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Effect of a Classwide Peer-Mediated Intervention on the Social Interactions of Students with Low-Functioning Autism and the Perceptions of Typical Peers

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EFFECT OF A CLASSWIDE PEER-MEDIATED INTERVENTION ON THE SOCIAL
INTERACTIONS OF STUDENTS WITH LOW-FUNCTIONING AUTISM
AND THE PERCEPTIONS OF TYPICAL PEERS

A Dissertation Presented
To
The Faculty of the School of Education
Learning and Instruction Department

In Partial Fulfillment
of the Requirements for the Degree
Doctor of Education

By
Lisa A. Simpson
San Francisco
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THE UNIVERSITY OF SAN FRANCISCO

Dissertation Abstract

Effect of a Classwide Peer-Mediated Intervention on the Social
Interactions of Students with Low-Functioning Autism
and the Perceptions of Typical Peers

Students with autism often display significant challenges when acquiring

friendships and participating in ongoing relationships with typical peers. The social

interaction deficits that characterize students with autism are further exacerbated by the

severity of the disorder, such that students with low-functioning autism require

significantly more support to successfully participate in peer interactions than students

with high functioning autism. This study used mixed methodology to examine the effects

of a classwide peer-mediated intervention on the social interactions of students with low-

functioning autism and typically-developing peers.   A single subject ABAB design was

employed in which students with low-functioning autism were grouped with typical peers

for a shared reading activity. The study alternated between baseline and intervention

stages in which students were taught to stay, read, and talk with their buddy.   Results of

the study indicate that three of the four participants with low-functioning autism

increased their interactions with typical peers from each baseline to intervention stage.

Results of a perception survey indicate that typical students held a high positive

perception of their peers with autism, while interviews revealed that typically-developing

peers considered themselves to be friends with their buddies with low-functioning autism.

The unexpected response pattern of one participant with low-functioning autism warrants further investigation into individual characteristics of the student as well as characteristics of the peer group.

This dissertation, written under the direction of the candidate's dissertation committee and approved by the members of the committee, has been presented to and accepted by the Faculty of the School of Education in partial fulfillment of the requirements of the degree of Doctor of Education. The content and research methodologies presented in this work represent the work of the candidate alone.

Lisa A. Simpson   May 9, 2013
Candidate   Date

Dissertation Committee

Yvonne Bui, Ph.D.   May 9, 2013
Chairperson

Robert Burns, Ph.D.   May 9, 2013

Caryl Hodges, Ph.D.   May 9, 2013

DEDICATION

This dissertation is dedicated to all of the children with autism who graced my classroom through the years. Each child was truly special and taught me something new and different everyday we were together. They opened my eyes to things I could not see, taught me the value of patience and persistence, and brought me joy and laughter in so many ways. I am truly inspired by their courage and forever touched by the love they shared with me.

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overwhelmed David was always there to convince me I could keep going and tell me how proud he was of me. I am so blessed to have his love and support.

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CHAPTER ONE

STATEMENT OF THE PROBLEM

Autism is characterized by qualitative impairments in social interaction,

qualitative impairments in communication, and restricted, repetitive and stereotyped

behaviors (American Psychiatric Association, *Diagnostic and Statistical Manual, Fourth*

Edition, Text Revised, 2000). These characteristics have frequently been referred to as

the triad of impairments, with impairments in social interaction most often viewed as the

defining attribute of autism. Social interaction impairments have been further described

as a failure to use nonverbal behaviors, develop peer relationships, spontaneously seek to

share enjoyment with others, and display social or emotional reciprocity (American

Psychiatric Association, 2000), all of which make it difficult for students with autism to

interact with their typically-developing peers.

These social impairments of students with autism present significant challenges

with acquiring friendships and participating in ongoing relationships with typical peers

(Owen-DeSchryver, Carr, Cale, & Blakeley-Smith, 2008). Even when physically

included in general education classrooms these students may be socially excluded from

participation because of limited communication skills or awkward behaviors.

Additionally, students with autism struggle with understanding the social nuances of peer

interactions, misinterpret what is being said, and fail to engage in the give and take of

conversation, all of which further limits their acceptance by peers (DiSalvo & Oswald,

2002). Such extensive struggles with social relationships may preclude students with

autism from making friends at all.

With few friendships available to them and a plethora of social competency deficits, students with autism have limited ability to cope with the myriad of social interactions present in the school setting making them especially susceptible to teasing and bullying. As a result, they often learn to avoid social contacts, leading to more social rejection (Cotugno, 2009; Stichter et al., 2010). Thus, avoidance and rejection may become the cycle by which students with autism are eventually isolated from peers altogether, engaging in few if any social interactions. Without benefit of positive social interactions and without opportunities for peer support, there is an increased likelihood that students with autism will engage in maladaptive behaviors (Bellini, Peters, Benner, & Hopf, 2007; DiSalvo & Oswald, 2002).   The maladaptive behaviors may further cause typical peers to want to be around other typical peers rather than peers with autism. Maladaptive behaviors also hold the potential for increased isolation by restricting access to inclusive settings (Stichter, Randolph, Gage, & Schmidt, 2007).

Poor peer interaction skills have potentially long-term consequences for students with autism as well. Skills associated with play and interaction in the preschool years, such as joint attention and motor imitation, have been found to be predictive of language and social skills at age seven (Charman et al., 2005). These findings have led researchers to believe that assessing early social-communication behaviors in young students with autism may be as important as assessing IQ in terms of looking at future outcomes (Ben-Itzchak & Zachor, 2007; Charman et al., 2005). Additionally, the deficits in social skills, specifically peer interaction, tend to compound over time. Long-term studies indicate that few adults with autism report having reciprocal friendships, and the majority report

having no friends or acquaintances at all outside of family or paid caregivers (Billstedt, Gillberg, & Gillberg, 2011; Howlin, Goode, Hutton, & Rutter, 2004).

Peer interaction deficits in students with autism are further exacerbated by the severity of the characteristics of the disorder. Students with more severe levels of autism are often categorized as *low-functioning* and tend to display more social skills deficits, whereas students with milder forms of autism are often categorized as *high functioning* and tend to display fewer deficits in social interaction skills (Ben-Itzchak & Zachor, 2007). Exactly what constitutes high or low-functioning autism, however, varies across research studies. Neither high functioning nor low-functioning autism is a diagnostic category in the DSM-IV, and reports in the literature vary from using an IQ < 80 to using an IQ < 50 to designate low-functioning autism (DeRosier, Swick, Davis, McMillen, & Matthews, 2011; Macintosh & Dissanayake, 2006; Manning & Wainwright, 2010; Mayes, et al., 2009; Mayes & Calhoun, 2011; Webb, Miller, Pierce, Strawser, & Jones, 2004). The present study used IQ < 80 to designate low-functioning autism (LFA), consistent with the literature on the use of the *Childhood Autism Rating Scale* (Schopler, Reichler, & Renner, 1986; Schopler, Van Bourgondien, Wellman, & Love, 2010), a diagnostic instrument with good psychometric support commonly used in the school setting to identify children with LFA (Mayes & Calhoun, 2003; Mayes et al., 2012).

Compared to students with high functioning autism, students with LFA (IQ < 80) have been shown to display more stereotypical and self-injurious behavior, more resistance to change, and less emotional expression (Mayes & Calhoun, 2011). Also, students with LFA generally show less reduction in social impairments from early childhood through adolescence than students with high functioning autism (McGovern &

Sigman, 2005).   Much of the research examining peer interaction with students with autism looks at participants with high functioning autism.   Students with LFA are generally considered to require significantly more support to successfully participate in peer interactions than students with high functioning autism, which is likely why fewer studies involve this population (Ben-Itzchak & Zachor, 2007; Simpson, de Boer-Ott, & Smith-Myles, 2003).   Also, strategies that work for higher functioning children with autism may not always work with students with LFA.   There remains a critical need for effective peer interaction strategies for students with LFA to increase the social skills and long term outcomes for this subset of the population as well (Banda, Hart, & Liu-Gitz, 2010; Harper, Symon, & Frea, 2008; Reichow & Volkmar, 2010; Rogers, 2000).   The present study aimed to address that need by employing an intervention to increase the social skills of students with LFA.

Educating students with autism in inclusive general education settings has been thought to be beneficial for them because of increased access to typical peers (McConnell, 2002).   Yet research has shown that the mere presence of typically-developing peers is not enough to promote appropriate peer interaction in students with autism (Bass & Mulick, 2007; DiSalvo & Oswald, 2002; Simpson, de Boer-Ott, & Smith-Myles, 2003).   Students with autism often display very narrow interests with restricted and unusual patterns of behavior, leading typically-developing students to choose to interact with other typically-developing students rather than their peers with autism.   As a result, students with autism may be subjected to significant social isolation in inclusive settings if specific interventions do not take place (Bass & Mulick, 2007).   Also, students with LFA may be placed in specialized settings in order to receive more intensive

interventions, and thus have less access to typical peers. For these students, time with typical peers needs to be organized and planned into the school day. Whether students with autism are receiving services within general education classrooms or specialized classrooms within a public school setting, opportunities must be developed for them to meaningfully interact with typically-developing peers (Laushey & Heflin, 2000).

In an attempt to promote such meaningful interactions, specific interventions have been examined which target the social deficits of children with autism. Early interventions aimed at improving social interactions between children with autism and their typical peers involved adults delivering instructions to the target children with autism as well as the peers. These interventions, labeled adult-mediated interventions, included the delivery of prompts and reinforcement by the adult to the participants during the interaction activity (Rogers, 2000; Weiss & Harris, 2001). Adult mediated interventions have shown success with improving the social skill deficits of students with autism, yet there has been some concern that when used in isolation adult-mediated interventions promote dependence on adults and may not readily generalize to more natural peer settings (Rogers, 2000; Weiss & Harris, 2001).

Because of the limitations inherent in using adult-mediated social skills intervention, researchers moved to using peer-mediated interventions. In peer-mediated interventions, typically-developing peers are taught the skills to interact with students with autism, and thus they become the intervention agents themselves (Rogers, 2000). The use of typical peers as intervention agents is thought to hold particular promise because the peers are modeling the social behavior themselves. Indeed, peer-mediated interventions have been used successfully to increase social interactions between students

with autism and typical peers (Banda, Hart, & Liu-Gitz, 2010; Harper, Symon, & Frea, 2008; Kamps et al., 2002; Morrison, Kamps, Garcia, & Parker, 2001; Owen-DeSchrvyer et al., 2008). Additionally, peer-mediated interventions have been used to increase eye contact, remain in close proximity, and stay on topic in conversations, with students with high functioning autism (Krebs, McDaniel, & Neeley, 2010). Peer-mediated social skills interventions have shown particular promise for students with autism by allowing for removal of the adult as the intermediary step.

Though many peer-mediated interventions have proven successful with students with autism, few of these peer-mediated social skills interventions have been conducted with students with LFA. There remains a need to find interventions that work with more severe levels of autism (Rogers, 2000). Additionally, most of the peer-mediated interventions have been conducted in the relatively unstructured activities of lunch and recess. Few studies have examined peer-mediated interventions within academic activities in the classroom, and the need remains to address interventions in these settings (Banda, Hart, & Liu-Gitz, 2010). The present study attempted to address these areas by implementing a peer-mediated social skills intervention for students with LFA and typical peers in a classroom setting.

While peer-mediated interventions have been effective at improving the social skills deficits of students with autism, concerns remain about whether the interventions improve the quality of interactions and overall relationships between the typical peers and the students with autism (Owen-DeSchryver et al., 2008; Rogers, 2000). Ultimately the interactions between students with autism and typical peers need to be meaningful interactions rather than just rote responses. To date there have been few attempts to

assess the quality of the relationship between the typical peer and the student with autism, especially in interventions aimed at students with LFA (Owen-DeSchryver et al., 2008; Rogers, 2000). Little is known about how the interventions impact the typical peers, and yet it is important to understand the view of the typical peer in order to understand the quality of the relationship. Students with autism need reciprocal friendships and long-term relationships with typical peers if they are to have improved social skills and ultimately improved long-term outcomes. The present study aimed to improve social skills for students with LFA by implementing a social skills intervention, while also examining the perspective of the typical peers in the intervention to gain insight into how to further improve the social relationship to ultimately enhance the social skills of the students with LFA.

Purpose of the Study

The purpose of the study was to examine the effects of a class-wide peer-mediated social skills intervention on the social interactions of students with low-functioning autism, and their typically-developing peers. The study employed a mixed methodology using a single subject ABAB design for the social skills intervention, pre- and post-intervention surveys of the typical peers to assess peer perception, and post-intervention interviews to glean information about qualitative aspects of the peer relationships. The study participants included a class of twenty-four general education second-graders, and a class of eight students with LFA in kindergarten through second-grade. The participants were randomly assigned to groups, combining three general education second-graders with one student with LFA. Establishing small groups is consistent with a review of the literature indicating that peer-mediated interventions work

best with higher ratios of typically-developing students to students with autism (Rogers, 2000).

The intervention, termed *Reading Buddies,* was a class-wide intervention in which all members of the general education and special education class took part. The groups read together for 20-minute sessions two or three times a week, in the special education classroom of the students with LFA. The study employed an ABAB design alternating a baseline phase (4 data points) with an intervention phase (6 data points). During the *Reading Buddies* intervention phase, students were instructed to stay with their buddies, read with their buddies, and talk with their buddies. Students were also given general instruction on ways to share reading with their buddies, talk about the book, and praise each other for doing a good job.

Following protocol for single subject research design the dependent variables were operationally defined, measured repeatedly, and assessed for consistency (Horner et al., 2005). The dependent variables of initiations and responses were selected as important skills for the students with LFA to increase their interactions with typical peers, and as such held social significance for these students (Horner et al., 2005). Trained observers observed the interaction of the groups for random ten-minute intervals during the *Reading Buddies* activity, and recorded the initiations and responses between the members of the group.

Initiations were defined as any motor or vocal behavior demonstrated by the target child to a typical peer, or a typical peer to the target child, that attempted to gain attention or occasion a response from the other. Examples of initiations included verbalizing to the other person, looking at the other person's face, touching the other

person appropriately (e.g., tapping shoulder, touching hand), presenting the book to the other person, and pointing to a picture in the book while looking at the partner.

Responses were defined as any appropriate motor or vocal behavior demonstrated by the target child to a typical peer, or typical peer to the target child, that was preceded by an initiation and occurred within ten seconds of the initiation. Examples of responses included looking at the other person's face, verbalizing to the other person, smiling at the other person, touching the other person appropriately, and giving a motor response such as nodding head or touching a named picture.

The study also examined the perceptions of the typically-developing students toward their peers with LFA before and after their participation in the peer-mediated social skills intervention. The study used the *Autism Peer Perception Survey* designed by the researcher for use with second-grade students and piloted on an earlier intervention. The survey assessed the second-grade students' perception of the peer intervention in terms of enjoyment of the activity, anxiety about the activity, feeling of helping the peer, and feeling of similarity with the peer. Assessing the peers' perception of the intervention was important for increasing the interaction between the typical students and the students with LFA. Assessing peer perception was also important for understanding qualitative changes in the relationship, and ultimately improving long-term outcomes for the students with LFA.

Finally, interviews were conducted with the typically-developing students at the end of the intervention phase to glean qualitative information about the peer relationship. Peer-mediated interventions have heretofore not attempted to address qualitative aspects of the relationship between the typical peer and the peer with autism. Interviewing the

typical students themselves may help bridge the gap between increasing social interactions in the short-term and improving social outcomes in the long-term.

Theoretical Framework

The present study of a peer-mediated social skills intervention for students with LFA draws on the theoretical framework of Lev Vygotsky. Vygotsky's sociocultural theory emphasizes the role of the social world in cognitive development. Sociocultural theorists posit that learning takes place within a cultural context involving the interaction of both individual and social learning, and that individual development originates within the social context (John-Steiner & Mahn, 1996). Learning occurs first in the social interaction of two people, inter-psychological, and then develops within the person, intra-psychological (Vygotsky, 1978). In this way sociocultural theorists believe the child not only develops, but is also developed by others.

The importance of social interaction is elaborated further, as sociocultural theorists view learning as an interactive process that is collaborative and dynamic in nature (Eun, 2010). Learning is seen as a process rather than a product and teachers are viewed as facilitators of learning rather than directors. According to sociocultural theory, teachers and students engage in learning through shared goals, adjusting purposes through dialogue and interaction with peers (Vygotsky, 1978). Similarly, knowledge is co-constructed between the learner and the environment, and learners interact with each other in social situations to derive meaning (Jaramillo, 1996). The view that knowledge is constructed when there is social interaction between learners was particularly important for the present study, as children with LFA have been shown to require more than close proximity to appropriate peer models to develop appropriate social skills

(Myles, Simpson, Ormsbee, & Erickson, 1993; Laushey & Heflin, 2000). Social interaction provides the link between the student with LFA observing the model and acquiring the skill, setting Vygotsky's theory apart from the social learning theory of Albert Bandura.   Not only must observation of an appropriate model be present, but there must also be interaction with that model for learning to take place.

In much the same way, Vygotsky held that each concept acquired by the child appeared twice in his or her development, once on the social plane between two or more persons, and then again on the individual plane, or inside the individual (Eun, 2010; Lourenco, 2012). Concepts are first learned through interaction with others and then internalized within the child. Vygotsky emphasized that participation in socially meaningful activities with others is important for shaping the development of the individual child, which is particularly important for children with LFA who by nature of their disability participate less often in social interactions than their typically-developing counterparts (Ben-Itzchak & Zachor, 2007; Majlaars, Noens, Jansen, Scholte, & vanBerckelaer-Onnes, 2011). Participation in socially-relevant activities facilitates the generalization of skills from the scientific to the everyday environment, and according to Vygotsky, should be the focus of school instruction (Eun, 2010). The construct of generalization is especially important to students with LFA. Students with LFA have been shown to have great difficulty generalizing skills across environments (Volkmar, Lord, Bailey, Schultz, & Klin, 2004), making socially-relevant activities necessary to bridge the gap between skills students with LFA have and skills they need to acquire.

Zone of Proximal Development

Another key construct of Vygotsky's theory of sociocultural learning is the concept he called the zone of proximal development (ZPD). Vygotsky defines the ZPD as the zone between actual level of development and potential level of development (Vygotsky, 1978), and it is through interaction and problem solving with an adult or more capable peer on a task just slightly above the learner's developmental level that the learner is able to acquire new skills and concepts. In this way students learn concepts that were initially beyond them through interaction with the teacher or more capable peer. The ZPD is seen as the difference between what the child is able to do independently and what the child is able to do with the guidance of an adult or more experienced peer (Vygotsky & Kozulin, 2011). Vygotsky further explained that actual development is tied to learning that took place yesterday while proximal development examines learning that is to take place tomorrow.

When utilizing the zone of proximal development it may be necessary for the teacher or more capable peer to provide scaffolding for the learner to acquire the skill that is initially a little beyond their level. Scaffolding provides a system of support until the student can complete the skill on his or her own, and is similar to the construct of shaping and reinforcement in the behaviorist theory. Sociocultural theorists view scaffolding as an important part of an apprenticeship model and critical for acquiring skills in the zone of proximal development (Mastergeorge, 2001). The construct of scaffolding and the apprenticeship model provided a level of support to the present study of children with LFA beyond that which could be found using the social learning theory of Bandura. Children with LFA needed additional support beyond simple observance of appropriate models to acquire the necessary skills.

Sociocultural Theory Applied to This Study

Vygotsky's model of sociocultural learning was particularly applicable to the present study of a peer-mediated social skills intervention for students with LFA. In the study, students with LFA were grouped with more socially competent typical peers, who fostered learning in the students with LFA through social interaction. The students with LFA interacted with the typical peers to negotiate social meaning through the *Reading Buddies* intervention, and through their social interactions students with LFA acquired skills and derived meaning first on an interpersonal level and then on an intrapersonal level.

Vygotsky's apprenticeship model supported the study wherein the students with LFA relied on the more socially competent typical peers to support and scaffold their participation in the *Reading Buddies* activity. As more socially competent peers, the typical students supported the students with LFA in learning appropriate social interactions and acquiring skills just beyond their current independent level. As the children with LFA practiced and improved their skills they came to resemble more experienced members of the society (Mastergeorge, 2001). Vygotsky reminds us that we are not so much teaching for the skills we have today but rather the skills we will have tomorrow (Vygotsky, 1978). By placing the students with LFA with their more socially advanced, but age-matched peers, to engage in socially relevant activities, students with LFA gained experience and skills that could not be learned by practicing with an adult alone.

Vygotsky's apprenticeship model influenced the similar work of Wolfberg and Schuler (1999) in their development of the integrated playgroup model for children with

autism. In this model, children with autism are placed in playgroups with more experienced learners -- the experts -- who model and scaffold their learning of new social constructs. Integrated playgroups can in fact be thought of as one type of peer-mediated intervention in which typical students are the experts and the children with autism are the novice learners. Such groups have been shown to be successful in increasing interaction between children with autism and their socially competent peers (Wolfberg & Schuler, 1999). While the present study was not an integrated playgroup study, it was an intervention in which children with autism were grouped with socially competent children (the experts) utilizing Vygotsky's apprenticeship model.

Background and Need

In developing the background and need for the present study, information is presented on (a) autism in general, (b) social characteristics of autism, (c) low-functioning autism, (d) inclusion, (e) adult mediated social skills interventions, (f) peer-mediated interventions, and (g) perspectives of the typical peers. This section concludes with a brief summary of factors relevant to the need for this study.

In looking at students with autism it is necessary to look briefly at the history of the disorder to gain an understanding of how the incidence of autism has changed in recent years. Dr. Leo Kanner first recognized autism as a disorder in 1943. In a lengthy report Kanner described eleven children who did not relate to others in the ordinary way and displayed an extreme propensity to be alone (Kanner, 1943). Dr. Kanner determined that these children displayed symptoms that did not fit into any of the diagnostic categories that were available at the time and diagnosed these children with "inborn autistic disturbances of affective contact" (p. 250). Autism was thought to be extremely

rare and little was understood about how to treat children with the disability. Autism remained relatively obscure for several decades and professionals at the time classified it as a mental disorder. It was not until the mid 1980s that students with any significant numbers were starting to enter the public school systems. During this time period students diagnosed with autism were served under the category of emotional disturbance or other health impaired.

Autism later came to be understood as a developmental disorder caused by a neurological malfunction in the brain and was first recognized as a disability category with the authorization of the Individuals with Disabilities in Education Act in 1990 (IDEA, 1990). Since that time the number of students diagnosed with autism has increased significantly. In fact, the prevalence of autism has skyrocketed from 0.3 cases per 1000 in the early 1990's to 11.3 cases per 1000 in 2012 (Center for Disease Control, 2012). These latest statistics indicate that roughly 1 in 88 children in the United States have been diagnosed with an autism spectrum disorder, bringing the total number of diagnosed students receiving special education services to almost 419,000 children between the ages of three and twenty-one (U.S. Department of Education, Office of Special Education Programs, 2010). Without question, autism has been the fastest growing disability category under IDEA. What was once thought to be a disability affecting only a few students is now seen in virtually every school across the United States (MacFarlane & Kanaya, 2009). The increased numbers of students with autism is impacting school districts across the United States, and school personnel are grappling with how to deal with the significant needs of this population (Delmolino & Harris, 2011).

Characterizing Autism

Autism is defined as a pervasive developmental disorder manifesting with significant impairments in social interaction, significant impairments in communication, and repetitive and restrictive behaviors (American Psychiatric Association, 2000). Children must manifest a number of prescribed symptoms to a significant degree to acquire the diagnosis. Though the DSM-IV lists specific symptoms necessary to acquire the diagnosis, how those symptoms manifest varies from student to student.

Some students with autism may develop age appropriate speech milestones but use speech in idiosyncratic ways, such as refer to themselves in the third person or fail to use pronouns appropriately. Other students with autism may acquire speech but be unable to functionally communicate, and still others develop no speech at all. Some students with autism may not acquire joint attention (looking at or pointing to an object of shared interest), while other students with autism are unable to take another person's perspective or recognize that others have feelings different than their own (Bass & Mulick, 2007; Hart & Whalon, 2011). Students with autism may be very rigid with their routines and become upset with the slightest change, some may engage in self-stimulatory behavior, such as hand flapping or flicking their fingers in front of their face, and still others may be extremely attached to objects or parts of objects becoming anxious if the object is removed or misplaced (Cotugno, 2009). Though each student has met the diagnosis of autism, each has a unique set of characteristics and behaviors that impacts overall life functioning.

Social Characteristics of Students with Autism

As described above, students with autism display a number of social competency deficits making it difficult for them to successfully interact with others. These social deficits are thought by many to be the defining characteristic of autism and what sets students with autism apart from all other disability groups. Examining social competency deficits in students with autism, however, can be difficult, as there is presently no single cause of these deficits, but rather the lack of social competence is thought to be the result of many factors (Cotugno, 2009; Stichter et al., 2010). When social competency deficits of students with autism spectrum disorders go unheeded, students with autism more readily encounter problematic behavior, become increasingly withdrawn, and experience a poor quality of life (Stichter et al., 2007).

Determining what factors contribute to the development of social competence is critical if remediation is to take place.   As students with autism become increasingly included in general education classrooms their ability to function in a socially competent manner is ever more important. They are expected to behave appropriately and participate in a wide variety of whole group and small group interactions throughout the school day. Parents and teachers must focus their efforts on interventions that strengthen social competencies so that students with autism can achieve success, independence, and integration within the community (Stichter et al., 2007).

One of the social competencies deemed to be critical to the success of students with autism is initiating and responding to social interaction. Students with autism often engage in low rates of pro-social behavior, and display specific difficulties in initiating and responding to interaction, maintaining reciprocity, sharing enjoyment with others, and taking another's perspective (Bellini, Peters, Benner, & Hopf, 2007; Boyd, Conroy,

Asmus, & McKenney, 2011).   Boyd et al. (2011) observed the interactions of eight

young children with autism across inclusive and self-contained special education

classrooms. The percentage of time the children with autism engaged in social

interactions with their peers ranged from 0.36% (1 min in 5 hours of observation) to

16.39% (34 minutes in 3.5 hours of observation). These results contrasted considerably

to initiations and responses made by typical children in a similar study, which consisted

of 300 initiations and responses in a five-hour period (Goldstein, Kaczmarek, Pennington,

& Shafer, 1992).

Students with autism displayed low levels of initiations across both inclusive and

special education settings, and when initiations did occur they were most often to access

adult attention or access preferred items rather than peer interaction. In contrast,

typically-developing students most often initiated interactions to engage socially with

peers, make comments, share a joke, plan what to do at recess, etc. Not only are students

with autism initiating interactions far less then their typically-developing peers, they are

initiating for very different reasons as well. The need remains for further examination of

which activities in which contexts promote increased peer interaction of students with

autism and typically-developing peers (Bass & Mulick, 2007; Boyd et al., 2011).

Examining Low-functioning Autism

Understanding which interventions work for students with LFA is important

because they display a number of characteristics that inhibit the development of

appropriate social skills even more than students with high functioning autism. Students

with LFA were found to have a lower verbal IQ, a lower performance IQ, significantly

greater impairment in social interaction, more repetitive behaviors, and had more

pragmatic language difficulties than students with high functioning autism (Barrett, Prior, & Manjiviona, 2004). Much of the research in peer interaction and students with autism has been with students with high functioning autism, while finding effective interventions for students with LFA remains an ongoing concern (Rogers, 2000).

Additionally, both initial IQ levels and severity of social deficits have been found to be predictors of long-term outcomes in children with autism. A study of young children with autism in an early intensive intervention program found that children with lower initial cognitive levels and more social interaction deficits at the start acquired fewer developmental skills over the year than the children with higher functioning autism (Ben-Itzchak & Zachor, 2007). While children with LFA do make progress with their social skills there is less research about how to facilitate interaction with peers with this population (Rogers, 2000). Strategies that work for higher functioning students with autism may not work with students with LFA, leaving a strong need for effective peer interaction interventions for children with LFA.

Inclusion

Increasing the social skills of students with LFA is also important for successful integration into general education settings. The inclusion of students with autism in general education classrooms is a fundamental assumption of IDEA, and is generally believed to be important for social development because the students with autism are exposed to typical peers. Including students with disabilities in the general education classroom is thought to be beneficial for the typically-developing students as well because it promotes tolerance of individual differences (Burstein, Sears, Wilcoxen, Cabello, & Spagna, 2004; Cole, 1999). In a study by Lyons, Cappadocia, and Weiss

(2011) students with autism placed in full inclusion settings were found to have better social competence and more friends than students with autism in non-inclusive classrooms. However, it is unknown whether these differences could be attributed to the inclusion setting facilitating the development of the social skills or whether having better social skills precluded placement in the inclusive setting in the first place.

