-level socially engaged time (Bauminger, 2002). Although previous studies examining the psychometric properties of DBRs have not used social engagement behaviors, the target behaviors selected for this rating probe were based on the previous investigation documenting observable social behaviors of students' with HFA (Bauminger, 2002).

Specifically, the lunchroom supervisor was asked to observe and rate target behaviors on a scale of 0% to 100% (0% = never happened and 100% = always happened) to assess the proportion of time TSs demonstrated the target behavior. Higher percentages indicated more time engaged in positive, negative, or low-level social interactions, whereas lower percentages indicated less time engaged in target behaviors. The direct observational rating probe used in this study is provided in Appendix F.

**Social comparison.** The same direct observational tool used to assess change in TSs' overt social interaction outcomes was also used to collect normative data for this investigation. Two of the 11 participating peers (Peer8 and Peer9) were randomly selected for social comparison probes during baseline, intervention, and maintenance conditions. The social comparison group was similar to the TPs in demographic variables (i.e., age and gender) but different in performance of target social communication and interaction behaviors (Kazdin, 2011). Specifically, Peer8 and Peer9 were identified as having average to above average social abilities as indicated on the SRS (37 and 36, respectively). The purpose of collecting social comparison data was to provide a basis for evaluating TPs reciprocal social interactions. Peer8 and Peer9 were

observed eating lunch with their peers not included in this study for a total of six 10-minute observation sessions.

**Consumer evaluation.** To measure social validity related to consumer evaluation participating students, parents, and school personnel were asked to complete a survey following the conclusion of the study. The consumer evaluation survey was used to solicit opinions of direct and indirect participants regarding their acceptability of the peer-mediated package (Kazdin, 2011). For this investigation, the survey was based on the satisfaction survey employed in the previous study by Kamps and colleagues' (1998), which examined social validity of peer-mediated interventions. The satisfaction survey developed by Kamps and colleagues (1998) was selected because it highlighted the importance of asking questions that reflect the intervention's goals and objectives. It was also selected because it used constructs inline with social validation measures addressed in Kazdin (2011) such as the importance of gathering subjective evaluations as a means for identifying important social and academic outcomes.

Participating students, parents, and school personnel completed a five to seven question survey. This survey used a 5-point Likert scale (0=strongly disagree and 5=strongly agree) to evaluate consumers' perceptions and overall satisfaction following the conclusion of the study. The researcher informed students and parents that all information provided would remain anonymous. Unfortunately, it was not possible to secure anonymity of school personnel as the researcher directly solicited information from the teachers and lunchroom supervisor. Appendix G provides a copy of each consumer evaluation survey given to participating students, parents, and school personnel.

## **Design and Procedures**

This investigation employed a multiple baseline design to examine changes in target behaviors across TSs. Three conditions were used to demonstrate a relationship between the peer-mediated package and changes in TSs' overt social interactions (i.e., baseline, intervention, and maintenance) (Kazdin, 2011). The procedures for this multiple baseline design began with observations of baseline performance of target behaviors. Following baseline performance systematic application of the peer-mediated package occurred across participating students to demonstrate experimental control and replication of changes in target behaviors at the time the intervention was applied (Tawney & Gast, 1984). The following section discusses the procedures and data driven decision-making rules used to shift from baseline to intervention to maintenance conditions.

### **Baseline Condition**

**Direct observation.** During the baseline condition, the primary outcome measure, direct observation, was collected. TSs were observed by data collectors two times per week for 10-minute observation sessions during their scheduled lunch shifts. Continuous data collection occurred following specific baseline procedures. First, during baseline conditions peers had access to initiation strategies through the Peer Buddy Program training sessions. These training sessions were evenly dispersed across each baseline condition to control for threats to external validity. For example, the final training session was implemented immediately before the start of the each peer networks' intervention condition. For this reason, the researchers asked peers to (a) eat lunch as they normally would, (b) refrain from using initiation strategies presented to them

through the Peer Buddy Program, and (c) respond to initiations by their assigned TS. Following stable performance in target behavior during the baseline conditions, the intervention condition was applied in a staggered fashion.

**Social validity.** In addition to direct observational measurement during baseline condition, data collection procedures also occurred for social validity constructs – social comparison and expert evaluation. Social comparison involved collecting two direct observational probes for target behaviors for two of the participating peers. Expert evaluation data involved the lunchroom supervisor completing the rating probe for socially engaged time following direct observational sessions.

### **Intervention Condition**

**Direct observation.** During the intervention condition, continuous direct observational data were collected using similar procedures as described above in that TSs were observed by data collectors two times per week for 10-minute observation sessions during their scheduled lunch shifts. However, in contrast to the baseline condition specific intervention procedures were employed. First, the researcher asked peer networks to implement initiation strategies acquired via the Peer Buddy Program training sessions by providing each peer with a cue card. Second, following three intervention data points performance feedback was employed. Upon completion of six intervention data points, each participant group moved into the maintenance condition.

**Social validity.** In addition to direct observations during intervention condition, similar data collection procedures as described in baseline condition also occurred for social comparison and expert evaluation.

### **Maintenance Condition**

**Direct observation.** During the maintenance condition, continuous direct observational data were collected using similar procedures as described in the baseline and intervention conditions. Procedures employed during the maintenance condition involved the same procedures as the intervention condition minus the cue card. Peer performance feedback sessions were employed based on the previous definition of low implementation fidelity.

**Social validity.** In addition to direct observations during maintenance condition, similar data collection procedures as used in baseline and intervention conditions also occurred for social comparison and expert evaluation.

## CHAPTER III

### RESULTS

The following chapter presents an analysis of the results. Results are presented in relation to the research questions for this investigation. First, a multiple baseline across three target students (TSs) was used to examine the relationship between implementation of the peer-mediated package and changes in continuous direct observational data for overt social interactions. To that end, normative data were also collected to provide a basis for evaluating TSs' social interaction behaviors. Second, fidelity for typical peers implementing initiation strategies were measured to examine the extent to which implementation fidelity impacts changes in social interaction outcomes. Third, data regarding expert evaluation and consumer satisfaction of the peer-mediated package were obtained as social validity measures. Fourth, data for teacher ratings and student performance on social competence assessments were collected as pre-post measures.

#### **Research Question One – Social Interactions**

**Following the completion of a SST group (the SCI-A program), what is the relationship between a peer-mediated package and changes in observed social interaction outcomes for target students and peer networks in a social setting?** To answer research question one – social interactions – a visual analysis of graphic data was employed (Tawney & Gast, 1984). A social interaction was defined as the back and forth exchange in which TSs successfully responded and initiated to their respective peer networks (Bauminger, 2002). Based on this definition, social interaction outcomes included continuous direct observational data for responses and initiations. Figure 1

displays a multiple baseline across three TSs for appropriate responses during 10-minute observation periods, and Figure 2 depicts appropriate initiations.

This investigation used the following criteria to ensure a trustworthy evaluation of data: (1) a minimum of three data points per condition, (2) only one manipulation of the intervention when changing conditions, (3) analysis of changes in trend direction and stability of the data points, (4) analysis of level change and stability of the data points, (5) the latency of change between the onset of a condition, and (6) the percent of non-overlapping data across conditions (Kazdin, 2011; Tawney & Gast, 1984). First, the researcher collected a minimum of three data points per condition with the exception of TS3's maintenance condition in that only one data point was collected. This paucity in data during TS3's maintenance condition was due to the conclusions of the school year.

Second, only one variable of the intervention package was changed when switching conditions to reliably identify a relationship between the peer-mediated package and target behaviors (Tawney & Gast, 1984). The next section summarizes procedural changes used to conduct this investigation. The baseline condition involved the researcher instructing typical peers to engage in social interactions as usual but to refrain from use of initiation strategies acquired via the Peer Buddy Program training sessions. Over the course of the baseline condition four 40-minute training sessions were provided to each peer network. Training sessions one and two were provided at the beginning of the baseline condition so that peers were familiar with the purpose of this investigation. Training session three was provided in the middle of the baseline condition, and training session four was provided immediately before the start of the intervention condition. Next, the intervention condition involved the researcher

instructing typical peers to use acquired initiation strategies by providing each peer with a cue card. In addition to the cue card, peers were also provided with a peer performance feedback (PPF) session prior to the start of the fourth data point during the intervention condition. Finally, the removal of the cue card marked the start of the maintenance condition.

To satisfy the third and fourth criteria of the evaluation process, data were visually analyzed for changes in trend direction and mean performance level within and between conditions (Tawney & Gast, 1984). To that end, the trend direction was generated using the split-middle method, and the mean performance level was calculated by adding the values of all the data points per condition and dividing this sum by the number of observations in that condition. At the same time, the stability of data points was judged based on the following stability criterion: if more than 80% of the data points fell within 15% of the previously determined trend and level lines, then the trend and level were considered stable (Tawney & Gast, 1984).

Fifth, the latency of change, or period of time, between the onset of intervention and the change in target behaviors were visually analyzed (Kazdin, 2011). Latency of change was determined as one of the following: immediate, delayed, or no change. The more abrupt the change the more likely it was due to the intervention (Kazdin, 2011). Sixth, the percentage of non-overlapping data was calculated. This process referred to evaluating the number of data points during intervention that did not overlap with the range of values attained during baseline (Kazdin, 2011). Moreover, the specific results of each visual analysis conducted for research question one – social interactions – are outlined in Appendix H.

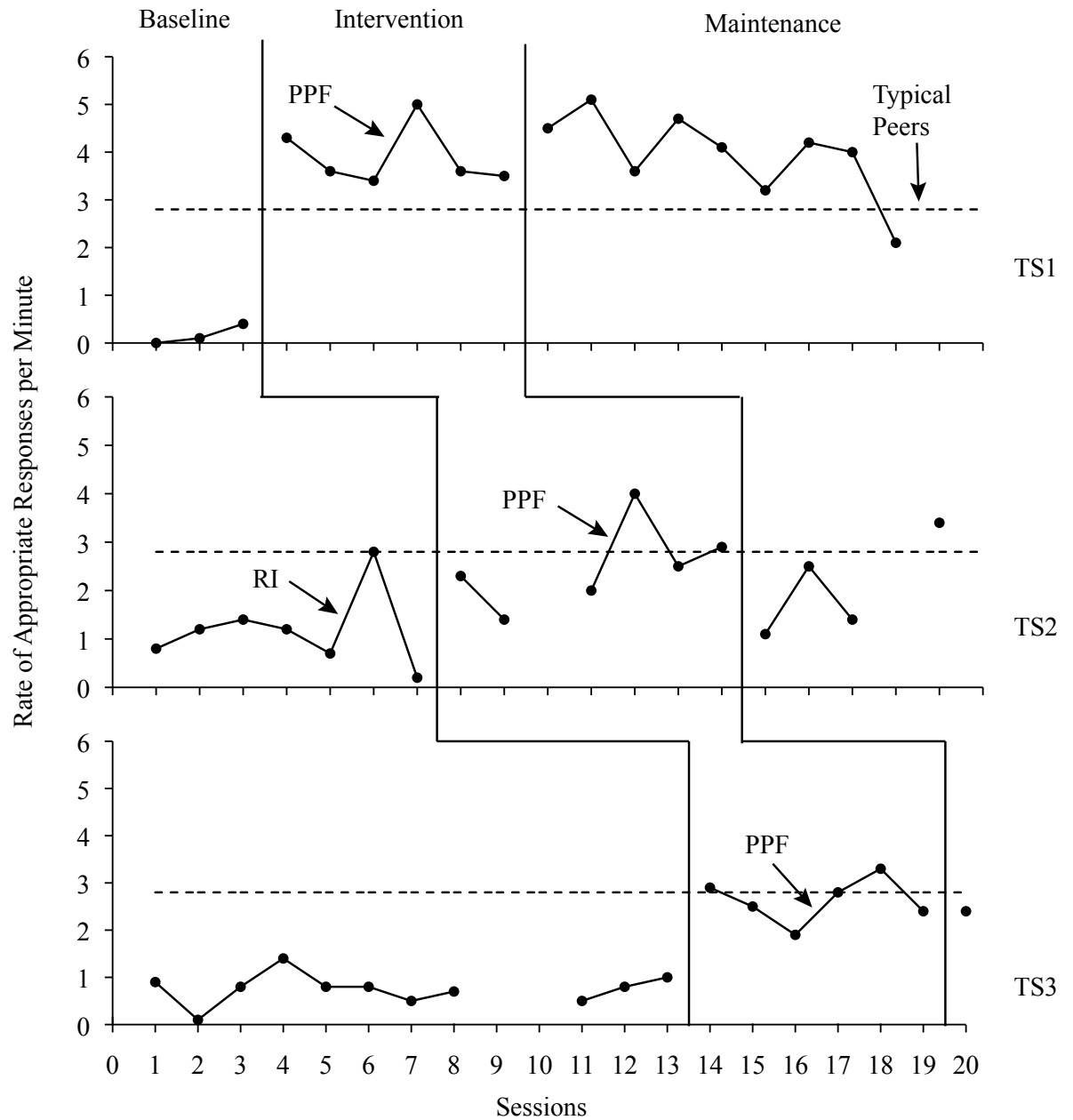


Additionally, given the paucity of normative benchmarks for appropriate initiations and responses for middle school students within lunchroom settings, a local normative sample of typical peers was taken. A visual comparison of social interaction data between TSs and peers provided an additional benchmark for evaluating changes in target behaviors before and after the intervention was applied. To acquire the comparison data the researcher collected six probes of direct observational data for two of the participating peers. Peer8 and Peer9 were randomly selected and observed interacting with peers not included in the study. Results included a mean performance level of 2.8 appropriate responses per minute (range = 1.1 – 3.9) and a mean performance level of 1.05 initiations per minute (range = 0.4 – 1.4). The average rate for appropriate responses and initiations for typical peers are represented by horizontal dashed lines. Finally, Table 12 shows the percent ratio for inappropriate initiations and responses across conditions for TSs and the typical peers. To calculate the percent ratio for inappropriate social interactions, the inappropriate social behaviors were added and then divided by the total number of inappropriate and appropriate social behaviors.

Generally, the visual inspection showed a greater magnitude of change for TSs' response data rather than initiation data across baseline, intervention, and maintenance conditions. Clear level changes in response behavior were evident for TS1 and TS3. For TS2, slight changes in response behavior for trend and level were noted. Additionally, inappropriate responses and initiations decreased for TS2 and TS3. Although inappropriate responses and initiations increased for TS1, the overall percentage of inappropriate social interactions remained lower than TS2, TS3, and typical peers. The summary of the analysis for each TS is described in the following section.

