Spring 2018

# A Peer-Mediated Social Network to Increase Social Interactions for a Student with Autism Using Augmentative Communication

Marissa L. Letterman
*Missouri State University*, Marissa248@live.missouristate.edu

**A PEER-MEDIATED SOCIAL NETWORK TO INCREASE SOCIAL**

**INTERACTIONS FOR A STUDENT WITH AUTISM USING AUGMENTATIVE**

**COMMUNICATION**

A Masters Thesis

Presented to

The Graduate College of

Missouri State University

In Partial Fulfillment

Of the Requirements for the Degree

Master of Science in Education, Special Education

By

Marissa Leigh Letterman

May 2018

# A PEER-MEDIATED SOCIAL NETWORK TO INCREASE SOCIAL INTERACTIONS FOR A STUDENT WITH AUTISM USING AUGMENTATIVE COMMUNICATION

Counseling, Leadership, and Special Education

Missouri State University, May 2018

Master of Science in Education

Marissa Leigh Letterman

## ABSTRACT

Social competency is a primary deficit for individuals with autism. Developing peer networks to support individuals with autism has been proven as an effective social skills strategy. This study focused on developing a peer network within a public-school setting to promote increased social communication between a seven-year old student with autism and his typically developing peers. A single-subject multiple baseline design was utilized to analyze the effects of the peer network intervention across three settings. Dependent variables included frequency of social initiations and social responses of the target and network peers. All sessions were video-recorded, and data were collected for all participants. In addition to the quantitative data, the teacher-researcher maintained a research journal and transcribed the video clips, (one session per intervention phase) to provide additional measurable and observable evidence to support the correlated qualitative data. Upon implementation of the peer network, preliminary analysis suggests the target student increased his social initiations from a total of 12 during baseline to 36 and an increase in responses from 29 to 548, respectively. The peer network participants initiated 1349 times and responded 392 times during intervention.

**KEYWORDS**: autism spectrum disorder, peer network, peer mediation, social interactions, practical setting

This abstract is approved as to form and content

_____

Dr. Linda Garrison-Kane
Chairperson, Advisory Committee
Missouri State University

**A PEER-MEDIATED SOCIAL NETWORK TO INCREASE SOCIAL INTERACTIONS**

**FOR A STUDENT WITH AUTISM USING AUGMENTATIVE COMMUNICATION**

By

Marissa Leigh Letterman

A Masters Thesis
Submitted to the Graduate College
Of Missouri State University
In Partial Fulfillment of the Requirements
For the Degree of Master of Science in Education, Special Education

May 2018

Approved:

_____
Linda Garrison-Kane, PhD

_____
Megan Boyle, PhD, BCBA-D, LBA

_____
Michael Goeringer, MS Ed.

_____
David Goodwin, PhD

_____
Julie Masterson, PhD: Dean, Graduate College

In the interest of academic freedom and the principle of free speech, approval of this thesis indicates the format is acceptable and meets the academic criteria for the discipline as determined by the faculty that constitute the thesis committee. The content and views expressed in this thesis are those of the student-scholar and are not endorsed by Missouri State University, its Graduate College, or its employees.

# ACKNOWLEDGEMENTS

I would first like to begin by thanking the participants in my study. To MacGyver, who showed us all that being unique is something to be celebrated. His joy for life could light up any room, making all our days brighter just by being with him. To the three peer participants, who volunteered their time to be part of our group and showed us that friendship has no boundaries. Thank you for your unconditional kindness and genuine care for one another. All four of you have made an impact on the lives of others and on your school community. The world is a better place because of people like you.

It is with my deepest gratitude that I thank each of my committee members for their continued encouragement and guidance throughout this study.  My thesis became the product it is today because of our thoughtful discussions and your honest feedback. As I reflect to when I started this journey, the experience has been truly transformative.  I have found my passion in life, and I thank you for fostering this passion and setting high expectations to help me grow into the educator and researcher I am today. I would also like to thank my research assistants, McKenzie Bacon and Michael Jarvis. Thank you for volunteering your time to help me orchestrate this lofty thesis idea, I could not have done it without your support and friendships.

Finally, I would like to extend my thanks to my family, friends and my life partner, Johnny. Thank you for the shoulders to cry on, the ears to hear me out, and the hearts to continue to push me to achieve my dreams.