Research indicates that there may be some differences in students with autism placed in inclusive settings and those in specialized placements. Students with autism who are placed in inclusive settings tend to be younger (i.e. elementary school age), tend to be higher functioning, and tend to have fewer behavior problems (Lyons, Cappadocia, & Weiss, 2011; Yianni-Coudurier et al., 2008), while children with autism placed in specialized settings tend to display more aberrant behaviors, irritability, and uncooperativeness (Yianni-Coudurier et al., 2008). The presence of more maladaptive behaviors may impact the student with autism's ability to learn from peers, and may necessitate significant behavioral and social support for the student to be successful in inclusive settings (Simpson, deBoer-Ott, & Smith-Myles, 2003). Providing support and structure for inclusive activities involving students with autism is critical for their success and one reason peer-mediated interventions are of particular importance.

Adult-Mediated Interventions

Interventions targeting social interactions with students with autism and typically-developing students largely began with adult-mediated interventions. Adult-mediated interventions are those in which the adults act as mediators of change by instructing, prompting, and reinforcing both the student with autism and the typically-developing student in ways to interact with each other. However, adult-mediated interventions may

be intrusive and alter the fundamental relationship between the student with autism and the typical peer (Weiss & Harris, 2001).   In one such adult-mediated study, Odom, Hoyson, Jamieson, and Strain (1985) implemented an intervention in which typically-developing students were taught to direct the social initiations of three students with disabilities in an inclusive preschool classroom.   Teachers in the study prompted the typically-developing students to engage their peers with disabilities and provided them with reinforcement for doing so. While the social initiations of the students with disabilities did increase there was no generalization to other classroom settings, and when the teachers reduced the prompts the typical peers' social interactions decreased. The researchers concluded that the intervention should be adjusted to a less teacher-directed context.

In another study by McGee, Almeida, Sulzer-Azaroff, and Feldman (1992), typical peers were again taught to interact with students with autism by displaying a bucket of toys and prompting the student with autism to ask for the toy he/she wanted. An adult teacher sat on the floor with the typical child and the child with autism and modeled peer interaction on alternating episodes. The adult was also responsible for keeping the student with autism in the defined interaction area. The typical peers were successful in getting the students with autism to initiate for the highly preferred items, but generalization to other settings (lunch, other free play periods) was minimal.

Peer-Mediated Interventions

Because of the issues surrounding lack of generalization with adult-mediated interventions, researchers then turned to peer-mediated interventions. Peer-mediated strategies use typical peers to prompt and shape the behavior of the child with autism

(Rogers, 2000). Usually the peers are trained by adults to reinforce the children with autism for initiations and responses. Peer-mediated interventions have been successfully used to increase interactions during recess on the playground, during free choice time within the classroom, and during lunch (Harper, Symon, & Free, 2008; Kamps et al., 2002; Laushey & Heflin, 2001; Licciardello, Harchik, & Luiselli, 2008). However, relatively few peer-mediated interventions have examined interactions during more academic classroom activities, even though most of the school day is spent in academic activities. Examining how interactions take place throughout the school day, and how academic activities may provide structure for peer interactions are important variables for future peer-mediated interventions (Banda & Hart, 2010).

Owen-DeSchryver et al. (2008) implemented a peer-mediated intervention involving three students with autism, and two to four typical peers for each of the three participants. The typical peers were trained in several phases, which involved discussing rationales for developing friendships with students with disabilities, the strengths and preferences of the participants with autism, and strategies to use to include the students with autism. The participants with autism and the typical peers were observed during the lunch and recess period for social interactions. Results of the study indicate that the typical peers increased their initiations toward their peers with autism, and the participants with autism increased their responses to these initiations. Untrained typical peers also increased their initiations toward the participants with autism. While the results of the study indicate that initiations and responses between the typical students and students with autism increased, little is known about the quality of the relationships

between the typical peers and the students with autism, and whether the increased interactions promoted any long lasting effects.

In another study of peer-mediated interventions, Laushey and Heflin (2000) examined the appropriate social interactions of two kindergarten students with autism in two inclusive kindergarten classrooms using a peer buddy approach. An ABAB reversal design was implemented with the entire class consisting of intervention and non-intervention phases. The intervention phases consisted of a buddy system structure in which all students were told to find their buddy (by viewing a chart), then stay, play, and talk with their buddy during a free play period. Each day the students were paired with a new buddy. During non-intervention phases (baseline) all students were instructed that it was time to play without being paired with a buddy. Results of the Laushey and Heflin study indicated that the buddy intervention elicited more appropriate social skills in the students with autism than the non-intervention (passive proximity) phase. The participants with autism were fully included in the general education classrooms and were considered to be functioning at the high end of the autism spectrum. Laushey and Heflin's study indicates that this class-wide intervention was successful at increasing the appropriate social skills of the two participants, but further research needs to be done with students with LFA who have less intact social repertoires to begin with. The present study drew on the work of Laushey and Heflin and examined the social interactions of students with LFA, using peer buddies in a class-wide intervention in a special education setting.

Peer Perspective

Peer-mediated interventions have been shown to be effective in increasing the social interactions of children with autism under specific conditions, which is thought to be important for promoting relationships with typical peers (DiSalvo & Oswald, 20002). However, little is known about the perspective of the peers in these interventions. Whether these interventions affect the overall quality of peer relationships has not been examined. In a review of peer-mediated interventions, Rogers (2000) called for increased focus on the quality of the peer relationship as well as the skills needed for long-term relationships. Understanding how the typical peer's view of the student with autism changes through participation in the intervention could provide important information about the relationship.

The typical peers used in peer-mediated interventions are largely hand-picked by the teacher or researcher as being students that would work well with the other students with autism, and who generally have strong social skills themselves. The peers most often display strengths in being able and willing to follow adult directions. Carefully choosing the typical peers is thought to help produce favorable outcomes during the intervention phases, but questions have arisen about whether hand-picking the typical peers is indicative of realistic class placements in which the child with autism needs to interact with a number of typical peers, not just the one specifically chosen for the study.

Summary

Each of these studies is important to the overall understanding of the social interaction deficits of students with autism. While the evidence base is strong for the use of peer-mediated interventions to improve the social interactions of students with autism

(Rogers, 2000; Weiss & Harris, 2001) little is known about the social development of students with LFA. Additionally, though the research indicates that peer-mediated interventions can promote an increase in social interactions in the form of initiations and responses with peers (Laushey & Heflin, 2000; Owen-DeSchryver et al., 2008), there is a paucity of information regarding the quality of those social interactions. Yet, increasing the quality of the interactions is seen as a necessary component in sustaining long-term friendships of students with autism (Rogers, 2000). Finally, few studies have examined the perceptions of the typical peers participating in peer-mediated interventions. This study attempted to address these gaps in the research by investigating the interactions of students with LFA and their typical peers in a class-wide peer-mediated social skill intervention, and by examining the perceptions of the typical peers through the use of a perception survey and qualitative interviews.

Significance of the Study

This study was important for several reasons. First this study examined a peer-mediated social skills intervention with students with LFA. Recent literature reviews of social skills interventions have revealed that much of the research has been conducted with children with higher functioning autism, and that more research needs to be done with students with LFA (Reichow & Volkmar, 2010; Rogers, 2000). Additionally, the study was important because it used a peer-mediated class-wide intervention in a public school setting during a shared reading activity. Most studies have examined peer-mediated interventions on the playground, in the lunchroom, or during other free choice activities (Harper, Symon, & Free, 2008; Kamps et al., 2002; Laushey & Heflin, 2001; Licciardello, Harchik, & Luiselli, 2008). Few studies have investigated interactions

during more structured academic activities. Finally, this study was important because it examined the role of the typically-developing peer in the peer-mediated intervention. While research indicates that peer-mediated interventions have shown success at improving specific social deficits of children with autism, concerns remain about how to improve the quality of the peer relationship (Owen-DeSchryver et al., 2008; Rogers, 2000). Improving the quality of the relationship requires an understanding of the perspective of the typical peer, and whether that perspective changes through the intervention.

Research Questions

This study addressed the following questions:

1. What is the effect of a class-wide peer-mediated social skills intervention on the social interactions, as measured by initiations and responses, of students with low-functioning autism and typically-developing peers?

2. What are the changes in perceptions of typically-developing second-graders toward their peers with low-functioning autism after participating in the *Reading Buddies* intervention?

3. How do typically-developing second-graders describe the quality of the relationship with their peers with low-functioning autism after participating in the *Reading Buddies* intervention?

Definition of Terms

While there may be some disagreement about the definition of these terms, when reading this study the following definitions should be applied.

Autism: In this study, *autism* was defined per the California Education Code

definition (California Education Code - Section 56846.2), which states a student with autism has as any of the following behaviors, or any combination thereof:

- An inability to use oral language for appropriate communication.

- A history of extreme withdrawal or of relating to people inappropriately, and continued impairment in social interaction from infancy through early childhood.

- An obsession to maintain sameness.

- Extreme preoccupation with objects, inappropriate use of objects, or both.

- Extreme resistance to controls.

- A display of peculiar motoric mannerisms and motility patterns.

- Self-stimulating, ritualistic behavior.

Typically-developing peer: In this study *typically-developing peer* was a student close in age to the target child who was developing according to age appropriate milestones and receiving education in a general education classroom.

Peer-mediated intervention: In this study *peer-mediated intervention* was defined as an intervention in which typical peers were taught to initiate and respond to peers with autism as the instructional treatment (Goldstein, Kaczmarek, Pennington, & Shafer, 1992; Kamps, Leonard, Vernon, Dugan, Delquadri, 1992; Rogers, 2000).

Initiation: In this study *initiation* was defined as any motor or vocal behavior demonstrated by the target child to a typical peer, or a typical peer to the target child, that attempted to gain attention or occasion a response from the other (Banda, Hart, & Liu-Gitz, 2010). Examples of initiations included verbalizing to the other person, looking at the other person's face, touching the other person appropriately (e.g., tapping shoulder,

touching hand), presenting the book to the other person, and pointing to a picture in the book while looking at the partner.

Response: In this study, *response* was defined as any appropriate motor or vocal behavior demonstrated by the target child to a typical peer, or typical peer to the target child, that was preceded by an initiation and occurred within ten seconds of the initiation (Banda, Hart, & Liu-Gitz, 2010). Examples of responses included looking at the other person's face, verbalizing to the other person, smiling at the other person, touching the other person appropriately, and giving a motor response such as nodding head or touching a named picture.

Perception: In this study *perception* was defined as the typical student's regarding, understanding, or interpreting (New Oxford American Dictionary online, 2012) the cumulative interactions with their peer with autism as positive or negative, based on the following (*Autism Peer Perception Survey, author, 2012)*:

- feeling of anxiety about the peer,
- feeling of enjoyment with the peer,
- feeling the peer is similar to self and other friends,
- feeling of helping the peer

Summary

This chapter reviewed the background and need for the present study of a classwide peer-mediated social skills intervention for students with low-functioning autism and typical peers. Vygotsky's social-learning theory was presented as the theoretical framework of the study and a brief review of relevant research was introduced. Research questions for the present study were outlined and important terms

were defined. The next chapter presents a more detailed examination of the literature in the areas of low-functioning autism, inclusion of students with autism, adult-mediated and peer-mediated interventions, as well as peer perceptions.

CHAPTER TWO

LITERATURE REVIEW

Autism is a pervasive developmental disorder characterized by a triad of impairments consisting of deficits in communication skills, deficits in social interaction skills, and the presence of repetitive and restrictive behaviors (American Psychiatric Association, *Diagnostic and Statistical Manual, Fourth Edition, Text Revised*, 2000). Of these three, social impairments are often seen as the defining characteristic of autism (Laushey & Heflin, 2000; Rogers, 2000). These social interaction deficits make it difficult for students with autism to engage in ongoing relationships with typical peers and may impact long-term outcomes as well. Students with autism often have difficulty making friends, leaving them susceptible to teasing and bullying in the school setting. Few adults with autism report having any friends at all and often rely on immediate family members for ongoing social support (Billstedt, Gillberg, & Gillberg, 2011; Howlin, Goode, Hutton, & Rutter, 2004). Most professionals agree that improving social outcomes for this population is of utmost importance and should be an integral part of intervention efforts from an early age.

This chapter reviews the literature for the present study of a social skills intervention for students with low-functioning autism (LFA). The first section examines the characteristics of students with LFA, while the second section investigates inclusion of students with LFA. The third section of the review investigates social skills interventions for students with autism, specifically adult-mediated and peer-mediated interventions. The fourth section looks at the typically-developing peers participating in

inclusive activities with students with autism. The chapter concludes with a summary of factors important to the present study.

Characteristics of Students with LFA

The research literature has well established that students with autism display marked variability in characteristics and symptoms (Ben-Itzchak & Zachor, 2007). Consequently, interventions that work for one group of students with autism may not always work with other students who have autism (Schreibman, Stahmer, Barlett, & Dufek, 2009; Simpson, 2005). Determining which interventions work on which skills, for which group of students with autism, is important for the long-term improvement of this population. The present study investigated students with LFA. Consequently, the review begins with an examination of the characteristics of these students.

The first study related to students with LFA is that of Ben-Itzchak and Zachor (2007) who examined young children with autism for the purpose of determining which pre-intervention characteristics in cognitive, communication, and social interaction influenced post-intervention outcomes in children entering an applied behavior analysis program. The participants in the study were 25 children aged 20-32 months. All participants met the criteria for autism and were assessed on cognitive functioning. In order to determine the effects of intellectual functioning and autism severity on post intervention outcomes, participants were divided on the basis of their pre-intervention IQ scores. Participants who obtained a score of less than 70 points were defined as low IQ scorers (LIQ), and those scoring 70 or above were defined as high IQ scorers (HIQ).

All participants attended a center-based ABA program for one year, which included one-on-one instruction for 35 hours weekly. Significant changes were observed

on six developmental domains after the year of intervention for both the HIQ and the LIQ

groups. Mean IQ scores increased an average of 17.3 points from pre- to post-

intervention for both groups of children indicating both subgroups benefitted from the

intervention and replicating the seminal research of Lovaas (1987). However, the HIQ

group showed greater progress than the LIQ group in receptive language, expressive

language, play skills, and nonverbal communication skills.

To further examine whether specific differences existed between HIQ scorers and

LIQ scorers, Pearson correlations were performed between participants' *Autism*

Diagnostic Observation Scale (Lord, Rutter, DiLavore, & Risi, 1999) subtest scores and

IQ scores. The Pearson correlations yielded a significant negative correlation between

the subtest scores of reciprocal-social interaction and intellectual functioning ($r = -.61$,

$p < .01$). Higher IQ scores correlated with fewer deficits in social interaction. Students

with lower cognitive functioning were found to have fewer social interaction skills even

after a year of intervention. While both HIQ and LIQ participants showed improvement

in cognitive functioning through the course of the study, overall results indicate that

children with higher initial IQ scores and children with fewer social interaction deficits

showed better acquisition of developmental skills across the six domains.

Few studies have compared outcomes for both HIQ and LIQ students with autism.

For students with LFA these results are important because they show that interventions

that work for students with high functioning autism may not result in the same outcomes

for students with LFA. The results are also indicative of the greater difficulties students

with LFA have with social interaction skills. Because so few studies have targeted social

skills interventions for students with LFA even though these students have been shown to

display greater social deficits than students with high functioning autism, the Ben-Itzchak and Zachor study was significant for its inclusion of students with LFA as participants. Outcomes from the study indicate that there remains a critical need to find interventions that result in improved social outcomes for this subgroup of students, making the present study important as a potential source of new information on effective interventions for students with LFA.

In a related study, McGovern and Sigman (2005) examined long-range outcomes of 48 older participants with autism having a mean age of 19 years. The participants were part of a longitudinal study to determine whether the diagnosis of autism remained stable over time and whether or not symptoms improved. In this final phase of the longitudinal study researchers investigated whether students with autism who were more involved with their peers in the mid-school years would make greater gains in adaptive behavior and be more socially engaged in young adulthood.

Parents reported improved symptoms from mid-school years to young adulthood on the social and repetitive interests domains of the *Autism Diagnostic Interview-Revised* (Lord, Rutter, & Couteur, 1994) and on the daily living and socialization domains of the *Vineland Adaptive Behavior Scale* (Sparrow, Balla, & Cicchetti, 1984). In order to assess whether changes in symptoms over time differed with cognitive functioning level, the participants were grouped on the basis of IQ scores, with IQ $\geq$ 70 comprising the high IQ group and IQ < 70 comprising the low IQ group. Participants in the high IQ group demonstrated larger reductions in social impairments, larger reductions in verbal communication impairments, and larger reductions in repetitive and stereotyped behaviors than the low IQ group. High IQ scorers also gained significantly more months

in adaptive behavior than low IQ scorers. Overall parents reported improvements in adaptive behavior with fewer symptoms identified in young adulthood than they remembered their children displaying at a young age. However, much of the improvement in adaptive behavior was confined to persons with high functioning autism.

To examine how involvement with peers in the mid-school years may have impacted long-term outcomes in social interactions, Pearson correlations were conducted using playground observations and adaptive behavior composite scores on the *Vineland Adaptive Behavior Scale* in the young adult years. Even after controlling for IQ, the researchers found that the percentage of time spent engaged with peers in high level play in the mid-school years positively predicted gains in adaptive behavior in the later years on overall composite scores ($r = .51$), communication scores ($r = .52$), and socialization scores ($r = .56$).   These scores indicate moderately strong correlations, leading the researchers to conclude that increasing peer engagement for students with autism in the school setting holds the potential for improving long-term socialization and adaptive behavior outcomes.

The results of this study are similar to the results of the Ben-Itzchak and Zachor (2007) study in that older teens and young adults with LFA displayed more social interaction deficits than persons with high functioning autism. Participants with LFA demonstrated fewer improvements in adaptive behavior overall indicating their symptoms did not abate as much as students with high functioning autism. McGovern and Sigman went a step further in their study however, and found that even after controlling for IQ, time engaged with peers in the mid-school years led to improved social outcomes in the young adult years. This finding is extremely important to the

present study because even though students with LFA have been found to have more social deficits than students with high functioning autism it appears that those deficits can be ameliorated to some degree by increasing time spent with typical peers. The present study becomes important then for its potential to improve the long-range outcomes of the participants with LFA because it included time with typical peers as a key component of the intervention.

In a final study of students with LFA, Maljaars, Noens, Jansen, Scholte, and van Berckelaer-Onnes (2011) investigated the differences in rate and proportion of communicative functions and communicative forms in students with LFA and typically-developing students. Fifty-two students were participants in this study with twenty-six diagnosed as students with LFA. Each student with LFA was matched to a student with typical development based on nonverbal mental age. Participants were assessed using the *Communication and Symbolic Behavior Scales–Developmental Profile Sample* (Wetherby & Prizant, 2002), which looked at spontaneous communicative behavior during activity play sessions (balloon play, bubble play, wind-up toy). The play sessions were videotaped and scored on form and function of communicative acts.

Results of the study indicated that students with LFA communicated significantly less often than the typically-developing students for all communicative functions except those coded as unclear function. When students with LFA did communicate it was more often to regulate the behavior of others and less often for social purposes, whereas in typically-developing students the proportion of communicative acts for social purposes, such as joint attention, was much higher than for behavioral regulation.

When dividing the students with LFA into verbal and nonverbal communicators, almost half of the nonverbal group communicated only for behavior regulation, whereas students with LFA in the verbal group and typically-developing students used all three communicative acts. In general, students with LFA communicated at a significantly lower rate than typically-developing children, indicating decreased opportunities for social interaction.

Communication acts for social purposes appeared to be highly correlated to overall language ability in students with LFA. Students with LFA displayed few if any attempts to communicate for social interaction or joint attention. Typically-developing children, however, were able to communicate for social interaction and joint attention quite substantially even before they had developed language. Nonverbal students with LFA had the most restrictive communicative acts with the least ability to access social interaction.

The Maljaars et al. study results support the need for interventions that emphasize communication as interaction with others rather than only targeting increasing communicative forms and length of utterances for students with LFA. Typically-developing children were shown to engage in social communication before their use of language had developed whereas students with LFA rarely engaged in social communication even after language developed. Social outcomes appear to be related then to social communication and communicative intent of social interaction partners. Consequently, increasing the social interactions of students with LFA by including them with typical peers for a social skills intervention aimed at increasing communicative intent between the social partners is an important aspect of the present study. The

increased social interaction between the students with LFA and the typical peers is important to improving the social outcome of the students with LFA.

Each of these studies illustrate that students with LFA display more social interaction deficits than students with high functioning autism and typically-developing students (Ben-Itzchak & Zachor, 2007). Students with LFA exhibited less communication overall for social interaction and more for behavioral regulation than students with high functioning autism and typical development (Maljaars et al., 2011). Preschool students with LFA displayed fewer gains in social interaction than students with high functioning autism after a year of intensive intervention (Ben-Itzchak & Zachor, 2007). Young adults with high functioning autism demonstrated larger reductions in social impairments than young adults with LFA (McGovern & Sigman, 2005). Even when controlling for IQ, students who displayed high-level play with peers on the school playground in the middle childhood years exhibited greater gains in adaptive behavior as a young adult (McGovern & Sigman, 2005). Finally, interventions aimed at increasing communication for social interaction between partners rather than just increasing functional communication was deemed important for improved social outcomes of students with LFA (Maljaars et al., 2011).

Students with LFA display more deficits in social interaction when compared to higher functioning students with autism, yet the literature reveals few social skills interventions specifically targeted to this subset of the population. Improving the social interaction of students with LFA is critical to the long-term success of these students. The present study employed an intervention that aimed to increase not only the time students with LFA spent engaged with typical peers, but also aimed to increase the

communicative interactions between the typical peers as communicative partners with the students with LFA, ultimately improving the social outcomes of the students with LFA.

Inclusion

Students with LFA have been shown to display significant social skills deficits, especially when compared to students with high functioning autism and typically-developing students, yet there is some indication that time spent with typical peers in the school setting can lead to improved social outcomes (McGovern & Sigman, 2005). The potential for improved social outcomes has lead many professionals and parents alike to advocate for educating students with LFA in inclusive settings. This section of the review examines the impact of inclusion on the social outcomes of students with LFA.

The first study in this section is that of Boyd, Conroy, Asmus, and McKenney (2011), who examined the social interactions of young students with autism and their typical peers within their classroom settings. The participants in this study were eight students with autism ranging in age from 3 years to 5 years 10 months. Two students were served in self-contained special education settings while the remaining students were served in inclusive classrooms.

Observations of social behaviors between the target children and classroom peers were conducted in the classrooms during naturally occurring activities. The observation categories were defined as social initiations, social responses, and duration of social interactions. Outcomes of behavior were also recorded. Additionally, overall rates of social initiations, responses, and interactions were calculated for each participant by dividing frequency of observation events by total time observed.

Results of the study indicated considerable variation across participants and across settings. Participants in self-contained preschool classrooms initiated at rates of 0.10/min and 0.07/min and responded at rates of 0.05/min and 0.16/min. Participants in inclusive preschool classrooms initiated at rates of 0.17/min, 0.03/min, and 0.22/min and responded at rates of 0.31/min, 0.06/min, and 0.10/min. Participants in inclusive kindergarten classrooms initiated at rates of 0.02/min, 0.07/min, and 0.16/min and responded at rates of 0.20/min, 0.07/min, and 0.16 min. Students engaging in the highest percentage of interaction time were served in inclusive settings and the student engaging in the lowest percentage of interaction time was served in a self-contained special education setting.

The outcomes of social initiation indicated some differences related to setting. For the two participants in self-contained preschool settings outcomes of initiations were most often for attaining adult attention followed by obtaining a tangible item. For participants in inclusive settings the most often observed outcome for social initiation was access to a tangible item or peer attention. Outcomes of social response were also highly variable to individuals. One participant in the self-contained special education preschool responded to peer initiation with escape 100% of the time, yet the other participant responded to initiation using a variety of outcomes. For participants in inclusive settings most of the responses to peer initiations were obtaining tangible items and peer attention.

Results of the study indicated a noteworthy difference in social interactions between the two settings. Social interaction outcomes of the participants in the self-contained setting were rarely observed to be for obtaining peer attention. This may have

been because the other students in the self-contained classroom were also students with

disabilities and may not have had the skills to engage in peer interaction themselves.

This result would seem to strengthen the argument for placing students with autism in

inclusive settings though the small number of participants in this study is somewhat

limiting. The researchers did not address why students were placed in their respective

classroom settings in the first place, which may have led to some differences.

Nevertheless, the improved outcomes for students in inclusive settings cannot be

overlooked, and are important for the present study, which included students with LFA

with typical peers for a shared reading activity.

More specifically, results of the Boyd et al. study indicate that the participants in

the present study who were placed in self-contained settings would likely not be seeking

peer attention and peer interaction as often as other students who are included with

typical peers, compounding the social deficits they already display. By including the

participants with LFA with typical peers, the present study increased the potential that the

students with LFA would seek out peer attention and peer interaction with more socially

competent partners resulting in improved outcomes. The present intervention intended to

engage the more socially competent typical peers and the students with LFA in social

initiations and social responses that would not normally take place in the self-contained

setting, thereby improving social outcomes for the students with LFA.

In a related study comparing inclusive and special education settings, Lyons,

Cappadocia and Weiss (2011) investigated the impact of setting on the social

characteristics of students with autism.   The researchers hypothesized that students with

autism in full inclusion settings would exhibit more social competence and better quality friendships than students with autism in non-inclusion settings.

Participants of this study were parents of 146 students with autism ranging in age from 6 to 12 years recruited via online postings on local and national autism websites in Canada. Eighty-one percent of the sample indicated their students with autism were educated in full inclusion settings. Parents in the sample tended to be highly educated with over 83% indicating college degrees and reporting high annual incomes.

Parents rated the socialization of their children using a researcher developed parent perception instrument, consisting of behavioral statements (e.g. "my child plays with other students"), which parents rated on a 5-point Likert scale. Higher scores on the perception scale indicated greater social competence. Parents were asked how many friends their child had both in school and in other settings, and were also asked to rate the quality of those friendships on a single item 5-point Likert scale. Parents additionally rated the severity of their child's autism symptoms using the *Autism Spectrum Quotient* (Auyeung, Baron-Cohen, Wheelwright, & Allison, 2007), and the presence of problem behaviors using a behavior rating scale. Parents provided information about whether their child was primarily educated in a full inclusion or special education setting, and whether or not they had additional school supports such as behavior therapists or full or part-time educational assistants.

Results of the study indicated that students with autism in full inclusion settings displayed greater social competence and more friends than students in settings other than full inclusion, as reported on the researcher developed parent perception instrument. Regression analyses revealed that greater severity of autism symptoms was associated

with less social competence and poorer friendship quality. Older age and more problem behaviors were associated with fewer friends outside the school setting. Even after controlling for autism severity and age, students with autism in full inclusion settings displayed greater social competence than students in non-inclusion settings.

Although the researchers of this study did not address how the students with autism were placed in full inclusion or non-inclusion settings, they suggest that students with autism in full inclusion settings may have displayed better social competence because of their exposure to typical peers who themselves displayed greater social competence. Students with autism in non-inclusion settings spent most of their time around peers that displayed limited social competence. Results of the study also showed that students with autism in full inclusion settings had more friends, which may have been because of the continued close proximity to typical peers.

A major limitation of this study is that parents reported the data at a single point in time. There was no attempt to conduct pre/post analysis, making it difficult to know whether the students with autism served in full inclusion settings displayed greater social competence prior to being placed in their current setting or whether greater social competence was something that was acquired as a result of being placed in the full inclusion setting. Additionally, there were no direct observational measures of student behavior that may have indicated more or less social competence.

The parents in the study tended to be highly educated and enjoyed a relatively high annual income, which may have influenced their ability to access additional services for their child with autism, and may not have been indicative of the population of parents of students with autism as a whole. Though this study by Lyons, Cappadocia, and Weiss

is not without limitations, it does contribute to the relatively sparse base of empirical research examining social outcomes of students with autism in full inclusion and non-inclusion settings. Despite the fact that inclusion of students with autism with general education peers is thought to be important there is a surprising lack of empirical research examining outcomes of the two settings.

Results of the Lyons et al. study are important to the present study of students with LFA who were served in self-contained settings. Because these participants were in self-contained settings they had limited opportunities to be around typically-developing peers, which in turn limited their access to friendships. Lyons, Cappadocia, and Weiss found that students with autism in full inclusion settings had more friends than students with autism in non-inclusion settings and displayed better social competence overall. The present study included the participants with LFA with their typically-developing peers giving them access to more socially competent peers and increasing their social interactions through the *Reading Buddies* intervention. By grouping the students with LFA with the typical peers over the ten-week intervention, the potential increased for friendships to form between the students with LFA and the typical peers. The improved quality of the friendships in turn held potential for ultimately improving the social outcomes of the students with LFA.