**Figure 1.**

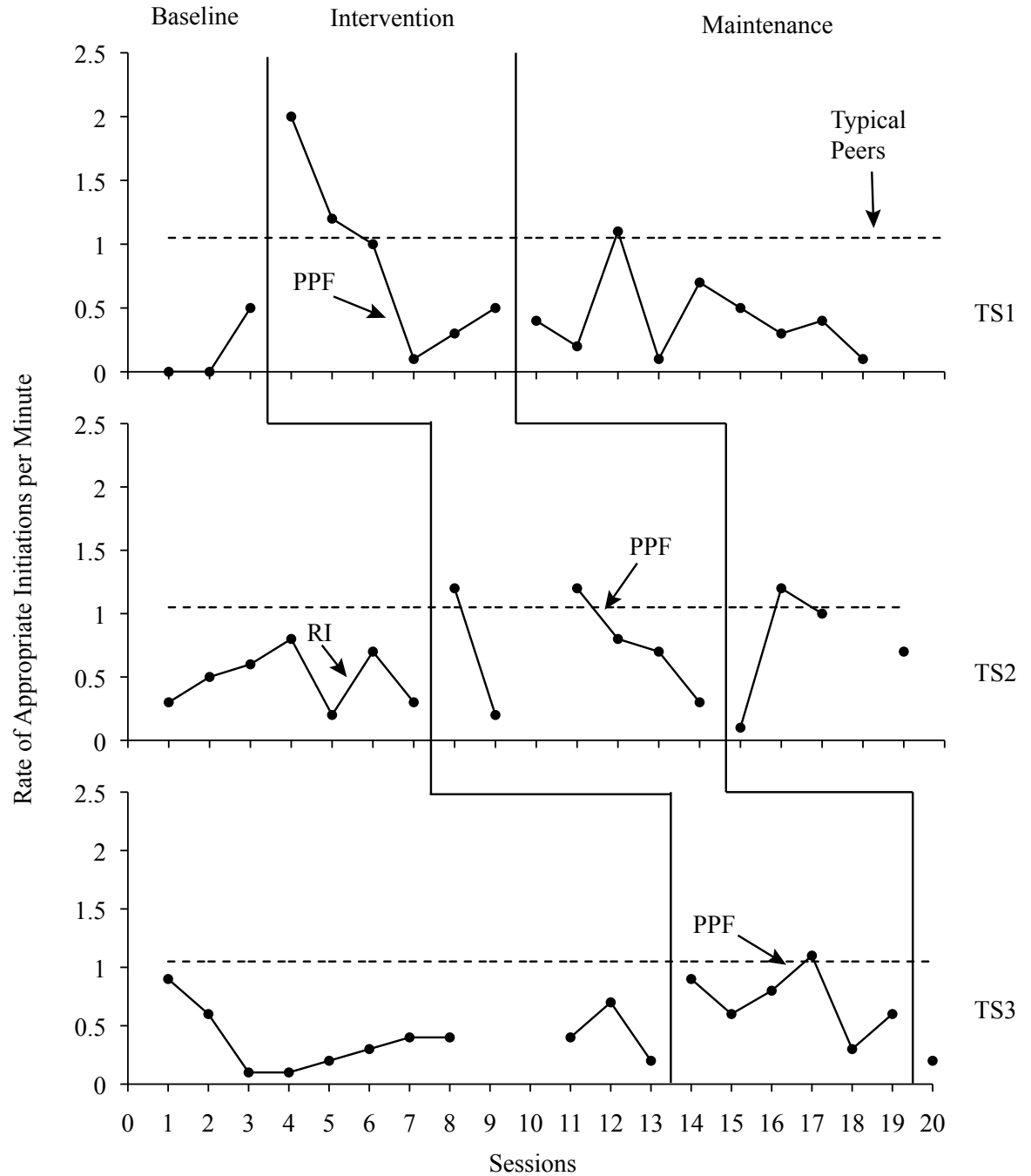
*Target students' appropriate responses compared to typical peers during 10-minute observations*



*Note.* RI = researcher interference; PPF = peer performance feedback

**Figure 2.**

*Target students' appropriate initiations compared to the typical peers during 10-minute observations*



*Note.* RI = researcher interference; PPF = peer performance feedback

**Table 12.**

*Percent ratio and changes for inappropriate initiations and responses for target students and typical peers across conditions*

	Baseline: A		Intervention: B		Maintenance: C		Change A vs. B	Change A vs. C
	Avg	Range	Avg	Range	Avg	Range	Avg	Avg
<b>TS1</b>								
Responses	0	0 – 0	4.2	0 – 7.9	4.5	0 – 12.2	+ 4.2	+ 4.5
Initiations	0	0 – 0	0	0 – 0	16.8	0 – 50	0	+ 16.8
<b>TS2</b>								
Responses	20.9	0 – 60	12.3	0 – 33.3	11.8	4.9 -21.4	- 8.6	- 9.1
Initiations	38.8	0 – 86.7	10.8	0 – 25	38.5	12.5 - 83.3	- 28	- 0.3
<b>TS3</b>								
Responses	34.0	11.1 - 83.3	11.4	3.8 - 17.4	14.3	14.3 - 14.3	- 22.6	- 19.7
Initiations	68.1	41.7 – 89.5	31.2	0 – 60	50	50 – 50	- 36.95	- 18.1
<b>Peers</b>								
Responses	3.6	0 – 7.1	7.4	0 – 14.7	5.1	2.9 – 7.3	+ 3.8	+ 1.5
Initiations	7.2	1 – 1	9.4	0 – 18.8	0	0 – 0	+ 2.2	- 7.2

*Note.* Improvement indicated by decrease in percentages

### **Target Student 1**

**Appropriate responses.** During the baseline condition appropriate response data for target student 1 (TS1) showed a variable and accelerating trend (66% of data points fell within the 15% stability criterion). Additionally, TS1 recorded a mean performance level of 0.16 responses per minute (range = 0 – 0.4) across three baseline data points. Although the baseline trend was variable and increasing, the decision to apply the intervention was made because this improvement was gradual (Tawney & Gast, 1984). Also, the mean performance level for TS1 was considerably lower than the mean

performance level for typical peers. In fact, TS1's average response rate was 17.5 times lower than the average response rate for typical peers.

Following the onset of the intervention multiple changes were noted between conditions. First, TS1 showed gains in the intervention level (mean = 3.9 per minute; range = 3.2 – 5.0) across six data points and the maintenance level (mean = 3.9 per minute; range = 2.1 – 5.1) across nine data points. The latency of change occurred immediately following the introduction of the intervention. Second, the split middle method showed a flat trend during intervention and gradually decelerating trend during maintenance. Although appropriate response data for level and trend were variable during intervention and maintenance, TS1 showed consistently high performance, which was verified by 100% of nonoverlapping data points across intervention and maintenance, relative to baseline data.

**Appropriate initiations.** During the baseline condition, appropriate initiation data for TS1 showed similar patterns to appropriate response data. The split-middle method determined a variable (66% of data points fell within the 15% stability criterion) and gradually accelerating trend. The mean baseline level was 0.16 initiations per minute (range = 0 – 0.5). Thus, TS1 was about six and a half times less likely to initiate a conversation with his respective peer group compared to typical peers. The decision to implement the intervention was based on appropriate response data.

Multiple changes were noted across conditions for appropriate initiation data. First, an abrupt increase in the rate of initiations occurred immediately after the onset of the intervention. Moreover, the last baseline data point was 0.5 per minute while the first intervention data point was 2.0 per minute. Although the split-middle method showed a

variable and decelerating trend during intervention, an increase in mean performance level was noted (mean = 0.9 per minute; range = 0.1 – 2.0). Following termination of the intervention condition, the mean maintenance level decreased to 0.4 per minute (range = 0.1 – 1.1) and showed no increasing or decreasing trend. Although maintenance performance was lower than intervention data, it remained higher than baseline data. This variability in performance was verified by 50% of nonoverlapping data points during intervention and 22% during maintenance, in comparison to baseline data.

**Inappropriate social interactions.** During the baseline condition the average percentage of inappropriate responses for TS1 was 0% across three data points. This average increased to 4.2% (range = 0% – 7.9%) across six data points during intervention and 4.5% (range = 0% – 12.2%) during maintenance across nine data points. Inappropriate response data was lower than the average percentage of inappropriate responses across conditions for typical peers (mean = 5.4; range = 0% – 14.7%) across six probes.

Inappropriate initiation data for TS1 was 0% during baseline and intervention conditions. An increase in mean performance was calculated during maintenance in comparison to preceding conditions. The average percent ratio for inappropriate initiations was 16.8% (range = 0% - 50%). This was about 11.3% more than average percent ratio for typical peers (mean = 5.5%; range = 0% - 18.8%).

## **Target Student 2**

**Appropriate responses.** During the baseline condition, appropriate response data for target student 2 (TS2) were variable and slightly decelerating (43% of data point fell within a 15% stability criterion). The mean baseline level was calculated at 1.2

responses per minute (range = 0.2 – 2.8) across seven observation sessions, including one outlier session of extremely high performance. Although baseline data were variable, the intervention was applied because not only was TS2's mean performance level lower than typical peers but also because data showed a gradual regression (Tawney & Gast, 1984).

Following the onset of the intervention TS2 demonstrated a number of clear changes. First, an immediate change in performance between the last baseline observation session (0.2 responses per minute) and the first intervention observation session (2.3 responses per minute) occurred. Second, the mean performance level increased to 2.5 responses per minute (range = 1.4 – 4.0) across six intervention data points. This average slightly decreased to 2.1 responses per minute (range = 1.1 – 3.4) across four maintenance data points, but maintenance performance remained higher than the baseline level. The split-middle method showed a variable but slightly increasing trend across intervention and maintenance conditions. Overall percentage of nonoverlapping data was 33% during intervention and 25% during maintenance in comparison to baseline data points; however, this increased to 83% during intervention and 50% during maintenance after excluding the extreme outlier session that occurred during baseline.

**Appropriate initiations.** During baseline, appropriate initiation data for TS2 were variable and showed a decreasing trend (57% of data points fell within the 15% stability criterion). The average rate of initiations per minute was 0.5 (range = 0.2 – 0.8) across seven baseline data points. This mean performance level was about two times lower than typical peers. The decision to move into the intervention condition was based upon appropriate response data for TS2.

The introduction of the intervention resulted in ambivalent changes for subsequent conditions. Although the latency of change was immediate, the mean performance levels during intervention (mean = 0.73 per minute; range = 0.2 – 1.2) and maintenance (mean = 0.75 per minute; range = 0.1 – 1.2) were only slightly better than the baseline level. Additionally, the split-middle method showed a variable and decelerating trend during intervention that stabilized over the last four intervention sessions, and a variable and accelerating trend during maintenance that stabilized to decelerating over the last three maintenance sessions. These inconclusive changes in performance were notably evident after calculating the overall percentage of nonoverlapping data across conditions (40%), relative to baseline data.

**Inappropriate social interactions.** During the baseline condition the mean percent ratio of inappropriate responses for TS2 was 20.9% (range = 0% - 60%) across seven data points. This average decreased to 12.3% (range = 0% – 33.3%) across six data points during intervention and 11.8% (range = 4.9% – 21.4%) during maintenance across four data points. Although inappropriate response data decreased over the span of the study, it remained higher than the average percent ratio for typical peers' inappropriate response data. Anecdotal data reported that TS2 would often not respond to peers because he was preoccupied with drawing for large durations of observation sessions.

During baseline the average percent ratio for TS2's inappropriate initiation data was 38.8% (range = 0% - 86.7%). TS2 was observed using inappropriate school language during the fourth baseline observation session and his respective peer group reported feeling uncomfortable. Thus, researcher interference (RI) occurred prior to the fifth data



point by the researcher asking TS2 to refrain from using inappropriate school language. The mean percent ratio for TS2's inappropriate initiations decreased to 10.8% (range = 0% - 25%) during intervention but increased again to the baseline level during maintenance (mean = 38.5%; range = 12.5% – 83.3%). The average percent ratio of inappropriate initiations was about 24% more than the average percent ratio for typical peers.

### **Target Student 3**

**Appropriate responses.** During the baseline condition appropriate response data for target student 3 (TS3) were stable (82% of data points fell within the 15% stability criterion) and showed no increasing or decreasing trend over a period of 11 observation sessions. Additionally, TS3 recorded a mean performance level of 0.75 responses per minute (range = 0.1 – 1.4). Although the final three baseline data points showed a stable and accelerating trend line, the average rate of 0.76 responses per minute (range = 0.5 – 1.0) remained considerably lower typical peers. Thus, the decision to introduce the intervention condition was based on gradual improvement and the mean performance level (Tawney & Gast, 1984). In fact, TS3's average response rate was about four times lower than the average response rate for the typical peers.

Following the onset of the intervention clear changes occurred. First, TS3 showed gains in mean intervention level (mean = 2.6 per minute; range = 1.9 – 3.3) across six data points. In addition, the one maintenance probe also showed improvement (2.4 per minute). The latency period between termination of the baseline condition and introduction of the intervention indicated immediate change in response behavior. Second, the split-middle method showed a variable and slightly increasing trend. Overall

the percentage of nonoverlapping data was 100% for the intervention condition and maintenance probe in comparison to the baseline data.

**Appropriate initiations.** During the baseline condition appropriate initiation data for TS3 were variable (63% of data points fell within the 15% stability criterion) and showed a gradually accelerating trend over a period of 11 observation sessions. Additionally, TS3 recorded a mean performance level of 0.4 initiations per minute (range = 0.1 – 0.9). The final three baseline data points showed a variable and decelerating trend line and had an average rate of 0.46 initiations per minute (range = 0.5 – 1.0). This mean performance level was about 2 times lower than typical peers. The decision to intervene was made based on appropriate response data.

Although improvement in performance was less clear, a number of changes were noted between baseline and intervention for TS3. First, upon implementation of the intervention, TS3 demonstrated an immediate increase in rate of initiations. The difference between the last baseline observation and the first intervention observation was 0.7 initiations per minute. Also, an increase in mean performance level occurred between conditions. The mean performance level was 0.72 initiations per minute (range = 0.3 – 1.1). However, the split-middle method showed a variable and decreasing trend across the intervention condition and a rate of 0.2 initiations per minute was recorded for the maintenance probe. Overall the percentage of nonoverlapping data was 14% for the intervention condition and maintenance probe in comparison to the baseline data.

**Inappropriate social interactions.** During the baseline condition the average percent ratio for TS3's inappropriate responses was 34.0% (range = 11.1% - 83.3%) across 11 data points. This average decreased to 11.4% (range = 3.8% – 17.4%) across

six data points during intervention and 14.3% for one maintenance probe. Overall inappropriate response data decreased across conditions in comparison to baseline data; however, it remained higher than the average percent ratio of inappropriate responses for typical peers. Anecdotal data reported that TS3 often responded off topic or used repetitive language during social interactions with peers.

During baseline the average percent ratio for TS3's inappropriate initiation data was 68.1% (range = 41.7% - 89.5%). TS3 was observed using atypical social interaction behavior such as pretending to turn into a werewolf, hitting himself, and asking peers to scratch his ear or to touch their nose. This unusual use of language seemed to lack any type of intended communicative function. The mean percent ratio for inappropriate initiations decreased to 11.4% (range = 3.8% - 17.4%) during intervention, and although mean percent ratio increased for the maintenance probe (50%), it remained lower than baseline data.

### **Interobserver Agreement**

Interobserver agreement was checked for 23 of 53 total observation sessions (43.4%). The frequency ratio method was used to compute interobserver agreement between two observers who independently recorded target behaviors (Kazdin, 2011). This method is often used to assess agreement on frequency count and interval recording measures as used in this investigation. Although there are limitations to using the frequency ratio method, if the margin of error between the two observers is close (10% to 20%), then this method serves as a useful method for ensuring agreement (Kazdin, 2011). For this investigation the average interobserver agreement percentages for frequency count measures were 87.1% (range = 76.5% – 100%) for responses and 89.3% (range =

77.8% – 100%) for initiations. The average interobserver agreement percentages for interval recording measures were 86.1% (range = 44.6% – 100%). Interobserver agreement was checked for 22.2% of TS1’s observation sessions, 76.5% of TS2’s observation sessions, and 33.3% of TS3’s observation sessions. Table 13 provides a summary of interobserver agreement results for target behaviors across TSs.

**Table 13.**

*Interobserver agreement percentages for target behaviors across target students*

Target Behavior	TS1	TS2	TS3	Total
Frequency count measures				
Appropriate responses	96	85.25	97	87.1
Inappropriate responses	100	76.5	68	
Appropriate initiations	90.9	91.5	87	89.3
Inappropriate initiations	100	88.2	77.8	
Interval Recording Measures				
Positive social engagement	96.7	99.5	81.9	86.1
Negative social engagement	100	44.6	72.8	
Low-level social engagement	95.8	92.7	90.8	

### **Research Question One – Implementation Fidelity**

**To what extent does the level of implementation fidelity for typical peers impact changes in observed social interaction outcomes?** To further understand the impact of the peer implementing initiation strategies on observed social interaction outcomes data for peers’ implementation fidelity and TSs’ social interactions were visually analyzed for each participant group. Participant groups were defined based on

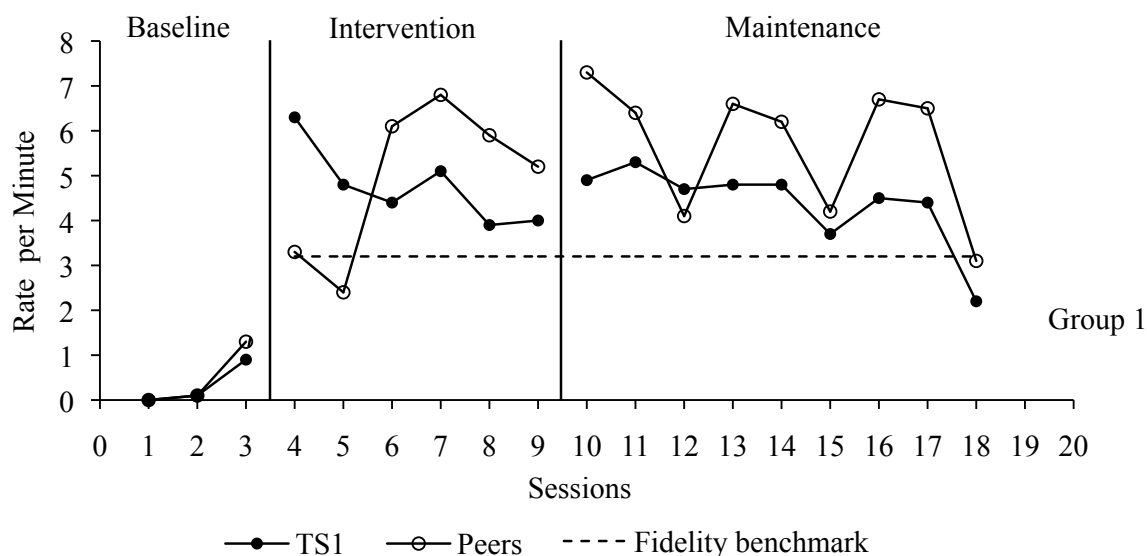
each baseline grouping (See Figures 3, 4, and 5). First, the rate per minute for each observational session in which typical peers implemented initiation strategies was plotted (open circles). This was known as implementation fidelity. To calculate peers' implementation fidelity the total use of initiation strategies were added (i.e., greeting, initiation, response, and assistance) and then divided by 10-minute observation sessions. Second, the rate per minute for each observational session in which TSs engaged in social interaction exchanges with peers was plotted (closed circles). To calculate TSs' social interactions the researcher added the values of initiations and responses and divided its total by 10-minute observation sessions.