I dedicate this thesis to MacGyver.

# TABLE OF CONTENTS

# LIST OF TABLES

# LIST OF FIGURES

**CHAPTER I: INTRODUCTION**

Autism Spectrum Disorder (ASD) is a neurological disorder that manifests primarily in the form of social communication and social interaction deficits, affecting an individual's ability to establish and maintain inter-personal relationships (American Psychiatric Association, 2013; Kanner, 1943).

Deficits in social communication and social interaction may impact an individual across contexts, significantly impairing social, occupational or other key areas of daily functioning. These deficits may include an absence of social-emotional reciprocity, inability to read nonverbal communication behaviors and facial expressions, and difficulty developing, maintaining, and understanding relationships that are developmentally appropriate (APA, 2013; Bregman & Higdon, 2012; Centers for Disease Control and Prevention, 2016).

Given the degree to which these deficits affect an individual's social-emotional development, it is important for teachers and therapists to utilize evidence-based strategies to instruct individuals with ASD how to appropriately acquire these skills and utilize them across contexts (Battaglia & Ridley, 2014). One such intervention involves the use of a peer network within the individual's natural setting. A peer network is defined as an intervention that promotes generalization of social skills through the utilization of peers as communication partners and intervention agents (Battaglia & Ridley, 2014; Garrison-Harrell, Kamps, & Kravits, 1997; Haring & Breen, 1992; Kamps, et al., 1992; Kamps, Lopez, Kravits, & Kremmerer, 1997; Kamps, Dugan, Potucek, & Collins, 1999; Kamps, et al., 2002).

**Purpose of the Study**

The objective of this study was to examine the effects of a peer-mediated intervention (i.e., peer network), implemented with a seven-year old student with ASD and his typically developing peers, on frequency of social initiations and social responses across three public-school settings. A teacher-researcher, also serving as the public special education service provider, implemented this study. This unique perspective allowed the teacher-researcher to investigate the practicality of a peer network strategy in a public-school setting.

This study replicated and expanded on previous peer network studies (Garrison-Harrell, et al., 1997; Kamps, et al., 2002), adapting individual components of those strategies to meet the specific needs of the student with ASD and the network peers. Results of this study offer data to further support the use of peer network strategies to target social communication skills of students with ASD. The results also provide additional data suggesting these strategies are well-accepted across all participants, families of participants, and school personnel.

Finally, the results of this study demonstrate that though these peer network interventions are labor intensive during initial development phases, once established, they can become peer-mediated, requiring minimal assistance by an adult facilitator. This conclusion suggests peer network interventions could be feasible social strategies for teachers in the public-school setting.

**Research Questions**

1. To what extent does a peer network intervention increase social initiations and social responses from a student with a diagnosis of ASD, to his peers?

2. To what extent does a peer network intervention increase social initiations and social responses from peers to a student with ASD?

3. Does a peer network intervention increase the frequency of AAC (augmentative and alternative communication) use for a student with ASD?

4. To what extent is a peer network strategy feasible for a teacher in a public - school setting?

By addressing these questions, this study contributed to research-based practices in the area of social- skills and the use of peer networks to increase the number of social interactions for children with a diagnosis of autism. Increasing the number of opportunities for individuals with autism to interact with their typically developing peers was hypothesized to increase the social-communicative behaviors exhibited by the target participant.

**Research Hypothesis**

It was hypothesized that when provided with a peer network strategy across multiple educational settings and activities, a student with autism would increase his social-communicative skills, use of AAC device, and interactions with his same-age typically developing peers.

It was hypothesized that when given assistance with research-based components of the study (i.e., video-recording, data recording, and facilitation of probe sessions), the peer network strategy would be a feasible, evidence-based strategy for practical use in a public-school setting.

**Research Design**

  This study was conducted utilizing a single-subject multiple baseline across settings experimental research design. Gay, Mills, and Airasian (2012) define a multiple-baseline design as a systematic process of applying treatment to each behavior, subject, or setting one at a time until all are exposed to the treatment. For the purposes of this study, specific social communicative behaviors (eye contact, joint attention, social initiations, and social responses) were assessed for the participant, across three separate general education settings and three typically developing peers.