Though placement of students with autism in inclusive settings has generally been advocated as beneficial for both the student with autism and the general education peers, some professionals have expressed concern that the presence of such high need students in the general education classroom may negatively impact the academic achievement of the general education students. To investigate this concern, McDonnell et al. (2003)

studied the effect of students with developmental disabilities in general education classrooms. The purpose of the study was to examine the performance of elementary students with developmental disabilities enrolled in general education classrooms on measures of adaptive behavior, and to compare the performance of typical students enrolled with and without the students with disabilities on a criterion referenced assessment.

Five elementary schools from four school districts located in rural, urban, and suburban areas were involved in the study. Fourteen students with developmental disabilities from these five schools were selected as participants in the study. Participants were in grades first through fifth and were enrolled in inclusive age appropriate classes. Participants were identified with disabilities as follows: five with developmental disabilities, five with intellectual disabilities, three with multiple disabilities, and one with autism. All participants had IQ scores < 80. Participants spent from 67% to 100% of the school day in the general education classroom.

Participants without disabilities were divided into two experimental groups, a total of 324 students constituted the inclusive classrooms of the 14 students with disabilities (one per class) and 221 students constituted the comparison classes at the same grade level without children with disabilities. Heterogeneous groupings were used to compose the general education classes; however, students with developmental disabilities were hand-placed in the classrooms based on special education teacher and principal recommendations.

The *Scale of Independent Behavior-Revised* (*SIB-R*; Bruininks, Woodcock, Weatherman, & Hill, 1996) was used to assess adaptive behavior, including social

interaction and communication skills, for students with developmental disabilities, and the *Utah Core Assessment* (Utah State Office of Education, 1999) was used to assess students without disabilities in the areas of reading/language arts and math. The special education teacher completed the *SIB-R* each May with the students with disabilities and the *Utah Core Assessment* was administered each spring to all elementary students.

Two quasi-experimental designs were used in the study. A pretest – posttest design was used to assess performance of the students with disabilities, with the assessment in May being the pretest for the following May posttest. A posttest only control group design was used for the participants without disabilities. Results of the study indicated that 13 of the 14 students with disabilities made improvements in their adaptive behavior as evidence by improved scores on the *SIB-R* with significance at the $p = .001$ level.

Including students with disabilities with typically-developing students appears to have had a positive impact on adaptive behavior for these participants. Social interaction and the ability to socially communicate with others are important components of adaptive behavior and indeed make up one of the four subtests of the *SIB-R*. Improvements in overall adaptive behavior suggest improvements in social interaction as well. Although only one of the participants was identified as a student with LFA, all participants had similar cognitive functioning scores. Time spent with typical peers in the inclusive setting improved adaptive behavior for the student with LFA lending additional importance to the present social skills intervention which included students with LFA with typical peers.

Additionally, achievement scores of non-disabled students in classrooms with and without students with disabilities were compared and no significant differences were found between the two groups on either reading/language arts or math scores, indicating that the inclusion of students with disabilities did not in fact negatively impact the academic achievement of students without disabilities. The positive results of this study suggest that the inclusion of students with LFA in the shared reading activity for the present study could take place without negatively impacting the academic achievement of the students without disabilities.

The literature reviewed in this section both lends support to the present study by highlighting the importance of including students with autism with typical peers, and points to a significant gap in the research literature involving the inclusion of students with LFA. Students with autism in inclusive settings were found to use social interactions to access peer attention more often than students in self-contained settings (Boyd et al., 2011), were found to have more social competence and more friends than students with autism in special education settings (Lyons et al., 2011), and were found to impose no detrimental effects on the academic achievement of the general education students in the inclusive classroom (McDonnell et al., 2003). Students with autism in inclusive settings evidenced better social outcomes than students in non-inclusive settings (Lyons et al., 2011), supporting the inclusion of students with autism with typically-developing peers. The present study held potential for increasing the social interactions of the students with LFA by including them with students who had better social competence rather than isolating them with students with similar social deficits as themselves.

Increasing the social interactions between the two groups of participants in turn increased the potential for establishing friendships and in turn improving long-term outcomes.

The studies reviewed are also indicative of a significant gap in the literature regarding the inclusion of students with LFA. While the studies presented did include students with autism, not all were designated as students with LFA. Many were participants with high functioning autism, and some were students with developmental disabilities other than autism that would not necessarily have had the same social deficits as students with LFA. Students with LFA generally display more social interaction deficits than students with high functioning autism, contributing to their exclusion from inclusive settings, and leading to the scarcity of data collected with this population. There remains a need to examine interventions specifically with students with LFA included with typical peers not just students with high functioning autism, especially given that students with LFA and high functioning autism do not respond to interventions in the same way. The present study employed students with LFA as participants and included these participants in a social skills intervention with typical peers, which aimed to improve the social outcomes of students with LFA.

Social Skills Interventions

The literature reviewed thus far has examined characteristics of students with LFA and the inclusion of these students with typical peers. The studies have demonstrated that students with LFA display more social skills deficits than students with high functioning autism and students in inclusive settings demonstrate improved social outcomes over students in special education settings. An area not yet addressed in the review is that of specific social skills interventions for this population. The unique social

deficits of students with autism often necessitate specific interventions to improve social outcomes and increase interactions between students with autism and typical peers (Myles, Simpson, Ormsbee, & Erickson, 1993), making social skills interventions an important part of educational programming for these students (Bellini et al., 2007). This next section of the literature review investigates interventions targeting specific social skills for students with autism.

Adult-Mediated Interventions

Early attempts at increasing the social skills of students with autism were largely centered on adult-mediated interventions. Adult-mediated interventions rely on adults to prompt interaction and deliver reinforcement in an effort to increase the social skills of participants with autism (Weiss & Harris, 2001). This section will review three studies using adult-mediated interventions. Because adult-mediated interventions have been indicative of some of the field's first attempts at improving the social skills of students with autism, one slightly older study is presented in this section of the review.

In the first study, Gonzalez-Lopez and Kamps (1997) examined the effect of social skills training combined with a reinforcement procedure on the social behavior of elementary school aged students with autism and typical peers. The participants were four students with autism, aged five to seven, receiving services in a self-contained special education classroom and 12 typical peers. The students with autism displayed limited communicated skills and some inappropriate behaviors.

Experimental group sessions consisted of four students and one teacher who led a social skills training for ten minutes followed by 10 to 15 minutes of playtime. The social skills training was made up of direct instruction on five social skills: (a) using greetings,

names, and conversation skills, (b) imitating and following directions, (c) sharing and turn taking, and (d) asking for help and requesting items. Twenty-five toys were selected as play materials and were rotated throughout the study. Reinforcement consisted of stickers and star charts.

The design of the experiment consisted of baseline, social skills training, social skills training plus reinforcement, return to baseline, and return to social skills training plus reinforcement. Intervention phases consisted of ten minutes of social skills training followed by ten minutes of playtime. During the training session participants sat at the table with the teacher who reviewed previous skills learned, introduced the new skill, modeled the new skill, and had the participants practice the skill together for the remainder of the ten minutes. During the play session the teacher prompted the students to respond. When reinforcement was added the teacher gave verbal feedback and assigned stars to a star chart for appropriate interaction. The dependent variables in this study were the frequency and duration of social interaction between the students with autism and typical peers, the use of the specific social skills during the play session, and the occurrence of disruptive behavior.

Results of the study indicated that the social skills training with reinforcement increased the frequency of interactions as well as duration of interaction time for the students with autism. Social skills training with reinforcement resulted in the largest gains for these participants. Frequency of interaction was highly variable for the peers. Some students showed increases from baseline to training plus reinforcement and others showed decreases. All of the participants with autism showed increases on some social skills (e.g., greetings, following instructions given by peers) but not on others (e.g.,

asking for help and offering help, asking for materials and giving materials to others). Inappropriate behaviors did not show substantial change through the course of the study for participants with autism or typical peers.

Peers' use of specific behavior management skills was generally observed to increase after training, though some skills were not observed at all. Peers showed general increases in giving simple directions and prompting and redirecting. However few instances of praising were observed, and some peers were never observed to offer praise throughout the entire study.

While this study did show that students with autism made improvements in some skill areas, not all skills improved. Additionally, not all participants with autism showed consistency in predicted direction across intervention phases, highlighting some of the difficulties students with autism have with applying skills learned in adult-mediated interventions, namely that skills taught by adults do not always transfer to use with peers. The study is both notable to the field and important to the present study in that it did employ a social skills intervention with students with LFA. However, the present study employed a peer-mediated intervention to address the concern with skill transfer in this adult-mediated intervention. Additionally, the inappropriate behaviors displayed by the students with LFA may have impacted not only the participants' ability to acquire appropriate social skills, but also the peers' ability to interact appropriately.

The intervention phase that showed the most consistency was the phase that included social skills training with reinforcement. Reinforcement appeared to be a critical factor in increasing both the frequency and duration of interactions, especially for the participants with autism. The saliency of the social skills deficits in these students

makes it unlikely that they would naturally acquire appropriate social skills without the use of reinforcement making it important that interventions aimed at increasing the social skills of this population make use of reinforcement as an integral component. The present study incorporated the use of reinforcement for both the participants with autism and the typical peers as part of the social skills intervention.

In a later study of an adult-mediated intervention, Licciardello, Harchik, and Luiselli (2008) investigated a social skills intervention for three boys and one girl diagnosed with autism, aged six to eight years old. All participants received instruction in general education classrooms, had acquired learning readiness skills, had verbal skills, could communicate functionally to make verbal requests, and could ask for information when needed. All participants were identified as interacting with peers infrequently.

The study used a multiple baseline design across participants. Baseline consisted of observations during the regular recess period, with neither the participants with autism nor the typical peers given any instruction in how to play or what to do. Observation and data collection took place at random 4.5-minute intervals during the play session.

The study targeted initiations and responses during regularly scheduled play sessions at the school with teaching assistants implementing the intervention. At the beginning of each play session (i.e., recess) the teaching assistants had participants select a toy or activity, as well as the peers they wanted to play with. The participant and teaching assistant reviewed how to ask peers to play. The teaching assistant also told participants they would earn a reward for appropriate play.

During the intervention phase teaching assistants prompted participants to initiate interactions if more than one minute had elapsed without an initiation. The teaching

assistant acknowledged and praised the participant each time he/she initiated an interaction. At the end of the play session the participant was given a tangible object or preferred activity if he/she had at least one initiation. The criteria for earning a reward was kept deliberately low so that the participants would earn a reward every time.

The key components of this adult-mediated intervention included pre-teaching, prompting, and rewards. All participants showed increases in both initiations and responses from baseline to intervention though one participant had only two data points taken during intervention and there were some overlapping data points. The components of the intervention were not assessed separately so it is difficult to know whether one component contributed more to the increase in social skills than others, but it is clear the components together were important to the increase in skills of the students with autism. The researchers did not address attempts to fade the adult prompting of initiations, an oft-cited limitation of adult-mediated interventions.

The intervention and data recording were carried out with relative ease by the teaching assistants making a notable contribution toward using school based personnel rather than clinical staff infused in a school setting. However few sessions of inter-observer agreement data were recorded.

The present study similarly targeted initiations and responses between students with autism and typically-developing peers during a social skills intervention with observations taking place at random intervals during the observation period. Pre-teaching and reinforcement were important components of the Licciardello et al. intervention and were instrumental for the present study as well. Additionally, the present study used

trained school staff to record the data and was able to increase the collection of inter-observer agreement data points.

One final adult-mediated intervention reviewed in this section is that of Banda, Hart, and Liu-Gitz (2010).   The purpose of this study was to increase social initiations and responses of students with autism and typical peers during center time activities in a general education kindergarten classroom. The participants in this study were two kindergarten students with high functioning autism and six typically-developing students. The study took place in the two kindergarten classrooms of the participants with autism.

The center time activities consisted of small group activities to reinforce the academic concepts taught in math, language arts, and writing. Observations for the study took place during those activities that included cooperative play or shared materials. Observations were recorded for one ten-minute interval during center time activities two to three days per week on the dependent variables of initiations and responses, using a multiple-baseline design.

The intervention was implemented by the researcher and was also composed of pre-teaching and prompting as in the previous study. Intervention began with a four to five minute training session that occurred before the data collection period and adult prompts that occurred during the data collection period. During the training sessions participants were taught to ask and answer questions with their peers. The researcher first modeled the behavior and then prompted each participant to display the behavior. If any participant was unable to independently ask or answer a question the researcher modeled and prompted a correct response.

The second part of the intervention took place during the data collection sessions when the researcher prompted participants and peers to ask questions and answer questions of each other whenever five seconds had elapsed without conversation. A trained graduate student recorded data during the sessions. As in the previous study, components of the intervention included pre-teaching, prompting and reinforcement though reinforcement was limited to verbal praise from the researcher.

Results of the study showed clear increases in both initiations and responses for both participants when intervention was implemented, with no overlapping data points. Inter-observer agreement was collected on 23% to 29% of sessions for each participant. Attempts at fading adult prompts were not addressed. Adult-mediated interventions with students with autism have caused concern because of the potential of leading to dependency on the adult for interaction, and as such, continued prompting of interactions by the investigator could be considered a significant limitation of the study.

This study was notable in its use of a social skills intervention during an academic activity. This study took place during a semi-structured academic activity within the classroom, whereas most other social skills interventions rely on free-play settings for their intervention. Additionally, the study made extensive use of modeling during the pre-teaching portion of the intervention. Modeling appropriate behaviors is thought to be especially important for students with autism, which likely lead to increased target behaviors for the participants with autism.

The present study drew on several aspects of the social skills intervention developed by Banda, Hart, and Liu-Gitz. The present study was meant to increase the social initiations and responses of students with autism and typical peers during a semi-

structured academic activity rather than a free-play setting. Few studies have attempted to address social interactions during classroom activities outside of lunch and recess and the present study aimed to fill that gap. Additionally, the present study incorporated modeling of appropriate interactions in the pre-teaching portion of the intervention.

The studies of adult-mediated interventions reviewed in this section have shown increases in the social interactions of students with autism when participating with typical peers in structured play sessions (Gonzalez-Lopez & Kamps, 1997), recess activities (Licciardello et al., 2008), and center-time activities in a kindergarten classroom (Banda, et al., 2010). The adult-mediated studies largely relied on pre-teaching, prompting, and reinforcement as essential components. However, the studies did not address how the adult prompting would eventually be faded, indicating a significant limitation of using adult-mediated interventions. Without adequate measures to withdraw prompting adult-mediated interventions risk students with autism becoming dependent on adult prompts to maintain skills (Rogers, 2000; Weiss & Harris, 2001). Adult-mediated interventions should incorporate a specific plan to fade dependency on adult prompting.

The studies of adult-mediated interventions also incorporated modeling of appropriate target social skills during the pre-teaching phases. Though the interventions did not analyze individual components of the training, it is likely that the modeling of social skills contributed to increases in social interaction of the students with autism. The modeling of appropriate social skills appears to be significant to the development of the skills in the students with autism and lends support to the present study, which incorporated modeling of appropriate skills into the intervention.

Peer-Mediated Interventions

Peer-mediated interventions are those in which typically-developing students model and reinforce appropriate social behaviors for students with autism. Typical students may be taught specific strategies for eliciting participation and may also be reinforced for their efforts.

The first study reviewed in this section is that of Kamps et al. (2002) who implemented two studies that examined the role of peer training to increase the participation of students with autism in inclusive settings. The first study investigated the effects and generalization of three conditions, a cooperative learning group, a social skills group, and a control group. The design of the study was a single subject reversal design, consisting of a no treatment baseline and either social skills or cooperative learning group interventions. Social interaction behavior probes were also used to assess for maintenance and generalization to untrained settings.

The dependent variables in this study were frequency, mean length of interaction, and duration of interactions. Peers were divided into three groups: cooperative learning groups with students with autism, social skills groups with students with autism, and peers familiar with the student with autism but who had not undergone any type of training.

Participants were five students with autism and 51 general education peers. Two participants with autism participated in cooperative learning groups, two in social skills groups, and one in a mainstream art class. Fifteen fourth-graders participated in cooperative learning groups while 17 third graders participated in social skills training.

Ten additional students participated as the control group and were enrolled in an art class in which the final participant with autism was mainstreamed.

In the cooperative learning group, peers were taught to tutor partners in vocabulary words and fact acquisition from the social studies curriculum. They were also taught the steps necessary to complete a team activity, responsibilities for group roles, and social skills for working in groups. In the social skills groups, peer training focused on initiating and responding to peers, cooperating with peers, and engaging in positive interactions during play activities. Pre- and post-intervention social behavior probes were conducted to assess generalization with all three groups.

Results of the study indicated that both the cooperative learning groups and the social skills groups increased the amount of time students with autism engaged with typical peers over baseline. Increases were seen in both frequency and mean length of interaction time. Cooperative learning groups increased interaction time from less than 30 seconds to over 190 seconds in a five-minute probe, while social skills groups increased interaction time from seven seconds to over 200 seconds. Generalization probes resulted in cooperative learning groups increasing interactions by more than three times the baseline levels, and the social skills groups increasing interactions by two times over baseline levels. The control group (mainstream art) increased interactions by 50% over baseline levels. The researchers hypothesized that the cooperative learning groups may have shown greater increases in interactions because the intervention included instruction in both academic and social skills necessary for the activity and because the highly structured nature of the academic activities required more consistent interactions than the less structured free-play period of the social skills interventions.

Results of this study lent support to the present study of a peer-mediated social skills intervention that used the structured academic activity of shared reading as a means to facilitate the social skills intervention. The present intervention consisted of an academic and social component, which may have lead to greater increases in social interaction than an intervention involving only free-play periods.

The second part of the study was a three-year follow-up study. Thirty-four students with autism participated in this study ranging in age from 7 to 14 years old. One hundred thirty peers participated in videotaped probes in the first year and 120 in the third year.   Peers were categorized as either trained peers (participated in peer-mediated intervention), familiar peers (knew the student but was not trained) or stranger peers (did not know the student). Four dependent variables were identified: duration of social interaction, reciprocal interactions (e.g., turn taking, giving or receiving materials, initiating and responding) appropriate toy play, and on-topic verbalizations. Generalization probes consisted of 15-minute probes in which a student with autism and four peers were seated at a table with toys and games and played with the materials for 10 minutes.

Three behaviors showed increases over time with trained peers: duration of interaction, reciprocal interaction, and on-topic verbalizations. Increases were also seen with familiar peers on two of the target behaviors, duration of interaction and reciprocal interaction. The target behaviors were seen with much less frequency for stranger peers. Analysis of variance across all probes showed statistically significantly different effects by peer group condition for durations of social interaction. Pairwise comparisons showed

higher duration of interaction times and more reciprocal interaction for the students with autism and trained peers, than with familiar peers and stranger peers.

General findings of the study indicated that students with autism who participated in multiple peer-mediated interventions improved social interactions with their typically-developing peers. Strategies that used modeling, prompting, and reinforcement, and those that included multiple peers over time showed increased interaction skills for students with autism. Results of the study point to modeling and reinforcement as critical components of peer-mediated social skills interventions adding support to the present study.

The researchers make a recommendation for future studies that has not been addressed up until this point in the literature, namely, that of including evidenced-based instructional practices already embedded in the academic component of the intervention into the social skills intervention, specifically the use of visual cues. The use of visual cues has not been mentioned as a component of peer-mediated interventions though it is often used as an effective strategy for students with autism. The present study incorporated the use of visual cues through the use of a picture chart depicting the steps of the intervention, which is thought to be particularly important for the effective use of the skills by the students with LFA.

The next peer-mediated study presented is that of Owen-DeSchryver, Carr, Cale, and Blakeley-Smith (2008), who examined the social interactions between students with autism and typical peers in inclusive settings during lunch and recess using a multiple baseline design. Three male students with moderate to high functioning autism were identified as participants, two fourth-grade students and one second-grade student. Four

typical peers were chosen from each of the fourth-grade target student's classrooms. Two sets of typical peers were chosen from the target second-grade student's classroom. The first set of second-grade peers was a group of two boys, but after unsuccessful attempts was switched to three girls.

Baseline sessions consisted of observing the target students with autism and schoolmates during lunch and recess and recording social interactions. Peer training took place in three phases. In the first phase typical students were provided a rationale for developing friendships with students with disabilities. For the second-grade peers training included reading a book about a boy with autism and his friend in an inclusive classroom. The book described strategies the classmates used to include his friend with autism. For the fourth-grade peers this included identifying different types of relationships, e.g. family members, close friends, acquaintances, etc. The second phase of the training consisted of a discussion about the strengths and preferences of the classmate with autism as well as participants' own strengths and weaknesses. In the third phase of the training the typical peers were involved in a guided discussion on ways to get the target student with autism to play. Students also made a friendship book to review skills learned.

At the completion of the training sessions data were again recorded during lunch and recess on the interactions between the target students with autism and the typical peers. Data were also collected on untrained peers. The duration of the lunch and recess periods were recorded in order to determine rates of interaction. Target behaviors for observation were initiations and responses.

Results of the study indicated that peer initiations and responses increased toward participants with autism after intervention training. Though the intervention did not specifically target untrained peers, initiations increased for this group as well. Initiations by students with autism also showed some increase for two of the three participants. The fact that the first group of peers for the third target student were not suitable for the intervention highlights the complexity of determining which interventions are not only suitable for which students with autism but for which typically-developing students as well.

An interesting finding from this study was that untrained peers increased their initiations and responses to peers with autism after the training sessions. It is unknown how many of the untrained peers were classmates of the trained peers or whether there was any discussion of the training topics between trained and untrained peers. Nevertheless, it illustrates an added benefit of training even a few typical students in a classroom that includes a student with autism.

This study makes use of an intervention component in which the second-grade students were read a book about a student with autism and his friend in an inclusive classroom; a component that had not been identified in other studies in the review. The storybook reading is thought to be beneficial in explaining the disability of autism to the younger typically-developing students without drawing undue attention to the target students. Providing information about autism appropriate to the developmental level of the typically-developing students is important to their understanding of behavioral differences and their willingness to engage with peers with autism. The present study

incorporated a similar storybook reading in the pre-intervention phase study, as well as a discussion about the ways in which friends are alike and different.

The final study in this section is that of a class-wide peer-mediated intervention conducted by Laushey and Heflin (2000). The purpose of this study was to determine if a peer-initiated procedure taught to all peers in a kindergarten class would yield more effective peer involvement in social interaction than a proximity approach. The study was conducted in two separate kindergarten classes each containing a student with high functioning autism.

A reversal design was used alternating baseline and intervention phases. Baseline was considered the passive proximity stage in which students were told simply that it was time to play. The intervention phase consisted of assigning each student a different buddy every day. In this manner all students had an opportunity to buddy with all other students in the class. When it was time to play students were instructed to check the chart to find their buddy for the day.

The intervention started with a peer-training procedure. During the peer-training procedure the researcher and the teacher talked with the students about ways in which friends were alike and different and explained the buddy chart to the students. The researcher instructed the students on three steps to carry out when they were playing with their buddy: *stay with your buddy, play with your buddy, and talk to your buddy.* The researcher explained that buddies should stay together and take turns playing what each person liked to play, and reminded the students that buddies should talk to each other while they were playing. The researcher informed the students that buddy pairs

following the buddy procedure would be able to put their name in a box for a drawing to receive a special treat.

The dependent variables in this study were asking for an object and responding appropriately, appropriately getting the attention of another, waiting for a turn appropriately, and looking at or in the direction of the person speaking. Data were collected for a ten-minute interval once every ten days with baseline data collected for 4 weeks, followed by intervention for 11 weeks, six-week return to baseline and another seven weeks of intervention.

Results of the study indicated that the buddy program was more effective in promoting appropriate social skills than the passive proximity phase. Social skills performance improved from a baseline of 29% of opportunities to 75% of opportunities for student one and from 28% of opportunities to 66% of opportunities for student two. Both students showed significant regression in the return to baseline phase, but regained skills in the return to intervention phase. Visual analysis of the results showed a strong effect for the buddy program for the students with autism.

The kindergarten teachers expressed satisfaction with this intervention because it was effective for all students in the class not just the students with autism, and indicated they would use the intervention again in their classrooms, lending important social validity to the intervention. The researchers reported this intervention was effective because all members of the class received the intervention and did not single out the students with autism. The researchers also suggested that by using all members of the class the study was more realistic for the students with autism and did not pair them only with students who had exceptional social skills. Because the intervention included skills

that were already within the repertoires of the students it did not require the teacher to prompt interactions. Researchers expressed a need to replicate the study with students with LFA.

The present study drew heavily on this study by Laushey and Heflin. Target students with autism were buddied with typically-developing students for the intervention as in the Laushey and Heflin study, however the buddies did not change everyday. The researchers suggested that the random assignment of buddies was important to the intervention because it meant that the students with autism had to develop skills to interact with a variety of peers not just those identified as being ideal buddies. While the present study did not change buddies everyday because the target participants were students with LFA, it did randomly assign the buddies to students. This random assignment eliminated the identification of ideal typical peer models for the students with LFA and incorporated all members of the class as buddies for all members of the special education class of students with LFA.

The present study also incorporated an adapted version of the stay, play and talk intervention, using stay, read, and talk about the book as intervention components. The simplicity of the intervention (stay, read, and talk) and the use of a buddy chart similar to that in the Laushey and Heflin were important for the success of the students with LFA. The researchers recommended that the study be replicated with students with LFA, and while the present study is not a replication of the study, it did incorporate several key components of the original study.

The studies reviewed in this section on peer-mediated interventions resulted in increased social interactions of students with autism when participating in cooperative

learning groups (Kamps et al, 2002), social skills groups (Kamps et al., 2002), playground activities (Owen-DeSchryver et al., 2008), and free-play time in two kindergarten classrooms (Laushey & Heflin, 2000). Social skills interventions embedded in an academic activity yielded greater gains than social skills interventions during free-play periods (Kamps et al., 2002). The studies identified additional components worthy of further investigation: using visual cues (Kamps et al., 2002) and incorporating a storybook reading (Owen-DeSchryver et al., 2008). Additionally, a class-wide intervention was reviewed that shows particular promise in its use of the entire class not just a few chosen students and was rated as having high social validity (Laushey & Heflin, 2000).

The reviewed studies found significant increases in social interaction for students with autism, specifically with initiations and responses, as a result of the peer-mediated interventions. These peer-mediated interventions were effective in increasing social initiations and responses in students with autism despite the significant social deficits they display. As a result these studies have contributed significantly to the design of the present study, which also used a peer-mediated social skills intervention to increase social initiation and responses, however, this study used students with LFA and typical peers.

Additionally, each of the peer-mediated interventions reviewed contributed a unique component to the intervention that was incorporated into the present study. The present study drew on the storybook reading of the Owen-DeSchryver et al. (2008) study to explain autism to the typical second-graders at an appropriate developmental level. The present study also incorporated the use of visual supports as recommended in the

Kamps et al. study as part of the *Reading Buddies* intervention. Finally, the present study drew on Laushey and Heflin's use of a class-wide peer-mediated intervention, random assignment of typical students to buddy with the students with LFA, and the *stay, play, and talk,* elements of the study which were adapted to *stay, read, and talk about the book.* These elements were combined into a strong, class-wide peer-mediated social skills intervention for students with LFA and typical peers, which sought to increase the initiations and responses of both groups of students, and in turn improve the social outcomes for the students with LFA.

Typical Peer Perspective

The review so far has addressed social skills interventions for students with LFA and time spent with typical peers with the aim of improving social outcomes for the students with LFA. Though time spent with typical peers and peer-mediated interventions have been shown to improve initiations and responses of the students with LFA, the studies heretofore have not addressed the quality of the relationship between typical peers and students with LFA. Few studies have examined qualitative changes in relationships between students with autism and typical peers as a result of participation in social skills interventions. Yet, examining the quality of the relationship has been thought to be important to affect long-term changes and improve quality of life for the students with autism (DiSalvo & Oswald, 2002; Rogers, 2000). To address the qualitative aspect of relationships between students with autism and typical peers, this literature review discusses the typical peer perspective.

A few studies have begun to look at qualities of the typical peers that might lead teachers to choose them to participate in peer-mediated interventions with students with

autism. Jackson and Campbell (2009) examined differences in peer status between teacher sociometric ratings and peer sociometric ratings of students nominated to be peer buddies, evaluated the agreement between teacher and peer nominated buddy selections for an unfamiliar child with autism, and examined whether teachers' buddy selections endorse more positive attitudes toward an unfamiliar child with autism as compared to those not selected by the teacher.