Additionally, the horizontal dashed line represents the benchmark for peers' implementation fidelity. Based on the current investigation, the benchmark for implementation of fidelity was calculated as rate in which peer networks implemented initiation strategies. First, the average rate of initiation strategies per minute for the first three intervention data points for participant group one was calculated. Next, the benchmark for fidelity was determined by calculating 80% of the average rate per peer. Thus, group one and group two, which contained four peers each, had a benchmark of 3.2 strategies per minute, whereas group three had three peers so the benchmark was set at 2.4 strategies per minute. Data points plotted above this line indicated "high" levels of fidelity whereas data points that fell below this line were considered "low" levels of fidelity. Generally, data for peers' implementation fidelity were slightly greater than data for TSs' social interactions. In addition, peers' implementation fidelity often increased or decreased at similar rates to TSs' social interactions. Results for each participant group are further described below

**Participant group one.** Participant group one included TS1 and the first peer network (peer1, peer2, peer3, and peer4). Three of the four peers were present for 100% of the observation sessions, the fourth peer was present for 55%. Figure 3 illustrates the rate of peer network one's implementation fidelity and TS1's social interactions during 10-minute observation periods. The mean baseline level for peers' implementation fidelity was 0.47 strategies per minute (range = 0 – 1.3) across three observations. The mean baseline level for TS1's social interactions was 0.33 per minute (range = 0 – 0.9). During intervention the mean level for peers' implementation fidelity was 4.95 strategies per minute (range = 2.4 – 6.8) across six observations. The mean intervention level for TS1's social interactions was 4.75 per minute (range = 3.9 – 6.3). During maintenance the mean level for peers' implementation fidelity was 5.8 strategies per minute (range = 3.1 – 7.3) and the mean level for TS1's social interactions was 4.4 per minute (range = 2.2 – 5.3). For all three conditions the mean levels for peers' implementation fidelity were slightly greater than the mean level for TS1's social interactions. Additionally, peers' implementation was considered to be a “high” level of fidelity because the rate of initiation strategies fell above the benchmark.

**Figure 3.**

*Rate per minute for typical peers' implementation fidelity and TS1's social interactions for participant group one during 10-minute observations*

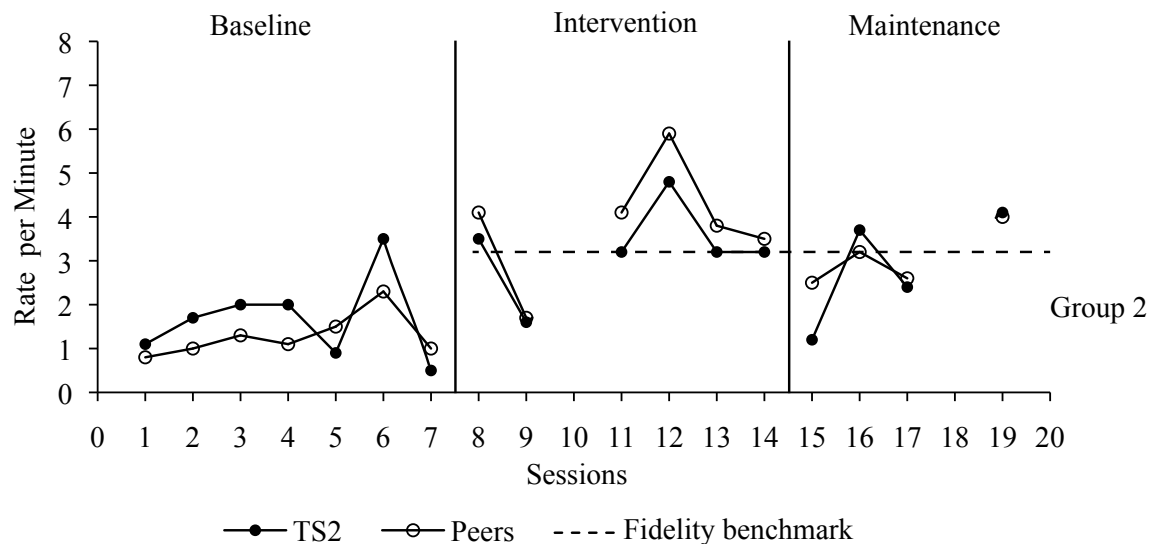


**Participant group two.** Participant group two included TP2 and the second peer network (i.e., peer5, peer6, peer7, and peer8). All four peers were present for 100% of social interactions sessions. Figure 4 represents implementation fidelity for peers and social interactions for TS2. First, the mean level during baseline for peers' implementation fidelity was 1.1 strategies per minute (range = 0.6 – 2.3) across seven observation sessions. The mean baseline level for TS2's social interactions was 1.7 social interactions per minute (range = 0.5 to 3.5). Next, during the intervention condition the mean level for peers' implementation fidelity was 3.9 strategies per minute (range = 1.7 – 5.9) across six observation sessions. Also, during intervention condition the mean level for TS2's social interactions was 3.3 per minute (range = 1.6 – 4.8). Finally, the maintenance mean level for peers was 3.1 strategies per minute (range = 2.5 – 4) across 4 observation sessions. The maintenance mean level for TS2's social interactions was 2.85 per minute (range = 1.2 – 4.1).

For baseline mean level for peers' implementation fidelity was slightly below the mean level for TS2's social interactions whereas implementation fidelity means were greater than social interaction means during intervention and maintenance conditions. Additionally, the intervention mean level for peers' implementation fidelity was considered above the benchmark, however this mean level slightly fell below the benchmark during the maintenance condition. Generally, the rate of TS2's social interactions per minute mimicked the rate of peers' initiation strategies per minute.

**Figure 4.**

*Rate per minute for typical peers' implementation fidelity and TS2's social interactions for participant group two during 10-minute observations*



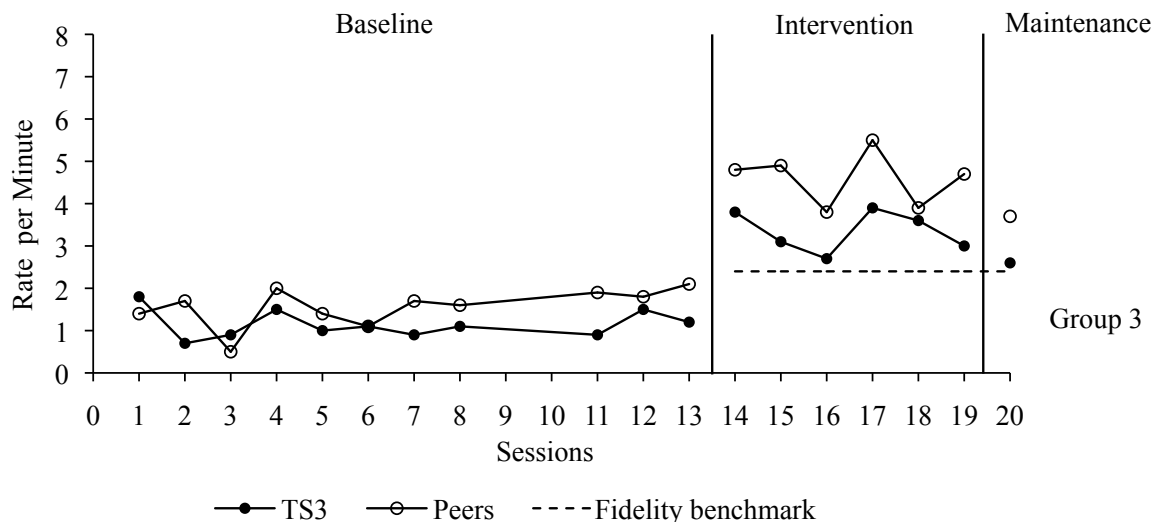
**Participant group three.** Participant group three included TS3 and the third peer network (peer9, peer10, and peer11). All three peers were present for 72% of observation sessions and two peers were present for the remaining 28% of sessions. The mean baseline level of peers' implementation fidelity was 1.5 initiation strategies per minute (range = 0.5 – 2.1) across 11 sessions, spanning a period of eight weeks. Also



during the baseline condition TS3's mean level of social interactions was 1.1 per minute (range = 0.7 – 1.8). During the intervention condition the peers' implementation of social interaction strategies were considered a “high” level of fidelity because the rate of initiation strategies fell above the benchmark. Specifically, the mean intervention level of peers' implementation fidelity was 4.6 strategies per minute (range = 3.8 – 5.5 per minute) across six observations, spanning a period of three weeks. Also during intervention, TS3's social interaction mean level was 3.4 per minute (range = 2.7 – 3.9). The one maintenance probe for peers' implementation fidelity and TS3's social interactions were 3.7 strategies per minute and 2.6 responses and initiations per minute, respectively. Both peers' initiation strategies and TS3's social interactions increased from baseline to intervention and remained relatively the same during maintenance.

**Figure 5.**

*Rate per minute for typical peers' implementation fidelity and TS3's social interactions for participant group three during 10-minute observations*



## **Research Question One – Social Validity**

**To what extent do social validity measures by direct and indirect consumers of the peer-mediated package determine meaningful changes in observed social interaction outcomes?** To examine the extent to which social validity measures determined meaningful changes based on expert and consumer evaluation descriptive and correlation analyses were used (Kazdin, 2011). According to Kazdin (2011) social validity constructs can be used to identify important aspects of the intervention as well as assessment. The two social validity constructs used in this investigation included (1) social comparison (see research question one – social interactions) and (2) subject evaluation. Research question one – social validity addressed subject evaluation by soliciting the opinions of others who were judged as one of the following: (a) an “expert” of target behaviors (i.e., lunchroom supervisor); (b) a indirect consumer of the intervention, who was familiar with the participating students (i.e., parents and teachers); and (c) a direct consumer of the intervention (i.e., TSs and peer networks). The following section describes the results to expert and consumer evaluation.

### **Expert Evaluation**

As part of the social validation process the participating lunchroom supervisor served as the “expert” and was asked to complete daily ratings for TSs’ socially engaged time. The primary purpose of expert evaluation was to use a descriptive analysis to detect changes in observable behaviors such that they made a difference to the expert. The secondary purpose was to compare expert evaluation data for socially engaged time to direct observational data for the same behavior. A correlation analysis was used to compare measures.

As described in the methods section, the participating lunchroom supervisor observed and rated percent of time in which TSs were engaged in positive, negative, or low-level social interactions with their peer networks. The lunchroom supervisor knew the TSs prior to the start of the study but was blind to conditions of this investigation. At the end of an observation, the lunchroom supervisor made ratings that corresponded to the proportion of time (0% never occurred to 100% always occurred) in which each TS was observed to display the target behavior. Expert evaluation was based on summation observations as well as ratings that occurred at the end of the observation, thus ratings failed to reflect actual behaviors. In addition, the lunchroom supervisor judged target behaviors as approximation, so they were not considered mutually exclusive.

In conjunction with taking expert evaluation data, continuous direct observational data using the same definitions for target behaviors that were used in expert evaluation was collected for each TS. The purpose of collecting direct observational data was to explore the relationship between observational ratings obtained by expert evaluation and direct observations. Direct observations used a momentary time sampling interval recording system to evaluate target behaviors (positive, negative, low-level) as either occurring or not occurring following 15-second intervals. Thus, target behaviors were judged as mutually exclusive. Results from this analysis are provided in tables 14 and 15. Specifically, table 14 presents the mean percent for expert evaluation and table 15 provides mean percent of interval for direct observations across target behaviors and conditions.

**Table 14.**

*Expert evaluation data for mean percent of time engaged in social interactions and number of observations across conditions*

Target Participant	Baseline	Intervention	Maintenance
<b>TS1</b>			
# observations/total	2/3	3/6	4/9
Positive	65.0%	76.6%	92.5%
Negative	57.5%	36.7%	17.5%
Low-level	60.0%	43.3%	25.0%
<b>TS2</b>			
# observations/total	6/7	5/6	3/4
Positive	55.8%	62.0%	70.0%
Negative	31.7%	44.0%	33.3%
Low-level	64.2%	66.0%	43.3%
<b>TS3</b>			
# observations/total	6/11	4/6	0/1
Positive	60.0%	85.0%	n/a
Negative	36.2%	15.0%	n/a
Low-level	51.7%	37.5%	n/a

*Note.* Percentages are not mutually exclusive. Data included 33 out of 53 total observations.

**Table 15.**

*Direct observational data for percent of interval engaged in social interactions compared to typical peers during 10-minute observations*

Participant/Behavior	Baseline	Intervention	Maintenance
<b>TS1</b>			
Positive	1.7%	62.2%	55.1%
Negative	10.0%	0.0%	1.9%
Low-level	88.3%	37.8%	43.3%
<b>TS2</b>			
Positive	19.1%	28.7%	44.5%
Negative	3.2%	1.4%	0.0%
Low-level	77.7%	70.0%	55.5%
<b>TS3</b>			
Positive	12.6%	47.3%	35.0%
Negative	16.7%	1.4%	0.0%
Low-level	70.7%	51.3%	65.0%
<b>Typical Peers</b>			
Positive	44.7%	40.7%	56.3%
Negative	1.3%	0.0%	0.0%

Low-level	54.0%	59.3%	43.8%
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*Note.* Percentages are mutually exclusive. Data extracted from all 53 observations.

The lunchroom supervisor rated 62.3% of the total observation sessions. Ratings were derived by calculating the mean percent of time TSs were engaged in target behaviors across the number of observations in each condition. To compare data, direct observational data was collected. Direct observations used an interval recording method and data was converted into the mean percent of intervals. For direct observations, data were taken from 100% of the observation sessions. Percent of interval was calculated by taking the number of intervals in which the target behavior occurred and then dividing this sum by the total number of intervals in an observation.

Overall, the expert evaluation and the direct observations showed an increase in the amount of time all TSs engaged in positive interactions with their peer network and a decrease in the amount of time all TSs engaged in negative and low-level interactions across the span of the study. For TS1, positive social engagement ratings by the expert were 65% during baseline, 76.6% during intervention, and 92.5% during maintenance. The expert also rated a decrease in mean percentage for negative (baseline = 57.7%; intervention = 36.7%; maintenance = 17.5%) and low-level (baseline = 60%; intervention = 43.3%; maintenance = 25%) social engagement. For the comparison measure, direct observational data showed an increase in the mean percent of interval for positive engagement from baseline (1.7%) to intervention (62.2%) and maintenance (55.1%). A decrease in mean percent of interval for negative and low-level social engagement was noted (negative: baseline = 10%; intervention = 0%; maintenance = 1.9%) (low-level: baseline = 88.3%; intervention = 37.8%; maintenance = 43.3%). Following the onset of

the intervention, TS1's mean percent of interval for positive, negative, and low-level behaviors were similar to the comparison group. Specifically, direct observational data for typical peers was collected (positive = 47.2%; negative = 0.43%; low-level = 52.4%) across six observation sessions, spanning the entire duration of the study.

For TS2, expert evaluation indicated an increase in average percentage for positive engagement from baseline (55.8%) to intervention (62%) and maintenance (70%). However, the mean percentages for negative engagement slightly increased from baseline to the other conditions. The "expert" rated little change in average percentage for low-level engagement from baseline (64.2%) to intervention (66%) and a slight decrease during maintenance (43.3%). For direct observations, TS2's average percent of interval for positive engagement increased across conditions (baseline= 19.1%; intervention=28.7% maintenance=44.5%). Although direct observations and expert evaluation increased for positive engagement during each condition, direct observational data were generally lower than expert ratings. Direct observational data observed a decrease in mean percent of interval for negative and low-level engagement behavior across conditions. During the maintenance condition, TS2's average percent of interval for target behaviors were similar to the typical peers as indicated by direct observational data.

For TS3, from baseline to intervention the expert rated an increase in average percentage for positive engagement (baseline=60%; intervention=85%). Expert evaluations indicated a decrease in mean percentage for negative (baseline=36.2%; intervention=15%) and low-level (baseline=51.7%; intervention=37.5%) social engagement. For direct observations, TS2 showed an increased in mean percent of

interval for positive social engagement (baseline= 12.6%; intervention=47.3%) and decrease in percent of interval for negative (baseline=16.7%; intervention=1.4%) and low-level (baseline = 70.7%; intervention = 51.3%) social engagement. During intervention TS3's average percent of interval for target behaviors were similar to typical peers as measured by direct observational data.

***Correlation analysis.*** Pearson's correlation using a statistical software program was calculated to determine the relationship between expert evaluation and direct observations for socially engaged times (see table 16) (Chafouleas et al., 2009). The expert evaluation measure was moderately and positively correlated with direct observations for two of the three target behaviors, positive social engagement and low level social engagement. The participating administrator's ratings for positive social engagement were moderately related to the data collector's direct observations for the same behavior ( $r = .624, p < 0.01$ ). In addition, the administrator's ratings for low-level social engagement were moderately related to direct observation measures for the same behavior ( $r = .622, p < 0.01$ ). However, no relationship occurred for negative social engagement ( $r = -.028$ ).