**Significance of the Study**

  As previously stated, autism is a social and language-based disorder that can directly affect the individual's ability to build and maintain meaningful relationships—specifically in this study, social relationships with same-age peers were targeted for this study. The participant selected for this study was observed to participate in parallel play, side-by-side, but did not engage in interactive play which includes turn-taking and some form of expressive social communication (e.g., sharing, gestures, use of AAC, vocalization). As the target student with autism continues his educational career, gaining meaningful social relationships with his peers could decrease his alone time and social isolation, thus potentially increasing his social interactions and ability to maintain relationships within the school environment.

**Assumptions**

  1. The teacher-researcher assumed that all students would communicate in some way, even if they were not intentionally trying to do so.

2. The teacher-researcher assumed that the students, both participants and peer network members, were able to utilize their communication modality, whether that mode was verbalizations or the use of an AAC device.

3. The teacher-researcher assumed that for the student utilizing an AAC device, the student was able to navigate the folders within his respective AAC device and was able to travel with it from communication partner to communication partner with little to no teacher prompting.

**Definitions of Terms**

1. Augmentative and alternative communication (AAC) system: "an integrated group of components, including the symbols, aids, strategies, and techniques used by individuals to enhance communication" (McCormick, Loeb, & Schuefekbusch, 2003, p. 437).

2. Speech-Generating Device: "programmable digital device that provides voice output in the form of digitized or synthesized speech when activated (Trottier, Kamp, & Mirenda, 2011).

3. Social Initiation: a motor (e.g., gesture, sharing materials, helping) or vocal behavior (e.g., verbal or use of AAC device) clearly directed to a peer/target to evoke a response.

4. Social Response: any motor (e.g., gesture, sharing materials, helping) or vocal behavior (e.g., verbal or use of AAC device) reciprocated within 3 seconds of an initiation from a peer. Termination of social interaction occurs once the initiator doesn't respond after 3 seconds or turns away from the communication partner.

5. AAC Response: any audible output (initiation or response, as defined above) in the form of synthesized speech, clearly activated by the target and directed to a peer to evoke a response. (e.g., included individual words and the completed sentence, as peers were often observed to respond before the sentence communication was complete. "I", "want", "R2D2", "I want R2D2" would be 4 total social responses/initiations.).

6. Eye Contact: observable, sustained eye contact from target student clearly directed toward peer for at least 3 seconds.

7. Joint Attention: observable, focused attention from target student toward shared activity or item with peer(s) for at least 3 seconds.

8. Peer Network: intervention that promotes generalization of social skills through utilization of peers as communication partners and intervention agents.

9. Typically-Developing Peer: a peer of the same age and grade as the target students, but do not have an educational diagnosis of autism. Teacher-researcher reported peers developed at an appropriate rate, as determined by state criterion.

# CHAPTER II: LITERATURE REVIEW

Literature focusing on interventions intended to increase positive social communication for elementary students with a diagnosis of ASD is substantial. However, to better understand why social skills interventions (i.e., peer networks) are important to consider in every day practice, it is necessary to review defining characteristics of ASD and how these features impact social interactions and language development. This chapter will include the following: (a) a review of defining characteristics of ASD; (b) a review of social communication deficits and language development related to ASD; and (c) the positive outcomes of previous peer network studies.

## Autism Spectrum Disorders

Autism spectrum disorder is a neurodevelopmental disorder that can affect social interaction and social communication (e.g., deficits in social reciprocity, nonverbal communication, development of relationships) across a variety of contexts. Individuals with ASD often engage in restricted, repetitive patterns of behavior that may impede a student's involvement in school activities. In addition, ASD often results in significant disability, including intellectual deficits and language and adaptive behavior deficits, as well as problem behaviors. Severity of these impairments often vary from person to person (APA, 2013; Bregman & Higdon, 2012; CDC, 2016).

In a seminal article written by Kanner (1943), eleven children were evaluated to find common characteristics, which are now associated with autism spectrum disorders. The characteristic that Kanner reported to be the fundamental deficit was central to the discrepancies observed during social interactions, specifically the inability to relate to

others. These discrepancies can be observed in children with autism from as early as the beginning of life.