The participants in this study were 31 general education teachers and 576 students from third, fourth, and fifth grade within five public schools in Northeast Georgia. Participating classrooms did not include students with autism. Seven percent of the participants reported having heard of autism but were unable to explain what it was. Teachers' knowledge of autism was not assessed. Participation rates for each classroom ranged from 76% to 100%.

Student participants completed peer nominations of social status, behavioral characteristics, and social influence using rosters of participating classmates. After completing the peer nominations, participants watched two videotapes of a 12-year old child actor portraying a student with LFA. Students completed the *Adjective Checklist* (Siperstein & Bak, 1977) to rate the child in the videotape on positive and negative descriptive adjectives and the *Shared Activities Questionnaire* (Morgan et al., 1996) to rate their willingness to engage in social and recreational activities with the child in the video.

The students also completed the *Revised Class Play* (Masten et al., 1985) in which they were asked to cast their classmates in the play according to who would fit the character description the best. Students nominated three classmates they would like to

play with the most and the least and three classmates they believed were the most and least popular at school. Teachers completed the teacher nomination form that was similar to the student nomination form and were asked to choose whom they thought were the most liked and least liked students. Teachers also nominated three buddies and a best buddy for the child with autism portrayed in the video, as well as listed three students they would not choose as buddies.

Results of the study indicated that teachers chose males in their buddy selections with greater frequency than females, yet males were also more frequently listed as students that would not be chosen by teachers as buddies. The teachers' choice of males as most and least likely buddies for students with autism was not fully explained by the researchers other than to suggest that since the character portrayed in the video was male, teachers may have relied on using only males as buddies. Selected buddies received more nominations for *like most* and *most popular* than not selected or not nominated students. Selected buddies also received more nominations for pro-social/bright, socially visible, leader, admire, influence and self-confident than non-selected buddies.

Teacher-selected and peer-selected classmates were similar for students who would make a good buddy to the student with autism; however on the "best" buddy selection teacher-selected buddies received higher nominations than the other groups. When examining correlations between teacher and student nominations and behavior characteristics 11 of the 17 descriptors had high correlations ($r > .80$). Students reported they would be less likely to engage in recreational activities with the child portrayed in the video than academic or social activities.

The researchers concluded that selected buddies were more often perceived as popular from both the teacher and student standpoint. Additionally, the selected buddies were most often labeled as smart, athletic, helpful, good problem solvers, leaders, self-confident, influential and admired.

The researchers suggested that students' responses indicated greater comfort in participating in academic activities over recreational activities and as such, buddies may benefit from engaging in academic activities together before participating in recreational activities. These results support the present study, which included typical buddies with students with LFA in an academic activity. The structure of the academic activity may have offered a degree of comfort to the typically-developing students not found in recreational activities and in turn supported increased social interactions.

The second study in this section is that of Jones (2007). The purpose of this study was to examine the impact of peer tutoring with children with autism on the typical peer tutors. The study was conducted at a mainstream primary school in England that had a special unit for twelve children with autism. The children with autism were four to ten years of age while the peer tutors were aged ten or eleven.

A tutoring schedule was implemented in which two children with autism were paired with one mainstream student. Tutoring sessions were held once a week for 30 minutes and were supervised by the staff from the autism unit. Tutors volunteered for six weeks. Tutoring sessions took place in the autism unit, either in the playroom, or on the unit playground or on the main school playground. Though the peer tutors had a basic understanding of autism they did not have any specific training. The adults supervising

the tutoring sessions were to support the interactions between the mainstream students and the students with autism though they tried to limit their interaction.

Peer tutors tried to engage the children with autism through imitation and paired play with identical toys. Activities included table top games, building activities, car races, ball games, dress up activities and outdoor play. Familiar games such as ready, set, go, hot potato, hide and seek, and musical chairs were also played. Activities were changed from week to week but a familiar start and end routine was used.

After four cycles (24 weeks) the peer tutors completed a questionnaire about their experiences and feelings about being a peer tutor. Teachers and parents also completed questionnaires. Responses were overwhelmingly positive with 17% responding they enjoyed the experience and 83% responding they enjoyed it very much. Peer tutors commented that the tutoring experience helped them understand that all people are different, helped them to be more patient and responsible, and helped them to realize how lucky they are. One student rated peer tutoring as difficult, while 50% rated it as "okay not too difficult" and 44% rated it as "not difficult at all." Peer tutors commented that it was difficult to get the attention of the child with autism and difficult to get the child with autism to listen and control his behavior.

Parent response was also very positive with 57% feeling it was "important" and 36% feeling it was "extremely important" for their children to participate in the activity. Parents commented that they felt the experience gave their children an awareness of autism and how to relate to children with autism, helped them learn how to be more accepting and not to judge others, gave them a greater understanding of the needs of others, helped them in their relationships with their own siblings, and helped them to

grow up and act more responsibly at home. One parent of child who experienced

academic difficulties felt the experience gave the child confidence to deal with her own

difficulties.

The teacher responses were very positive with teachers commenting that it gave

their students self-confidence, enthusiasm in supporting others, a greater understanding of

the difficulties of others, and an opportunity to feel successful beyond academics. The

teachers also responded that sometimes the children that had the most difficulty in the

classroom excelled at being peer tutors. Parents and teachers both raised concerns about

the exposure of the peer tutors to challenging behaviors displayed by the children with

autism. The researchers cited the peer tutoring activities as important to the overall

climate of inclusion for the school.

The researchers did caution that not all students and parents completed the survey

so those persons not completing may have held different viewpoints than those who did

respond. Also the peer tutors were several years older than the students with autism so

other challenges may have been observed with tutors closer in age to the students with

autism.

The present study employed a perception survey similar to the questionnaire used

in this study. However, the present study incorporated the peer perception survey before

and after the intervention as a means of examining whether changes in perception took

place. Since the present study was a class-wide peer-mediated intervention incorporating

all members of the class and not just peers specifically chosen as ideal candidates, it was

important to have an understanding of how all participants view the students with autism.

If typically-developing students and students with LFA are to have sustained interactions

the perceptions of the typical students must be understood. Whether or not changes in perceptions of students with autism occur in the typically-developing students may be important information for the development of future interventions.

The final study in this section is that of Locke, Rotheram-Fuller, and Kasari (2012). The purpose of this study was to examine the characteristics of typically-developing peer models and to examine the changes in behavior of the typically-developing peer models in comparison to a matched cohort of non-peer models. Participants for this study were drawn from 56 classrooms from 30 public schools in a large urban school district. Teachers nominated 107 typically-developing children to be peer models for children with autism in inclusive first-grade through fifth-grade classrooms. An additional 107 typically-developing children were randomly selected as a control group and matched on classroom, grade, age, and gender as match as possible.

Participants completed a friendship survey in which they were asked to make a list of people they like to hang out with and those they do not like to hang out with, circle their top three friends, and place a star by their best friend. Participants were also asked to identify students in the class who liked to hang around together in groups and to include themselves in a group. The friendship surveys were coded for connection scores and rejections. Reciprocal friendships were identified when children selected each other as their top three or best friend within the classroom. Social network analyses were conducted to obtain each student's social network centrality score with scoring as levels 0 to 3: isolated, peripheral, secondary, and nuclear.

The *Friendship Qualities Scale* (*FQS*; Bukowski, Hoza, & Boivin, 1994) was administered which was a 23-item questionnaire that assessed five features of friendship

quality: companionship, help, security, closeness, and conflict. Students used the *FQS* to rate one of their friendships, typically their best friendship. Additionally the *Peer Network Dyadic Loneliness Scale* (Hoza, Bukowski, & Beery, 2000) was given to assess feelings of loneliness. A peer-mediated intervention was implemented in which three typically-developing children from the target child's classroom were trained to work with children with social difficulties in the class not just the child with autism.

Results of the study indicated that 88.8% of the peer models and 73.8% of non-peer models were secondary or neutral in their classroom social structure at baseline and held stable at exit. Peer models had significantly higher social network centrality status within their classrooms and had significantly more classmates select them as a friend when compared to non-peer models at baseline and at exit. However, peer models were not significantly different from non-peer models with regard to the number of outward friendship nominations. Reciprocal friendships, rejections and connections to classmates were not significantly different between peer models and non-peer models at baseline or exit.

All children identified a best friend before completing the *Friendship Qualities Scale*. Both groups of children showed stable friendship quality at baseline and exit. Peer models reported significantly less loneliness than non-peer models at baseline: however there were no differences at exit. The average number of connections to students with autism was low for both peer models and non-peer models but increased between baseline and exit for the peer models. Students with autism were more likely to choose a peer-model as a friend at exit.

Results of the study illustrate that typically-developing peer models were more socially adept than non-peer models at both the beginning and end of the intervention. Peer models had relatively stable connections within their classroom social structure and were more connected to the students with autism. Researchers noted that peer models reported fewer feelings of loneliness and were more self-assured than non-peer models suggesting that they may be more secure in their relationships with children with autism. These findings lend support to the notion that a particular type of student is often selected as a peer model for students with autism and challenges the notion that there are ill effects of being a peer model or buddy to a student with autism

Researchers did not conduct observations of the students so it is unknown whether students actually interacted more as a result of the intervention. Though this study examined friendship quality of the self-nominated best friend, it did not address the quality of the relationship between the student with autism and the peer model.

Overall results of this study were important in establishing that typically-developing peer-models were not negatively impacted by being a peer model and provides support to the present study, which incorporated all members of a typical second-grade class as buddies to students with LFA. Peer models were found to be more socially adept than non-peer models supporting the concern that specifically chosen peer models are not indicative of classroom settings in which students with autism must learn to interact with a variety of peers. The present study heeded this concern and incorporated a class-wide intervention in which peer models were randomly assigned as buddies to students with LFA.

The three studies in this section examined perspectives of typical peers in peer-mediated interventions with children with autism. Peer models were more often males (Jackson & Campbell, 2009), were found to experience few feelings of loneliness and were found to enjoy higher social status among their peers (Locke et al., 2012). Peer buddies' relationships with friends remained stable even after participating as a peer buddy, indicating the experience of being a buddy did not negatively impact them (Locke et al., 2012). Finally typical peers participating in activities with students with autism were found to show greater comfort with participating in academic activities over recreational activities (Jackson & Campbell, 2009), and were found to enjoy the activities overall (Jones, 2007).

Peer-mediated interventions have been shown to increase social interactions between typical students and students with autism, although little is known about the relationships between these students other than increased social interactions between the two groups. It remains unknown whether increases in social interactions lead to more important improvements in the quality of relationships between students with autism and typical peers. Yet, improving the quality of the relationship between typical peers and students with autism is important for improved social outcomes and long-term success of students with LFA.

The present study made use of a perception survey given to the typical peers before and after their participation in the peer-mediated intervention for the purpose of examining whether changes took place in their perceptions and hence overall relationship with the students with LFA. Additionally, the typical peers participated in open-ended interviews to investigate qualitative aspects of the buddy relationship with the students

with LFA at the end of the intervention. Given that students with LFA have been found to have few friends in long-term studies -- predicting poor social outcomes -- the present intervention aimed at understanding and ultimately improving the quality of the relationship between the typical peers and students with autism was particularly important.

Summary

This review has examined the literature that holds particular significance for the present study of a peer-mediated social skills intervention for students with LFA. The studies investigated characteristics of students with low-functioning autism, the inclusion of students with autism with typical peers, social skills interventions for students with autism, including both adult-mediated and peer-mediated interventions, and the perspective of typical peers included in social skills interventions. The review has addressed a number of findings important to the present study.

Students with LFA have been shown to display more social skills deficits than students with high functioning autism even after intensive intervention (Ben-Itzchak & Zachor, 2007), have been found to exhibit fewer gains in social interaction over time (McGovern & Sigman, 2005), and have been found to communicate more for behavior regulation than social interaction (Maljaars et al., 2011). The unique deficits of students with LFA make it important to consider the characteristics of this population when implementing interventions.

Interventions aimed at increasing the social interactions of students with LFA are important and should be considered as necessary as interventions aimed at improving academic and communication skills (Ben-Itzchak & Zachor, 2007)). Time spent with

typical peers in the school years has been shown to improve social outcomes in adults

(McGovern & Sigman, 2005), indicating interventions aimed at increasing time with

typical peers should have positive social outcomes on students with LFA. Additionally,

targeting social interaction components of communication have been shown to be

particularly important for students with LFA who often do not use communication for

social purposes at all (Maljaars et al., 2011).

Students with LFA display many cognitive and language deficits that impact their

ability to acquire appropriate social skills which is likely why few researchers have

targeted this population specifically for social skills interventions. Yet improving social

skills of students with autism have been correlated to improved long-term outcomes

(McGovern & Sigman, 2005). The present study, which sought to improve social skills

for students with LFA by increasing time in social communication activities with typical

peers, was important for addressing this recognized gap in the field.

Additionally, students with LFA in inclusive settings have shown increases in

adaptive behavior and have appeared to benefit from increased opportunities to interact

with appropriate peer models (Boyd et al., 2011). Parents of students with autism in

inclusive settings have also reported increased social competence in their students when

compared to students in special education classrooms (Lyons, Cappadocia, & Weiss,

2011). Exposure to typical peers who model appropriate behavior and offer increased

opportunities for friendships are thought to be key reasons students with LFA show

improvement of adaptive skills in inclusive settings.

Because many students with LFA require more intense interventions or display

greater social deficits they are often served in special education settings and few studies

have examined social interactions of these students when included with typical peers. The present study which employed students with LFA in a special education setting aimed to improve the social outcomes of the students with LFA by including them with typical peers in the *Reading Buddies* intervention as well as contribute to the relatively little information on the social outcomes of including these students with typical peers.

Adult-mediated and peer-mediated social skills interventions have been shown to increase initiations and responses between students with autism and typical peers using both modeling and reinforcement as key intervention components (Banda, Hart, & Liu-Gitz, 2010; Laushey & Heflin, 2000). Most of these interventions, however, have taken place at lunch or recess or in other free-play settings and have relied on continued adult prompting to increase initiations. Additionally, few social skills interventions have aimed to increase initiations and responses during more structured academic activities (Banda, Hart, & Liu-Gitz, 2010), yet interventions including an academic component have shown greater outcomes than free-play interventions (Kamps et al., 2002), and typical students have shown greater comfort with participating with students with LFA in academic activities compared to recreational activities (Jackson & Campbell, 2009). The present study incorporated a storybook reading to present autism at an appropriate developmental level for the typical peers and used visual cues to aid the students' with LFA understanding of the intervention.

Most peer-mediated interventions have used carefully selected peers to serve as models. While these interventions have proven effective at increasing initiations and responses in students with autism and typical peers, researchers have expressed concern over using such ideal peer models (DiSalvo & Oswald, 2002; Gresham, 1998). Critics

have argued that such models are not indicative of the wide range of social skills displayed in a typical classroom. One peer-mediated intervention took a class-wide approach and included all members of a class in the intervention (Laushey & Heflin, 2000), but other studies have not been found. The present study included all members of the class as intervention participants thereby addressing the concern of specially chosen peer models for students with LFA.

Finally the perspective of the typical peer was explored. Typical peers have been found to enjoy activities with their peers with autism and have been found to experience increased awareness of the difficulties of others as a result of participating in the activities (Jones, 2007). Peers nominated by classroom teachers to be buddies for the students with autism have been found to be mostly popular and well-liked students within their classrooms (Jackson & Campbell, 2009). Participation in the activities with the students with autism was not found to diminish the typical peers' social status (Locke, Rotheram-Fuller, & Kasari, 2012). Studies examining the quality of the relationship between typical peers and students with autism have not been explored, although researchers have expressed concern about whether interventions that increase social interactions between students with autism and typical peers improve the quality of the relationship as well (Rogers, 2000). The present study, which explored the peer perspective through a perception survey and open-ended interviews, provided an important addition to the sparse research base.

Given the research explored in this review and the remaining gaps in the literature that exist, a critical need remains for the present study to examine the effects of a class-wide peer-mediated social skills intervention on the social interactions of students with

LFA and typical peers, while also examining the perspective of the typical peers in the intervention and the quality of the relationship between the peers and the students with LFA.

CHAPTER THREE

METHODOLOGY

Students with autism display deficits in social interaction making it difficult for them to interact with peers and to participate in ongoing relationships (Owen-DeSchryver et al., 2008). These students often have few friends and find it hard to participate in the give and take of conversation. The social impairments evident in students with autism present significant challenges in the school setting, often leading to limited acceptance by peers and poor long-term outcomes (DiSalvo & Oswald, 2002). Developing interventions to improve the social skills deficits of students with autism is critical to the success of this population and should be an integral part of educational programming from an early age.

The purpose of this study was to examine the effect of a class-wide peer-mediated social skills intervention on the interactions of students with low-functioning autism (LFA) and their typically-developing peers. This chapter presents the design of the research study, sample, protection of human subjects, instrumentation, procedures, pilot procedures, data analysis overview, and possible limitations of the study.

Research Design

This study investigated three research questions:

1. What is the effect of a class-wide peer-mediated social skills intervention on the social interactions, as measured by initiations and responses, of students with low-functioning autism and typically-developing peers?

2. What are the changes in perceptions of typically-developing second-graders toward their peers with low-functioning autism after participating in the *Reading Buddies* intervention?

3. How do typically-developing second-graders describe the quality of the relationship with their peers with low-functioning autism after participating in the *Reading Buddies* intervention?

This study employed a mixed methods design, using both quantitative and qualitative components. Mixed method studies have frequently been used by social scientists to examine perceptions that cannot be ascertained from using quantitative methods alone (Krathwohl, 2009). Mixed methodology design was appropriate to this study because it investigated the effect of the social skills intervention as well as examined perceptions of the participants. Figure 1 provides an overview of the study.

The quantitative portion of the study utilized single-subject research design, in which the individual was the unit of analysis and served as his/her own control. Single-subject research is experimental in nature and is used for the purpose of establishing causal or functional relationships between independent and dependent variables (Horner et al., 2005). The study used an (ABAB) reversal design consisting of baseline (A) and intervention phases (B). The independent variable was the *Reading Buddies* intervention, while the dependent variables were the number of initiations and responses made by the students with LFA and the typical second-graders during the shared reading activity.

The qualitative portion of the study consisted of measuring the perceptions of the typical peers before and after the intervention using the *Autism Peer Perception Survey*,
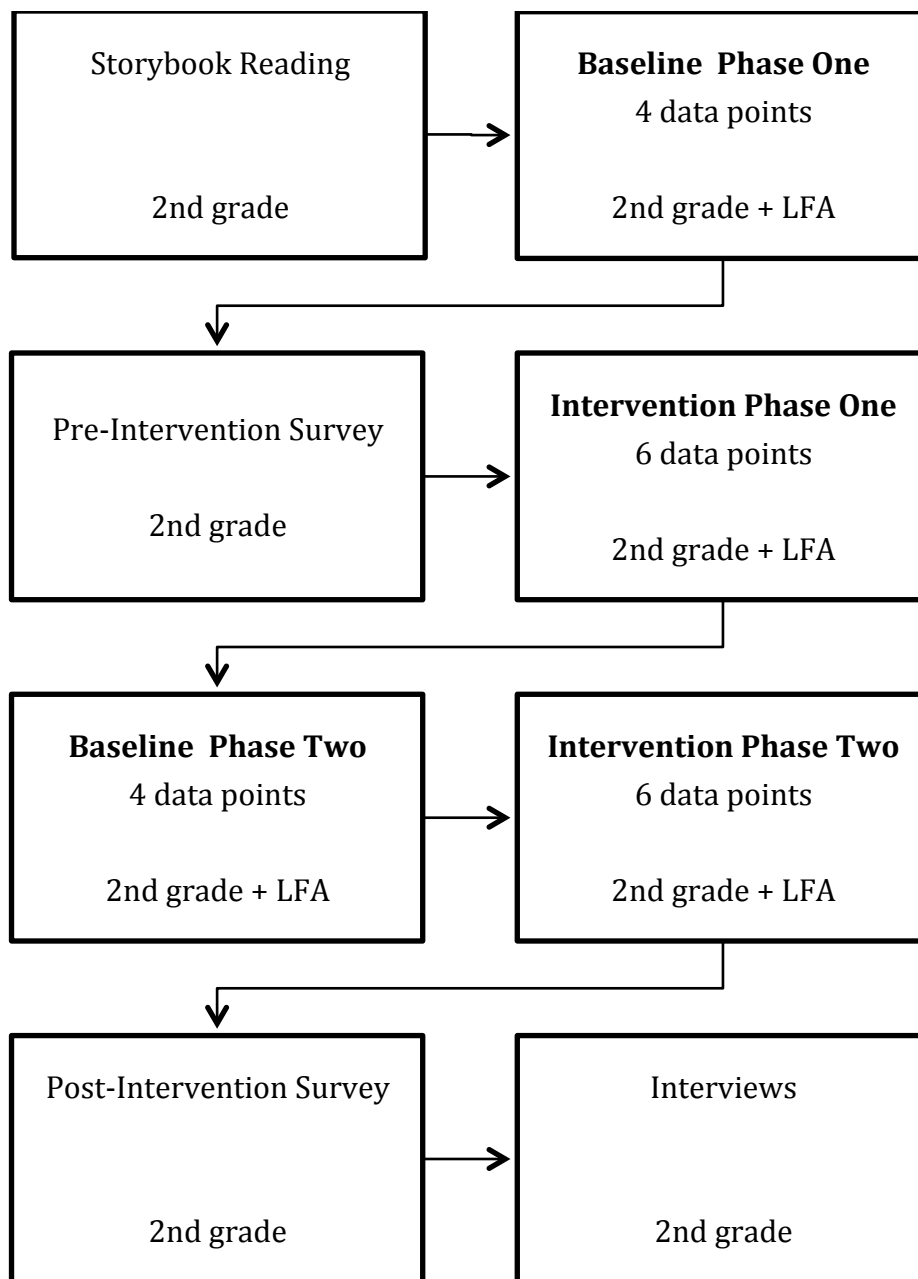
Figure 1. A graphic depicting the research design.

and interviewing the typical students after the final intervention phase. The study took place over a ten-week period and consisted of twenty data collection points.

A comparison of the intervention and baseline phases provided a measure of whether the *Reading Buddies* intervention promoted more interaction between the typical second-grade students and the students with LFA than during the baseline phase (Research Question 1). Additionally, an examination of the pre and post surveys of the typical second-grade students provided information on the second-grade students' perceptions of their peers with LFA (Research Question 2). Finally, the interviews provided information about the quality of the relationship between the students with autism and the typical second-grade students (Research Question 3).

Sample

School

The study took place in a public elementary school in a suburban area of Northern California. The elementary school served over 600 students from preschool to fifth grade, including several special day classes for students with moderate to severe disabilities and autism. The student population was moderately diverse with 54% Caucasian, 25% Asian, 12% Hispanic, 4% African-American, and 2% Filipino students. Eleven percent of the student population was identified as socio-economically disadvantaged, 14% identified as English Language Learners, and 9% identified with a disability. All teachers at the school were fully credentialed and highly qualified, and the majority of the teachers, including all of the second-grade teachers, had more than ten years teaching experience. The teacher turnover rate at the school was extremely low.

The school was located in a relatively stable community with many families remaining in the area a long time. More than a few students had parents that attended the school as a child. Many parents were active in the Parent Teacher Association, which financially supported a number of the extra activities taking place at the school, such as art and music classes and small group tutoring. The current principal was a relatively young principal who had been at the school less than three years. She was well liked and supported in the community. The principal was also a big proponent of including the students with disabilities in all school activities, and worked hard to make sure these students had ample opportunity for inclusion with their general education peers.

Reading buddies program. Reading Buddies was a school-wide activity in which two classes were paired together to participate in a shared reading activity once or twice a week. Most pairings included an older-grade class reading aloud to a younger-grade class. The shared reading activity gave students an opportunity to practice their reading skills, promoted the development of oral reading fluency, developed listening comprehension skills, and allowed students to make connections with text. The shared reading activity also provided a means for the older students to act as role models for the younger students on campus.

Researcher

The researcher was a former teacher of the special day class for students with autism at the school site, and continued to work for the district on a part-time basis coaching teachers, conducting professional development workshops, and developing curriculum for students with autism and intellectual disabilities. The researcher also played an active role in training teachers and support staff in the applied behavior

analysis program of the district. These trained support staff were the data collectors for the study.

Participants

The study was a class-wide intervention in which all students from each of two classes were included in the intervention. One class was a general education class of second-grade students, while the other was a self-contained special education class of students with LFA.   There were four classes of second-grade students at the school. One of these classes had participated in a pilot version of the intervention but did not participate in the study. A second class of second-grade students participated in the present study.   The principal selected the class of second-grade students for the present study based on teacher willingness to participate.

The second-grade classes at the school site were composed of approximately 24 students with equal numbers of boys and girls as much as possible. Second-grade students ranged in age from seven to eight years old. Classes were developed prior to the beginning of the school year and efforts were made to divide the classes on an equal basis of boys and girls, high, medium, and low performing students, ethnically diverse students, and English Language Learners. While the students were not randomly assigned to classes, the classes were designed to be equally representative of the population of second-graders at the school.

The eight students with LFA in the special day class were also participants in the study. The special day class was part of an autism specific program at the school site aimed at providing intense intervention for these students. No other students with disabilities were part of the class.   The autism specific program provided an applied

behavior analysis component for all students in the class. The adult to student ratio for the class was 1:2.

The participants with LFA ranged in age from five to eight years old and were in kindergarten to second-grade. Participants qualified for special education services under the disability of autism per the California education code definition, and were identified as a student with LFA using the *Childhood Autism Rating Scale*, second edition (Schopler, Van Bourgondien, Wellman, & Love, 2010), and a measure of intellectual functioning administered by a licensed school psychologist. The researcher conducted a review of records to verify eligibility for the study.

Participants for data collection. Though all members of the second-grade class and all members of the special education class participated in the intervention, observational data were only collected from a portion of the students. Every student on which observational data were recorded had submitted signed parental consent.

Second-grade participants and participants with LFA were randomly placed in buddy groups by creating a numbered list of students and using a random number generator to create the order in which students would be assigned from the list. Each buddy group consisted of three typically-developing second-grade students and one student with LFA. All members of both classes were assigned to buddy groups, yielding a total of eight buddy groups. Four of the buddy groups, in which all members had signed parental consent forms, were the target groups for collection of initiation and response data.

At the end of the first baseline phase one of the typically-developing second-grade students who had been assigned to one of the target groups for data collection withdrew

from the school for health reasons. That buddy group continued the study with the remaining two typically-developing peers and the student with LFA.

Participants for surveys. All members of the second-grade class completed the *Autism Peer Perception Survey* at pre and post-intervention phases. Surveys were analyzed from the students with signed parental consent. Sixteen of the typically-developing second graders had signed parental consent, with one of those later withdrawing from school after the pre-intervention survey. Thus, fifteen surveys of second-grade students were analyzed using both pre and post-intervention survey data.

Participants for interviews. Eight of the second-grade participants with signed parental consent forms were randomly chosen for participation in the interview.

Protection of Human Subjects

An application was submitted to the University of San Francisco Institutional Review Board for the protection of Human Subjects, and permission was granted for the study. Permission for the study was also secured from the assistant superintendent of the school district and from the school principal, via verbal approval and a signed letter (see Appendix A for approval letters). The special education teacher gave verbal consent for participating in the study, and written consent was secured from both the special education teacher and the second-grade teacher participating in the study.

Recruitment letters and permission slips were sent home to parents of the second-grade students and parents of the students with LFA in the two participating classes. The recruitment letter described the study and explained why the student had been chosen for participation. The letter also included contact information for the researcher if the parent

had questions about the study. Finally, the letter included an informed consent permission slip for parents to sign and return to school.

Teachers used the weekly class newsletter to remind parents to submit the consent forms. A second recruitment letter was sent home to parents not returning permission slips after one week. Parental consent was obtained for 16 second-grade students and four students with LFA. Every effort was made to conceal the identity of all participants in the study. Any information collected in the study was kept confidential and stored in a secure place. There were no anticipated adverse effects for participants in the study.

Treatment Description

The independent variable in this study was the *Reading Buddies* intervention, adapted from a similar procedure used in a study of two kindergarten students with high functioning autism in a general education kindergarten classroom during free play sessions (Laushey & Heflin, 2000). This was a classwide intervention, meaning all members of both classes participated in the intervention, though data were collected on a portion of the students. The study took place each day in the special education classroom of the students with LFA, with all second-graders joining the students with LFA after morning recess. The intervention consisted of placing three typically-developing second-grade students with one student with LFA into buddy groups. Each intervention session began with a review of the *Stay, Read, and Talk* procedures described below, as well as reviewing a chart to remind students of who was in their buddy group. A picture chart was displayed of the *Stay, Read, and Talk* procedures.