As expected, inverse target behaviors produced negative correlation coefficients. For example, higher levels of positive social engagement resulted in negative coefficients with negative and low-level social engagement ( $r = -.579$  and  $r = -.755$ , respectively) as measured by expert evaluation. Similar patterns occurred for direct observations in that when positive social engagement increased, low-level social engagement decreased. However, for direct observation data, positive and negative social engagement were not related ( $r = -.242$ ).

**Table 16.**

*Correlations between expert evaluation and direct observation (DO) for target students' socially engaged time*

	Expert – Positive	Expert – Negative	Expert – Low-level	DO – Positive	DO – Negative	DO – Low-level
Expert – Positive	_____					
Expert – Negative	-.579**	_____				
Expert – Low-level	-.755**	.534**	_____			
DO – Positive	.624**	-.501**	-.648**	_____		
DO – Negative	.104	-.028	.045	-.242	_____	
DO – Low-level	-.675**	.519**	.622**	-.873**	-.262	_____

*Note.* \*\*  $p < 0.01$  level

### **Consumer Evaluation**

In addition to expert evaluation and as part of social validation process, consumer evaluation for the peer-mediated package was measured. To measure the acceptability of the intervention participating students, parents, and school personnel were asked to complete satisfaction surveys at the conclusion of the study. Although each participant group rated different survey items specific to their involvement in the intervention, all surveys used the following rating scale: (1) strongly disagree, (2) disagree, (3) neutral, (4) agree, (5) strongly agree. Participating students were asked to rate seven items with a total possible score of 35, while participating parents and school personnel were asked to rate five items with a total possible score of 25. Survey items for each participant group are shown in Appendix.



Participating students and parents were asked to provide anonymous opinions about their involvement in the intervention whereas the identities of school personnel remained known due to directly soliciting information from this latter group. Higher scores indicated more favorable perceptions. Specifically, scores of one and two were interpreted as “low”, scores of three were interpreted as “neutral”, and scores of four and five were considered “high”. Table 17 provides means and ranges for participating students and parents and raw scores for participant school personnel as well as a summary score.

**Table 17.**

*Student, parents, and school personnel satisfaction ratings for the peer-mediated package*

<b>Participant</b>	<b>Item 1</b>	<b>Item 2</b>	<b>Item 3</b>	<b>Item 4</b>	<b>Item 5</b>	<b>Item 6</b>	<b>Item 7</b>	<b>Total</b>
<b>Students</b>								
Peers (n=11)	4.4 (4-5)	4.5 (3-5)	4.55 (4-5)	4.45 (3-5)	3.73 (3-5)	4.36 (4-5)	3.82 (3-4)	29.77
TSs (n=3)	4.7 (4-5)	5 (5-5)	4.7 (4-5)	5 (5-5)	5 (5-5)	5 (5-5)	4.3 (3-5)	33.7
<b>Parents</b>								
Parents (n= 7)	4.71	4.39	4.29	4.57	4.71	n/a	n/a	22.68
<b>School Personnel</b>								
Teacher 1	5	5	5	5	5	n/a	n/a	25
Teacher 2	3	3	4	3	3	n/a	n/a	16
Teacher 3	3	4	4	4	4	n/a	n/a	19
Lunchroom supervisor	5	5	5	5	5	n/a	n/a	25

*Note.* Total possible score for students = 35; Total possible score for parents and school personnel = 25.

## **Research Question Two**

**To what extent do teacher ratings and student performance for social and executive functioning change after target students following the completion of the**

**peer-mediated package?** To answer research question two a descriptive analysis of pre-post assessments was used. According to Kazdin (2011), pre-post assessments may be used as a supplementary measure to continuous ongoing measures. Additionally, pre-post assessments may serve as an important compliment to direct observational data. The pre-post measures included in this investigation were: (a) the *Delis-Kaplan Executive Function System* (D-KEFS; Delis, Kaplan & Kramer, 2001), which is a student performance battery for executive functioning; (b) the *Behavior Rating Inventory of Executive Function* (BRIEF; Gioia et al., 2000), which is a teacher report for executive functioning skills; and the *Social Responsive Scale* (SRS; Constantino & Gruber, 2005), which is a teacher report for overall social functioning. Specifically, the BRIEF measured teacher perceptions related to change in the following executive functioning domains: inhibit, shift, emotional control, initiate, working memory, plan/organize, organization of materials, and monitor. The SRS measured teachers perceptions for changes in social functioning associated with characteristics of ASD, including social awareness, social cognition, social communication, social motivation, and social mannerisms. Table 18 reports TSs' standard scores for each of these measures at pre and post intervention.

For the teacher report measure on executive functioning only one of the three TSs showed improvement from pre to post intervention. BRIEF raw scores were converted to *T*-scores, with a mean of 50 and standard deviation of 10. Despite these minimal changes on the BRIEF, all three TSs either stayed the same or outperformed their baseline scores following their participation in the intervention on select D-KEFS student performance subtests, including number sequencing and cognitive switching tasks. For example, the

higher the scaled score the better the performance. D-KEFS raw scores were converted to scaled scores, with a mean range of 10 and a standard deviation of three.

Additionally, only one TS showed improvement on total social functioning score as indicated by teacher report on the SRS. However, all three TSs showed improvement from pre to post intervention on the SRS social motivation subtest. SRS raw scores were converted to *T*-scores, with a mean of 50 and standard deviation of 10. *T*-scores between 60 and 75 are considered clinically significant for mild and moderate difficulties with reciprocal social interactions, whereas *T*-scores that are 76 or higher are considered clinically significant for severe social challenges, and scores within this range are strongly associated with an ASD diagnosis. Finally, *T*-scores that are 59 or lower are associated with the typical population and not a diagnosis of ASD.

**Table 18.**

*Pre-post scores for executive functioning (D-KEFS and BRIEF) and social functioning (SRS)*

Measure	<u>TS1</u>		<u>TS2</u>		<u>TS3</u>	
	Pre	Post	Pre	Post	Pre	Post
<b>D-KEFS – student</b>						
TM: visual scanning	12	10	10	7	6	1
TM: number sequencing	12	14Δ	7	12Δ	1	1
TM: letter sequencing	12	9	5	11Δ	1	1
TM: number/letter switch	14	14	6	6	5	4
TM: motor speed	13	11	11	13Δ	10	10
VF: letter frequency	9	15Δ	11	11	8	9Δ
VF: category fluency	6	10Δ	9	10Δ	5	3
VF: category switching	3	8Δ	8	9Δ	1	2Δ
VF: switching accuracy	5	8Δ	6	9Δ	1	3Δ
DF: filled dots	11	11	7	7	5	3
DF: empty dots	8	8	7	7	6	7Δ
DF: switching	11	13Δ	7	9Δ	4	8Δ
CW: naming	8	9Δ	8	10Δ	5	3
CW: reading	9	6	6	6	4	1
CW: inhibition	11	9	11	8	10	6

CW: inhibition/switching	9	9	11	12Δ	6	6
<b>BRIEF – teacher</b>						
Global Executive Composite	82	85	55	62	77	71Δ
Inhibit	75	80	53	64	75	80
Shift	68	82	58	60	66	60Δ
Emotional Control	69	75	48	51	69	72
Initiate	78	81	63	60Δ	75	66Δ
Working memory	78	78	48	57	88	66Δ
Plan/Organize	81	81	53	60	66	62Δ
Organization of Materials	80	83	54	57	60	44Δ
Monitor	86	78	60	71	83	83
<b>SRS – teacher</b>						
Total	62	67	51	59	74	65Δ
Social awareness	62	57Δ	52	65	72	67Δ
Social cognition	56	69	56	61	80	70Δ
Social communication	63	68	61	57Δ	71	66Δ
Social motivation	57	46Δ	59	53Δ	56	46Δ
Social mannerisms	66	78	59	60	80	70Δ

*Note.* Δ indicated improvement from pre to post intervention

Standard scores reported in BRIEF and SRS; Growth = scores decrease

Standard scores reported in D-KEFS Growth = scores increase

### Summary

The results for this investigation indicated increased appropriate responses and limited improvement for appropriate initiations across TSs and their respective peer networks. Furthermore, two of the three TSs were approaching response data similar to typical peers while initiation data remained below typical peer data. Results also indicated that peers' implementation of the initiation strategies played an integral part in the total number of TSs' social interactions. Results for the pre-post social competence measures indicated improvement for all three TSs on executive functioning tasks as measured by student performance; however, improvement only occurred for one of the three TSs on teacher report measures. Finally, consumers' overall satisfaction following the intervention was considered high.

## **CHAPTER IV**

### **DISCUSSION**

The purpose of this study was to investigate the peer-mediated package as a method for the performance and generalization of social interactions and skills acquired in the previously implemented Social Competence Intervention for Adolescents (SCI-A) program for target students (TSs). This study employed a single-subject multiple-baseline design (Kazdin, 2011) across participants to assess the relationship between the peer-mediated package and social interactions between TSs and peer networks during lunch. The peer-mediated package based on adopted lessons from the SCI-A program (Stichter et al., 2012), social learning theory constructs (Bandura, 2005), performance feedback, and visual prompting strategies, was implemented to each participant group. The primary dependent variable was continuous direct observations of TSs' initiations and responses direct towards their respective peer networks. Secondary outcomes measures included peers' implementation fidelity, social validity data, and pre-post measures of social competence

This investigation expanded the existing peer-mediated intervention literature. First, it replicated and extended the work of Schmidt and Stichter (2012) by measuring the generalization of social skills following the implementation of the SCI-A program. This investigation used similar peer training procedures based on the SCI-A program (Stichter et al., 2012) as Schmidt and Stichter (2012). However, the peer-mediated package employed in the current study differed from Schmidt and Stichter's (2012) intervention in the following ways: (1) use of peer networking techniques (Garrison-

Harrell et al., 1997; Haring & Breen, 1992; Kamps et al., 1997) instead of pairing one peer per target student; (2) use of peer supports including performance feedback and visual prompting strategies; and (3) the training program was slightly shorter in length (four 40-minute sessions instead of six 40-minute sessions). These changes were made to examine a shorter peer training program with additional peer supports including peer networking, performance feedback, and cue cards strategies.

Second, previous research has investigated the effectiveness of peer-mediated interventions for preschool and elementary aged children relative to typical peers interacting with other typical peers (Kamps et al., 1992; McGrath, Bosch, Sullivan, & Fuqua, 2003); however, no studies known to the researcher have included comparison data of direct observations for social interactions among typical peers in middle or secondary lunchroom settings. Thus, this investigation expanded the literature by collecting social comparison data for typical peers to further interpret the changes in TSs' social interaction outcomes. Additionally, measures of implementation fidelity, social validity, and social competence were also included to provide potential insight into the effectiveness of the peer-mediated intervention.

Specifically, the objectives of this investigation were to: (a) determine the extent to which the peer-mediated intervention supported the generalization of social skills acquired in the SCI-A program to a natural setting; (b) determine the extent to which peers' implementation of the initiation strategies impacted changes in TSs' social interaction data, (c) determine the extent to which TSs' social interaction skills compared to typical peers, (d) assess satisfaction level for consumers of the peer-mediated intervention, and (e) assess social competence measures for TSs before and after the

intervention. This chapter presents a discussion of findings as organized by research question. In addition, limitations of the study and implication for practice and research are also presented.

### **Research Question One – Social Interactions**

**Following the completion of a SST group (the SCI-A program), what is the relationship between a peer-mediated package and changes in observed social interaction outcomes for target students and peer networks in a social setting?** Few studies have investigated the use of peer networks for high-functioning students with social competence deficits. Literature highlighted the importance of investigating components of peer-mediated interventions to promote practice and generalization of social interactions and social skills acquired via social skills training (SST) groups. To answer research question one – social interactions – continuous direct observational data were collected to measure changes in TSs' social interaction outcomes (i.e., initiations and responses) following implementation of the peer-mediated package. To that end, social comparison data for typical peers was collected to further evaluate the effectiveness of the peer-mediated package. A visual analysis within and between conditions for each TS was conducted to assess the impact of the peer-mediated package on change in TSs' social interaction outcomes. The following section provides a discussion of social interaction outcomes as well as social comparison across TSs.

**Appropriate responses.** Altogether, TSs demonstrated improvement in social interactions following the onset of the intervention. Results suggest that implementation of the peer-mediated package may increase TSs social interactions with peers compared to proximity alone (Schmidt & Stichter, 2012). Specifically, results indicated clear level

changes in response data for TS1 and TS3 and an improving trend for TS2 following implementation of the intervention. TS2's less apparent level changes may be due to different social interactions styles associated with children with HFA (Scheeren et al., 2012). Anecdotal data reported that TS2 often drew for majority of observational sessions resulting in few social interactions between TS2 and his respective peer network. Additionally, the ambiguity of TS2 appropriate response data aligns with social learning theory and accurately attending to peer models. Since TS2 often looked down at his drawings this may have impacted fewer or atypical responses to any of the initiations made by peers. For example, many responses were observed as short (e.g. "yes" "no"), off-topic, inappropriate, or odd.

**Appropriate initiations.** On the other hand, results indicated no clear level or trend changes in initiation data for all three TSs. According to Zhang and Wheeler (2011), previous peer-mediated interventions were more effective at increases responses rather than initiations for students with ASD. These findings may attribute to the fact that peers were taught to use initiation strategies, thus if TSs did not initiate a social interaction with peers first then the peers would start the initiation process, giving TSs more opportunities to respond. Additionally, lack of changes in initiations may be due to the TSs' social interactions styles (Scheeren et al., 2012).

**Inappropriate social interactions.** Additionally, once the intervention was in place, a decrease in inappropriate social interactions, including inappropriate, off-topic, repetitive and/or restricted language, for TS2 and TS3 were noted. Bauminger (2002) reported similar decreases in inappropriate behavior after the delivery of a group-based SST program with peer-mediated component to children and youth with HFA. TS1



showed no inappropriate social interactions during baseline; however, an increase in inappropriate behavior, such as not responding or initiating topics that were uninteresting to peers, was observed during intervention. A reason for TS1's increase in rates of inappropriate responses and initiation may be due to the fact that fewer social interactions occurred during baseline because peers were asked to eat lunch as usual and not use initiation strategies. However, during treatment peers were asked to use initiation strategies thus increasing the number of social interactions and opportunities to practice social skills either accurately or inaccurately.

**Social comparison.** Social comparison data showed that TS1's average response rate was above and TS2 and TS3 average response rates were approaching similar rates of typical peers during intervention and maintenance conditions. On the other hand, change in initiation behavior was variable and consistently fell below typical peers' average rate of initiations for all three TS. These findings were similar to improvement of social interactions following peer-mediated interventions relative to social comparison data for preschoolers and kindergarteners with ASD (Kamps et al., 1992; McGrath et al., 2003). Overall, these results suggest the potential for the generalization of social skills acquired via the SCI-A program to natural settings when the peer-mediated intervention includes the following variables: (1) peer initiation training (Schmidt & Stichter, 2012), (2) performance feedback (Dufrene, et al., 2005), (3) cue cards (Harper et al., 2008).

### **Future Directions**

Future research needs to further examine social comparison data of middle school aged typical peers interacting with other typical peers during naturally occurring social contexts. Rogers (2000) discussed the importance of understanding actual peer behavior

instead of adults' expectations of peer behavior, and using actual social comparison data to set treatment goals for youth with HFA. For example, future research might be better served if it focused on understanding specific social interaction behaviors such as typical peers rate of initiation or responses and how that impacts other peers. Finally, future research needs to program for additional maintenance and generalization measures to evaluate the effects of the peer-mediated intervention over time and across settings and peers.

### **Research Question One – Implementation Fidelity**

**To what extent does the level of implementation fidelity for typical peers impact changes in observed social interaction outcomes?** Given the paucity of peer-mediated interventions programming for implementation fidelity of typical peers, research question one – implementation fidelity – investigated patterns between TSs' social interaction outcomes and peers' implementation fidelity. To that end, fidelity was determined calculating the rate at which peers' implemented initiation strategies acquired in the Peer Buddy Program training sessions. Implementation fidelity data indicated that for the most part peer networks implemented initiation strategies at or above the previously determined fidelity benchmark. An independent visual analysis per participant group was used to examine the impact of peers' implementation fidelity on TSs' social interaction outcomes. Inline with previous studies (Odom & Watts, 1991), results demonstrated that performance of peers implementing initiation strategies affected the performance of all three TSs' social interactions. For this investigation, peers' initiation strategies generally occurred at greater rates than all three TSs' social

interactions. Specific discussion related to group dynamics for each participant group is provided below.