Specific language impairments such as echolalia and non-verbal language behaviors were reported to be present in a small percentage of Kanner's eleven case studies. However, nearly all the participants were observed to have deficits in literal language and social language reciprocation and initiation. In addition to the language deficits, Kanner reported several sensory-based behaviors, which he referred to as "intrusions" from outside sources such as moving objects, loud noises, and specific food smells and tastes. Kanner's initial analysis also included the autistic characteristic of repetitious behaviors, which included motor, vocal or self-stimulating sensory-based behaviors. Overall, Kanner's observational case study of eleven children was one of the first documentations that demonstrated characteristics that are now commonly associated with autism spectrum disorders.

The fifth edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM 5) now defines ASD as a single diagnostic disorder, to include several previously recognized classifications (e.g., Asperger's disorder, pervasive developmental disorder not otherwise specified). The current diagnostic criteria for ASD defines deficits in social communication and social interaction across multiple contexts and the display of restricted and repetitive patterns of behavior. Individuals with ASD often display deficits in the ability to demonstrate social-emotional reciprocity, use nonverbal communicative behaviors, and develop and maintain relationships (APA, 2013).

These deficits in social communication and social interaction can significantly impact the social interactions individuals with ASD have with their peers, across multiple

contexts. Individuals with ASD often have difficulty with social reciprocity, which is the ability to participate in the back-and-forth interchange of social interaction. This can result in individuals with ASD engaging in little to no social initiation toward peers. Joining on-going conversation or activities and responding to peers can also be challenges for individuals with ASD, as usage and understanding of nonverbal communication can be limited. Individuals with ASD may engage in atypical use of nonverbal communication, such as eye contact, facial expressions, speech intonation and rate, and body language (APA, 2013). Consequently, these traits may be perceived as unusual by others and may decrease the frequency of others initiating conversations with individuals with ASD.

The presence of restricted behaviors, interests, or activities may also impede the student's ability to engage in daily school and social activities. Insistence on routines and/ or repetitive motor movements may confuse peers, as these behaviors may be abnormal in intensity or focus. The combination of these skills deficits can result in individuals with ASD having difficulty establishing and maintaining relationships (APA, 2013).

As previously mentioned, the severity of impairments varies from person to person. The DSM 5 describes three levels of impairment based on social communication impairments and restricted, repetitive patterns of behavior. Levels of severity are defined and range from "requiring support" (Level 1) to "requiring very substantial support" (Level 3).

In summary, the defining characteristics of ASD can greatly impact the social interactions between individuals with ASD and their peers. Initiating and responding can be difficult and consequently, individuals with ASD may engage in limited social

interactions, thus developing few social relationships throughout their lifetime (APA, 2013; Bregman & Higdon, 2012; CDC, 2016; Kanner, 1943).

**Social Communication Deficits and Autism**

Autism Spectrum Disorders (ASD) are characterized by symptoms that change as individuals mature developmentally and vary with the degree of associated cognitive impairment (Bregman & Higdon, 2012). The distinctive impairment that is commonly referred to as the primary feature of autism is the presence of social and communicative deficits. This feature distinguishes autism from other neurodevelopmental disabilities, such as an intellectual disability, because autism is characterized by a distinctive impairment in social communicative development whereas intellectual disabilities are characterized by a pervasive developmental delay.

Given that social reciprocity and the development of friendship formations has been noted by numerous researchers as primary deficits for individuals with autism, young children with autism may not engage in common social-communicative activities as their same-age, typically developing peers. Young children with autism are often observed to engage in parallel play (alongside a peer, but not engaging peer) and tend to respond only to adults or engage other children in a one-sided physical or highly scripted play activity. In addition to these play-based behaviors, children with autism may not engage in the following: (1) reciprocal eye contact as they point and vocalize; (2) monitor the reactions of others to gauge interest, enthusiasm, and approval; or (3) demonstrate curiosity about the interests, preferences, opinions, and experiences of others (Bregman & Higdon, 2012).

**Language Acquisition and Autism**

One of the most common characteristics associated with ASD are the language deficits observed in individuals with ASD, beginning at an early age. When analyzing communication development, previous research notes the need for joint attention, imitation, toy play, and non-verbal cognitive abilities in the development of language (Luyster, Kadlec, Carter, & Tager-Flusberg, 2008; Toth, Munson, Meltzoff, & Dawson, 2006).