The *Reading Buddies* intervention consisted of three things that students should do to be a good buddy. They should **STAY** with their buddies, **READ** with their

buddies, and **TALK** with their buddies. As part of the intervention the researcher explained the steps to the students using the following detail:

1. *Stay with your buddies.* The researcher explained that this meant that they were to stay together with their buddies at all times. To be a good buddy they had to take turns reading their books, but they should all stay together while another buddy was reading. If one of the buddies wandered away from the group they should follow the buddy and try to get them to return to the area, or read with their buddies in the new area. Most important though they should stay with their buddies.

2. *Read with your buddies.* The researcher explained that to be a good buddy they should all take turns reading their books. Sometimes they may want to help each other read their books, and that was okay. They must remember though that each buddy should have a chance to have his/her book read aloud. The researcher also explained that when students were reading the book they should hold the book near to the other members of the group so that everyone could see and enjoy the book.

3. *Talk with your buddies.* The researcher explained that to be a good buddy they should also talk with their buddies about the book. This meant they should ask questions about the book, and look at the pictures together. They may want to talk about the pictures, or ask each other what they liked about the book. Some students liked to talk a lot and other students talked less, and that was okay. They should remember though to talk to their buddies.

The researcher also informed the students that everyone should try hard to be a good buddy. Part of being a good buddy was working together and telling each other when they were doing a good job because everyone liked to know when they were doing well. The researcher further explained that some students used a "happy face" card to help them know when they were doing a good job, and that their buddies should give them a "happy face" if they were doing well. Students who were using the "happy face" cards would in turn be able to give their buddies a sticker at the end of the session if they did a good job.

The students with LFA used an individualized reinforcement system, as part of their school program, in which they earned "happy faces" for appropriate behavior to access their reinforcement (e.g. small edible, hug). The typical students reinforced the students with LFA for appropriate behavior during the intervention by drawing a happy face on to the student's "happy face" card and providing the appropriate individual reinforcement when the card was filled. The students with LFA reinforced the typical second-grade students in their buddy group for appropriate behavior by giving them verbal praise and a sticker at the end of the session, with adult assist if needed.

After the intervention was explained the classroom teacher and the researcher role-played and modeled the steps of the intervention for the students. Students were also called upon to explain the steps of the intervention to the other students, and to role-play what it meant to be a good reading buddy. The researcher referred to the chart offering a visual depiction of the intervention as they went through the steps. Each day of intervention began with a review of the steps while looking at the chart and role-play.

When the review of the procedure was complete, the researcher reminded the students to look at the buddy chart, then called one buddy group at a time to find their buddy and begin reading. Because of the large number of children in the classroom, dismissing the children by group to find their buddy and begin reading was deemed the least chaotic and stressful for all students. In this manner the typically-developing second-graders could assist their peers with LFA to successfully transition to the reading portion of the intervention. Again, all members of both classes participated in the intervention so all students were assigned to groups and remained in the room.

Data collectors began data collection when their observation group settled in their assigned spot. Start times for data collection were varied such that all data collectors were not starting at the same time. The data collectors stayed within three to five feet of their assigned buddy group to record the initiations and responses of the students in the group, i.e. target student with LFA and three typical peers. Ten minutes of data were recorded everyday during the 15-minute session, with another two minutes of the session spent in 30-second breaks. There were 20 days of data collection in total across the ten weeks of the study.

When buddy groups were dismissed from the large group, students chose a book and read with the other members of the buddy group for approximately 15 minutes, following a semi-structured format of approximately 5 minutes for each book. Students were allowed to choose from any of the books provided by the classroom teachers. Books represented a variety of literature appropriate for the age and reading level of the students. No particular theme or book format was adhered to, though teachers did try to provide a variety of books so that all students were able to find something they enjoyed.

Additionally, books were provided at a variety of reading levels because not all students were fluent readers.

<div align="center">**Instrumentation**</div>

There were three dependent variables in this study. The first dependent variable of social interaction had two components: the number of initiations and responses of the students with LFA and typical second-grade peers. The second dependent variable was the perception of the typical second-grade students toward their peers with autism, and the third dependent variable was the quality of the relationship between the students with LFA and the typically-developing second-grade students. An observational recording instrument was used to record the initiations and responses during the *Reading Buddies* activity, and a survey was used to assess the perceptions of the typical peers before and after the intervention. Interviews were conducted with eight randomly selected second-grade peers using open-ended questions to assess relationship quality.

Measurement Instruments

Observational recording instrument. Initiations and responses were recorded on a specially designed data collection instrument. The data collection instrument was developed by the researcher and reviewed by two behavior specialists and a Board Certified Behavior Analyst (see Appendix B for the data collection instrument). Feedback from the reviewers was incorporated into the data collection instrument. After training sessions with the data collection instrument adjustments were made again until a finalized version was agreed upon.

The instrument was divided into a set of five grids, representing the five two-minute sessions, on which to record initiations and responses stemming from the student

with LFA or any one of the three typical second-grade students. One observer was

assigned to record the initiations and responses of one buddy group for the entire session.

Initiations were recorded by placing a tally mark in the initiation section of the grid under

the student's name. Responses were recorded by placing a tally mark in the response

section of the grid under the student's name. Initiations and responses were operationally

defined as discrete behaviors, making them easy to differentiate and tally.

Observation and recording took place for two minutes, followed by a 30-second

break in which no recording took place. Each data collector had her own timing device

(e.g., cell phone) and was responsible for tracking the two-minute intervals for her

observation group. Recording continued in the same manner with the data collection

instrument until 10 minutes of data had been recorded. At the end of the 10 minutes of

observation the number of initiations and responses were totaled for each participant.

Date, name of data collector, and name of participants were recorded on the data

collection sheet.

Training of data collectors. Seven data collectors in total were trained to record

the initiations and responses made by the target students with LFA and their typical

second-grade peers, using the researcher-designed data collection instrument. On each

day of the study four trained data collectors were collecting observational data on the four

target buddy groups. A second trained observer recorded observational data on one target

group for the purpose of collecting interobserver agreement reliability data. The data

collectors included the researcher and six staff members at the school site, including

classroom aides, para-educators, and behavior therapists. All data collectors had

previously been trained to record data in applied behavior analysis programs and were

familiar with collecting observational data as part of their routine job procedures. Training was conducted by the researcher and the behavior specialist for the school district and took place before school across several days.

Training was conducted with the observational recording instrument until at least 90% agreement rate was reached for all data collectors. Role-play was used to simulate student behavior during the training session. After the initial training session using adult role-play, a second round of training was done using the students with LFA and the pilot second-grade class during an inclusive art activity.

Operational definitions. Initiations were defined as any motor or vocal behavior demonstrated by the target child to a typical peer, or a typical peer to the target child, that attempted to gain attention or occasion a response from the other. Examples of initiations included verbalizing to the other person, looking at the other person's face, touching the other person appropriately (e.g., tapping shoulder, touching hand), presenting the book to the other person, and pointing to a picture in the book while looking at the partner.

Responses were defined as any appropriate motor or vocal behavior demonstrated by the target child to a typical peer, or typical peer to the target child, that was preceded by an initiation and occurred within ten seconds of the initiation. Examples of responses included looking at the other person's face, verbalizing to the other person, smiling at the other person, touching the other person appropriately, and giving a motor response such as nodding head or touching a named picture in the book.

Reliability and validity. All observers were trained in applied behavior analysis and had extensive experience with recording observational data. Additionally, the observers were trained on the data collection instrument until they reached an agreement

rate of at least 90%. A second observer double scored 25% of the observation intervals. Interobserver agreement scores were calculated to assess reliability of the observation scores.

A review of the literature established the use of observational recording as a valid means to assess initiations and responses in peer-mediated interventions (Banda, Hart, & Lui-Gitz, 2010; English et al., 1997; Kamps et al., 2002; Owen-DeSchryver et al., 2008). Additionally, in their seminal work on the use of single subject research design, Horner et al. (2005) stipulated that appropriate application of single subject research methodology required the use of operational definitions for all dependent variables and the measurement of those variables repeatedly across conditions. Dependent variables must also be assessed for consistency through the use of multiple observers.

The use of operationally defined variables allowed for the visual inspection of data points across conditions. Single subject research further required the demonstration of experimental control through the active manipulation of the independent variable, typically in baseline and intervention phases. Changes in the dependent variable were thus predicated on changes in the independent variable (Horner et al., 2005).

Autism Peer Perception Survey. The perceptions of the typical second-grade students were measured using the researcher-developed *Autism Peer Perception Survey* (see Appendix C for the Perception Survey). The *Autism Peer Perception Survey* was a ten-item Likert scale modified for use with children. Likert scales have been adapted for use with young children by adding pictures to the response options with acceptable results (Reynolds, Johnson, Dickenson, & McFadden, 2009; Reynolds & Johnson, 2011). Each item included only three response options, and each response option was paired

with a happy, sad, or neutral face. Response option *yes* had a corresponding happy face symbol, while response option *no* had a corresponding sad face symbol. The third response option of *maybe a little* corresponded with a neutral face symbol, i.e. straight line across for the mouth. Response options were also coded with the numbers 1, 3, and 5, with higher numbers associated with a more positive perception.

The perception scale included items such as, "I like being with my buddy because we can do fun things together," and "Being with my buddy is a lot of work." Items on the survey were designed to measure both positive and negative aspects of the activity. The survey included items related to whether the typical student was anxious about being with the peer with autism, whether the student enjoyed being with the peer with autism, whether the student thought he/she was helping the peer with autism, and whether the student thought his/her peer with autism was similar to themselves.

The perception surveys were scored by summing the responses (1, 3, and 5) into a total score, with a total possible score of 50 for each participant. Higher scores indicated a more positive perception of peers with autism. Scores were divided around the mean in order to determine which scores represented a positive or negative perception. A mean score of 30 was considered neutral, with mean scores above 30 considered to represent a more positive perception and mean scores below 30 considered to represent a less positive perception. Mean scores of the group were compared from pre- to post-intervention phases for changes in perception.

The *Autism Peer Perception Survey* was piloted in the spring of 2012, with 24 typically-developing second-grade students who had participated in a similar shared

reading activity with students with autism. Using Cronbach's alpha, the overall reliability of scores for the 10-item survey in the pilot administration was .87.

Interviews. In addition to the survey, eight typical second-grade participants were interviewed to examine the quality of the relationship between themselves and their peer with LFA. Interviews were conducted individually with the researcher and the second-grade students. Interviews were held in the school library with the librarian present, but occupied in another part of the room. Interviews lasted from six to ten minutes depending on the length of individual responses.

The interview consisted of ten questions developed by the researcher and reviewed by two experts for content validity (see Appendix D for interview questions). One content expert was an associate professor in the department of special education at a local university, had conducted research in the area of autism, was the executive director of a community based autism program and was the parent of a child with autism. This content expert assisted in the development of the research questions as part of a pilot interview study conducted with the researcher.

The second content expert was an associate professor in the department of special education at a large mid-western university and had extensive research experience with students with severe disabilities and autism. Interview questions were submitted to this content expert via email from the researcher. Feedback from both content experts was incorporated into the final version of the interview questions.

Research on friendship quality suggests that indicators of high quality relationships include friends helping each other out, friends knowing what the other one likes and how the other feels, friends enjoying being around each other and doing

activities together, and friends recognizing that sometimes they have disagreements

(Dunn, Cutting, & Fisher, 2002; Rose & Asher, 2004; Salvas, Vitaro, & Brendgen, 2011;

Weiner & Schneider, 2002). Interview questions were developed to reflect these markers

of high quality relationships and include questions such as "Do you and your buddy ever

help each other out?" Interview responses were examined for information about the

quality of the peer relationship or friendship.

Procedure

The study employed a single-subject alternating treatment design (ABAB). The

study alternated baseline, or non-intervention phases, with the intervention phase. In

single-subject design studies the researcher actively manipulates the independent variable

to demonstrate experimental control (Horner et al., 2005). The study took place in the

classroom of the students with LFA, for a total of twenty sessions across ten weeks.

Sessions took place at the same time of the day, with all members of the second-grade

class joining the students with LFA in their class after morning recess. Each baseline

phase consisted of four sessions and each intervention phase consisted of six sessions.

The overall study design consisted of two weeks of baseline, followed by three weeks of

intervention, another two weeks of baseline, and another three weeks of intervention

phases.

Pre-Intervention

The study employed a pre-intervention component in which the researcher read

aloud a book about a boy with autism to the typically-developing second-grade students.

In the storybook one character explained some of the learning differences of his friend

with autism. The book was read to the typical second-grade students in their own

classroom prior to the first session with their peers with LFA. The researcher answered

any questions the students had by giving information about autism in language that they

could understand but without specifically identifying their peers with autism by name.

The researcher also talked to the students about ways in which friends could be alike and

different. Students participated in the discussion by sharing ways in which they were

alike and different from their friends.

The first time the two classes were together the researcher again talked to the

students about how everyone was both alike and different. The researcher and teachers

shared examples of ways they were alike and ways they were different. The researcher

then asked the students for other examples of how friends might be alike and different.

The researcher also discussed with the students how some friends they have might be a

lot like them and other friends they have might be different from them, but it could be fun

to have friends that were different because sometimes they could teach each other new

things.

Baseline Phase

Baseline phases took place in the special education classroom of the students with

LFA. During the baseline phase all members of the second-grade class were brought to

the special education classroom, reminded of who was in their buddy group, and told to

read with their buddies. Students were NOT given directions about staying with their

buddy, reading with their buddy, or talking with their buddy. Students were also NOT

given directions about working hard to be a good buddy, or telling each other they were

doing a good job. Adults only intervened with students to re-direct aggressive or self-

injurious behavior. Trained observers recorded initiations and responses of students with

LFA and typical second-graders for 10 minutes during each baseline phase, using the observation protocol of two minutes of observation followed by a 30 second break. After 15 minutes the session was ended and the second-grade students were thanked for coming. Each baseline session followed this same format.

Pre-Intervention Perception Survey

At the end of the first baseline phase the *Autism Peer Perception Survey* was administered to the typical second-grade students. The students completed the *Autism Peer Perception Survey* in their own classroom. Questions were read aloud by the researcher, and students circled their responses yes, no, or maybe. The survey took approximately ten minutes to complete.

Intervention Phase

The intervention phases took place in the special education classroom of the student with LFA. Each intervention session began with a review of the *Stay, Read, and Talk* procedures detailed in the section on treatment description. The researcher reminded students of the three steps using the visual chart, and then called upon students to role-play each of the steps. Each day of intervention began with a review of the steps, role-play, and looking at the chart.

Students then chose a book and read with the other members of the buddy group for 15 minutes, following a semi-structured format of 5 minutes for each book. During this time, trained observers recorded the initiations and responses of the buddy groups, using a procedure of two minutes of observation followed by a 30 second break, until 10 minutes of observation were recorded.

During the intervention phase students were also reminded to work hard to be a good buddy, and to tell each other they were doing a good job. The typically-developing students reinforced the students with LFA for appropriate behavior during the intervention by drawing a happy face on to the student's "happy face" card and providing the appropriate individual reinforcement when the card was filled. The students with LFA reinforced the typical second-grade students in their buddy group for appropriate behavior by giving them verbal praise and a sticker at the end of the session, with adult assist if needed.

Post-Intervention Survey

At the end of the second intervention phase the typically-developing second-grade students were given the *Autism Peer Perception Survey* again. The students completed the *Autism Peer Perception Survey* in their own classroom. Questions were read aloud by the researcher, and students circled their responses yes, no, or maybe. The survey took approximately ten minutes to complete.

Interviews

At the end of the second intervention phase eight typically-developing second-grade students were randomly chosen from the 16 participants with signed parent consent forms to participate in interviews with the researcher. The interviews took place in the school library during the lunch period. Each interview consisted of ten open-ended questions about the buddy relationship and took approximately four to six minutes to complete. An audio recording was made of the interview for transcription purposes. The recordings were deleted at the completion of the study.

Scheduling

Upon receiving IRBPHS approval, the second-grade class was chosen for the study and permission slips were sent home. The researcher met with the second-grade teacher and the special education teacher to give an overview of the study, answer questions, and to set days and times for the *Reading Buddies* intervention. The researcher also began training for the staff that was participating in the data collection.

When permission slips were returned three second-grade students were randomly assigned to each student with LFA and a chart was made of the buddy groups. The chart served as a visual reminder of which students were grouped together as buddies during the intervention phases. Another chart was made to serve as a visual reminder of the *Stay, Read, and Talk to your buddy* procedure. When training of observers was completed and permission slips were returned the study began.

Treatment Fidelity and Social Validity

Treatment fidelity was assessed through observation by the researcher and use of a treatment protocol checklist (see Appendix E for treatment protocol checklist). The checklist served as a reminder to gather the small number of items needed: buddy chart, *Stay, Read, and Talk to Your Buddy* chart, books, markers for happy face cards, stickers, and a timer. The intervention materials were readily available in most classrooms and did not require special purchase. Teachers found the procedure easy to follow enhancing the social validity of the intervention and contributing to fidelity of implementation. Additionally, increasing the interactions between students with LFA and typically-developing students was important for increasing the quality of life of both groups.

Pilot Procedures

The *Autism Peer Perception Survey* was piloted as part of its development for the researcher's class assignment at the University of San Francisco. The survey was approved by the principal and administered to a class of typical second-grade students who had participated in a shared reading activity with students with LFA. An analysis of the survey scores produced a Cronbach's alpha score of .87. Nearly all of the students felt that the survey was easy to complete, and had little trouble following along as questions were read aloud. The survey had a possible range of 10 – 50. Actual scores from administering the survey ranged from a low of 14 to a high of 50 (*M*=32.5, *SD*=10.32).

Data Analyses

Research Question One

In order to assess the effects of the class-wide peer-mediated social skills intervention on the social interactions of students with LFA and typically-developing peers, the researcher used single-subject data analysis, in which performance during baseline was compared to performance during intervention (Horner et al., 2005). Initiations and responses were summed for each session for students with LFA as well as for the typical peers to get a total interaction score for each participant, for total peers (three typically-developing second-graders), and for total buddy group (three second-graders plus student with LFA). Scores were graphed using a simple line graph with sessions running on the horizontal axis and number of interactions running on the vertical axis. Graphing continued from session to session. Introduction of each phase was indicated on the graph by a vertical line.

Three graphs were constructed for each buddy group to analyze: (1) the data of the student with LFA, (2) the data of the student with LFA alongside the total of the three peers, and (3) the data of the entire buddy group as one sum total. A visual inspection of the data for non-overlapping data points and a comparison of mean interactions served as the analysis of the success of each phase. In single-subject design the data should increase or decrease in accordance with active manipulation of the independent variable by the researcher (Horner et al., 2005).

Research Question Two

The second research question examined the perceptions of typical students toward peers with LFA. Students completed the *Autism Peer Autism Peer Perception Survey* at the end of the first baseline phase and again at the end of the study. The researcher examined the scores with respect to mean and standard deviation, as well as to the number of students having a positive or negative view of students with LFA. Possible scores from the survey range from 10 to 50. Scores were examined to see if there were more scores clustered at the high end of the scale (above the mean of 30), indicating a high positive perception or more scores clustered at the low end of the scale (below the mean of 30), indicating a low negative perception. Overall mean scores were examined for changes from pre to post-intervention phases. Finally, individual item mean scores were examined for changes from pre to post-intervention phases.

Research Question Three

To examine the third research question, the researcher conducted open-ended interviews with eight typical second-grade students. Interviews were recorded with an audio recorded and then transcribed. The interview transcriptions were read by the

researcher and then coded as themes emerged by grouping similar comments together. Interview transcriptions were then further reviewed for categories within the themes.

Summary

This chapter presented the methodology for the study of a class-wide peer-mediated intervention to increase the social skills of students with LFA. The research design was presented as an ABAB single-subject design, alternating baseline and intervention phases. A detailed description of the *Reading Buddies* intervention was provided as well as a description of the sample used in this study. The instrumentation was detailed and the researcher included the instruments to be used as appendixes. Data analysis was discussed for each of the research questions. The methodology of the study presented here was paramount to the answering of the research questions.

CHAPTER FOUR

RESULTS

The present study used a mixed method design to investigate the effects of a classwide peer-mediated intervention on the social interactions of students with low-functioning autism (LFA) and typically-developing peers, the perceptions of the typical peers before and after the intervention, and the quality of the relationship between the students with LFA and their typical peers. The first portion of the study used a single-subject ABAB design to compare the social interactions, as measured by initiations and responses, of students with LFA and typically-developing second-grade students. The *Autism Peer Perception Survey* was used to compare pre and post-intervention perceptions of students with LFA held by the typical peers. Finally, open-ended interview questions were used to examine the quality of the relationship between the students with LFA and their typical peers.

All members of the second-grade class and all members of the special education class participated in this classwide peer-mediated intervention and were assigned to reading buddy groups. There were a total of eight reading buddy groups, with each reading buddy group consisting of three typically-developing second-grade students and one student with LFA. Four reading buddy groups were the target groups for observation and data recording during the classwide peer-mediated intervention. The intervention included three key steps, stay with your buddy, read with your buddy, and talk with your buddy. The intervention was designed to increase the social interactions between the students with LFA and their typically-developing peers. Trained observers recorded the

initiations and responses of the participants for varying ten-minute intervals during the activity.

The results of the study are presented in three sections to address the research questions. The first section reviews the results of the single subject design study on the interactions of students with LFA and typically-developing second-graders. The second section reviews the results of the *Autism Peer Perception Survey* before and after the *Reading Buddies* intervention. Finally, the third section examines the quality of the students' relationship using the open-ended interviews.

Analysis Related to Research Question One

The first research question asked what is the effect of a class-wide peer-mediated social skills intervention on the social interactions, as measured by initiations and responses, of students with LFA and typically-developing peers. A single-subject ABAB design was implemented and results were analyzed using both a visual comparison of data points across conditions, as well as a comparison of mean interactions across conditions. The study consisted of two baseline phases (A) and two intervention phases (B). Each baseline phase was composed of four data points and each intervention phase was composed of six data points. Data were evaluated three ways: by individual participant with LFA, by total of the three peers in the buddy group of the student with LFA, and by total buddy group, which included the three typical peers and one student with LFA. Pseudonyms were given to participants in order to maintain confidentiality. Table 1 provides an overview of the mean interactions for all study participants.

Table 1

Mean Interactions of Students with LFA and Typical Peers

	Baseline Phase One		Intervention Phase One		Baseline Phase Two		Intervention Phase Two	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Caleb (LFA)	11.75	9.54	22.67	12.42	5.75	5.68	19.00	6.78
Peer one	4.75	5.50	9.00	6.03	5.75	6.50	15.33	8.66
Peer two	13.50	9.57	16.67	16.33	4.75	3.77	12.83	8.84
Peer three	3.00	2.94	8.83	8.13	7.25	8.62	11.33	10.52
Total peers	21.25	11.76	34.50	10.35	17.75	13.79	39.50	7.42
Total Buddy Group One	33.00	18.94	57.17	22.31	23.50	19.47	58.50	13.66
Jack (LFA)	13.25	5.44	26.20	12.44	26.00	11.27	30.00	9.97
Peer one[a]	10.50	7.59	----		----		----	
Peer two	9.75	6.18	20.00	11.11	15.00	5.29	23.50	6.61
Peer three	13.50	6.56	31.00	13.71	19.67	5.51	53.75	24.57
Total peers	33.75	19.96	50.00	17.93	34.67	10.02	77.25	31.04
Total Buddy Group Two	47.00	25.22	76.20	27.72	60.67	21.23	107.25	38.68
Mary (LFA)	7.75	8.06	36.20	17.40	28.75	11.90	40.50	12.86
Peer one	7.00	10.23	18.00	4.47	19.00	11.17	20.17	9.60
Peer two[b]	4.75	3.40	17.20	9.91	12.00	--	19.33	14.67
Peer three	4.25	7.85	11.60	8.05	14.25	11.59	19.00	10.12
Total peers	16.00	12.91	46.80	17.50	36.25	13.77	58.50	30.55
Total Buddy Group Three	23.75	20.37	83.00	34.31	65.00	25.66	99.00	42.35
Thomas (LFA)	25.67	2.52	17.33	7.63	22.25	13.12	21.17	11.23
Peer one	20.67	17.90	25.33	10.56	16.00	16.59	21.80	8.23
Peer two	24.67	12.66	23.00	10.71	16.00	16.00	20.83	17.60
Peer three	14.67	9.07	25.17	16.45	16.25	20.53	21.50	10.93
Total peers	60.00	14.73	73.50	19.90	44.25	4.79	60.50	14.72
Total Buddy Group Four	85.67	12.02	90.83	23.94	66.50	16.34	81.67	23.38

Note. [a]Peer one (Jack LFA) withdrew from school after the first baseline phase. [b]Peer two (Mary LFA) was absent three days in baseline two.

Buddy Group One

Participants in buddy group one responded with an increase in interactions from the first baseline to the first intervention phase. Caleb, the student with LFA, exhibited an increase in mean interactions from baseline phase one (M=11.75, SD=9.54) to intervention phase one (M=22.67, SD=12.42). Total mean interactions of the three typical peers increased from baseline phase one (M=21.25, SD=11.76) to intervention phase one (M=34.50, SD=10.35), and mean interactions for the entire buddy group increased from baseline phase one (M=33.00, SD=18.94) to intervention phase one (M=57.17, SD=22.31).

Participants displayed a regression in interactions when the second baseline phase was implemented. A reduction in interactions was observed, for Caleb (M=5.75, SD=5.68), total peers (M=17.75, SD=13.79), and the entire buddy group (M=23.50, SD=19.47).

Participants showed an increase in interactions when the final intervention phase was reinstated. An increase in interactions was observed for Caleb (M=19.00, SD=6.78), total peers (M=39.50, SD=7.42), and the entire buddy group (M=58.50, SD=13.66). A visual analysis of the data graphs showed few overlapping data points for Caleb, total peers, and the buddy group. Figure 2 provides an overview of interactions for buddy group one.