**Participant group one.** For participant group one data from baseline to intervention indicated that the rate at which the peers used initiation strategies increased at similar rates to TSs' social interactions. Except for the first three days of intervention, it was observed that TS1 would seldom initiate conversations with peers. However, once a peer initiated a conversation with TS1, he was observed responding to peers in order to maintain the conversation. TS1 and his peer network shared many of the same classes and knew each other prior to the start of the study. Anecdotal evidence reported that the peers would often ask TS1 about his homework and assignments. Anecdotal evidence also revealed that peers invited TS1 to participate in cooperative learning groups outside the lunch settings. Perhaps this familiarity prior to the intervention contributed to participant group one's change in initiation strategies and social interactions (Koegel et al., 2012; Sperry et al., 2010). During maintenance although peers' initiation strategies and TS1's social interactions slightly decreased, data remained higher than baseline. This pattern aligns with previous research examining SST groups with peer-mediated components (Kamps et al., 1992).

**Participant group two.** For participant group two, data from baseline to intervention indicated that peers' rate of initiation strategies as well as TS2's social interactions increased, with the exception of the sixth data point during baseline. Although results indicated an increase in peers' initiation strategies and TS2's social interactions during intervention, this data decreased during maintenance. This variability in improvement may have been due to a number of reasons. First, it was observed that

TS2 often drew in his notebook during observation sessions. In such cases, peers were usually observed talking with each other and using fewer initiation strategies. TS2 was usually observed engaged in inappropriate behavior such as self-talk in which many of his comments seemed to be directed towards no one in particular. Second, this inconsistency in reciprocal social interactions may have attributed to the fact that the TS2 may have been more resistant to concepts and skills taught in the SCI-A program and the peer-mediated intervention did not provide TS2 with any additional social skills instruction (Barry et al., 2003; Schmidt et al., 2011). Third, the maintenance condition involved the removal of the cue card, which may have resulted in an observed decrease in peers' initiation strategies. Previous research related to different methods of peer training may have contributed to peers' implementation fidelity for the present peer-mediated package (Kuhn et al., 2008).

**Participant group three.** For participant group three, data from baseline to intervention and maintenance indicated that rate in which peers implemented initiation strategies increased at similar rates to TSs' social interactions. Once the intervention was in place, peers were observed taking turns interacting with TS3. First, peer10 would look at the cue card and then use one of the examples on the back of the cue card to initiate a conversation with TS3. Next peer11 or peer10 would initiate a social interaction with TS3. Previous research related to selecting peers emphasizes the importance of including multiple peers as peer network to spread the responsibility across peers (Sperry et al., 2010). Perhaps using peer networks influenced that likelihood of increased social interactions for TS3.

### **Future Directions**

First, peer training may need to match not only target students social skills deficits but also peers' social interactions styles (Bellini et al., 2007; Gresham et al., 2001). Future research needs to better understand differing social interactions styles for both target students and peers and how a responder or initiation impacts the group dynamics. Previous research has identified steps for practitioners to appropriately select peers for young children with ASD. These steps often include the following: (a) age-appropriate social skills, (b) well-liked by peers, (c) positive social interactions history with target child, (d) generally attentive and compliant to adult directives, (e) willingness to participate, and (f) attend school regularly (Sperry et al., 2010). However, more research is needed to identify similar steps for selecting peer networks to encourage social interactions for adolescents with HFA. Effective group dynamics may need to include peers who are high initiators and peers who are good responders. Assessing peers based on social interaction styles may promote generalization of social skills across trained peers who have different initiation and response characteristics and thus peers who are not involved in the peer initiation training (DiSalvo & Oswald, 2002).

### **Research Question One – Social Validity**

**To what extent do social validity measures by direct and indirect consumers of the peer-mediated package determine meaningful changes in observed social interaction outcomes?** Previous research has highlighted the importance of measuring indirect and direct consumers of peer-mediated interventions from anonymous surveys as well as including direct observations of relevant changes to everyday functioning based on expert evaluation (Chan et al., 2009; Hurley, 2012). Research question one – social validity – was measuring two types of social validity constructs to further understand the

effectiveness of the peer-mediated package relative to expert and consumer evaluation.

The following section provides a discussion of each social validity construct employed in this investigation.

**Expert evaluation.** First, a descriptive analysis was used to examine a relationship between expert evaluation measures compared to data obtained via direct observations. The participating lunchroom supervisor who was deemed the “expert” for this investigation observed and rated approximate times in which TSs engaged in positive, negative, and low-level social interactions. Additionally, data collectors collected direct observations for the same target behaviors. Previous research has examined similar observational rating measures for academic engagement and disruptive behaviors (Chafouleas et al., 2009; Chafouleas et al., 2010). This is the first examination of an observational rating measure for socially engaged time.

First, descriptive analysis indicated that throughout the study all TSs increased percentage of time engaged in positive social interactions on both expert evaluation and direct observation measures. Second, results also indicated that as positive social engagement increases negative and low-level social engagement decreased for TS1 and TS3. However this relationship did not exist for TS2. This may reflect the fact that when students increase total social interactions they also increase the likelihood that their initial performance is both appropriate and inappropriate.

Although some consistent data trends exist between expert evaluation and direct observations for positive and low-level, the expert generally rated the occurrence of target behaviors at a higher percentage than direct observations. One reason for such discrepancies between expert evaluation and direct observations may be attributed to the

expert not rating target behaviors as mutually exclusive, whereas direct observations coded the behaviors as either occurred or did not occur. Previous studies comparing actual behavior via direct observations to parent or teacher ratings have noted that ratings often fail to correspond to direct observations (Kazdin, 2011). Another reason for the discrepancy may involve the novelty of the observational rating probe used by the expert and designed for the scope of this investigation.

Second, correlation analysis resulted in a moderate relationship between expert evaluation and direct observations for positive and negative social engagement. However, the correlation analysis determined no relationship between expert evaluation and direct observations for negative social engagement. This may have been due to low percentages of negative behavior as measured by direct observations. Correlations outcomes for this investigation may have served as an initial step to the design and implementation of measures that are time-efficient as well as accurate for socially engaged time, in comparison to time-intrusive and expensive measures such as direct observations.

Expert evaluation measures and direct observations provided different perspectives about changes in target behaviors and potential insight to the effectiveness of the peer-mediated intervention package. For example, the lunchroom supervisor could potentially provide accurate, time-efficient ratings as well as meaningful anecdotal information about target behaviors. At the end of the study, the lunchroom supervisor reported that TS2 was sitting by himself on the days the intervention was not in session. Additionally, the lunchroom supervisor could potentially judge the culture of the lunchroom environment. As the study progressed the punitive actions seemed to increase

towards the end of the year compared to the beginning of the year, thus this change in culture of the lunchroom environment may have impacted outcomes of the intervention.

**Consumer evaluation.** A descriptive evaluation of consumer evaluation measures was used to expand the literature related to social validity of peer-mediated intervention. Previous investigations have focused on the social validity of peer-mediated interventions for children and youth with low-functioning disabilities (Carter & Hughes, 2005). In addition, many of these studies have not used anonymous questionnaires (Hurley et al., 2012). This investigation adds to the literature in that anonymous satisfaction surveys were given to direct consumers (i.e., peers, target children) and indirect consumers (i.e., parents of peers) for high-functioning individuals with social competence deficits. All participating parents and students, as well as the three participating teachers and one lunchroom supervisor, completed satisfaction surveys following the conclusion of the peer-mediated package.

Results found that, similar to previous studies, peers were highly accepting of their involvement in the intervention (Kamps et al., 1998). Following the intervention many of the peers asked if they could do the intervention again the following year. Similar to the study by Hughes and colleagues (2001) investigating a peer-mediated intervention for high school students with severe disabilities, participating peers were asked an open-ended question on ways to improve the current peer-mediated package. Peers recommended making the program less structured and talking to their TS like they were always friends. Peers also suggested interacting with their TS in different settings outside of the lunchroom. Although peers felt their social skills improved by being in the program, many suggested more training sessions to continue to learn about the needs of



students with HFA and to practice initiation strategies. Finally, peers suggested including more peers in the group.

Results for TSs also found that TSs were highly satisfied with their involvement in the intervention. These findings were consistent with a study by Haring and Breen (1992) examining peer networks for youth with severe disabilities. Generally, TSs expressed a higher satisfaction with the intervention than their peers. When asked an open-ended question on ways to improve the current peer-mediated package, one TS reported that he needed to improve his performance related to drawing less, staying on-topic, and talking more about positive things.

Results for participating parents were also relatively high on the satisfaction surveys. Although only half of the parents responded, many of the parents commented about their child's involvement in the current peer-mediated package. For example, parents thanked the researcher for providing a positive experience for their child. Also parents asked if there was a way for the researcher to sit separately from the students because their child felt awkward. Participating parents' perceptions about their child's participation in the peer-mediated package aligned with results from the previous study by Castorina and Negri (2011), which investigated the generalization of social skills acquired in a SST group to siblings within home settings.

Perhaps the most surprising results may have been the variability in reports regarding acceptability of the current peer-mediated package across school personnel. Teacher 1, who completed the survey associated with TS1 viewed the Peer Buddy Program as highly acceptable. However, teacher 2, who completed the satisfaction survey associated with TS2, generally reported items as "neutral." Teacher 3 who

completed the survey associated with TS3, perceived the Peer Buddy Program as more acceptable than Teacher 2 but less acceptable than Teacher 1. Finally, the lunchroom supervisor, who completed the satisfaction survey for all TSs, viewed the Peer Buddy Program as highly acceptable. Moreover, he reported, “this experience means a lot to each child. Sometimes these three students cannot create meaningful friendships or interact without the peer participants. Thank you for providing a wonderful experience.”

Overall, results from school personnel’s satisfaction surveys were similar to previous research. Although ratings from teacher 2 and teacher 3 were lower than teacher 1 and the lunchroom supervisor, a study by Gonzalez-Lopez and Kamps (1997) also reported neutral satisfaction ratings by teachers. One possible explanation for the difference in acceptability may be associated with teachers’ familiarity with peer-mediated interventions.

### **Future Directions**

Future research addressing expert evaluation needs to examine the validity of an expert observing and rating socially engaged time compared to direct observations. Such investigations need to employ measures of interrater agreement and social comparisons to typical peers. These investigations also need to determine the accuracy and utility of the observational rating probe for target behaviors in secondary settings. Future research for consumer evaluation may want to include a survey item related to consumers’ familiarity with the effectiveness of peer-mediated interventions.

### **Research Question Two**

**To what extent do teacher ratings and student performance for social and executive functioning change after target students following the completion of the**

**peer-mediated package?** This study also employed pre-post measures to assess changes in social competence deficits. A descriptive analysis of standard scores within participants was used to compare scores before and after the intervention. Results for the social motivation domain as measures by the SRS teacher report showed that all TSs improved from pre to post intervention. These findings aligned with social learning theory as well as previous studies examining the effects of group-based SST programs on target students' motivation for engaging in social interactions with their peers (Schmidt et al., 2011; White et al., 2007).

Results of the pre to post measures of the social competence, SRS and BRIEF teacher report, revealed that TS1 and TS2's social and executive functioning skills, with the exception of social motivation domain on the SRS, did not improve. This lack of improvement for TS1 and TS2 was similar to previous studies and may be due to the fact that the peer-mediated intervention employed in this study did not target specific social skills measured by the SRS and BRIEF (Barry et al., 2003; Ozonoff & Miller, 1995). Specifically, the peer-mediated intervention targeted generalization of social skills acquired during the SCI-A program, whereas the SRS is often used to measure the acquisition of social skills following a SST group intervention.

On the other hand, TS3 showed improvement on multiple social and executive functioning areas as measured by the SRS and BRIEF. One reason for TS3's change in social competence deficits may be because TS3 initially scored in the clinically severe range of impairment on both social and executive functioning tasks during pre assessment. Thus, for TS3 to acquire social skills measures by the SRS, TS3 may have needed additional practice in reciprocal social interactions via participating in the peer-

mediated package employed in this study. TS3 scored in the mild to moderate range of impairment on many of the SRS and BRIEF subtests during post assessment.

Also inline with previous research, following the intervention all TSs outperformed their baseline scores on select D-KEFS domains, especially cognitive switching tasks (Solomon et al., 2011; Stichter et al., 2012). The D-KEFS is a standardized student performance battery measuring an array of executive functioning abilities. According the D-KEFS examiner's manual (Delis, Kaplan, & Kramer, 2001), improvement on cognitive switching tasks may be associated with improved cognitive flexibility, shifting and verbal and nonverbal inhibition.

### **Future Directions**

The peer-mediated package employed in this study targeted the practice and generalization of social skills acquired via the SCI-A Program, whereas the SCI-A program targeted the acquisition and practice of social skills. Previous studies examining the effects of group-based SST instruction on acquisition often used SRS and BREIF reports. However, the SRS and BREIF may not detect changes and nuances associated with fluency of social skills. Thus, future research may need to included measures appropriate for measuring generalization of social skills rather than a standardized measure. For example, studies examining generalization, as well as maintenance, effects may need to focus on measuring norms based on typical student behaviors and social validity.

### **Limitations**

The researcher could not control for all threats to external, internal, and construct validity (Kazdin, 2011; Tawney & Gast, 1984). The following provides a summary of

several limitations identified for this investigation. First, a small number of target students participated in the current peer-mediated package. As with many single-subject research designs this limits the external validity of results. In addition, a common objection to single-subject research is that results may not generalize to participants and settings beyond the original study (Kazdin, 2011). A second limitation of this study is that more maintenance and generalization data were not collected due to limited time and resources. Thus, the sustained use of the peer-mediated intervention and the generalization of social skills to untrained peers and settings outside the intervention were not evaluated. Third, the presence of the observers may have had reactive effects. Consequently, the participants knew that their behaviors were being watched and this awareness may have influenced how they interacted. Additionally, observers were not blind to the purpose of the study and may have unintentionally changed their criteria for target behaviors, thus limiting internal validity. Fourth, although satisfaction surveys were mailed to all participating parents, results only reflect parents who returned surveys. Findings from the parent satisfaction survey only represent parents who choose to respond to the survey. Fifth, the rating tool used for expert evaluation was developed for the purpose of this study. Thus, the reliability of the rating tool was not determined and may have influenced conclusions about the effectiveness of the intervention related to social validity (Kazdin, 2011).

A final limitation to this study was the inclusion of multiple treatment inferences (Tawney & Gast, 1984). TSs were exposed to a multi-component intervention composed of the following strategies: (a) peer-initiation training, (b) peer networking, (c) cue card, and (d) peer performance feedback. This multi-component intervention limits construct

validity. Thus, conclusions made about the effectiveness of the current peer-mediated package cannot be explained by one strategy over another but rather the implementation of the entire intervention as a whole. Additionally, peer training occurred during the baseline condition exposing the study to threats of internal validity. Although peers were asked to engage in social interactions as normal and to not use any initiation strategies until after the final training session, it is plausible that during baseline the peers used strategies anyway.

### **Conclusions**

The overall goal of the peer-mediated package was to provide opportunities for students with social competence deficits to practice acquired social skills with trained peer networks and to encourage generalization of social skills to a natural setting. Although previous studies have examined generalization of acquired social skills following implementation of a SST program, these have generally resulted in limited generalization outcomes (Bellini et al., 2007; Stichter et al., 2007). Despite these limitations, results of the current investigation provided initial evidence that the use the peer-mediated package is a promising intervention to support the practice and generalization of social skills acquired via the SCI-A Program. Additionally, results indicated initial evidence that the peer-mediated package was associated with a decrease in inappropriate, negative, and low-level social interactions and an increase in appropriate positive social interactions. Finally, outcomes related to acceptability of the peer-mediated package were generally high. More research is needed to examine components of peer-mediated interventions that results in successful generalization of social skills acquired in SST groups to naturally occurring settings.

## APPENDIX A

### Parent of Target Student Consent Letter

Thank you for your participation in the Developing a School-Based Social Competence Intervention (SCI) project. As part of your participation, faculty and staff of the University of Missouri, in cooperation with Columbia Public Schools, are running a complimentary program designed to enhance social skills and interactions between your child and his/her peers. The Peer Buddy program is a research project that involves peers at Gentry Middle School being trained in similar components as the SCI project to engage in social interactions with your child during lunch. We, along with CPS officials, will monitor these social interactions to see how your child is doing in the months after his/her completion of the SCI project.

**Being in this follow-up portion of the project may include these activities:**

- Your child will practice social skills and behaviors that he learned when he participated in the SCI project. These additional practice opportunities will involve eating lunch with 3 of his trained peers 2 times per week during the semester.
- Research staff will observe social interactions between your child and trained peers for 20 minutes each time. Teachers will be asked to complete social competence surveys about your child after the study.

**Benefits of being in the follow-up portion of the project include:**

- You and your child will be important in helping to understand the effects the Peer Buddy program.
- Your child will learn and practice different social skills in the lunchroom setting.

**There are few risks of participating in the follow-up portion of the project.** Your child may feel uncomfortable practicing his/her skills with his/her peers. No other risks are anticipated.