Further research investigates the common loss of language that occurs among the ASD population. Researchers Pickles et al. (2009) conducted a study to determine the reliability of early language acquisition in children with ASD as an indicator of eventual language acquisition outcomes. Pickles et al. (2009) states that language loss occurred in 15% of children assessed and classified as having autism spectrum disorder. Results demonstrated that though the loss of language skills before their first phrases postponed the phrased speech milestone, it did not significantly affect long-term language skill development when compared to those children with ASD whom did not experience early language loss.

**Peer Network**

In the seminal network study, researchers Haring and Breen (1992) investigated the effects of a peer-mediated social network intervention to increase the social interactions of individuals with moderate and severe disabilities. Participants of this study included two 13-year old males, one with a diagnosis of autism and the other with a moderate intellectual disability and severe language delay. Peer network members

included nine typically developing students, each assigned to a specific participant's peer network. The setting for this study was in a public junior high school and intervention was provided during the participants' lunch period. A multiple-baseline design across participants was utilized in this study to demonstrate the effects of peer support networks within the general education setting (Haring & Breen, 1992).

Dependent variables for this study included the frequency of social interactions between peer participants and the students with disabilities, the frequency of those interactions with appropriate social responding, and the identity of the peers with whom interaction occurred during the session. In addition to these dependent variables, researchers also collected daily qualitative data using a 3-point Likert Scale for peers to rate the quality of interactions they had with the student with disabilities. Satisfaction of the student with disabilities was measured weekly, immediately prior to the group meetings. Finally, researchers asked peers to rate their satisfaction with the program, considering specific elements of the program, their attitude interacting with the student, and their relationship with the student. This 5-point Likert Scale was provided to the peers before, during, and after intervention (Haring & Breen, 1992).

Results of this study demonstrated functional control of the intervention on increasing the frequency of social interaction, however no functional control was demonstrated for the frequency of interactions with appropriate responding (Haring & Breen, 1992). Though no functional control was present for the frequency of interactions with appropriate responding, researchers did observe an increase in the number of social interactions with appropriate social responding in non-structured contexts across the school day. Peers also reported an increased satisfaction of the peer network group,

noting increases in the areas of specific program variables as well as friendship toward students with disabilities. Implications of this study suggest that friendships can be developed while systematically increasing the social competence of individuals in natural contexts (Haring & Breen, 1992).

The same year, Kamps et al. (1992), studied the effects of social skills groups for high-functioning first-grade students with autism to improve social interaction skills with peers. Participants included three male students with autism and their classroom peers. A computer system was utilized to record social interactions with initiations, responses, and duration of interactions as dependent variables. Results of this study demonstrated an increase of social interactions across all three participants with autism, while also supporting the use of social skills instruction in small-group formats that include both students with disabilities and their typically developing peers (Kamps, et al., 1992). Additionally, the results of this study also indicated that groups were more successful when fewer social skills behaviors were targeted, with more practice opportunities of those basic skills (Kamps, et al., 1992).

In a later study investigating the effects of a peer network across multiple settings, Kamps, Potucek, Lopez, Kravits, and Kemmerer (1997) proved the intervention to be successful to increase interaction time with peers for three elementary students with autism. Peer training included modeling, adult-student practice, and peer-student practice of social skills. Additionally, peers were provided task and social scripts and a visual reinforcement system (Kamps et al., 1997). Improved interaction time was observed for all three participants with autism, across all settings. Results of this study indicate social behaviors can increase across multiple, naturally occurring public school settings.

Though there were no specific data on training variables (i.e., prompting or reinforcement schedules), the results did prove teachers and paraprofessionals to be effective implementers of social programs for students with autism (Kamps, et al., 1997). In addition to improved interaction time, some generalization of interaction was noted in settings that had not been exposed to treatment.

Garrison-Harrell, Kamps, and Kravits (1997) analyzed the duration of social-communicative skills for students utilizing augmentative communication systems (AAC). The study focused on three students with autism, all of whom utilized AAC systems as their primary mode of communication. Conducted in the context of a multiple-baseline design across settings, researchers collected data on the duration of the social interaction time, use of the AAC system by the target students and their peers, language use, and disruptive behavior (Garrison-Harrell, et al., 1997).