Buddy Group Two

Participants in buddy group two also responded with an increase in interactions from the first baseline to the first intervention phase. Mean interactions for Jack, the
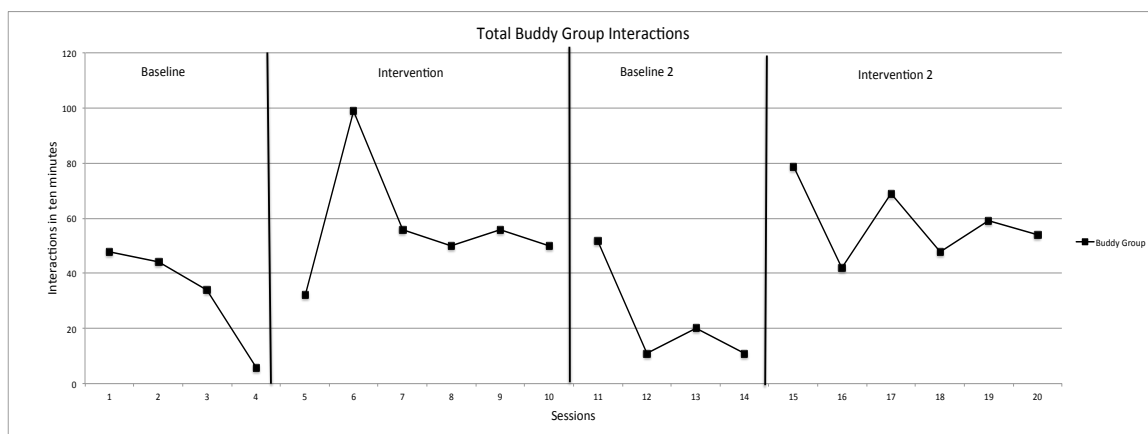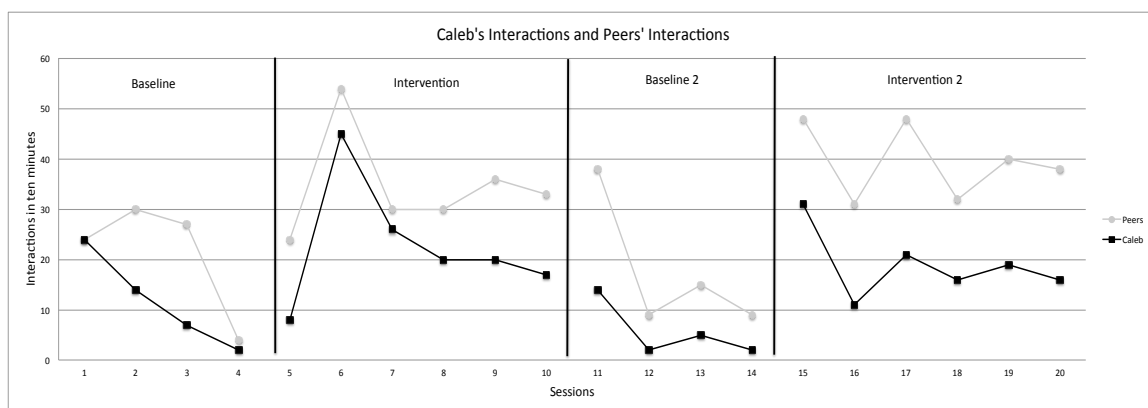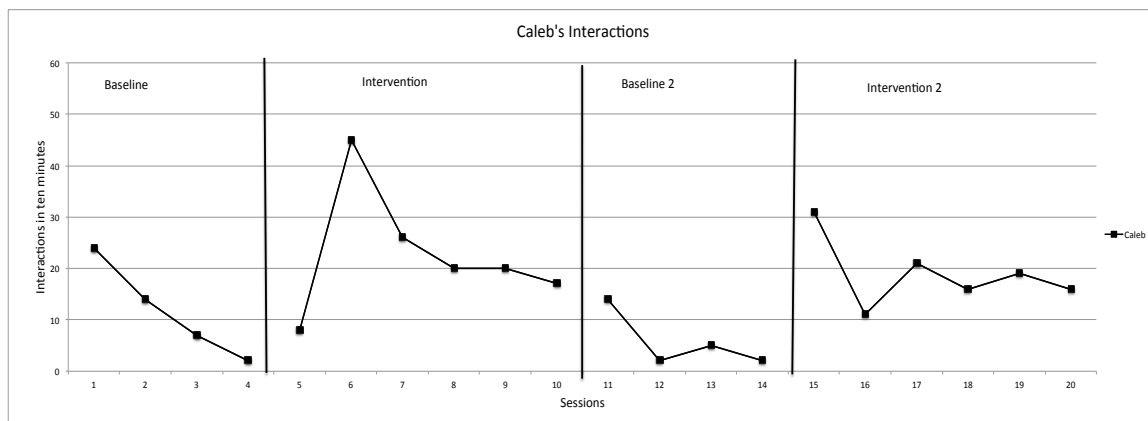
Figure 2. Graphs of Caleb's and peers' interactions.

student with LFA, increased from baseline phase one (M=13.25, SD=5.44) to intervention phase one (M=26.20, SD=12.44).   Mean interactions for total peers increased from baseline phase one (M=33.75, SD=19.96) to intervention phase one (M=50.00, SD=17.93), and mean interactions for the buddy group increased from baseline phase one (M=47.00, SD=25.22) to intervention phase one (M=76.20, SD=27.72).

Returning to the baseline phase resulted in a regression in interactions for all group two participants. Jack exhibited a decrease in interactions (M=26.00, SD=11.27), as did total peers (M=34.67, SD=10.02), and the buddy group (M=60.67, SD=21.23). Interactions increased again during the second intervention phase for Jack (M=30.00, SD=9.97), total peers (M=77.25, SD=31.04), and the buddy group (M=107.25, SD=38.68).   A visual analysis of the data graphs showed small variability in interactions across phases for Jack, with one low data point in one intervention phase and one high data point during one baseline phase. Aside from these two data points, Jack and his peers displayed few overlapping data points all together. Figure 3 provides an overview of the interactions for buddy group two.

Buddy Group Three

Participants in buddy group three increased mean interactions from baseline phase one to intervention phase one. Mary, student with LFA, increased interactions from baseline phase one (M=7.75, SD=8.06) to intervention phase one (M=36.20, SD=17.40). Mean interactions for the peers increased from baseline phase one (M=16.00, SD=12.91) to intervention phase one (M=46.80, SD=17.50), and mean interactions for the entire buddy group increased from baseline phase one (M=23.75, SD=20.37) to intervention phase one (M=83.00, SD=34.31).
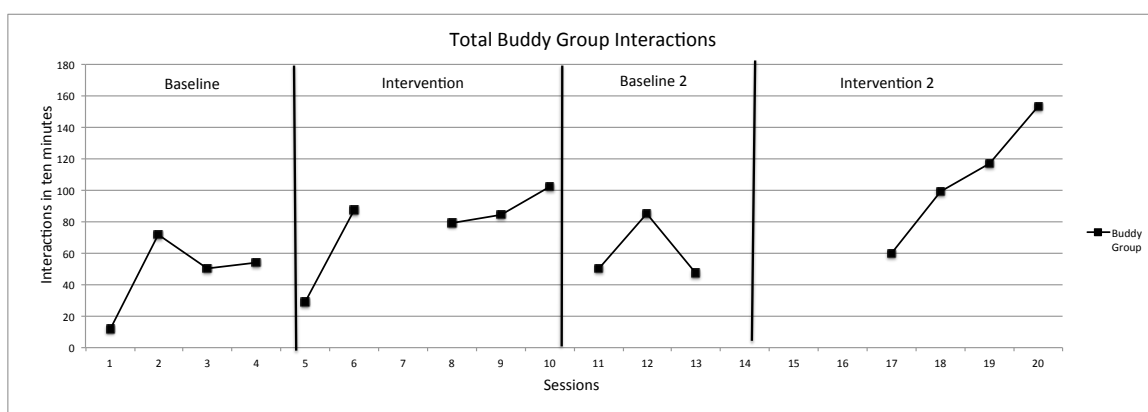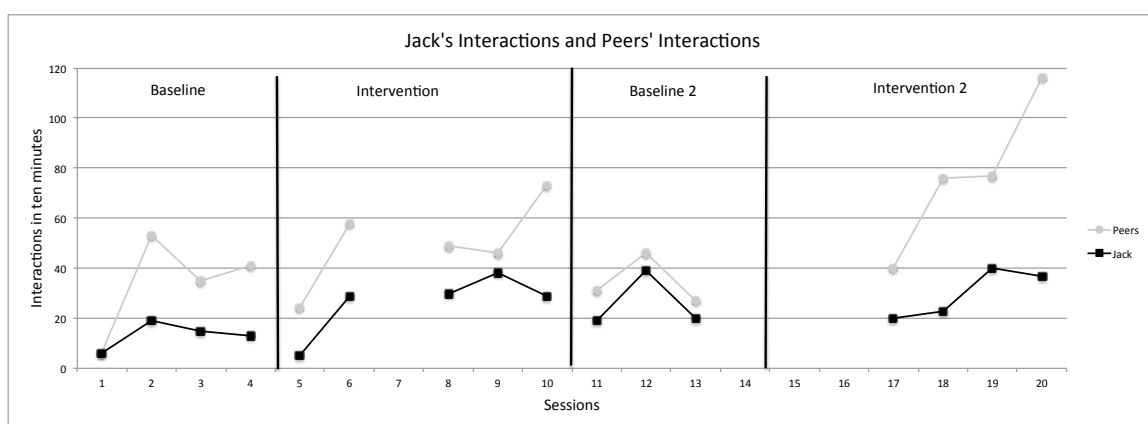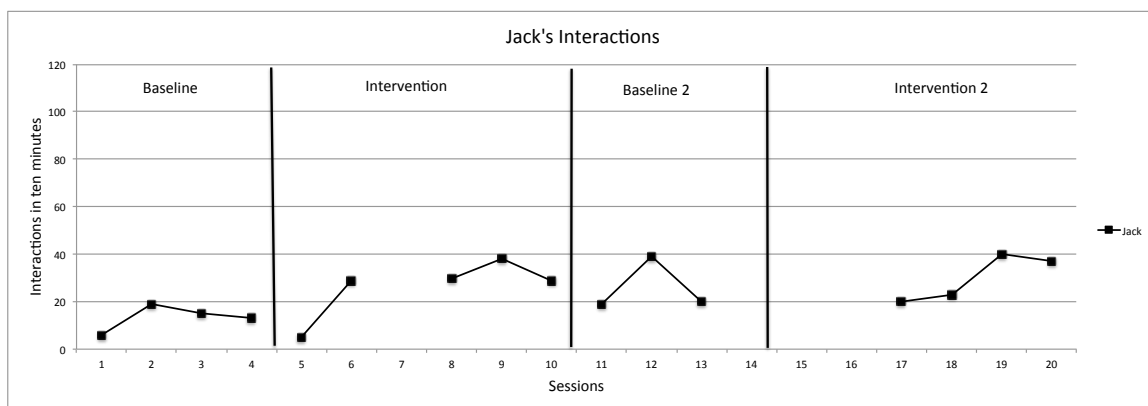
Note. Jack spent entirety of session 7 in behavioral episode, and was absent sessions 14-16.

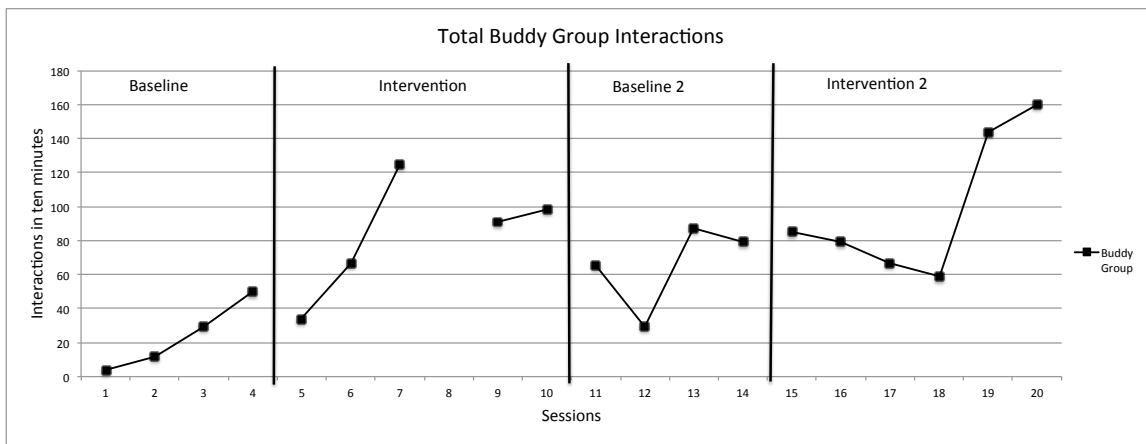*Figure 3.* Graphs of buddy group two.

Group three participants exhibited a reduction in interactions from intervention phase one to baseline phase two. Mary displayed a decrease in interactions (*M*=28.75, *SD*=11.90), as did total peers (*M*=36.25, *SD*=13.77), and the entire buddy group (*M*= 65.00, *SD*=25.66).

Interactions for group three participants increased with a reinstatement of the intervention. Mary increased interactions in intervention phase two (*M*=40.50, *SD*=12.86), along with total peers (*M*=58.50, *SD*=30.55), and the buddy group (*M*=99.00, *SD*=42.35). A visual analysis of the data graphs from buddy group three showed a small degree of variability for Mary but overall few overlapping data points across phases. See Figure 4 for an overview of interactions for buddy group three.

Buddy Group Four

Participants in buddy group four increased mean interactions from baseline phase one to intervention phase one except for Thomas, student with LFA. Thomas decreased interactions from baseline phase one (*M*=25.67, *SD*=2.52) to intervention phase one (*M*=17.3, *SD*=7.633). Mean interactions for the total peers increased from baseline phase one (*M*=60.00, *SD*=14.73) to intervention phase one (*M*=73.50, *SD*=19.90), and mean interactions for the buddy group increased from baseline phase one (*M*=85.67, *SD*=12.02) to intervention phase one (*M*=90.83, *SD*=23.94).

When baseline phase two was implemented participants showed a reduction in interactions, except for Thomas. Thomas showed an increase in mean interactions (*M*=22.25, *SD*=13.12), while mean interactions for total peers decreased (*M*=44.25, *SD*=4.79), and mean interactions for the buddy group also decreased (*M*=66.50, *SD*=16.34).

Mary's Interactions

Mary's Interactions and Peers' Interactions

Total Buddy Group Interactions
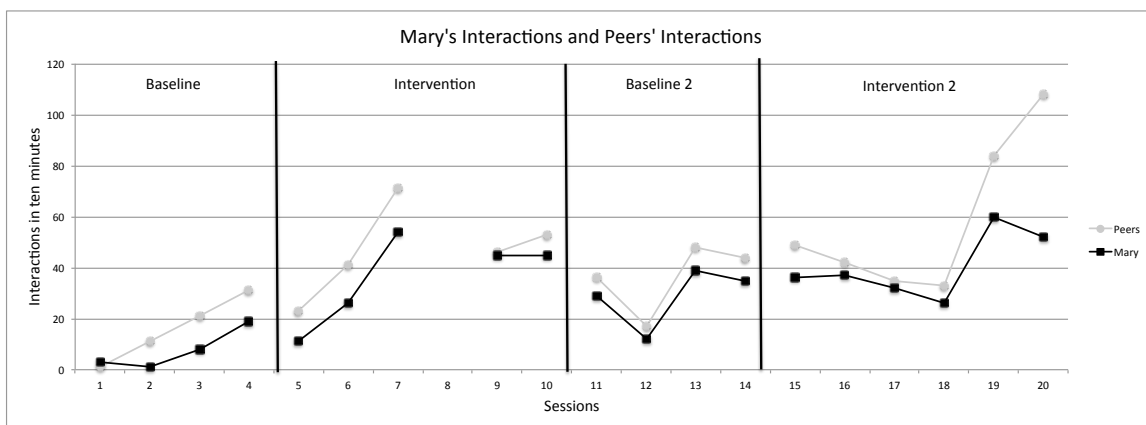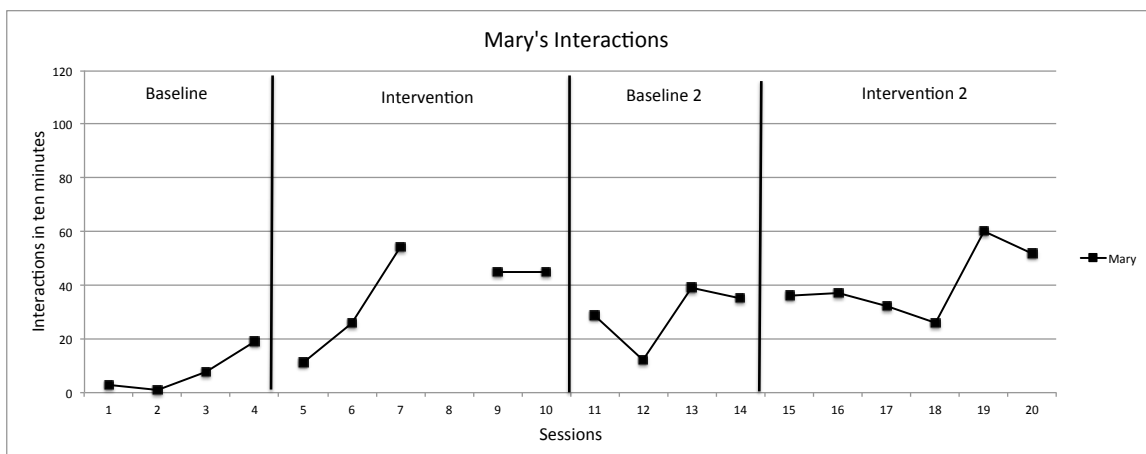
Note. Mary was absent on session 8.

Figure 4. Graphs of buddy group three.

Reinstating the intervention resulted in a decrease in mean interactions for

Thomas (*M*=21.17, *SD*=11.23), but an increase in mean interactions for total peers

(*M*=60.50, *SD*=14.72), and the buddy group (*M*=81.67, *SD*=23.38). A visual analysis of

the data graphs showed less distinction across phases for Thomas, with several

overlapping data points. However, data for the typical peers and the buddy group showed

few overlapping data points across conditions. Figure 5 provides an overview of

interactions for buddy group four.

Interobserver Agreement

Interobserver agreement was calculated by using two trained observers to record

the interactions of one buddy group. Twenty-seven percent of all sessions were double

scored with an overall interobserver agreement rate of 86%. Interobserver agreement

was calculated by first summing the total interactions recorded by each observer, and

then dividing the lower number of interactions by the higher number of interactions and

multiplying the answer by one hundred. Interobserver scores are presented in Table 2.

Table 2

Interobserver Agreement for Observations of Interactions

	Percent sessions double scored	Mean agreement	Range of agreement
Caleb's group	25%	90%	75% - 100%
Jack's group	25%	80%	47% - 95%
Mary's group	26%	81%	66% - 92%
Thomas' group	26%	91%	83% - 97%
Baseline phases	31%	86%	66% - 100%
Intervention phases	19%	86%	47% - 98%
Total	26%	86%	47% - 100%
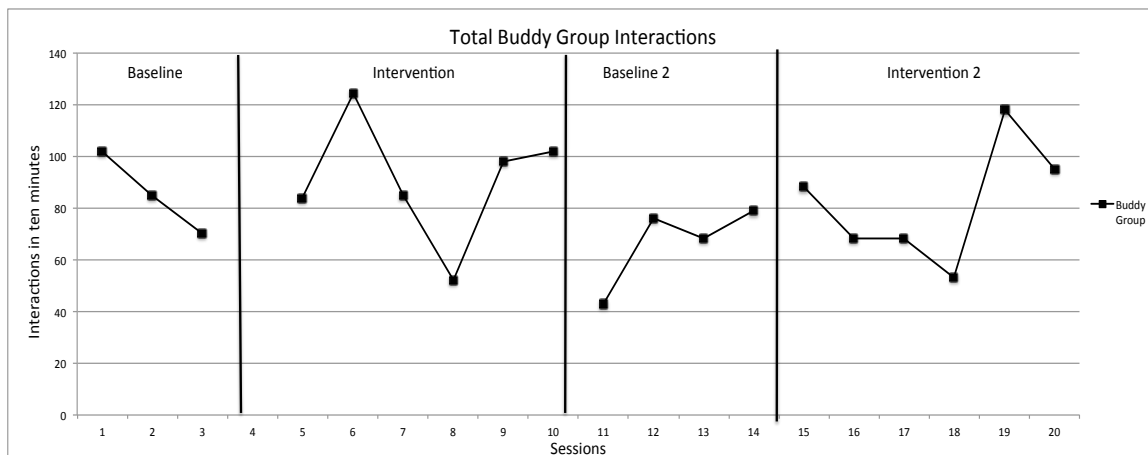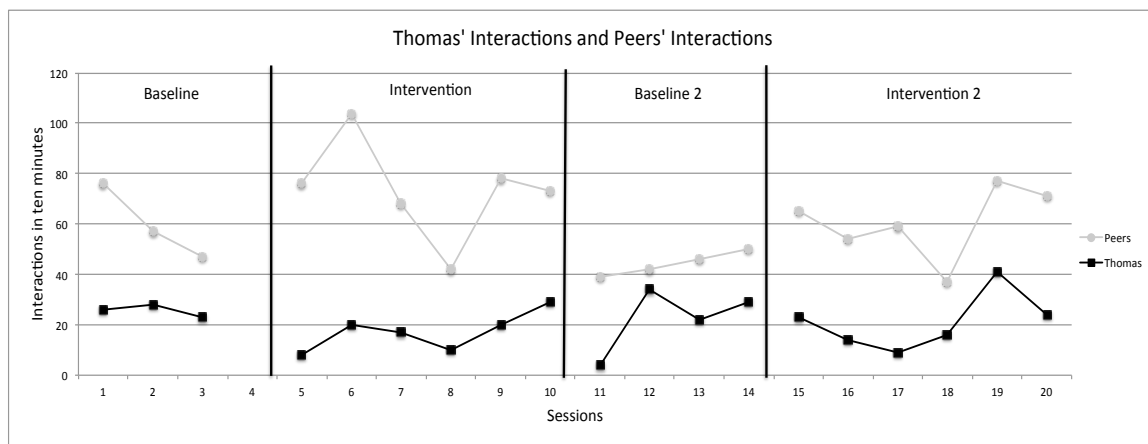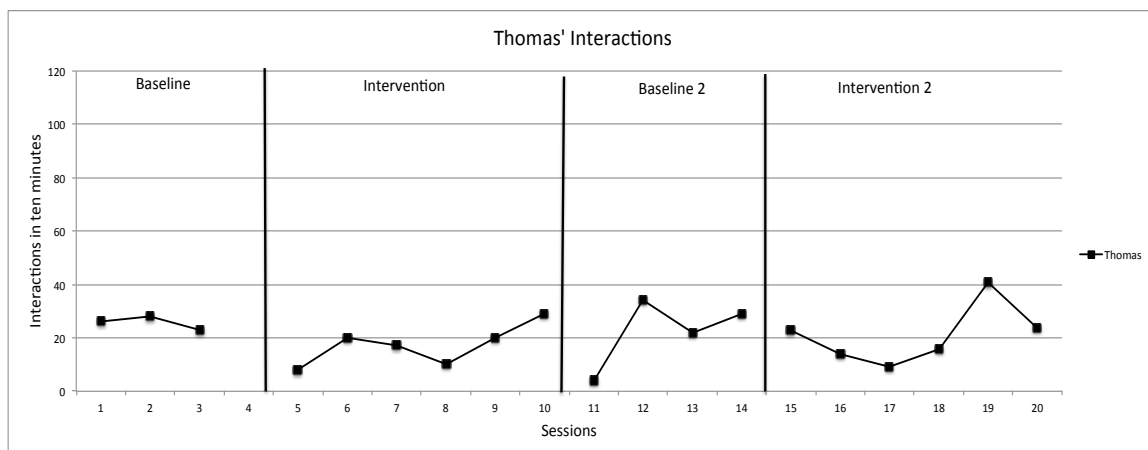
Note. Thomas was absent on session 4.

Figure 5. Graphs of buddy group four.

Analysis Related to Research Question Two

The second research question asked what are the changes in perceptions of typically-developing second-graders toward their peers with LFA after participating in the *Reading Buddies* intervention. Perceptions were measured using the *Autism Peer Perception Survey*, a ten-item, three-point Likert scale. The perception scale had a possible range of scores of 10-50, with higher scores indicating a more positive perception.

Perceptions of the typical peers were measured before and after the intervention. Fifteen typically-developing second-grade students, eleven boys and four girls, completed both the pre and post-intervention survey. The pre-intervention survey was given at the end of the first baseline phase. Scores on this first administration of the perception scale ranged from 26 to 50, (M=40.88, SD=7.83). Fourteen scores fell within the more positive range of the perception scale, no scores fell in the neutral range of the perception scale, and one score fell within the less positive range of the perception scale. There were small differences between girls (M=43.00, SD=11.49) and boys (M=40.73, SD=6.77). The overall mean score (M=41.33, SD=7.88) on the first administration of the perception survey indicated a perception in the more positive range. Table 3 provides an overview of survey results.

Table 3

Autism Peer Perception Survey Scores

	Pre-intervention			Post-intervention		
	N	Mean	SD	N	Mean	SD
Mean Scores	15	41.33	7.88	15	42.00	8.72
Boys	11	40.73	6.77	11	42.55	6.87
Girls	4	43.00	11.49	4	40.50	13.89
Perception Values						
More positive > 30	14			14		
Neutral $= 30$	0			0		
Less positive < 30	1			1		

To examine changes in perception of the typically-developing students toward their peers with LFA the *Autism Peer Perception Survey* was administered a second time. The perception survey was given again at the end of the study after the second intervention phase. Scores on the post-intervention survey ranged from 20-50, (*M*=42.00, *SD*=8.72). Again, fourteen scores fell into the more positive range, no scores fell in the neutral range and one score fell in the less positive range. The post-intervention survey scores indicated that individual scores showed little variation from pre-intervention scores, with the same number of students scoring in the more positive, neutral, and less positive ranges. Overall 93% of participants had perception scores in the more positive range before and after participating in the intervention.

Perception scores were also examined by gender. There were small differences between girls (*M*=40.50, *SD*=13.89) and boys (*M*=42.55, *SD*=6.88) indicating some change from pre-intervention scores for both groups. Boys mean perception scores went up, while girls mean perception scores went down. Reliability was assessed using the

statistical software package SPSS. An analysis of Cronbach's alpha revealed high

reliability scores for pre (α = .84) and post-intervention surveys (α= .87).

In addition to overall mean scores of the survey, individual items were examined

for changes in mean responses. Items one and five showed the greatest mean differences

of the ten survey items, both in the positive direction. Item one asked the participant to

respond to "My buddy is a lot like me even though he/she has autism," and resulted in a

mean difference of .40 in the positive direction. More students responded that their

buddy with LFA was a lot like them after participating in the intervention. Item five

asked the participant to respond to "If I saw my buddy on the playground I would play

with him/her," and resulted in a mean difference of .67 in the positive direction. More

students responded that they would play with their buddy on the playground after the

intervention than before. Item five represented the greatest change from the pre-

intervention survey. Table 4 provides an overview of all item response means.

Table 4

Autism Peer Perception Survey Item Mean Scores

	Pre-intervention		Post-intervention		Difference
	Mean	SD	Mean	SD	
Question 1	3.40	1.35	3.80	1.26	0.40
Question 2	4.60	.83	4.33	.98	-0.27
Question 3	3.67	1.45	3.53	1.60	-0.13
Question 4	4.33	1.45	4.20	1.47	-0.13
Question 5	3.80	1.47	4.47	1.19	0.67
Question 6	4.47	1.23	4.73	.70	0.27
Question 7	4.20	1.01	3.93	1.67	-0.27
Question 8	4.73	.70	4.73	.70	0.00
Question 9	3.93	1.49	4.20	1.26	0.27
Question 10	4.20	1.27	4.07	.49	-0.13

Analysis Related to Research Question Three

The third research question asked how do typically-developing second-grade students describe the quality of the relationship with their peers with LFA after participating in the *Reading Buddies* intervention. To answer this question, eight typically-developing second-graders were randomly chosen from the participants and interviewed by the researcher at the end of the second intervention phase. Interviews consisted of ten questions and took from four to six minutes to complete. Interviews were recorded and then transcribed. The interview conversations were then examined for themes. Three main themes emerged from the interview analysis.

Mutual Enjoyment of the Activity

The first theme to emerge from the interviews was the theme of mutual enjoyment of the *Reading Buddies* activity, with typically-developing peers expressing that they and the student with LFA gained pleasure from being together. Four main categories developed under this theme: having fun and physical affection, enjoying reading together, enjoying the reinforcement component, and wanting to continue the activity.

Fun and physical affection. Fun and physical affection was a component mentioned by all the interview participants.   This category describes the ways the participant had fun together and the physical action of the participants showing affection toward each other, predominantly through hugs and high fives. The typically-developing second-graders stated that they had fun during *Reading Buddies* and gave many examples of ways their buddy enjoyed the activity too. One student stated, "It's pretty fun because they (student with LFA) can hug us and we can give them high fives."   Another student stated, "He always hugs me on the arm and we always give him high fives. We are happy

to interact with him." Other statements made by interview participants included, "We have lots of fun together" and "We play and have fun and read." Though the *Reading Buddies* intervention was a structured activity involving shared reading, the typically-developing peers expressed enjoyment beyond the academic component. The typical peers also expressed pleasure in making their buddy with LFA happy. One student responded, "I like reading to him so he can be happy and he likes being with me."

Enjoying reading together. Enjoying reading together was also mentioned by almost all of the interview participants. This category describes the actual reading of the books and how reading was a shared source of pleasure for the participants. Several of the interview participants indicated that they knew their buddy with LFA enjoyed the activity because the buddy with LFA looked at the book and paid attention when the book was read to him or her. One typical peer indicated that when he/she was reading the book, the buddy with LFA was smiling. Another typically-developing second-grader indicated that when he/she stopped reading the book, their buddy with LFA indicated he/she wanted to continue the activity by saying, "Read, read." Another typically-developing second-grade participant stated, "When I was reading *Bubbles, Bubbles* (name of book) he was laughing." One further participant indicated that, "He (student with LFA) likes having me read to him so he can be happy. He is happy and we don't make him feel lonely."