**Being in the follow-up portion of the project is voluntary.** Although officials at your child's school support the SCI project and peer training program and an understanding of its benefits over time, it is your decision to take part in the peer training portion of this project. Your choice about being in the peer training program will not result in any extra benefit or penalty for you or your child (i.e., his/her grades will not be affected). If you choose to participate, you may change your mind at any time and choose not to participate in later follow-ups. If you choose to withdraw from this project, any data already provided will be separately coded to indicate your withdrawal (records must be retained for seven years per IRB policy).

**All information we get from you will be kept confidential.** All information provided by your child and by others about your child will be marked with a code number. Only research staff will know which child is assigned which number. Any presentation of the data will not contain any identifiable information. The information collected will be stored in a safe place at MU for seven years before being safely destroyed.

## APPENDIX A

### Target Student Assent Letter

I remember participating in the SCI project. This was a research project where I learned social skills with other students at my school. I have the opportunity to continue learning and using my skills this semester with some kids I know at school during lunch.

**I know that for this part of the research project:**

- Two times per week, I will eat lunch with my peers and practice using the social skills I learned when I participated in the SCI project
- People from University of Missouri will eat lunch with me and watch me as I talk to my peers. They want to know how well we interact.
- I will receive a \$20.00 visa gift card for my participation

My parent (or guardian) said that it is okay for me to eat lunch and practice social skills with my peers. Even though my parent said it is okay, I don't have to take part in these activities if I don't want to. I know that if I change my mind about doing these activities, I can stop at anytime and will not have to do other activities with my peers – I just have to tell my parent or the MU people. Nothing bad will happen to me if I do these activities or if I don't.



## APPENDIX A

### Parent of Peer Consent Letter

You child expressed interest in participating in the Peer Buddy program, involving students without disabilities engaging in social interactions and developing friendships with students with disabilities. Faculty and staff of the University of Missouri, in cooperation with Columbia Public Schools, are running this research project to investigate the development of a peer initiation training program, (i.e., Peer Buddy program), for students who demonstrate social interaction difficulties. Your child has been nominated and expressed interest in being a trained peer in this program because he/she demonstrates average to above average social interaction skills.

**Being in this program may include these activities:**

- Your child and a group of his peers will be a part of a group that meets one time per week for four weeks during non-instructional time. Each peer training session will last about 30 to 40 minutes. While in this group he/she will learn strategies to foster social interactions with his/her peers who have social challenges.
- Your child and 2-3 other trained peers will be asked to eat lunch with his/her peer buddy two times per week during the semester.
- Research Staff from the University of Missouri will observe the social interactions of all students for 20 minutes.
- Your child will be asked to complete a social validity scale about his/her perspective about the importance of the program
- At the beginning of the study, you will be asked to fill out a parent report survey giving MU staff information about your child's social skills

**Benefits of being in this program include:**

- You and your child will be important in helping us understand the effects of the Peer Buddy program
- Your child will learn new strategies to help interact with children who have different needs than themselves and may develop new friendships.

**There are few risks of participating in the follow-up portion of the project.** Your child may feel uncomfortable using strategies with a child with a disability. You may feel uncomfortable giving us information about your child. No other risks are anticipated.

**Being in this project is voluntary.** Although teachers at your school nominated your child to participate in the PTP, it is your decision to take part in this project. Your choice about being in the project will not result in any extra benefit or penalty for you or your child (i.e., his/her grades will not be affected). If you choose to participate, you may change your mind at any time and choose not to participate. If you choose to withdraw from the peer training program any data already provided will be separately coded to indicate your withdrawal (records must be retained for seven years per IRB policy).

**All information we get from you will be kept confidential.** All information provided by your child and by others about your child will be marked with a code number. Only research staff will know which child is assigned which number. Any presentation of the data will not contain any identifiable information. The information collected will be stored in a safe place at MU for seven years before being safely destroyed.

## **APPENDIX A**

### **Peer Assent Letter**

I expressed interest to participate in the Peer Buddy program. This program will teach me strategies to engage in social interactions and to develop friendships with my peers who have trouble making friends. People from the University of Missouri (MU) are running the Peer Buddy program and they will teach me strategies and watch me use those strategies during lunchtime.

**I know that for this program I will:**

- One time per week, I will meet with a group of students and people from MU. They will teach us ways to talk to our peers with disabilities.
- Two times per week, people from MU will eat lunch with me and watch me as I talk to my peer with social challenges. They want to know how well we interact together.
- I will receive a \$20 visa gift card for my participation

My parent (or guardian) said that it is okay for me to do the Peer Buddy program. Even though my parent said it is okay, I don't have to take part in the Peer Buddy program if I don't want to. I know that if I change my mind about doing the Peer Buddy program, I can stop at anytime and will not have to do other training activities – I just have to tell my parent or the MU people. Nothing bad will happen to me if I do the Peer Buddy program or if I don't.

## APPENDIX A

### Teacher Consent Letter

A student at your school has participated in the development of a School-Based Social Competence Intervention (SCI) Project. Faculty and staff of the University of Missouri, in conjunction with Columbia Public Schools, are running a complimentary program to the SCI project. This Peer Buddy program is designed to enhance the social interactions between the student and his/her trained peers. In this research project, participating students will practice social skills they learned in the SCI project during lunch. To gain an understanding of this student's social interactions and skills with his/her peers, we would like the perspective of one of his/her current teachers.

**Being in this project may include these activities:**

- You will be asked to complete two social competence surveys (Social Responsiveness Scale and Behavior Rating Inventory of Executive Functioning) one time following the conclusion of the intervention.
- Each survey will take about 15 to 20 minutes to complete.

**Benefits of being in this project include:**

- You will be providing important information that will help us to improve programs that can be done in schools and will help kids improve their social skills.

**There are few risks of being in this project.** You may feel some discomfort in expressing your opinion about participating students. No other risks are anticipated.

**Being in this project is voluntary.** Although we believe you can provide helpful information, it is your decision to take part in this project. Your choice about being in the project will not affect your relationship with the school district and will not result in any extra benefit or penalty. If you choose to participate, you may change your mind and leave the project at any time without penalty. If you choose to withdraw from this project, any data already provided will be separately coded to indicate your withdrawal (records must be retained for seven years per IRB policy).

**All information we get will be kept confidential.** All information you provide will be marked with a code number. Only research staff will know which person is assigned which number. Any presentation of the data will not contain identifiable information. The information collected will be stored in a safe place at MU for seven years before being safely destroyed. The information will not be shared with anyone in your school district.

## APPENDIX A

### Lunchroom Supervisor Consent Letter

A student at your school has participated in the development of a School-Based Social Competence Intervention (SCI) Project. Faculty and staff of the University of Missouri, in conjunction with Columbia Public Schools, are running a complimentary program to the SCI project. This Peer Buddy Program is designed to enhance the social interactions between the student and his/her trained peers. In this research project, participating students will practice social skills they learned in the SCI project during lunch. To gain an understanding of this student's social interactions and skills with his/her peers, we would like the perspective of one of his/her current teachers.

**Being in this project may include these activities:**

- You will be asked to observe and then rate the quality of participating student's skills and behaviors with his/her trained peers in the lunchroom setting 4 times per week.
- You will be asked to complete Direct Observation Rating probes following each observation 4 times per week. Each probe will require a 10-minute observation, this can be done during your typical duties, and takes about 1-minute to complete each time.

**Benefits of being in this project include:**

- You will be providing important information that will help us to improve programs that can be done in schools and will help kids improve their social skills.

**There are few risks of being in this project.** You may feel some discomfort in expressing your opinion about participating students. No other risks are anticipated.


**Being in this project is voluntary.** Although we believe you can provide helpful information, it is your decision to take part in this project. Your choice about being in the project will not affect your relationship with the school district and will not result in any extra benefit or penalty. If you choose to participate, you may change your mind and leave the project at any time without penalty. If you choose to withdraw from this project, any data already provided will be separately coded to indicate your withdrawal (records must be retained for seven years per IRB policy).

**All information we get will be kept confidential.** All information you provide will be marked with a code number. Only research staff will know which person is assigned which number. Any presentation of the data will not contain identifiable information. The information collected will be stored in a safe place at MU for seven years before being safely destroyed. The information will not be shared with anyone in your school district.

## APPENDIX B


### Session 1 Peer Buddy Program

6/18/13




**Peer Buddy Program**  
Building Friendships During Lunch

Session I




**Today's Schedule**

- Introduce the Peer Buddy Program
- Introduce Social Challenges
- Introduce
  - 1. Social Skill - Facial Expressions
  - 2. Strategy – Modeling and Positive Feedback
- Modeling Activity
- Practice Activity
- Review of skills used today




**Peer Buddy Program**  
Building Friendships During Lunch




**What is the Peer Buddy Program**

- You have been selected as a Peer Leader
- You will help your Buddy improve his social skills
- In this program you will...
  - Learn social skills and strategies to help you initiate and maintain a conversation with your Buddy
  - Use these skills and strategies while eating lunch with your Buddy




**Peer Buddy Program**  
Building Friendships During Lunch



**What is your job?**


- To participate in each training sessions
- Eat lunch with your Buddy
- Follow the important steps before you eat lunch
- Make your Buddy feel like a part of the conversation
- Have fun and get to know your Buddy



**Peer Buddy Program**  
Building Friendships During Lunch

### Learning about Social Challenges


- Social challenges can affect a person's ability to make friends
- People with social challenges have difficulty with communication, socialization, and repetitive behaviors
- People with social challenges have difficulty initiating and responding during conversations



**Peer Buddy Program**  
Building Friendships During Lunch

### Learning about Social Challenges


- Your Buddy may...
  - Have intense interest in topics
  - Sensitive to the environment
  - Have difficulty interpreting social cues
  - Have a hard time initiating a conversation
- Examples
  - Dragons, Star Wars, etc.
  - Loud noises, clothing textures, crowds
  - May not know when you are bored with the topics
  - May sit quietly and not talk back to you



**Peer Buddy Program**  
Building Friendships During Lunch

### Learning about Social Challenges


- Your Buddy may...
  - Difficulty understanding your feelings
  - Impairments using non verbal communication (gestures/ body language)
  - Difficulty developing friendships
- Examples
  - May not know when you are having a bad day
  - May not make eye contact, may look away all the time, inaccurate facial expressions, etc.
  - May not feel comfortable talking with kids their own age




**Peer Buddy Program**  
Building Friendships During Lunch

### Schedule and Buddies

Week 1	Introduction and Helping Others Read Facial Expressions
Week 2	Helping Others Share Ideas
Week 3	Helping Others Read Feelings and Emotions
Week 4	Helping Others Problem Solve




**Peer Buddy Program**  
Building Friendships During Lunch




### Each Session Includes

1. Review of previous session and important steps
2. Introduction to new social skill and strategy
3. Modeling and Practice Activities
4. Conclusion of the session




Peer Buddy Program  
Building Friendships During Lunch



### Important Steps to Follow


- **ONLY** follow these steps when instructed to do so

1. Sit down next to or across from Buddy
2. Get your Buddy's attention
3. Initiate conversation using one of the strategies
4. Respond to Buddy's response
5. Repeat steps 2-4




Peer Buddy Program  
Building Friendships During Lunch

## Social Skill 1: Helping Others Read Facial Expressions



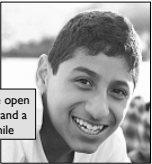
### Facial Expressions

- Facial Expressions are the motion of several facial features used to show a certain emotion

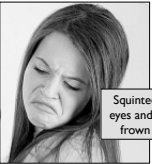


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Building Friendships During Lunch

### Look at These 2 Facial Expressions:




Wide open eyes and a smile




Squinted eyes and a frown

How are these two facial expressions different?

 **Peer Buddy Program**  
Building Friendships During Lunch


### Reading Facial Expressions

- Reading Facial Expressions is the process looking at and understanding how the facial features work together to show an emotion
- This often comes natural for you and me
- People with social challenges may have trouble reading others' facial expressions or making the right facial expressions

 **Peer Buddy Program**  
Building Friendships During Lunch


### Facial Expressions

- What is it important to understand others facial expressions?
- So you can read their emotion
- So you know how to talk to them

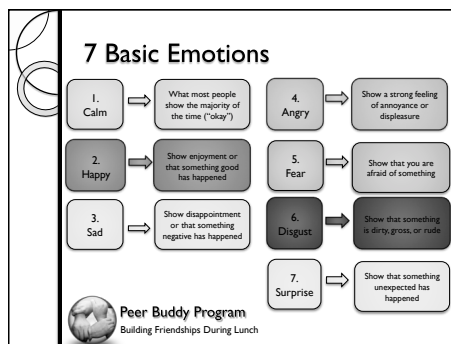
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### Facial Expressions

- In addition to facial expressions what else gives you clues when reading someone's emotion?
- Volume and tone of someone's voice
- Someone's body language and gestures

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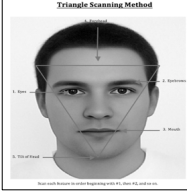




### Triangle Scanning Method


- **Triangle Scanning Method:** is the process used to scan the most important facial features

1. Eyes
2. Eyebrows
3. Mouth
4. Forehead
5. Title of Head



**Triangle Scanning Method**

1. Eyes  
2. Eyebrows  
3. Mouth  
4. Forehead  
5. Title of Head


 **Peer Buddy Program**  
Building Friendships During Lunch


## Strategy I: Modeling and Positive Feedback

### Modeling

- **Modeling** is when you demonstrate good social skills for someone else
- Why is it important to show good social skills?

- Your buddy may have a hard time using social skills
- When your buddy watches you show good social skills, then he might be more likely to show good social skills


 **Peer Buddy Program**  
Building Friendships During Lunch




## Positive Feedback

- **Positive Feedback** is when you tell someone they are doing a good job
- What are some examples of positive feedback that you use with your friends?

- Thanks for helping
- Great job, man!
- High five




Peer Buddy Program  
Building Friendships During Lunch




## Modeling

- Avatar Power Point




Peer Buddy Program  
Building Friendships During Lunch




## Practice

- Draw and share your avatar with a partner

1. Choose one of the 7 basic emotions (Do not tell your partner your emotion)
2. Draw a facial expression that matches
3. Model your facial expression
4. Guess your partners emotion
5. Tell your partner one thing he did well




Peer Buddy Program  
Building Friendships During Lunch



## Conclusion

- What is your job during this program?
- Name one thing you learned about people with social challenges today
- What are the three clues that help you read others' emotions?




Peer Buddy Program  
Building Friendships During Lunch

## APPENDIX B


### Session 2 Peer Buddy Program

6/18/13




**Peer Buddy Program**  
Building Friendships During Lunch

**Session 2**




**Today's Schedule**

- Review Schedule, Buddies, Important Steps
- Review Previous Skills and Strategies
- Introduce
  - 1. Social Skill - Sharing Ideas
  - 2. Strategy - Initiating and Responding
- Modeling activity
- Practice activity
- Review skills used today




**Peer Buddy Program**  
Building Friendships During Lunch




**Schedule and Buddies**

Week 1	Introduction and Helping Others Read Facial Expressions
Week 2	Helping Others Share Ideas
Week 3	Helping Others Read Feelings and Emotions
Week 4	Helping Others Problem Solve




**Peer Buddy Program**  
Building Friendships During Lunch




**Important Steps to Follow**

- **ONLY** follow these steps when instructed to do so
- 1. Sit down next to or across from Buddy
- 2. Get your Buddy's attention
- 3. Initiate conversation using one of the strategies
- 4. Respond to Buddy's response
- 5. Repeat steps 2-4




**Peer Buddy Program**  
Building Friendships During Lunch




### Review

- What is the Peer Buddy Program?
- What behaviors do kids with social challenges show?
- What is one thing you learned about how to help others read facial features?



**Peer Buddy Program**  
Building Friendships During Lunch

## Social Skill 2: Sharing Ideas




### Sharing Ideas


- Sharing is the act of telling an idea or experience to others

- Why do we need to share ideas or listen to others share their ideas?

- Help us solve problems
- Gain and share information and knowledge
- Develop relationships with friends, peers, parents and teachers




**Peer Buddy Program**  
Building Friendships During Lunch




### Sharing Ideas Involves 2 roles

Speaker Role	Listener Role
<ul style="list-style-type: none"> <li>• The person who shares an idea</li> </ul>	<ul style="list-style-type: none"> <li>• The person who listens to the idea being shared</li> </ul>



**Peer Buddy Program**  
Building Friendships During Lunch




### Gaining Attention


- The first step the speaker needs to use to share an idea with others

- Why is it important to gain the listeners attention?

- The listener is better prepared to listen
- Helps others know who you are talking to
- Share your idea




Peer Buddy Program  
Building Friendships During Lunch




### Speaker and Listener Roles

• Speaker Skills	• Listener Skills
<ul style="list-style-type: none"> <li>• Gain listeners attention to make an initiation</li> </ul>	<ul style="list-style-type: none"> <li>• Respond to the Speaker</li> <li>• Face the Speaker</li> <li>• Use eye contact</li> <li>• Use appropriate facial expressions</li> <li>• Wait for speaker to finish taking before talking</li> </ul>



Peer Buddy Program  
Building Friendships During Lunch

## Strategy 2: Initiating and Responding




### Starting a Conversation


- Conversation is when people take turns to share information

- How can you take turns when talking to someone?