During the intervention phase of the study, peers participating in the peer-network were provided with eight, 30-minute training sessions during which social skills were modeled by the researchers. Peers were also provided the opportunity to role-play practice with the researchers while receiving corrective feedback and reinforcement of expected social interaction behaviors. The target behaviors of this study were as follows: initiating and responding, conversing, sharing, giving instructions, and saying nice things (Garrison-Harrell, et al., 1997). In addition to the instruction of the target skills, peers were also provided instruction on how to interact with their peers with autism, specifically those that used AAC systems as their primary mode of communication.

The results of this study indicated that peer networks including AAC systems were a, "functional, effective intervention for students with autism in public school

settings" (Garrison-Harrell, et al., 1997). The frequency and total duration time of social interactions increased substantially throughout the process of the study, as evidenced by the data collected. All three target students demonstrated an increase in overall social interactions ranging from a baseline of 0 social interactions up to 9 interactions (frequency) and a baseline of 0 seconds duration of time spent interacting up to 299 seconds of time spent interacting. These results suggest that peer-networks serve as an effective strategy for students with autism that use AAC systems as their primary mode of communication.

In 2002, Kamps et al. published an article detailing two studies in which the researchers implemented a peer-network to facilitate social interaction for elementary students with autism. The first study served as an initial investigation of peer training within the contexts of social skills. The study was conducted in one setting within the general education environment with a small number of students with autism and their peers. The researchers set out to examine the effects and generalization of the following conditions: "(a) social skills, (b) cooperative learning, and (c) control groups in which forms of peer training were embedded within the intervention" (Kamps et al., 2002, p. 174). Throughout the duration of this study, the researchers utilized several modes of data collection such as event recording (frequency), the mean length of the social interaction, and the duration of interactions between the students with ASD and their peers. The results of the first study indicated that there was a significant increase in the amount of time students with ASD were engaged in social interactions with their peers, as evidence by the change in duration from less than 30 seconds during baseline to 191 or more seconds during the intervention phases. Though the amounts of time may seem minor in

isolation, when considered in the context of the 5-minute probes, the time spent engaged with their peers significantly increased by the end of the study.

In the second study conducted by Kamps et al. (2002), the researchers replicated and improved upon the procedures used in the first study. While still focusing the interventions in cooperative learning groups, the number of participants increased from 5 students with autism to 34 students with autism. In addition, the intervention and outcomes were analyzed across multiple school districts and school years. This span in time allowed for the analysis of maintenance and generalization of the targeted social skills across participants. As hypothesized, the results of the second study indicated improved social interaction skills not only in frequency but also duration. Kamps et al. (2002) stated, "these outcomes suggest generalization of social skills by both students with autism and peers" and goes on to conclude that these results depict a, "trend where social situations become more naturally reinforcing for students with autism, with an improvement in general responsiveness" (Kamps et al., 2002, p. 183).

In addition to these positive results, the researchers interviewed over 100 peers who participated in the peer-networks, and over 90% indicated an interest in continued programs with their peers with autism. Results of the interviews suggest not only a benefit for children with autism, but also for their typically-developing peers.

Battaglia and Radley (2014) focused their research on the lack of evidence-based practices implemented in schools for individuals with ASD due to limited resources and time. Researchers have worked to develop evidence-based interventions that are easy to implement as well as time and cost efficient. One of the interventions that fit these criterion is a peer-network intervention. Battaglia and Radley (2014) describe peer-

16

network interventions to limit demands placed on educators by providing an alternative primary instructional source that is not only abundant but also free of cost.

In their study, peers were utilized as intervention agents by training them how to initiate and respond to social interactions, model the target skill, prompt, and reinforce the appropriate behaviors displayed by their peers with ASD. Though the initial development of this intervention requires prominent levels of adult-led instruction and corrective feedback to ensure treatment fidelity, once the peers are appropriately trained, the demands on instructors significantly decrease.

In addition to the benefit of time and cost efficiency, Battaglia and Ridley (2014) discuss the benefits students with ASD receive by the natural social-contexts peer networks provide to practice the target social skills. This is a strength of peer-networks because they "provide children with access to social situations in which they can practice skills in multiple settings and with multiple peers, allowing children with ASD to contact natural maintaining contingencies for social skill use (Battaglia & Ridley, 2014, p. 4).

The purpose of this study was to provide an evidence-based approach of how to appropriately implement and maintain an effective peer-network to increase social skill interaction for children with ASD.