Enjoying the reinforcement component. Enjoyment of the reinforcement component was also mentioned as a common element of many interview participants. This category relates to the reinforcement (reward) system, sometimes called token economy, which the students with LFA used as part of their autism program. The typical

second-grade peers participated in delivering the reinforcement to their buddies with LFA. For example, the second-grade peer would draw a happy face on the student with LFA's token card when the student with LFA was participating appropriately. When the card was full it could be exchanged for a small prize or activity. One typical second-grade student said, "I like to see him (student with LFA) play the activities that he likes." The typical peer was referring to the reinforcement system in which he/she gave the student with LFA a happy face on his token card. The token card was then exchanged for reinforcement, such as a minute of a preferred activity (i.e. iPad, bouncing a ball). This typical peer gained pleasure in seeing the student with LFA enjoy his/her reinforcement. Another student stated that he liked it, "when he (student with LFA) gets a prize with three happy faces." The typically-developing second-graders were clearly able to indicate that they enjoyed when their peer with LFA gained access to their reinforcement, even though they were not receiving that same reinforcement.

Wanting to continue the *Reading Buddies* activity. This category refers to the desire expressed by the typically-developing peers to continue with the *Reading Buddies* activity. The interviews were conducted after the last intervention session and the typically-developing students understood that *Reading Buddies* was over, i.e. they would no longer be meeting with their buddies with LFA. Several interview participants indicated their desire to continue the *Reading Buddies* activity even after intervention sessions were complete. One typical peer stated, "We have lots of fun together," and wanted to continue the activity, "It's just been fun and I'd like to do it (again) next week." Another typical peer commented, "I want to do it every year of my life." One student indicated he enjoyed seeing his buddy even outside of the *Reading Buddies*

activity, " I see him sometimes at school and I can talk to him and I just like doing that because it just make me happy."

Typical Peer and Buddy Help Each Other

Another theme to emerge from the interviews was the theme of the typical peer and the student with LFA helping each other. Three main categories developed under this theme: the typical peer helping the student with LFA, the student with LFA helping the typical peer, and helping beyond the reading component.

Typical peers help students with LFA. Helping the student with LFA was expressed as a common theme by almost all of the typically-developing second-grade participants.   Comments in this category reflected ways in which the typically-developing students helped their buddy with LFA. Many of the typical second-graders expressed that they helped their buddy with LFA by restating the core steps of the intervention, "We stay with our buddy, we read with our buddy, and we talk with our buddy." The typical peers were then able to expand on that concept and explain how the activity was helping the student with LFA. One typical peer commented, "We don't hog the book to ourselves. We show them that they need to do what they are supposed to do." Another typically-developing student stated, "Sometimes (student with LFA) can get up and go away but I just take him back to the chair and keep reading my book." The typical peers also recognized that beyond just reading the book they were expanding the activity and helping the student with LFA. One participant commented, "He (student with LFA) listens to what I say when I point to something (in the book) or when I ask him a question or I ask him to do something with the book that involves the book."

Students with LFA help typical peers. A second category to develop within this theme was that the students with LFA also helped the typically-developing second-grade students. Comments in this category reflected ways in which the student with LFA helped the typically-developing peer. Several typical peers indicated that the student with LFA helped them with words in the book. Recognizing that the students with LFA were able to help with reading is an important factor as some of the second-grade students were still developing their own reading skills. One student expressed, "(Student with LFA) is actually a pretty good reader because he read the first word to me. He just read me the word." Another typical peer expressed, "When I kind of get stuck on a word he (student with LFA) kind of says the beginning of the word."

Helping beyond the reading component. A third category to develop in this theme was that participants helped each other beyond the reading component. This category relates to the manner in which participants were able to help each other in addition to reading the book. Several typically-developing second-grade participants commented on ways that they and their buddies with LFA helped each other that were not necessarily related to reading. One typical peer expressed, "We always ask each other questions and we can do what we are best at doing together." Another typically-developing student expressed, "We help each other if somebody feels bad, if he (student with LFA) feels bad or if I feel bad." Several interview participants also expressed that they helped the student with LFA to not be lonely. One typical peer commented, "I would say don't be lonely …. Do what you like doing with me." Another typical peer stated, "We don't make him feel lonely."

Typical Peer and Buddy are Friends

The third theme to emerge from the interviews was that the typically-developing peers and the buddies were friends. Two main categories developed under this theme: recognizing the friendship, and recognizing the buddy as a friend beyond the reading activity.

Recognizing the friendship. A common element throughout the interviews was that the second-grade participants recognized their buddy with LFA as a friend. Comments in this category largely described how the participants knew they were friends. All typical peers indicated without hesitation that their buddy with LFA was a friend and were able to give examples of how they knew they were friends. One typical second-grade student expressed, "We are friends because whenever I hold his hand he holds it tighter," and another typical peer expressed, "Whenever someone else is reading to him, he (student with LFA) holds my hand, so I think we are good friends." Another typically-developing student expressed that she knew they were friends because, "Whenever I am reading (student with LFA) is always smiling and trying to play." One additional typical peer expressed that he and his buddy with LFA were friends because, "We always play together and we do stuff together."

Recognizing the friendship beyond the reading activity. The typically-developing second-grade participants also recognized the friendship with their buddy with LFA beyond the reading activity. Comments in this category reflect the ways participants viewed themselves as friends outside of the reading activity. Several typically-developing students discussed seeing their buddy with LFA outside of the *Reading Buddies* activity and indicated they treated their buddy as a friend. Some typical

students talked about seeing their buddy on the playground, and one expressed, "I would play with him and ask him what he wants to do." Another typical peer commented, "I go over there (to him) and ask him what do you want to do?" One typically-developing student mentioned seeing his buddy with LFA around school and commented, "I see him sometimes at school and I can talk to him and I like doing that." Another participant stated, "Sometimes at recess I look at him (student with LFA) and say "hi" and sometimes I might play with him for a bit." Another student expressed, "He's my friend so if he was playing alone I would say don't be lonely … do what you like doing with me." When asked if he and his buddy with LFA were friends one student summed it up by saying, "Oh yeah definitely," and when asked how he could tell they were friends he said, "because we can do what we are best at doing together."

Summary

In this study of a classwide, peer-mediated social skills intervention aimed at increasing the social interactions of students with LFA and typically-developing peers, mean interactions, as measured by initiations and responses, were examined across conditions. Three students with LFA, Caleb, Jack, and Mary, demonstrated increased interactions from each baseline to intervention phase. More specifically, Caleb, Jack, and Mary showed at least one increase in mean interactions that was doubled from baseline to the intervention phase. This examination of the mean interactions across conditions indicated a clear manipulation of the dependent variable -- initiations and responses -- based on the introduction and withdrawal of the independent variable, *Reading Buddies,* for Caleb, Jack, and Mary.

One student with LFA, Thomas, showed a decrease in mean interactions from each baseline to intervention phase. Overall Thomas exhibited relatively little change in mean interactions across each phase of the study.   The manipulation of the dependent variable by the introduction and withdrawal of the independent variable did not result in mean interactions changing in the expected direction for Thomas.

Each of the four sets of typically-developing peers displayed an increase in mean interactions from each baseline to intervention phase. Additionally, all four buddy-groups (three typical peers and one student with LFA) showed an increase in mean interactions from each baseline to intervention phase. The results of the study indicate that the introduction and withdrawal of the independent variable did result in a change in the dependent variable for all participants except Thomas.

This study also examined the perceptions of the typically-developing second-graders toward their peers with LFA before and after their participation in the *Reading Buddies* intervention using the *Autism Peer Perception Survey.* Results of the survey revealed a high initial perception of peers with LFA held by the typically-developing second graders (*M*=41.33, *SD*=7.88), and a maintenance of high positive perceptions after participating in the intervention (*M*=42.00, *SD*=8.72). Following the intervention 14 of 15 participants reported a more positive perception of peers with LFA, no participants reported a neutral perception of peers with LFA, and one participant reported a less positive perception of peers with LFA.

A review of individual item response means from the pre and post-intervention surveys revealed two questions that displayed substantial change in the positive direction. More participants indicated that "My buddy is a lot like me even though he/she has

autism," after their participation in the intervention than before their participation in the intervention. Additionally, more participants indicated that "If I saw my buddy on the playground I would play with him/her," after their participation in the intervention than before their participation in the intervention.

Finally, this study examined the quality of the relationship between the student with LFA and the typically-developing peers through the use of open-ended interviews. Three main themes emerged from the analysis of interview responses. One theme revealed in the interviews was that participation in the *Reading Buddies* intervention was mutually enjoyable for both the typically-developing peers and the students with LFA. Interview participants indicated they enjoyed reading with their buddy with LFA and making their buddy with LFA happy, enjoyed giving and receiving hugs and high fives, enjoyed seeing their buddy with LFA earn their reinforcement activities even though they were not receiving the same reinforcement, and could tell their buddies with LFA enjoyed the activity by the way they laughed, smiled, and asked for more reading.

Another theme to emerge in the interviews was that the typical peers and their buddies with LFA helped each other out. Interview participants indicated that they read to their buddies with LFA, asked them questions, and tried to get them involved in the stories, and that their buddies with LFA sometimes helped them read words they did not know. Participants also revealed that both they and their buddies with LFA helped each other if one felt bad or lonely, and that they each helped by each doing what they were best at doing.

The final theme to emerge was that the typically-developing students and their buddies with LFA viewed each other as friends. Participants indicated that their buddies

with LFA held their hands, smiled, laughed, and played with them, which indicated to them that the buddies with LFA thought they were friends. Participants also revealed that they talked with their buddies with LFA when they saw them at school, played with them on the playground, and tried to make sure they were not lonely. All of the typical peers indicated that they were indeed friends with their buddy with LFA, and were able to give specific examples of how they knew that to be so.

CHAPTER FIVE

SUMMARY, LIMITATIONS, DISCUSSION, AND IMPLICATIONS

This chapter presents the summary, limitations, discussion, and implications of the research study. The summary section provides an overview of the study, including the rationale, purpose, theoretical framework, research questions, methodology, and summary of the findings. The second section presents a discussion of the limitations of the study. The third and fourth sections discuss the findings and the implications for future research and practice. The chapter concludes with a final summary.

Summary of Study

The social impairments of students with autism present significant challenges with acquiring friendships and participating in ongoing relationships with typical peers (Owen-DeSchryver, Carr, Cale, & Blakeley-Smith, 2008). Even when physically included in general education classrooms students with autism may be socially excluded from participation because of limited communication skills or awkward behaviors. Students with autism rarely initiate interactions with their peers, and when peers initiate with them they often respond inappropriately, prompting the typical peer to terminate the interaction. These social difficulties often mean students with autism are left with few opportunities for peer support, leaving them susceptible to teasing and bullying in the school setting, and increasing the potential for maladaptive behaviors (Bellini, Peters, Benner, & Hopf, 2007; DiSalvo & Oswald, 2002).

Poor peer interaction skills of students with autism also have potentially long-term consequences, as deficits in social interaction tend to compound over time. Few adults with autism report having reciprocal friendships, and many report having no

friends at all aside from family members or paid caregivers (Billstedt, Gillberg, &

Gillberg, 2011; Howlin, Goode, Hutton, & Rutter, 2004). Increasing time spent with

typical peers is important for improving social interaction skills across the lifespan,

making inclusive activities a critical component of school programs for students with

LFA.

The long-term outcomes of students with autism are further impacted by the

severity of the characteristics of the disorder, such that students with low-functioning

autism (LFA) generally show less improvement in social deficits over time than students

with high functioning autism (Ben-Itzchak & Zachor, 2007; Mayes & Calhoun, 2011).

Students with LFA exhibit greater difficulties in communication and behavioral

regulation than students with high functioning autism making them less likely to interact

with peers for social engagement. Additionally, interventions that are successful at

improving the social deficits of students with high functioning autism may not be

successful at improving the social deficits of students with LFA. Finding effective peer

interaction strategies for students with LFA is critical to improving the social outcomes

for this subset of the population (Banda, Hart, & Liu-Gitz, 2010; Harper, Symon, & Frea,

2008; Reichow & Volkmar, 2010; Rogers, 2000; Schreibman, Stahmer, Barlett, &Dufek,

2009).

Educating students with autism in inclusive settings has been thought to be

beneficial because of increased access to typical peers (McConnell, 2002). By exposing

students with autism to typical peer models that engage in socially appropriate behavior,

it was anticipated that the students with autism would learn appropriate social skills.

However, research has shown that simply placing students with autism in inclusive

settings without specific interventions is not enough to promote peer interaction (Bass & Mulick, 2007; DiSalvo & Oswald, 2002; Simpson, de Boer-Ott, & Smith-Myles, 2003). Students with autism do not inherently assimilate the social skills of their peers just by being in close proximity.

Peer-mediated interventions in which typically-developing peers are taught the skills to interact with students with autism have been shown to be successful at increasing interactions between students with autism and their peers (Banda, Hart, & Liu-Gitz, 2010; Harper, Symon, & Frea, 2008; Kamps et al., 2002; Morrison, Kamps, Garcia, & Parker, 2001; Owen-DeSchrvyer et al., 2008). Peer-mediated interventions rely on typically-developing peers to model and reinforce appropriate social behaviors of students with autism. In addition, peer-mediated interventions remove the adult as the intervention agent and promote the typical peer directly eliciting participation of the student with autism. However, few peer-mediated studies have involved students with LFA and few have involved interventions using academic activities within the classroom setting (Banda, Hart, & Liu-Gitz, 2010; Rogers, 2000).

Though peer-mediated interventions have been shown to be effective at improving the social skills deficits of students with autism, the relationship between the typical peer and the student with autism has not been examined (Owen-DeSchryver et al., 2008; Rogers, 2000). Questions remain over what impact peer-mediated interventions have on the quality of the relationship between the student with LFA and the typical peer. Furthermore, little is known about how participation in such interventions impacts the typical peers. Students with LFA need reciprocal friendships and extended relationships if they are to have improved social skills and ultimately improved long-term outcomes

(McGovern & Sigman, 2005). Examining the perspective of the typical peers holds potential for understanding the relationship between the peers and the students with LFA and whether or not the typical peers see themselves as friends to the students with LFA. The present study sought to improve the social deficits of students with LFA by implementing a peer-mediated intervention aimed at increasing the social interactions between the students with LFA and their typically-developing peers. The present study also examined the perspective of the typical peers participating in the peer-mediated intervention in order to gain insight into the quality of the relationship between the peers and the students with LFA. Both factors are important for enhancing the social outcomes of the students with LFA.

This study of a peer-mediated social skills intervention for students with LFA was drawn from the theoretical framework of Lev Vygotsky, whose sociocultural theory emphasized the role of the social world in cognitive development. According to sociocultural theory, learning occurs first in the social interaction of two people, inter-psychological, and then develops within the person, intra-psychological (Vygotsky, 1978). Learning occurs through interaction with others in a shared activity (Vygotsky, 1978), a construct of particular importance to the present study. Social interaction provides the link between the student with LFA observing the peer model and acquiring the skill; this interaction sets Vygotsky's theory apart from the social learning theory of Bandura (1977). However, children with LFA have been shown to require more than close proximity to peer models to develop appropriate social skills (Laushey & Heflin, 2000; Myles, Simpson, Ormsbee, & Erickson, 1993). Not only must students with LFA

observe an appropriate peer model, but there must also be social interaction with that peer model for learning to take place.

The present study also drew on Vygotsky's framework of an apprenticeship model incorporating the zone of proximal development in which the students with LFA interacted with more capable peers to acquire new skills and concepts. The more capable peers promoted the development of appropriate social skills in the students with LFA by scaffolding and supporting the students with LFA in appropriate interactions as they participated in the shared reading activity together.   The students with LFA improved their skills by interacting with the typical peers, whose social skills were slightly higher than the students with LFA, and they gained experience beyond that from interacting with adults alone.

The purpose of the present study was to examine the effects of a classwide peer-mediated social skills intervention on the social interactions of students with LFA and their typically-developing peers. The study employed a mixed methodology in which a single-subject ABAB design was used for the peer-mediated intervention, along with a pre- and post-intervention survey to assess the perceptions of typical peers, and open-ended interviews to glean qualitative information about the peer relationship. Study participants included a class of twenty-four general education second-graders, and a class of eight students with LFA in kindergarten through second-grade. The participants were randomly assigned to groups, combining three general education second-graders with one student with LFA.

The intervention, termed *Reading Buddies,* was a class-wide intervention in which all members of the general education and special education class participated. The

groups read together for 20-minute sessions two or three times a week, in the special education classroom of the students with LFA. The study employed an ABAB design, alternating baseline and intervention phases. During the *Reading Buddies* intervention phase, students were instructed to stay with their buddies, read with their buddies, and talk with their buddies. Trained observers recorded the initiations and responses between the members of the group.

The study also examined the perceptions of the typically-developing students toward their peers with LFA before and after their participation in the peer-mediated social skills intervention using the *Autism Peer Perception Survey*. Finally, interviews were conducted with the typically-developing students at the end of the intervention phase to glean qualitative information about the peer relationship.

The study addressed the following research questions:

1. What is the effect of a class-wide peer-mediated social skills intervention on the social interactions, as measured by initiations and responses, of students with low-functioning autism and typically-developing peers?

2. What are the changes in perceptions of typically-developing second-graders toward their peers with low-functioning autism after participating in the *Reading Buddies* intervention?

3. How do typically-developing second-graders describe the quality of the relationship with their peers with low-functioning autism after participating in the *Reading Buddies* intervention?

Summary of Findings

The summary of findings is presented in three sections related to the research questions. The first section summarizes the findings of the peer-mediated social skills intervention. The second section summarizes the findings of the peer perception survey, and the third section summarizes the findings of the open-ended interviews with the typical peers.

Research Question One

The first research question investigated the effects of a classwide peer-mediated social skills intervention on the social interactions, as measured by initiations and responses, of the students with LFA and typically-developing peers. Reading buddy groups were formed with three typically-developing second-grade students and one student with LFA. Interactions were examined for each buddy group in terms of the student with LFA, total peers, and total buddy group (student with LFA and three typical peers).

Buddy group one. Buddy group one responded to the intervention in the expected direction. The student with LFA, total peers, and the buddy group all showed an increase in mean interactions from baseline phase one to intervention phase one, followed by a regression in mean interactions when a return to baseline phase was implemented. Subsequently, the student with LFA, total peers, and the buddy group displayed an increase in mean interactions with the reinstatement of the intervention.

Buddy group two. Buddy group two also responded to the intervention in the expected direction. The student with LFA, total peers, and the buddy group displayed an increase in mean interactions from baseline phase one to intervention phase one. The

student with LFA, total peers, and the buddy group all exhibited a decrease in mean

interactions with the implementation of the second baseline phase, and displayed

increased mean interactions again with the implementation of the second intervention

phase.

Buddy group three. Buddy group three, like group one and two, responded to

the intervention in the expected direction. The student with LFA, total peers, and the

buddy group all showed increased mean interactions from baseline phase one to

intervention phase one. A regression in mean interactions was observed for these

participants when the return to baseline was implemented, followed by another increase

in mean interactions during the final intervention phase.

Buddy group four. Buddy group four showed some variation in response to the

intervention.   The total peers and the buddy group displayed an increase in mean

interactions from baseline phase one to intervention phase one, followed by a regression

in social interactions from intervention phase one back to baseline phase two. Total peers

and the buddy group exhibited an increase in mean interactions with the reinstatement of

the intervention.

However, the student with LFA displayed a decrease in mean interactions from

baseline phase one to intervention phase one, followed by an increase in interactions from

intervention phase one back to baseline phase two. The student with LFA displayed a

decrease in social interactions with the reinstatement of the intervention.

Research Question Two

The second research question examined the changes in perception of typically-

developing second-grade students toward their peers with LFA after their participation in

the *Reading Buddies* intervention. Fifteen participants were administered the *Autism Peer Perception Survey* both before and after participating in the intervention to examine changes in perceptions.

The total mean score for the pre-intervention survey was 41.33 (*SD*=7.88). Mean score for boys was 40.73 (*SD*=6.77) and mean score for girls was 43.00 (*SD*=11.49). Fourteen participants scored in the more positive range of perception, no participants scored in the neutral range of perception, and one participant scored in the less positive perception range.

The total mean score for the post-intervention survey was 42.00 (*SD*=8.72). Mean score for boys was 42.55 (*SD*=6.88) and mean score for girls was 40.50 (*SD*=13.89). Fourteen participants scored in the more positive range of perception, no participants scored in the neutral range of perception, and one participant scored in the less positive perception range.

Survey items were also examined for mean differences between pre- and post-intervention responses, with items one and five showing the greatest change from pre- to post-intervention. Item one asked students to respond to "My buddy is a lot like me even though he/she has autism." Responses to item one showed an increase of .40 in the positive direction on the post-intervention survey. Item five which asked students to respond to "I would play with my buddy on the playground" increased .67 in the positive direction on the post-intervention survey.

Research Question Three

The third research question examined how typically-developing second-grade students describe the quality of the relationship with their peers with LFA after

participating in the *Reading Buddies* intervention. Open-ended interview questions were used to gather information about the buddy relationship. Eight students were interviewed using ten interview questions. Three themes emerged from the interview analysis.

Theme one: mutual enjoyment of the activity. The first theme to emerge from the interviews was the theme of mutual enjoyment of the activity, with four categories developing within the theme; fun and physical affection, enjoying reading together, enjoying the reinforcement component, and wanting to continue the activity. Typical peers responded that they and the student with LFA had fun together, and that the student with LFA gave them (typical peer) hugs and high fives. Typical peers also responded that they and the student with LFA enjoyed reading together, and that they enjoyed giving the student with LFA "happy faces" to earn reinforcement. Finally, interview participants indicated that they wanted to continue the *Reading Buddies* activity.

Theme two: helping each other. The second theme to emerge from the interviews was the theme of the typical peer and the buddy helping each other. Three categories emerged within this theme; typical peers help students with LFA, students with LFA help typical peers, and helping each other beyond the reading component. Interview participants responded that they helped the students with LFA by reading and asking questions. Interview participants also responded that the student with LFA helped them by reading words too. Finally, typical peers commented that they and the student with LFA helped each other feel better if one of them felt bad.

Theme three: we are friends. The third theme to emerge from the interviews was the theme of the typical peer and buddy as friends. Two categories developed within this theme, recognizing the friendship in the intervention setting and recognizing the

friendship beyond the intervention setting. Typical peers responded that they were friends with their buddy with LFA because the buddy held their hand, and smiled at them, and that they did things together. Typical peers also responded that as friends they sometimes talked to or played with their buddy with LFA on the playground or other areas of the school. One typical peer responded that he and his buddy with LFA were friends "Because we can do what we are best at doing together."

Limitations

The present study has limitations in the areas of sample size, reliability, and response bias. These limitations are discussed in relation to both single subject design and validity of the results.

Sample Size

The first limitation discussed is that of small sample size. The single subject intervention involved four students with LFA. Because of the small number of participants it is difficult to know whether the participants are indicative of other members of the population of students with LFA and whether the results would generalize to them. Students with LFA have been shown to display marked variability in characteristics and symptoms (Ben-Itzchak & Zachor, 2007), and as such, interventions that are successful with some students with LFA may not be successful with other students with LFA (Schreibman, Stahmer, Barlett, & Dufek, 2009; Simpson, 2005).

To combat limitations of small sample size, single subject research calls for detailed descriptions of participants so that future researchers can replicate the study with a similar sample. Following protocol for single subject design, participants with LFA were described in detail in the methodology section of the present study. Additionally, in

single subject research each participant is his or her own control, making it possible to assess intervention effectiveness with as few as one participant (Horner et al., 2005). Though the small number of participants with LFA is a limitation of the present study, the appropriate use of single subject research design supports the findings.

The small sample size of the typically-developing peers also limits the results of the perception survey. There were fifteen typically-developing second-grade students who participated in the survey, with eight of these students also participating in the interviews. Peer-mediated interventions are most often used in single subject research designs, which involve from one to eight target participants (Horner et al., 2005), making large numbers of peer mediators unsuitable.

Though the participants represent a small number for survey data, the results are similar to other studies that surveyed typically-developing students who had participated in activities with students with autism. Jones (2007) and Kamps et al., (1998) found that typically-developing peers enjoyed participating in activities with students with autism and felt that they learned skills such as cooperating and sharing from their participation, lending credibility to the present study. However, most studies of peer-mediated interventions have not included a component that specifically targets the perceptions of typical peers as they relate to the quality of the peer relationship, making the present study an important first step. To further extend validity of the survey results, additional studies should be conducted with larger samples of typically-developing peer participants.

Reliability

A second limitation of the study was the variability in interobserver agreement scores. Reliability of the single subject intervention was assessed through interobserver agreement. Interobserver agreement scores were calculated by using two trained observers to record data on one buddy group. Results of interobserver agreement showed some variability in agreement with agreement percentages ranging from 47% to 100% agreement. Other peer-mediated interventions have yielded similar interobserver agreement results for social interaction data (Banda, Hart, and Liu-Gitz, 2010, [R=50-100%]; Kamps et al., 2002 [R=33-100%]), with variability likely due to the complexity of data collection.

For the present study, two interrater sessions across all participants were below 75% agreement. Total mean agreements for each participant (80%, 81%, 90%, and 91%) and for total observations across the study (86%) were all at or above the 80% criterion indicative of high quality single subject research design set forth in Horner et al., (2005). Interobserver agreement rates of 80% or higher are evidence that the dependent variables have been defined with precision and measured accurately over time, allowing the researcher to assess functional relationships of the independent variable. Though there were two sessions of low agreement in the present study, overall agreement was acceptable indicating results can be interpreted with reasonable certainty. The increased interactions of the participants during intervention phases can be supported by the research design.

Response Bias

A third limitation of the study is possible response bias. The participants completing the pre- and post-intervention survey as well as the interview were typically-developing second-grade students. Because of their young age these participants may have responded to the survey in a manner, which they thought might please adults (researcher or teacher) rather than responding with true perceptions. To combat possible response bias the researcher and the teacher explained to the students before administering the survey that there were no wrong or right answers in a survey and that participants should answer how they really felt. Because it is difficult to assess response bias in young children, results should be interpreted with caution. Future administrations of the survey may benefit from including survey items that might account for response bias in young children, such as asking the respondent to indicate how "their friend" perceived the buddy with autism. This type of survey item could provide some indication of whether response bias is impacting survey results (Swaim & Morgan, 2001).

A final limitation of the study is that twenty sessions across ten weeks of participation with the students with LFA may not have been enough time for changes in perception to develop in the typical second-grade students. It is unknown whether a longer study would have produced a more positive or negative perception. However, the length of the present study was similar to other peer mediated interventions lending support to the findings (Banda, Hart, & Liu-Gitz, 2010; Harper, Symon, & Frea, 2008; Owen-DeSchryver et al., 2008).

Discussion of Findings

Social interaction deficits make it difficult for students with autism to engage in on-going relationships with typical peers, leaving them with few opportunities for support from friends, and negatively impacting long-term outcomes (Owen-DeSchryver et al., 2008). Peer-mediated interventions, in which typically-developing peers model and reinforce appropriate social behavior for students with autism, have been used with some success to remediate social deficits in students with autism. However, few of the peer-mediated interventions have been used with students with LFA, who generally require more support, and show less reduction in symptoms over time, than students with high functioning autism (Ben-Itzchak & Zachor, 2007; McGovern & Sigman, 2005).

Peer-Mediated Intervention

Responders. Results of the present study of a peer-mediated intervention indicate that three of the four participants with LFA, Caleb, Jack, and Mary, did respond to the intervention and were engaging in social interactions with their typically-developing peers. Mean interactions doubled from baseline to the first intervention phase, clearly demonstrating a positive effect of the intervention. Experimental control was achieved across three different phases (intervention, baseline, intervention) for Caleb, Jack and Mary, illustrating that changes in the dependent variable, interactions, co-varied with changes in the independent variable, the intervention.

Further, visual analysis of the graphs combining the interactions of the student with LFA and the interactions of the typical peers indicated that the data lines were largely running parallel for typical peers and Caleb, Jack, and Mary. These parallel lines suggest that the interactions of the students with LFA were mirroring the interactions of

the typical peers. The students with LFA were responding to the interactions of the typical peers and as the interactions of the peers increased and decreased the interactions of the students with LFA followed. These results indicate that the intervention was successful at increasing the social interactions of Caleb, Jack and Mary and provide support to the literature on the use of peer-mediated interventions as an effective means to increase interactions between students with autism and typically-developing peers (Banda, Hart, Liu-Gitz, 2010; Harper, Symon, & Frea, 2008; Kamps et al., 2002; Laushey & Heflin, 2000; Owen-DeSchryver et al, 2008).   More specifically, results of this study support the use of peer-mediated interventions with students with LFA, a subgroup that has been examined less often in social interaction interventions.