- Use an initiation to start the sharing ideas process
- Talk and then pause to let others talk
- Facial Expressions




Peer Buddy Program  
Building Friendships During Lunch




### Ideas for Initiations

- Name some examples of initiations to encourage your buddy to share ideas ?
- I like your shirt, I have one just like that
- What is your favorite TV show?
- I watched the coolest show on TV last night...
- What are you eating for lunch today?
- I see you are eating PBJ that is my favorite




Peer Buddy Program  
Building Friendships During Lunch




### Keeping a Conversation Going

- Verbal Response is an on-topic comment, question made by listener to acknowledge speaker
- Nonverbal Response is a gesture used by the listener to recognize the speaker is talking




Peer Buddy Program  
Building Friendships During Lunch




### Examples of Responses

- Name some examples of non-verbal response?
- Nodding head
- shrugging your shoulders
- Name some examples of verbal response?
- Comment – “That is really cool”
- Question – “What happened yesterday?”




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Building Friendships During Lunch



### Keeping a Conversation Going

- Joiner is when you join a conversation already going
- Transition is a comment or question used to switch topics during a conversation or to exit a conversation



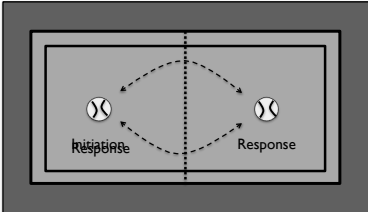
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### Examples of ways to Keep the conversation going...

- Name some examples of Joiners?
  - Hey guys what are you taking about
  - I have an idea, too
- Name some examples of Transitions?
  - Oh man that reminds me of another story
  - Well that was the bell I have to go

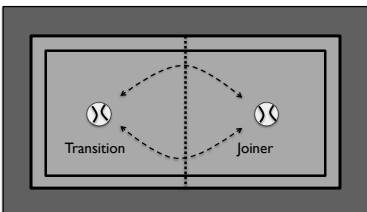
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### A conversation is like a tennis game



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### A conversation is like a tennis game




 **Peer Buddy Program**  
Building Friendships During Lunch

### Modeling


- Videos
- Rate the speaker and listener roles

 **Peer Buddy Program**  
Building Friendships During Lunch




### Practice

- Practice having a conversation you might have when eating lunch with a group
- During each conversation make sure you:
  - Initiate a conversation
  - Respond
  - Stay on topic
  - Keep the conversation going (joiners & transition)
  - Take turns
  - Use speaker/listener roles




**Peer Buddy Program**  
Building Friendships During Lunch




### Practice

- You have 2-3 minutes to complete your conversation
- Use your rating sheet to rate the quality of your conversation
- Ask your group how well they think you did




**Peer Buddy Program**  
Building Friendships During Lunch




### Conclusion

- When sharing ideas what do you need to do first?
- If the speaking was sharing an idea you thought was interesting, how could you let them know?




**Peer Buddy Program**  
Building Friendships During Lunch



### Conclusion

- How can you take turn when eating lunch with a group
- How can you keep a conversation going?




**Peer Buddy Program**  
Building Friendships During Lunch



## APPENDIX B


### Session 3 Peer Buddy Program

6/18/13




**Peer Buddy Program**  
Building Friendships During Lunch

**Session 3**




**Today's Schedule**

- Review Schedule, Buddies, Important Steps
- Review Previous Session
- Introduce
  - 1. Social Skills - Feelings and Emotions
  - 2. Strategy - Helping Others
- Model Activity
- Practice Activity
- Review skills used today




**Peer Buddy Program**  
Building Friendships During Lunch




**Schedule and Buddies**

Week 1	Introduction and Helping Others Read Facial Expressions
Week 2	Helping Others Share Ideas
Week 3	Helping Others Read Feelings and Emotions
Week 4	Helping Others Problem Solve




**Peer Buddy Program**  
Building Friendships During Lunch




**Important Steps to Follow**

- **ONLY** follow these steps when instructed to do so
- 1. Sit down next to or across from Buddy
- 2. Get your Buddy's attention
- 3. Initiate conversation using one of the strategies
- 4. Respond to Buddy's response
- 5. Repeat steps 2-4




**Peer Buddy Program**  
Building Friendships During Lunch




### What to do before the important steps ...

- Eat lunch like you usually do
- Do not initiate with your buddy
- If your buddy initiates with you, respond back




Peer Buddy Program  
Building Friendships During Lunch




### Review

- Why is it important to initiate or join a conversation?
- What can you use to further develop or keep a conversation going?




Peer Buddy Program  
Building Friendships During Lunch



### Review

- What are some examples of initiating with a question?
- How many brothers and sisters do you have?
- What are some examples of initiating with a comment?
- I like your MU sweatshirt... I have one just like it




Peer Buddy Program  
Building Friendships During Lunch

## Social Skill 3: Feelings and Emotions

### What is a Feeling?

- **Feelings:** Body's natural and physical reaction to certain situations
- What are some examples of feelings?

- Your face might get hot or red if you are really angry
- Your heart may beat fast if you are surprised




Peer Buddy Program  
Building Friendships During Lunch

### What is an Emotion?

- **Emotion:** The label for how you feel
- What are the 7 basic emotions?

1. Calm	5. Fear
2. Sad	6. Disgust
3. Happy	7. Surprised
4. Angry	




Peer Buddy Program  
Building Friendships During Lunch

### Feelings and Emotions

- When interacting with others why is it important you read their feelings and emotions?



- Know when to talk to them
- Know how to talk to them




Peer Buddy Program  
Building Friendships During Lunch

### Emotional Range

- **Emotional Range:** variation in how intensely you feel an emotion. It may be mild, extreme, or somewhere in-between


Peer Buddy Program  
Building Friendships During Lunch




### Emotional Regulation

- Emotional Regulation: how you adjust your emotion to match situation
- How could you lower your level of emotion to match the situation?

- Count to 10
- Take a Deep Breath
- Ask to be Alone




Peer Buddy Program  
Building Friendships During Lunch




### Emotional Range

- What is it important to understand your emotional range?
- So you can regulate your emotions better
- Why is it important to understand emotional range of others?
- So you can read their emotions and respond appropriately



Peer Buddy Program  
Building Friendships During Lunch


## Strategy 3: Helping



### Helping

- Helping: offering or receiving assistance and support from others
- What are some examples of helping your buddy?


- Throwing lunch away
- Cleaning area with rag



Peer Buddy Program  
Building Friendships During Lunch

## Helping


- What are some examples of receiving help from your buddy?
- Saying “sure” or “yes” when they ask for a napkin



**Peer Buddy Program**  
Building Friendships During Lunch

## Modeling

- Play Video Clips

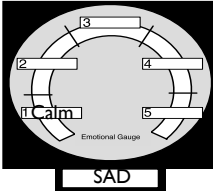



**Peer Buddy Program**  
Building Friendships During Lunch

**Character's body felt:**  
Still, regular heartbeat, normal body temperature

**Does the emotion and level match the situation?**  
YES

**Can any of the characters use a helping strategy?**  
YES - Help stack the chairs

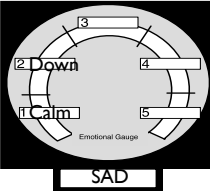




**Peer Buddy Program**  
Building Friendships During Lunch


**Character's body felt:**  
Stomach drops, head down

**Does the emotion and level match the situation?**  
YES

**Can any of the characters use a helping strategy?**  
YES - cheerleaders could ask what's wrong to make the girl feel better





**Peer Buddy Program**  
Building Friendships During Lunch




### Complete Worksheet

- How do you think the character's body felt?
- Fill out the Emotional Gauge by labeling the level of emotion and describing the situation
- Does the character's emotion and level of Emotion match the situation?
- Can any of the characters use a helping strategy?




Peer Buddy Program  
Building Friendships During Lunch




### Practice

- Divide into two teams
- Pick a scenario and plan a role play with your group
- Act out your role play for the other group
- Fill out role play checklist for the other group's role play




Peer Buddy Program  
Building Friendships During Lunch




### Role Play Discussion

- How were the role plays different?
- Did the emotion for the role play match the situation?
- Should emotion regulation be used?
- How could you use your helping strategy in each role play?




Peer Buddy Program  
Building Friendships During Lunch



### Conclusion

- If you saw that one of your group members was really frustrated about this project, what could you do?
- How were you able to tell what your group members thought about ideas being shared?




Peer Buddy Program  
Building Friendships During Lunch

## APPENDIX B


### Session 4 Peer Buddy Program

6/18/13




**Peer Buddy Program**  
Building Friendships During Lunch

Session 4




**Today's Schedule**

- Review Schedule, Buddies, Important Steps
- Review Previous Skills and Strategies
- Introduce
  - 1. Social Skill - Problem Solving
  - 2. Strategy – Inviting
- Modeling activity
- Practice activity
- Review skills used today




**Peer Buddy Program**  
Building Friendships During Lunch




**Schedule and Buddies**

Week 1	Introduction and Helping Others Read Facial Expressions
Week 2	Helping Others Share Ideas
Week 3	Helping Others Read Feelings and Emotions
Week 4	Helping Others Problem Solve




**Peer Buddy Program**  
Building Friendships During Lunch




**Important Steps to Follow**

- **ONLY** follow these steps when instructed to do so
- 1. Sit down next to or across from Buddy
- 2. Get your Buddy's attention
- 3. Initiate conversation using one of the strategies
- 4. Respond to Buddy's response
- 5. Repeat steps 2-4




**Peer Buddy Program**  
Building Friendships During Lunch




### What to do before the important steps ...

- Eat lunch like you usually do
- Do not initiate with your buddy
- If your buddy initiates with you, respond back




**Peer Buddy Program**  
Building Friendships During Lunch




### Review

- What are the social skills your buddy may struggle with?
- What are the strategies you can use to help promote conversations during lunch?




**Peer Buddy Program**  
Building Friendships During Lunch

## Social Skill 4: Problem Solving



### Problem Solving

- A Problem is a situation that presents uncertainty, confusion, or difficulty.
- There are different kinds of problems
  1. Annoyance
  2. Challenge
  3. Conflict
- There are different levels of Intensity
  1. Low
  2. Medium
  3. High




**Peer Buddy Program**  
Building Friendships During Lunch




### Problem Solving

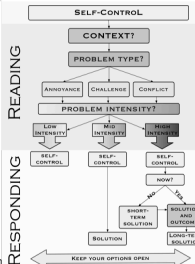
- Why is it important to understand that there are different types and intensities of problems?
- To help you identify important information about a current problem (i.e., the context)
- So you know how to respond and solve the problem

 **Peer Buddy Program**  
Building Friendships During Lunch

### Problem Solving Tree

- Process used to work through each step of a problem


 **Peer Buddy Program**  
Building Friendships During Lunch



### Problem Solving Tree

**Self-Control!**


- What is a Self-Control Strategy?
- Examples?

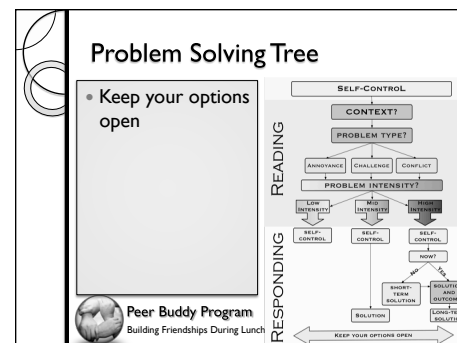
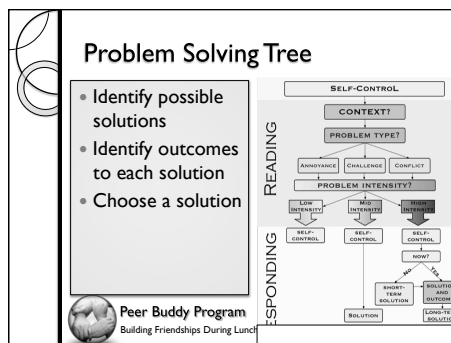
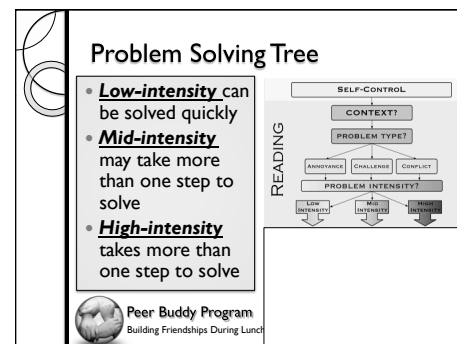
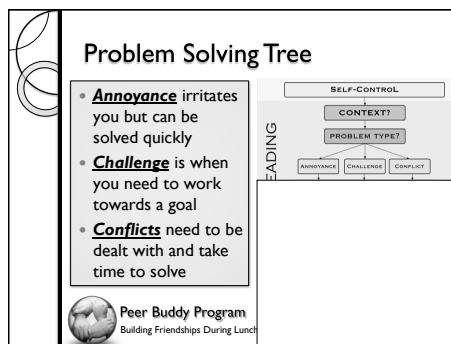
 **Peer Buddy Program**  
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### Problem Solving Tree

**Context**

- Who is involved?
- What happened?

 **Peer Buddy Program**  
Building Friendships During Lunch



## Strategy 4: Including

### Including others

- Including involves taking an interest in someone's hobbies, interests, and likes.
- Invitation is when you ask about someone's interests or ideas
- What are some more examples of invitations?

- What is your favorite thing to draw?
- What is your favorite sport?
- What do you like to do after school?



Peer Buddy Program  
Building Friendships During Lunch

### Video Clips

- Read the context, type, and intensity of each problem situation
- How well did the character respond to the problem?




Peer Buddy Program  
Building Friendships During Lunch

### Crash Dummy Test

- Work as a team to create a vehicle that will protect an egg when crashed
- Use invitation strategies
- At least one idea from every person needs to be used
- Budget is \$100.00




Peer Buddy Program  
Building Friendships During Lunch




### Conclusion


- What ideas did you contribute to the design of the vehicle
- How did you use the Problem Solving Tree when making the vehicle?
- What should you always do first when responding to a problem?



**Peer Buddy Program**  
Building Friendships During Lunch



### Questions?



**Peer Buddy Program**  
Building Friendships During Lunch

## APPENDIX C

### Treatment Integrity Sheet

Coder Name:	Session Number:	Date:
Peers Present:		

**Directions:** Observe the delivery of each component of the Peer Buddy Program.  
 Circle 1 = if the behavior occurred or 0 = if the behavior did not occur

Peer Buddy Program Component	Rating
Introduced the purpose of the Peer Buddy Program	0    1
Defined characteristics of people with social challenges	0    1
Introduced schedule and important steps to follow	0    1
Introduced and defined the SCI program social skill _____	0    1
Introduced new strategy _____	0    1
Modeled social skill and/or strategy _____ and _____	0    1
Allow an opportunity for students to practice social skill and strategy _____ and _____	0    1
Allowed an opportunity for students to ask questions	0    1

Comments (fire drill, emergency, etc.):
---

## APPENDIX D

### Cue Card

<b>Important Steps</b>
1. Sit next to your Buddy
2. Gain your Buddy's Attention
3. Use a strategy (i.e. initiation, assistance, or invitation)
4. Respond to your Buddy
5. Repeat steps 2 – 4

\*Remember to model good social interactions

<b>Strategy Examples</b>
1. What do you want to do when you grow up? I want to be _____?
2. I like your shirt...I have one just like it
3. Can I draw something? Do you have an extra sheet of paper?
4. What did you do in (math, science, reading, ac lab) today?