**LEGO© Group Format**

LEGO© therapy has been described as a "naturalistic" teaching strategy, focusing on the child's interests to motivate learning and change in behavior. In a 2008 article, authors Owens, Granader, Humphrey and Baron-Cohen implemented a division of labor

within a play-based social group to allow the participants to practice joint attention, joint problem solving, sharing, turn taking, listening and general social communication skills.

The authors of this study assembled a group of three people (comprised of both children with and without autism) to participate in the LEGO© group session, assigning each a specific role within the group. The roles were as follows: 1. Engineer (describes the instructions), 2. Supplier (finds the correct pieces), and 3. Builder (puts the pieces together) (Owens, et al., 2008). After a set amount of time or steps completed, the group would rotate roles.

In the present study, the teacher-researcher adapted this group format to better meet the specific needs of the participants. The lessons within this study were designed to use this activity structure within the lesson formats described in previous research (Garrison-Harrell, et al., 1997; Kamps, et al., 2002). This specific lesson structure was utilized during sessions in the recess setting, throughout intervention and probe phases.

**Social Validity**

When selecting a social skills intervention, it is important for the researcher to consider the social importance and acceptability of treatment procedures and outcomes for all participants in the study. Individuals with autism may have a number of social deficits that vary in severity, depending on the individual's current level of functioning. Kamps et al. (1998) investigated the social validity of peer-mediated social programs in multiple settings across a five-year span. With increasing numbers of students with disabilities being served in least restrictive environments, it has become imperative to investigate and develop measures to increase inclusionary practices for classroom

teachers and peers. Interview and/or survey information was described from peers who had been involved in school-based, integrated activities with students with autism. These analyses resulted in mostly positive conclusions to support peer-mediated networks as an effective strategy to increase social inclusion for students with autism.

Results suggest that peers are accepting and frequently display excitement about social activities with children with autism. Kamps et al. (1998) reports that peers, "were 84% to 100% certain that they wanted to be involved in the activities again, and many (76% to 96%) also stated that they wanted to spend more time with the children with autism" (p. 11). This finding provides data to support that structured opportunities to engage in social interactions (initiation-response sequence) can increase tolerance, acceptance, and interactive time together for peers and children with autism.

In summary, the study provided evidence for implementing peer-mediated social programs in the school environment to target social integration and participation of students with autism, demonstrating a high rate of peer satisfaction and desire to participate in future social programs with students with autism.

In a more recent study, Locke, Rotheram-Fuller, and Kasari (2012) examined the social impact of being a typical peer model as part of the social skills intervention for children with autism (p. 1895). When comparing peers of whom participated in the social skills intervention to those peers whom did not participate, peer models reported higher rates of social engagement, friendship reciprocity and quality, and less loneliness than non-peer models. As a direct correlation to the higher rates of friendship reciprocity and social engagement, peer models were also more likely to relate to children with ASD then non-peer models during baseline and intervention phases of the study.

The intervention implemented in the current study was socially valid, as it was designed to improve social reciprocity and the overall frequency of social interactions for a child with autism and his typically-developing peers.

**Summary**

In summary, peer-network interventions can serve as a functional and effective strategy to increase the overall frequency and duration of social interactions for children with autism and their peers (Battaglia & Ridley, 2014; Haring & Breen, 1992; Kamps, et al., 1992; Kamps, et al., 1997; Kamps, et al., 1999; Kamps, et al., 2002). Research has proven that this is true not only for those students with verbal language, but also those requiring alternative forms of communication such as the AAC systems (Garrison-Harrell, et al., 1997). Though these strategies can be time and energy consuming in the initial stages of the intervention process, peer-networks have proven to decrease teacher demands over time as well as provide a cost-efficient intervention any teacher can afford (Battaglia & Ridley, 2014). In addition, when established across settings and participants, peer network interventions can facilitate and help promote generalization and maintenance of the target social skills over time (Kamps, et al., 1997).

# CHAPTER III: METHODOLOGY

The purpose of this study was to examine the effects of a peer network on the social-communicative behaviors of an elementary student with a diagnosis of autism. The specifics of the study will be discussed under each of the applicable headings in this chapter.

## Setting

The site of this study was a public elementary school in a small town located in the Midwestern region of the United States. The most recent U.S. Census Bureau data (2010) reports the population of this town to have 17,820 residents, with an average household income of $49,116. The Department of Elementary and Secondary Education (DESE), reported the percentage of students receiving free and reduced lunch in this elementary building was 37.46% (DESE, 2016).