Variability in responders. Results of the peer-mediated intervention did show some variability in participant response across conditions, particularly with Jack, which can be somewhat accounted for by individual behavioral characteristics of the students with LFA. Students with LFA have been shown to display greater difficulty with social interaction and adaptive behavior skills (Ben-Itzchak & Zachor, 2007; McGovern & Sigman, 2005), and to communicate more often for behavior regulation than students with high functioning autism (Maljaars et al., 2011).   Such variability was seen in Jack who spent one day of the study in a behavioral episode from which he was unable to recover in time to participate. Jack also displayed more variability in behavior and consequently interactions, based on the availability of certain books. One day of baseline phase two Jack displayed a higher than usual response rate which may be accounted for by the availability of a book that made sounds. This book was not part of the regular classroom materials and was removed from the classroom after this day.

Theoretical framework. Results of the peer-mediated intervention also support the theoretical framework of the study. Placing the students with LFA in close proximity to typically-developing peers without benefit of intervention, as in the baseline phase, resulted in half the number of social interactions than when participants were provided the strategies to interact during intervention phases. Participants with LFA did not increase interactions by simply observing typical peer models. However, interactions did increase when strategies were introduced and supported by the typically-developing students. These outcomes suggest that the scaffolding provided by the more socially competent peers during intervention phases produced higher interactions for students with LFA, and are consistent with Vygotsky's model of socio-cultural theory (Vygotsky, 1978).

Intervention components. For Caleb, Jack, and Mary, the implementation and subsequent withdrawal of the *Reading Buddies* intervention resulted in a change in social interactions with typical peers. The three components, *stay with your buddy, read with your buddy, and talk with your buddy,* provided an effective intervention that the participants could easily carry out and that resulted in a change in interaction levels for typically-developing peers and students with LFA. As a classwide peer-mediated intervention all steps of the intervention were given to the members of the class as a whole, such that multiple peers were trained in a short period of time, and all members of the class were mediators of the intervention. Using multiple peers lessens the burden on any one participant to engage the student with LFA and allows for natural variations in social responsiveness from day to day (Harper, Symon, & Frea, 2008). Training multiple peers and incorporating skills the typical students already had in a classwide intervention

likely contributed to the successes of Caleb, Jack, and Mary. These results are also supported by the similar work of Laushey and Heflin (2000), and Owen-DeSchryver et al. (2008).

Many of the participants reiterated the three steps of the intervention when asked to describe what they did during *Reading Buddies* as part of the interview process. The fact that the typical peers referenced the three step strategy without specifically being asked about the steps provides evidence of their understanding and internalizing of the intervention. The *Reading Buddies* intervention made use of a chart that visually depicted the steps of the intervention *stay with your buddy, read with your buddy, and talk with your buddy*, which likely contributed to students' use of the strategy. Kamps et al. (2002) suggest that effective peer-mediated interventions should incorporate the use of visual cues to enhance the acquisition of appropriate social skills. The present study corroborates the work of Kamps and colleagues and provides further evidence of the effectiveness of the intervention.

Kamps et al. (2002) also suggest that effective peer-mediated interventions should incorporate the use of evidence-based instructional strategies such as modeling and reinforcement to enhance student acquisition of skills. Similarly, Vygotsky postulates that knowledge is constructed when learners interact with each other in social situations, and when more capable peers scaffold the learning of less experienced learners. Drawing on this framework, the present study utilized reinforcement as an integral component of the intervention. Typically-developing students reinforced the students with LFA using their individualized token reinforcement systems (happy face cards), while the students with LFA reinforced the typical peers by giving them stickers. Increased interactions

during intervention phases may be somewhat attributed to the use of reinforcement during these phases. No reinforcement was provided during baseline phases. During interviews with the typically-developing peers, many participants commented on the enjoyment they received from reinforcing their buddy with LFA, even though the two groups were not receiving the same reinforcement.

As interactions increased during intervention phases the interactions themselves may have become more reinforcing for the students with LFA and the typical peers, thus promoting reciprocity. Results of the present study are supported in the work of Owen-DeSchryver et al. (2008) who suggest that increased opportunities for students with LFA to *respond* to initiations from their typically-developing buddies, leads to the development of skills students with LFA need to *initiate* with those same peers. The present study of a peer-mediated intervention increased the opportunities that students with LFA had to respond to initiations from their typical peers, thereby providing increased opportunity to practice and develop their own social skills.

Many peer-mediated interventions to date have taken place during free-play and lunch-time activities, and have involved sharing toys or other items and playing games. Few peer-mediated interventions have been implemented in academic settings with students with LFA, leading researchers to cite that as an area of need (Banda, Hart, &Liu-Gitz, 2010; Rogers, 2000). The present study investigated the social interactions of students with LFA and typical peers in an academic setting. The intervention incorporated a shared reading activity. Results of the study indicate that the students with LFA and the typically-developing peers were interacting during the shared reading activity and were not just initiating for highly preferred items, as in many peer-mediated

interventions during free play settings (Banda & Hart, 2010). Participants were asking questions and commenting on things about the story, a higher-level activity than requesting preferred items. The intervention did not specifically outline what types of initiations and responses to make, but rather the intervention encouraged participants to talk about the book. Results of the present study are supported by the literature from Kamps et al. (2002) which indicate that interactions are higher in structured academic settings than non-academic settings, and by the work of Jackson and Campbell (2009) who found that typical peers displayed greater comfort in interacting with peers with autism in academic activities over recreational activities.

Non-responder. In general, the fourth participant with LFA, Thomas, showed little change in mean interactions across all phases of the study. Thomas did not respond in the expected direction during baseline and intervention phases. There are several possible explanations for his lack of response.

Thomas was the youngest student with LFA in the study (kindergarten versus second-grade for the other participants) so it may be that his age impacted his performance more than his slightly older classmates, though other peer-mediated interventions have used children of kindergarten age with positive results (Banda, Hart, Liu-Gitz, 2010; Laushey & Heflin, 2000). More likely, his younger age indicated he had less exposure to typical peers in the classroom setting than his classmates who had been in school two years longer. Kamps et al. (2002) found that students with autism who had taken part in multiple social groups with typical peers over three years made greater gains than those who had participated in just one intervention. Because the other students in the present study were slightly older they had more cumulative time spent with typical

peers in other activities, such as music, PE, and library classes, than Thomas, which may indicate why Thomas' response was not as strong as his classmates.

Observational notes from the data recorder also indicated that the typical peers in Thomas' group spent a fair amount of time disagreeing with each other, and that one peer was noted as being particularly bossy and irritating to the other typical peer group members, which may also have affected Thomas' response. There is some evidence in the literature that on occasion a particular group of peers may not be the best fit for the intervention. In a similar peer-mediated study by Owen-DeSchryver et al. (2008), typical peers for one participant were changed mid-way through the study because the typical peers themselves were not responding appropriately to the intervention. Such results suggest that certain groups of children may not be suitable when placed together for an intervention, lending support for this scenario with Thomas. Thomas' peers were less able to scaffold his learning because they were not expert learners and lacked the higher-level social skills to support him. Laushey and Heflin (2000) found in a similar classwide intervention that variation in skill level of the typical peers elicited different behaviors from day to day in the children with autism. Further research is needed to determine to what degree individual characteristics and group dynamics of the typical peers influence outcomes for students with LFA participating in peer-mediated interventions.

Finally, it was noted that Thomas' typical peer partners were engaging in initiations at a somewhat higher rate (M=60.00 compared to M=21.25, M=33.75, and M=16.00 for other peer groups baseline phase one and M=73.50 compared to M=34.50, M=50.00, and M=46.80 for other peer groups intervention phase one) than the other typical peers were with their buddies with LFA. Thomas may have been reacting to their

repeated attempts to interact with him by withdrawing during intervention phases. The data indicate that when the typical peers decreased initiations during the return to baseline phase, the interactions of Thomas increased.   An argument could be made that when the typical peers overwhelmed Thomas with too many attempts to interact as in the intervention phases he withdrew and participated less, and when the typical peers reduced their interactions as during the baseline phases, Thomas was more able to cope and increased his interactions. Thomas' pattern of interaction is corroborated to some degree by Bellini's (2006) developmental pathway model of social anxiety in autism. Bellini hypothesized that the high degree of physiological arousal manifested in students with autism makes it more likely that they will become overwhelmed by interactions with peers, leading to social withdrawal and subsequent reduced interactions with peers. Though practitioners have long identified that students with autism can become overwhelmed with too much input, research on what constitutes too much input has not been found. Given that Thomas' interactions responded in the exact opposite direction than what was expected for intervention and non-intervention phases more research into interaction levels is warranted.

Schreibman and colleagues (Ingersoll, Schreibman, & Stahmer, 2001; Schreibman, Stahmer, Barlett, & Dufek, 2009) have begun to investigate responder and non-responder profiles for another peer based intervention, Pivotal Response Training (PRT). PRT involves using role-play to teach peers how to play with children with autism, encouraging conversation, narrating play activities, and letting the child choose toys (DiSalvo & Oswald, 2002). Strong evidence has been found for both responder and non-responder profiles to this treatment. Children with autism who had a high interest in

toys and who were not socially avoidant responded better to PRT and were deemed to have a responder profile (Schreibman, Stahmer, Barlett, & Dufek, 2009; Sherer & Schreibman, 2005). Children who were peer avoidant did not respond well to this treatment and most often fell into the non-responder category. The researchers suggested that children with autism who display high peer avoidance might need additional support and specific interventions when placed in inclusive classrooms with typical peers (Ingersoll, Schreibman, & Stahmer, 2001).

Though this study did not use PRT as the intervention, the work of Schreibman and colleagues has relevance to the outcomes for Thomas who displayed less response to the peer-mediated intervention than his classmates. Beginning with the seminal work of Lovaas (1987) research has long shown that not all students with autism respond to treatment in the same way, and while some participants make very good progress others do not, particularly those with LFA. Thomas may have characteristics that the other participants with LFA did not share. Determining exactly which students with autism respond to which interventions is an on-going concern in the literature and an area of much needed future research (Ingersoll, Schreibman, & Stahmer, 2001).

Perception Survey

Results of the peer perception survey indicate that the typically-developing students held particularly high perceptions of their peers with autism. These findings are somewhat contradictory to other findings in the literature that have found typically-developing students to hold low perceptions of children with autism (Campbell, Ferguson, Herzinger, Jackson, & Marino, 2004; Swaim & Morgan, 2001). Differences may be somewhat attributed to the fact the participants in the current study knew their

peers with autism, whereas in the Campbell et al. (2004) and Swaim and Morgan (2001) studies the participants did not know the child with autism that they viewed on a videotape.

One typically-developing second-grade participant did, however, hold a less positive perception of the peers with LFA and maintained this less positive perception after participation in the intervention. An examination of the survey form and observational notes on the data collection instrument revealed that this participant with the less positive perception was the participant who struggled to interact appropriately in her buddy group and engaged in frequent struggles with the other typically-developing participants in her buddy group. This participant's own difficulty with social interaction likely made her less able to scaffold the interactions of the student with LFA, which may have influenced her perceptions.

Results of the present study are somewhat contradictory to the pilot implementation of the perception survey administered at the same school site a year earlier, with a different group of typically-developing peers. The pilot study was given after the typical peers had been with students with autism once a week for eight months in an inclusive, but unstructured activity. Results of the pilot survey indicated that the typical students held a much less positive perception of their peers with autism. There are several possibilities for these differences.

The students with LFA that had been part of the pilot class exhibited more challenging behaviors than the current group of students with LFA. While both sets of participants were identified as students with LFA needing an autism-specific, intensive, behavioral-based classroom, behaviors exhibited by the students were not the same from

year to year. Close proximity to students with challenging behaviors may have led

typically-developing students to perceive the students with LFA less favorably the year

before (Swaim & Morgan, 2001) while the absence of particularly challenging behaviors

contributed to the positive perception held by the present study participants.

Participants in the present study also took part in the peer-mediated intervention,

which likely supported a more positive perception of students with LFA. The specific

intervention strategies of *stay with your buddy, read with your buddy, and talk with your

buddy,* provided the typically-developing students with a means to engage their peer with

LFA, leading to increased interactions and reciprocity between the typical peers and

students with LFA. The pilot year survey participants were part of an inclusive activity

that lacked structure and did not offer typical peers strategies for interacting with students

with LFA. Without specific strategies the typical peers may have experienced more

difficulty and struggles with engaging their peers with LFA leading to a less positive

perception overall.

Additionally, the peer-mediated intervention incorporated reinforcement as an

important component of that intervention. Reinforcement not only increased the

interactions of the students with LFA and the typical peers, but also may have validated

the efforts of the typical peers and improved their perceptions of their buddies with

autism.

Although the high positive results of the peer perception survey were somewhat

unexpected, they are supported by the work of Locke et al. (2012) and Jones (2007) who

found that being a peer buddy to a student with autism was a favorable experience that

did not negatively impact the typical peer. Additionally, two items on the perception

survey showed moderate changes from pre- to post-intervention phases. These items were "My buddy is a lot like me even though he/she has autism," and "If I saw my buddy on the playground I would play with him/her." Increases in these two survey items suggest an increased comfort level with the students with autism after participating in the intervention. Increased comfort with students with autism is important for improving the overall quality of the relationship between the student with LFA and the typical peer.

Interviews

Results of the interview indicate that the typically-developing second-grade students found the experience of being a peer-buddy to a student with LFA to be very enjoyable. These results are supported by the work of Locke et al. (2012) and Jones (2007) who also found that typical peers enjoyed activities with peers with autism.

However, the discussion of physical affection, specifically the mention of enjoying the hugs and high fives is somewhat unexpected. Students with LFA are not often characterized as giving physical affection to others, so the fact that physical affection emerged as a common thread in the interview warrants further investigation. The devoted attention of the typical peers through the intervention may have supported the students with LFA in expressing affection toward their typical peer buddies.

The students with LFA spent the majority of the school day in a specialized classroom that did not contain typical peers. The time spent together in the peer-mediated intervention coupled with the structure of the intervention, supported interaction between the two groups and likely supported the expression of affection as well. The fact that the participants enjoyed being together, described the activity as fun,

and engaged in physical affection supports the development of high quality friendships (Engle, McElwain, & Lasky, 2010; Weiner & Schneider, 2002).

Interview participants also recognized that they (typical second-grader) and their buddy with LFA helped each other through the intervention. The fact that the typical peers recognized that the students with LFA were helping them is an important component of both the success of the intervention and the quality of the peer relationship.

Typical peers recognizing that they were helping their buddies with LFA is not unexpected, as the students with LFA had clearly delayed skills in many areas. What is unexpected is the number of ways the typical students recognized that the students with LFA were helping them. The typical second-graders stated that sometimes the students with LFA helped them read words, which is plausible because all of the participants with LFA could read some words.

Beyond that academic component the typically-developing second-graders cited that they and the students with LFA helped each other when one felt bad or lonely. Though the students with LFA may not have shown any outward displays of comforting the typically-developing student, participating in the intervention with the student with LFA may have in fact comforted the typically-developing student. One indicator of high quality friendships is that the friends are able to help each other (Rose & Asher, 2004), and interview responses clearly indicated that the participants recognized that they helped each other.

Finally every interview participant identified their buddy with LFA as their friend, and each was able to describe ways they knew that they were friends. Few studies to date have actually investigated whether typically-developing peers and students with LFA

establish friendships as a result of participating in peer-mediated interventions. Results of the interview portion of the study indicate for this group of participants, they did indeed feel they were friends.

Conclusions

The purpose of the present study was to examine the effects of a classwide peer-mediated intervention on the social interactions of students with LFA and the perceptions of typical peers. Results of the study indicate that the peer-mediated intervention was successful at increasing interactions between typically-developing peers and students with LFA, while also effecting a positive peer perception. Several conclusions can be drawn from this study.

First, the *Reading Buddies* intervention presented an effective strategy to increase social interactions between typically-developing second-grade peers and students with LFA. The success of the intervention can be attributed to the training of multiple peers at once, and the placement of more typically-developing peers in groups with one student with LFA. Additionally, the intervention relied on a visual support to relay the steps of the intervention, incorporated reinforcement for both students with LFA and typically-developing peers, and provided a structured format to increase interactions. The success of the *Reading Buddies* intervention suggests that peer-mediated interventions can be used to increase the social interactions of students with LFA and typical peers, and contributes to the literature base in this field by providing a better understanding of the specific components of the intervention that contribute to increased social interactions.

Second, training all members of the class in the intervention increases the opportunities for interaction with a variety of peers. The success of the intervention with

Caleb, Jack, and Mary suggest that a range of peers can be used in peer-mediated interventions, and not just a few chosen for their special characteristics. Training all members of a class also means many more students have the opportunity to develop relationships with the students with LFA, and many more students can participate as peer models.

Third, the unexpected response pattern of Thomas warrants further investigation into interaction rates between typically-developing students participating in peer-mediated interventions and the students with LFA. Understanding the interaction pattern of non-responders to an intervention is as important as understanding those of the responders. By understanding which characteristics contribute to a student's non-response, researchers can more effectively develop and target interventions to which he or she may show more success.

Finally, the positive perceptions held by the typical students toward their peers with autism are supported by the structured component of the intervention. Interventions that offer specific strategies for the typically-developing students to interact with students with LFA are more likely to engender a positive perception of the student with autism and promote the development of quality friendships, thereby improving long-term outcomes.

Implications for Research

Results of the present study indicate that the classwide peer-mediated intervention, *Reading Buddies,* was effective at increasing the social interactions of three of the four students with LFA. However, further research is needed to investigate why one of the participants did not respond to the intervention in ways similar to the others.

This research should investigate whether an academically based shared reading intervention is better suited to students with LFA who are slightly older, have spent more time with typical peers or have had more exposure to academic activities.

Further research is also needed on the interaction rates of typical peers involved in peer-mediated interventions with students with LFA. The participant with LFA who did not respond to the intervention in the expected manner was in a buddy group that was initiating at a higher rate than other typical peers in other buddy groups. As the typical peers increased their interactions the participant with LFA withdrew, but as the typical peers decreased their interactions the participant with LFA responded with an increase in interactions. This participant's pattern of responding proved to be the opposite of what was expected. Further research should investigate whether there is an ideal rate of interaction by typical peers that supports an improved response from the student with LFA.

The work of Schriebman and colleagues (Ingersoll, Schreibman, & Stahmer, 2001; Schreibman, Stahmer, Barlett, & Dufek, 2009) also suggest that is important to understand students with autism who are responders and non-responders to particular interventions. Understanding why Thomas did not respond to the intervention is important for the development of more precise strategies that can support his or similar students' success in the intervention.

Additional research is warranted to investigate whether the *Reading Buddies* intervention would be effective for other students with LFA. The present study showed a positive effect for three of four participants with LFA. Because single subject research entails small numbers of participants the study should be replicated with other students

with LFA. Horner et al. (2005) suggests that multiple replications of an intervention are needed to establish the intervention as an evidence-based practice.

The present study did not examine whether the typically-developing peers actually increased their interactions with the participants with LFA outside of the intervention setting. Though most of the participants stated in the interview that they did talk to their buddy with LFA in other areas of the school, and that they did at times play with them on the playground, no observations were done to see if this was indeed happening. Further research should attempt to triangulate data through observations.

Finally, further research is needed to understand which components of the intervention support a high positive perception of peers with autism. Perception rates of participants in the present study were substantially higher than perception rates in the pilot study, which did not employ a peer-mediated intervention. Understanding what aspects of the intervention support a more positive peer perception of students with autism can help researchers and practitioners develop more precise interventions.

Implications for Practice

The social interaction deficits of students with LFA make it difficult for them to participate in ongoing relationships with typical peers. Even when physically included with typical students, their poor interactions skills and awkward behaviors often subject them to further isolation. If schools are to improve long-term outcomes of their students with autism, the social interaction deficits of this population must be addressed.

Finding effective interventions to improve the social interaction deficits of students with LFA has not been easy. Peer-mediated social skills interventions have been shown to be effective at increasing the social interactions of students with autism but

most research studies involved students with high functioning autism, leaving a considerable gap in effective programs for students with LFA. The present study indicates, however, that peer-mediated interventions are a viable means to increase social interactions between typical peers and students with LFA. Schools serving students with LFA should incorporate peer-mediated social skills interventions as part of their overall program to promote increased interaction between their students with LFA and typically-developing peers.

Peer-mediated interventions that integrate visual cues, reinforcement for all participants, and specific structured strategies to promote interactions should be an integral component of school wide intervention programs. Employing classwide peer-mediated social skills interventions means multiple peers can be trained in a short period of time, a wide variety of typical students have an opportunity to interact with their peers with autism, and the perceptions of typical students toward their peers with LFA are improved.

The social impairments of students with LFA impact the long-term outcomes of this population. Few adults with autism report having any friends at all and many rely on paid caregivers as their sole source of interaction. Schools must make strides toward improving the long-term outcomes of students with LFA by addressing the extended social needs of these students. Assisting students with LFA to develop quality relationships with typical peers should not be overlooked.

Summary

The social interaction deficits of students with LFA make it difficult for them to participate in on-going relationships with typical peers. Students with LFA often have

few friends and limited opportunities for support from peer relationships. In order to improve long-term outcomes, students with LFA need access to high quality relationships with typical peers. The present study of a classwide peer-mediated intervention was effective at increasing the social interactions of three of the four students with LFA and their typical peers. Results of the perception survey and interviews indicate that the typical peers had a positive perception of their peers with LFA, enjoyed the shared reading activity, felt that they and their buddy with LFA were helping each other, and knew decisively that they were friends.

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Appendix A

District Approval Letters

Campbell

UNION SCHOOL DISTRICT

Campbell Union School District
155 North Third Street
Campbell CA 95008
408-364-4200
www.campbellusd.org

November 16, 2012

Institutional Review Board for the Protection of Human Subjects
University of San Francisco
2130 Fulton Street
San Francisco, CA 94117

Dear Members of the Committee:

On behalf of the Campbell Union School District, I am writing this letter to confirm our consent to have Ms. Lisa Simpson conduct a research study, pending IRBPHS approval. The consent is for a research study being performed in one of our elementary schools between the second grade and a special education classroom during the 2012-13 school year.

If you have additional concerns or questions, please feel free to contact me at (408) 341-7000 ext. 6213.

Sincerely,

Shelly Viramontez, Ed.D.
Assistant Superintendent, Human Resources

Governing Board Members

Danielle M.S. Cohen

Julie Constant

Leah K. Read

Juliet Tiffany-Morales

Thomas Gemetti

Governing Board Phone No.
408-341-7251

Superintendent
Eric Andrew, Ed.D.
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Forest Hill Elementary School

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Denise Khalid, Principal

Campbell
UNION SCHOOL DISTRICT

November 19, 2012

Institutional Review Board for the Protection of Human Subjects
University of San Francisco
2130 Fulton Street
San Francisco, CA 94117

Dear Members of the Committee:

On behalf of Forest Hill Elementary School, I am writing this letter to confirm our consent to have Ms. Lisa Simpson conduct a research study, pending IRBPHS approval. The consent is for a reseach study being performed at Forest Hil between the second grade and a special education classroom during the 2012-2013 school year.

If you have any questions or concerns, please feel free to contact me at (408) 364-4279.

Sincerely,

Denise Khalid
Principal

Governing Board Members

Danielle M.S. Cohen

Julie Constant

Leah K. Read

Juliet Tiffany-Morales

Governing Board Phone No:
408-341-7251

Superintendent

Eric Andrew, Ed.D.
408-341-7211

Appendix B

Data Collection Sheet

Data Collection Sheet

Observer: Date:	Student (autism):	Peer 1:	Peer 2:	Peer 3:
Record Data for 2 minutes.	**Initiations:**	**Initiations:**	**Initiations:**	**Initiations:**
	Responses:	**Responses:**	**Responses:**	**Responses:**
30 Second Break				
Record Data for 2 minutes.	**Initiations:**	**Initiations:**	**Initiations:**	**Initiations:**
	Responses:	**Responses:**	**Responses:**	**Responses:**
30 Second Break				
Record Data for 2 minutes.	**Initiations:**	**Initiations:**	**Initiations:**	**Initiations:**
	Responses:	**Responses:**	**Responses:**	**Responses:**
30 Second Break				
Record Data for 2 minutes.	**Initiations:**	**Initiations:**	**Initiations:**	**Initiations:**
	Responses:	**Responses:**	**Responses:**	**Responses:**
30 Second Break				
Record Data for 2 minutes.	**Initiations:**	**Initiations:**	**Initiations:**	**Initiations:**
	Responses:	**Responses:**	**Responses:**	**Responses:**

Appendix C

Autism Peer Perception Survey

1. I think my buddy is a lot like me even though he/she has autism.

☹	😐	☺
No not like me at all.	Maybe some	Yes a lot like me!
1	3	5

2. I like being with my buddy because we can do fun things together.

☹	😐	☺
No I don't like it	It's ok	Yes I like it!
1	3	5

3. Doing things with my buddy is a lot like doing things with my other friends.

☹	😐	☺
No not like my friends	Maybe a little	Yes like my other friends!
1	3	5

4. Being with my buddy is a lot of work.

☹	😐	☺
It is a lot of work	It's ok	It's not too bad!
1	3	5

5. If we have the same recess I would play with my buddy on the playground.

☹	😐	☺
No I would not play with him/her	Maybe a little	Yes I would play with him/her !
1	3	5

6. I help my buddy learn new things.

☹	☺	☺
No I don't help him/her	Maybe a little	Yes I help him/her
1	3	5

7. My buddy does things that bother me when we are together.

☹	☺	☺
He/she does bother me	It's ok	No he/she doesn't bother me!
1	3	5

8. I want to do more things with my buddy besides the *Reading Buddies* activity.

☹	☺	☺
No I don't want to do more	It's ok like it is	Yes I want to do more
1	3	5

9. I feel uncomfortable or nervous when I am around my buddy.

☹	☺	☺
I do feel nervous	It's ok	No I don't feel nervous at all!
1	3	5

10. I try to do what my buddy likes to do.

☹	☺	☺
No I don't know what he/she likes	Maybe a little	Yes I know what he/she likes!
1	3	5

Appendix D

Interview Questions

Interview Questions

Directions: " Would it be alright if I ask you some questions about the Reading Buddies activity?"
Wait for child to give consent. If child says no, then thank child and let them know they can go back to class
or whatever they were doing before the interview.

"I am going to ask you some questions about Reading Buddies. There are only ten questions but if you want
to stop just say stop, and we will stop. There are no wrong or right answers to the questions."

1. Can you tell me a little bit about what you do in *Reading Buddies?*
_____
_____

2. Can you tell me what kinds of things your buddy likes?
_____
_____

3. Do you think your buddy likes having you read to him/her in *Reading Buddies?* How can you tell?
_____
_____

4. Can you think of anything you don't like about the *Reading Buddies* activity*?*
_____
_____

5. Is reading with your buddy different than reading with your other friends? How?
_____
_____

6. What other things do you like to do at school with your buddy?
_____
_____

7. What would you do if you saw your buddy standing by him/herself on the playground at recess?
_____
_____

8. Do you and your buddy ever help each other out?
_____
_____

9. Do you think you and your buddy are good friends? Why?
_____
_____

10. Do you want to do *Reading Buddies* again next year?
_____
_____

Appendix E

Treatment Protocol Checklist

Treatment Protocol for *Reading Buddies Intervention*

Materials are in place and ready to begin:

_____   chart of buddy triads

_____   chart of stay, read, and talk

_____   adequate book selection for reading

_____   markers for students to give "happy faces"on reinforcement cards

_____   happy face cards and reinforcement for students with LFA

_____   stickers for typical second-graders

_____   timer to signal when to change books

Review of procedures before students begin to read

_____   review the buddy chart

_____   remind students that they are to

1. *Stay with their buddy.*

2. *Read with their buddy.*

3. *Talk with their buddy*

4. Tell their buddy they are doing a good job.

_____   Role-play procedure

Completed by:_____

Date: _____

Appendix F

IRB Approval Letter

January 2, 2013

Dear Lisa Simpson:

The Institutional Review Board for the Protection of Human Subjects (IRBPHS)
at the University of San Francisco (USF) has reviewed your request for human
subjects approval regarding your study.

Your application has been approved by the committee (IRBPHS #12-149). Please
note the following:

1. Due to the nature of your research, a renewal application will not be required..

2. Any modifications to the research protocol or changes in instrumentation
(including wording of items) must be communicated to the IRBPHS.
Re-submission of an application may be required at that time.

3. Any adverse reactions or complications on the part of participants must
be reported (in writing) to the IRBPHS within ten (10) working days.

If you have any questions, please contact the IRBPHS at (415) 422-6091.

On behalf of the IRBPHS committee, I wish you much success in your research.

Sincerely,

Terence Patterson, EdD, ABPP
Chair, Institutional Review Board for the Protection of Human Subjects
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IRBPHS – University of San Francisco
Counseling Psychology Department
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