\*Ignore any weird or unwanted comments

\*Give attention to any good comments

## APPENDIX E

### Direct Observation Tool for Social Interaction Outcomes

Date	Target Student and Peer Group Observing: TS1(P1, P2, P3, P4) TS2 (P5, P6, P7, P8) TS3 (P9, P10, P11)	Time	Main	IOA
<p><b>Directions:</b> Each observation is 20 minutes long</p> <p><b>Level 1:</b> To code target student social interactions, use a <i>Frequency Count</i>. Make a <u>tally</u> for the occurrence of each behavior in corresponding row</p> <p><b>Level 2:</b> To code target student social engagement, use <i>Momentary Time Sampling</i>. Each beep indicates a new 15-second interval. When you hear the <u>beep</u> code the occurrence of the behavior happening at that moment by making an “X” in the corresponding box.</p>				

#### Level 1: Social Interaction of Target Student

Frequency		Σ	%
App. Initiation			
Inapp. Initiation			
App. Response			
Inapp. Response			

#### Level 2: Social Engagement of Target Student

Duration	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20		
Positive																						
Negative																						
Low-Level																						
Duration	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	Σ	%
Positive																						
Negative																						
Low-Level																						

**Comments** (note any participant absences here):

## APPENDIX E

### Direct Observation Tool for Peer Implementation Fidelity

<b>Date</b>	<b>Target Student and Peer Group Observing:</b> TS1(P1, P2, P3, P4) TS2 (P5, P6, P7, P8) TS3 (P9, P10, P11)	<b>Time</b>	<b>Main</b>	<b>IOA</b>
<p><b>Directions:</b> Each observation is 20 minutes long</p> <p><b>Peer Fidelity of PMI:</b> Use a <i>Frequency Count</i>. Make a <u>tally</u> for the occurrence of each behavior in the corresponding row.</p>				

#### Peer Fidelity of PMI

Frequency	Peer 1	Peer 2	Peer 3	Peer 4	$\Sigma$	%
Greeting						
Initiation						
Response						
Assistance						
Invitation						

**Comments** (note any participant absences here):



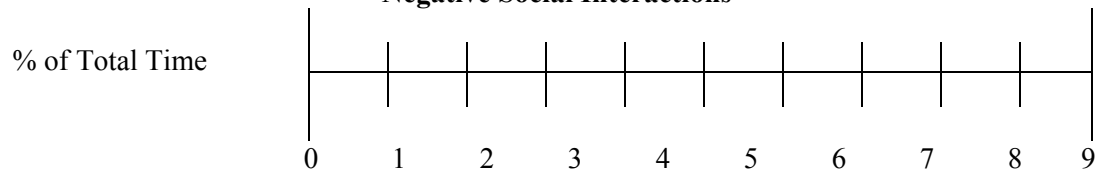
## APPENDIX F

### Direct Observational Rating Tool for Expert Evaluation

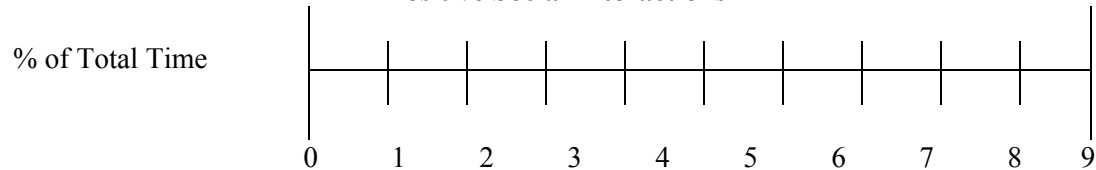
<b>Date:</b> _____ <b>Able to observe today?</b>  <div style="display: flex; justify-content: space-around;"> <span>Y</span> <span>N</span> </div>	<b>Target Student (circle):</b> <div style="display: flex; justify-content: space-around;"> <span>TS2</span> </div> <div style="display: flex; justify-content: space-around;"> <span>TS1</span> <span>TS3</span> </div>	<b>Observation Time (circle):</b>  <div style="display: flex; justify-content: space-around;"> <span>10:30 – 11:00 Lunch</span> </div> <div style="display: flex; justify-content: space-around;"> <span>11:10 – 11:40 Lunch</span> </div>	<b>Any changes in typical lunchroom routine?</b>  <div style="display: flex; justify-content: space-around;"> <span>Y</span> <span>N</span> </div>
---	---	--	--

**Directions:** Rate the student at the end of your observation. Place a mark along the line that best reflects the percentage of total time the student exhibited each target behavior. Note that the percentages do not need to total 100% across behaviors since some behaviors may co-occur.

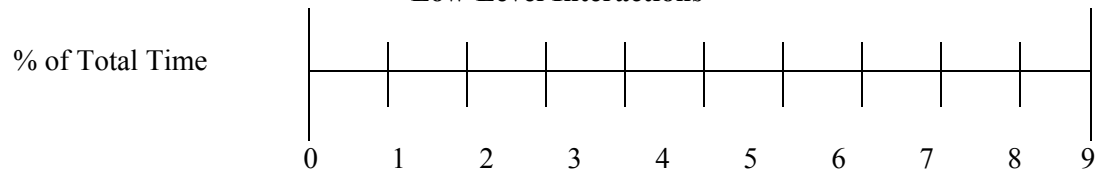
#### Negative Social Interactions



#### Positive Social Interactions



#### Low-Level Interactions



Target Behavior	Definitions	Examples
Negative Social Interactions	Target student engaging in unpleasant social behaviors (Verbal and nonverbal) that stop or decrease social interactions with peers	Physical or verbal aggression (Yelling) Making fun of others (you're ugly) Avoiding/not responding to peers (looks away)
Positive Social Interactions	Target student engaging in appropriate social behaviors (Verbal and nonverbal) that lead to effective social interactions with peers	Eye contact, smile, saying hello Affection (You are very nice) Sharing (What did you do this weekend?)
Low-level Social Interactions	Target student engages in minimal social interactions with peers without initiating positive or negative social interactions	Looking in general direction but never establishing eye contact Within close proximity but not initiating or responding Nodding 'Yes' or 'No' Communication unclear or functional in nature (I need a napkin) Imitating peers, repetitive behavior

## APPENDIX G

### Target Student Satisfaction Survey

**Directions:** For each item, please circle the number that best tells how much you agree with the statement about the Peer Buddy Program. Your answers will help us make sure this program works well for kids in the future.

1	2	3	4	5
Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

Item					
1. Overall, I like the Peer Buddy Program	1	2	3	4	5
2. I enjoyed interacting with my classmates during lunch	1	2	3	4	5
3. I feel like my classmates helped me be more social during lunch	1	2	3	4	5
4. I feel like my classmates helped me practice the skills that I learned in the SCI program	1	2	3	4	5
5. I would like to do more activities with my classmates	1	2	3	4	5
6. I would like to be a part of future Peer Buddy Programs	1	2	3	4	5
7. I would like to eat lunch with my classmates again	1	2	3	4	5

## APPENDIX G

### Peer Satisfaction Survey

**Directions:** For each item, please circle the number that best tells how much you agree with the statement about the Peer Buddy Program. Your answers will help us make sure this program works well for kids in the future.

	1	2	3	4	5
	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1. Overall, I liked the Peer Buddy Program	1	2	3	4	5
2. I liked the skills and strategies that I learned					
a. How to model good social skills and give praise	1	2	3	4	5
b. How to start and maintain a conversation	1	2	3	4	5
c. How to give and receive assistance	1	2	3	4	5
d. How to invite someone into a conversation so that they feel welcome	1	2	3	4	5
3. I think the strategies and skills I learned helped me better interact with my Buddy	1	2	3	4	5
4. I looked forward to going to the Peer Buddy Program	1	2	3	4	5
5. I would like to do more activities with my Buddy outside of the Peer Buddy Program	1	2	3	4	5
6. I would like to be a part of future Peer Buddy Programs	1	2	3	4	5
7. I would like to eat lunch with my Buddy again	1	2	3	4	5

## APPENDIX G

### Parent of Target Student Satisfaction Survey

Dear Parents/Guardians:

Thank you for your child's participation in the Peer Buddy Program. Please take a few minutes to complete this quick satisfaction survey. We are interested in your **anonymous** thoughts about your child's participation in this program. Your feedback is very important to ensuring the quality of programs for students in the future.

**Directions:** For each item, please circle the number that best describes your agreement with each statement about the Peer Buddy Program.

1	2	3	4	5
Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

Item					
1. Overall, I thought the Peer Buddy Program was a positive experience for my child	1	2	3	4	5
2. The Peer Buddy Program provided a safe environment for my child to practice skills he learned in the SCI-A program	1	2	3	4	5
3. I think the Peer Buddy Program provided meaningful social and education benefits for my child (including observable and adequate gains at home)	1	2	3	4	5
4. I would like my child to participate in similar Peer Buddy Programs in the future	1	2	3	4	5
5. I would recommend the Peer Buddy Program to other parents	1	2	3	4	5

## APPENDIX G

### Parent of Peer Satisfaction Survey

Dear Parents/Guardians:

Thank you for your child's participation in the Peer Buddy Program. Please take a few minutes to complete this quick satisfaction survey. We are interested in your **anonymous** thoughts about your child's participation in this program. Your feedback is very important to ensuring the quality of programs for students with special needs in the future.

**Directions:** For each item, please circle the number that best describes your agreement with each statement about the Peer Buddy Program.

1	2	3	4	5
Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

Item					
1. Overall, I thought the Peer Buddy Program was a positive experience for my child	1	2	3	4	5
2. I think my child learned important skills and strategies to help other children be more social					
a. How to model good social skills and give praise	1	2	3	4	5
b. How to start and maintain a conversation	1	2	3	4	5
c. How to give and receive assistance	1	2	3	4	5
d. How to invite someone into a conversation so that they feel welcome	1	2	3	4	5
3. I think the Peer Buddy Program provided meaningful social and education benefits for my child (including observable and adequate gains at home)	1	2	3	4	5
4. I would like my child to participate in similar Peer Buddy Programs in the future	1	2	3	4	5
5. I would recommend the Peer Buddy Program to other parents	1	2	3	4	5

## APPENDIX G

### School Personnel Satisfaction Survey

**Directions:** For each item, please circle the number that best describes your agreement with each statement about the Peer Buddy Program.

**Teacher/Administrative Staff:** \_\_\_\_\_

**Target Student(s):** \_\_\_\_\_

1	2	3	4	5
Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

Item					
1. Overall, I thought the Peer Buddy Program was a positive experience for the target student(s)	1	2	3	4	5
2. I think the Peer Buddy Program provided meaningful social benefits (including observable interactions with peers in the classroom/hallways/lunchroom)	1	2	3	4	5
3. The Peer Buddy Program offered a safe environment for the target student(s) to develop social competence	1	2	3	4	5
4. I would like the target student(s) to participate in similar Peer Buddy Programs in the future	1	2	3	4	5
5. I would recommend the Peer Buddy Program to other students with social challenges	1	2	3	4	5

## APPENDIX H

### TS1: Visual analysis results for response data within and between conditions

Within Condition	A		B		C
Condition length	3		6		9
Estimate of trend direction	/ (+)		– (=)		\ (-)
Trend stability	Variable (66%)		Variable (66%)		Variable (44%)
Data paths within trend	/ (+)		– (=)		\ (-)
Mean (range)	0.16 (0 – 0.4)		3.9 (3.4 – 5)		3.9 (2.1 – 5.1)
Level stability	Variable (33%)		Variable (66%)		Variable (44%)
Level change	0.4 – 0 = (+ 0.4)		4.3 – 3.5 = (- 0.8)		4.5 – 2.1 = (- 2.4)
Condition Comparison	A-B		C-B		
Number of variables changed	1		1		
Change in trend direction and effect	/	–	–	\	
	(+)	(=)	(=)	(-)	
	None		Negative		
Change in trend stability	Variable to Variable		Variable to Variable		
Change in level	4.3 – 0.4 = (+ 3.9)		4.5 – 3.5 = (+ 1.0)		
Percentage of nonoverlapping data	100%		100%		

## APPENDIX H

**TS1: Visual analysis results for initiation data within and between conditions**

Within Condition	A		B		C
Condition length	3		6		9
Estimate of trend direction	/ (+)		\ (-)		– (=)
Trend stability	Variable (66%)		Variable (66%)		Variable (66%)
Data paths within trend	/ (+)		\    / (-)    (+)		– (=)
Mean (range)	0.16 (0 – 0.5)		0.85 (0.1 – 2)		0.4 (0.1 – 1.1)
Level stability	Variable (66%)		Variable (16%)		Variable (66%)
Level change	0.5 – 0 = (+ 0.5)		2 – 0.5 = (-1.5)		0.4 – 0.1 = ( - 0.3)
Condition Comparison	A-B		C-B		
Number of variables changed	1		1		
Change in trend direction and effect	/ (+)	\ (-)	\ (-)	– (=)	
	Negative		None		
Change in trend stability	Variable to Variable		Variable to Variable		
Change in level	2 – 0.5 = (+ 1.5)		0.5 – 0.4 = (- 0.1)		
Percentage of nonoverlapping data	50%		22%		



## APPENDIX H

### TS2: Visual analysis results for response data within and between conditions

Within Condition	A		B		C
Condition length	7		6		4
Estimate of trend direction	\		/		/
	(-)		(+)		(+)
Trend stability	Variable (43%)		Variable (16%)		Variable (33%)
Data paths within trend	/	\	/		/
	(+)	(-)	(+)		(+)
Mean (range)	1.2 (0.2 – 2.8)		2.5 (1.4 – 4.0)		2.1 (1.1 – 3.4)
Level stability	Variable (29%)		Variable (33%)		Variable (25%)
Level change	0.8 – 0.2 = (- 0.6)		2.9 – 2.3 = (+ 0.6)		3.4 – 1.1 = ( + 2.3)
Condition Comparison	A-B		C-B		
Number of variables changed	1		1		
Change in trend direction and effect	\	/	/	/	
	(-)	(+)	(+)	(+)	
	Positive		Positive		
Change in trend stability	Variable to Variable		Variable to Variable		
Change in level	2.3 – 0.2 = (+ 2.1)		2.9 – 1.1 = (- 1.8)		
Percentage of nonoverlapping data	33%		25%		

## APPENDIX H

### TS2: Visual analysis results for initiation data within and between conditions

Within Condition	A		B		C	
Condition length	7		6		4	
Estimate of trend direction	\		\		/	
	(-)		(-)		(+) (+)	
Trend stability	Variable (57%)		Variable (66%)		Variable (0%)	
Data paths within trend	\		\		/ \	
	(-)		(-)		(+) (-)	
Mean (range)	0.49 (0.2 – 0.8)		0.73 (0.2 – 1.2)		0.75 (0.1 – 1.2)	
Level stability	Variable (29%)		Variable (33%)		Variable (25%)	
Level change	0.3 – 0.3 = (= 0)		1.2 – 0.3 = (- 0.9)		0.7 – 0.1 = ( + 0.6)	
Condition Comparison	A-B		C-B			
Number of variables changed	1		1			
Change in trend direction and effect	\	\	\	/		
	(-)	(-)	(-)	(+)		
	Negative		Positive			
Change in trend stability	Variable to Variable		Variable to Variable			
Change in level	1.2 – 0.3 = (+ 0.9)		0.3 – 0.1 = (- 0.2)			
Percentage of nonoverlapping data	33%		50%			

## APPENDIX H

### TS3: Visual analysis results for response data within and between conditions

Within Condition	A		B		C
Condition length	11		6		1
Estimate of trend direction	– (=)		/ (+)		n/a
Trend stability	Stable (82%)		Variable (33%)		n/a
Data paths within trend	– (=)		\   / (-)   (+)		n/a
Mean (range)	0.75 (0.1 – 1.4)		2.5 (1.9 – 3.3)		2.4 (2.4 – 2.4)
Level stability	Stable (82%)		Variable (67%)		n/a
Level change	0.9 – 1.0 = (+ 0.1)		2.9 – 2.4 = (- 0.5)		n/a
Condition Comparison	A-B		C-B		
Number of variables changed	1		1		
Change in trend direction and effect	– (=)	/ (+)	/ (+)	n/a	
	Positive		n/a		
Change in trend stability	Stable to Variable		Variable to n/a		
Change in level	2.9 – 1.0 = (+ 1.9)		2.4 – 2.4 = (= 0)		
Percentage of nonoverlapping data	100%		100%		

## APPENDIX H

### TS3: Visual analysis results for initiation data within and between conditions

Within Condition	A		B		C
Condition length	11		6		1
Estimate of trend direction	/ (+)		\ (-)		n/a
Trend stability	Variable (64%)		Variable (50%)		n/a
Data paths within trend	\   / (-)   (+)		\ (-)		n/a
Mean (range)	0.39 (0.1 – 0.9)		0.72 (0.3 – 1.1)		0.2 (0.2 – 0.2)
Level stability	Variable (29%)		Variable (33%)		n/a
Level change	0.9 – 0.2 = (- 0.7)		0.9 – 0.6 = (- 0.3)		n/a
Condition Comparison	A-B		C-B		
Number of variables changed	1		1		
Change in trend direction and effect	/	\	\	n/a	
	(+)	(-)	(-)		
	Negative		n/a		
Change in trend stability	Variable to Variable		Variable to n/a		
Change in level	0.9 – 0.2 = (+ 0.7)		0.6 – 0.2 = (- 0.4)		
Percentage of nonoverlapping data	17%		0%		

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## VITA

Shannon Leinert received her Master's degree in cross-categorical special education at the University of Missouri. Following her Master's degree she began her doctoral studies in the Department of Special Education at the University of Missouri. Shannon's studies primarily focused on the development and implementation of social and behavioral interventions for children with social skills deficits, and she had a secondary focus in positive psychology constructs. During her time as a doctoral student, Shannon provided social, academic, and positive behavior supports to children with disabilities. Shannon also worked as a graduate research assistant on an Institute of Education Sciences grant that examined the efficacy of a group-based social competence program in the general education setting. Her research interest involves the evaluating as well as implementation fidelity of evidence-based practices, specifically social skills training and peer-mediated intervention, for students with high-functioning autism, emotional and behavioral disorders, and other related disabilities. Shannon was also a collegiate athlete at the University of Missouri where she competed as a middle distance runner. During this time, she was a Big-12 champion, NCAA qualifier, and academic All-American. Currently, Shannon is a professional runner and qualified for the 2012 USA Olympic trials.