The participant in this study participated in a specialized program for students with multiple disabilities and mild-to-moderate behavioral disorders. Students who qualified to attend the specialized program were provided a structured, small learning environment and were predominantly served in the special education classroom. The participant's special education classroom had a student to adult ratio of 3:7 and had access to a neighboring motor-sensory lab, located immediately next to the classroom. The general education classroom had a total of 22 students, including MacGyver, and one teacher present at all times. A paraprofessional provided support when the target participant joined his class in daily activities.

**Participant Selection**

The target participant of this study was selected because of his existing need for social skills training. MacGyver was a seven-year old male with both a medical and educational diagnosis of ASD. MacGyver met the educational eligibility criteria for ASD, as outlined by DESE (2016).

In addition to the target participant, three peer models were selected from the participant's general education classroom. A peer model selection process used in previous research (Garrison-Harrell, et al., 1997; Kamps, et al., 1997) was adapted for use in this study.  Peers were selected based on the results of two sociometric assessments. Outcomes from both assessments were used to provide the general education teacher with a list of students from which to select the final peer network members. The final teacher selection was based on another set of criteria, described in detail later in this study.

**Target Participant**

At the time of the study, MacGyver was in the second grade and participated in general education settings for 24% of his school day (i.e., recess, art, music, computer skills, physical education, science, and snack). MacGyver had an emerging echoic repertoire (he was able to imitate two-word utterances and phrases). Throughout the course of the study, his repertoire observably improved. MacGyver was able to answer yes and no questions, label/match preferred movie characters and toys, use 1-button responses to answer questions presented in a question-format (e.g., "Do you like

strawberry or grape jelly?"), and could clarify a request for help by gestures (e.g., guiding other's hand to the specific LEGO© he needed help separating/putting together).

MacGyver utilized an AAC device that he carried to all settings throughout his school day. MacGyver traveled to and from home with his device, with parents reporting the same rate of device use in the home setting.

During baseline and intervention sessions, MacGyver utilized the Proloquo2go ™ program as his primary mode of communication. Proloquo2go ™ is a symbol-based communication application that utilizes research-based vocabulary levels and activity templates to support motor planning and promote language acquisition. The application was designed for specific tablets that support the software and consists of a touch-based communication function with speech-output capabilities.

**Peer Network Members**

Prior to any baseline data collection, the peer model selection process was completed. This process included the use of two sociometric assessments and teacher selection. Peers selected were considered typically developing, as determined by the lack of an educational diagnosis that meets state criterion to qualify for special services.

The first assessment consisted of peer ratings using a Likert scale on "how much you like to play with (classmate)" (1- Not at all; 2 - A little; 3 - Quite a bit; 4 - A lot). This Likert scale was adapted from a previous study (Garrison-Harrell, et al., 1997) to assess the social status of each student in the general education class.

The second assessment asked students to nominate three students from their class, following a series of social questions. These interview questions were intended to

determine social status of the students in the general education classroom (e.g., Who do you like to play with?; Who are your friends?; Who would you invite to your birthday party?).

Based on the results of these assessments, a list of five peers was provided to the general education teacher. Peers with the highest rate of peer nomination and whom had been rated as someone that others liked to play with "a lot" by at least four students, were listed for teacher consideration. This criterion was adapted from the previous research, as ratings were generously high, creating the need for a higher criterion for qualification.

The classroom teacher then selected three peers from the provided list, using the following criteria: he/she has good social skills, demonstrates compliance to adult directives, has good attendance, and has age-appropriate expressive/receptive language skills. In addition, the peers selected could not have a negative history with either target student and must had had parental consent to participate. Consent was obtained from all selected peer network members prior to any baseline data collection.

**Role of the Teacher-Researcher**

At the time of this study, the teacher-researcher was the target participant's special education teacher. The teacher-researcher in this study was responsible for selecting the participant and peer models, teaching the peer models how to interact with the participant's AAC device, teaching the social skills lessons, providing self-monitoring sheets, maintaining a research journal, and maintaining confidentiality throughout the duration of this study. Reliability partners served as research assistants. The research

assistants video-recorded all data sessions and assisted in the set-up and organization of each lesson from beginning to completion.

**Research Design**

A multiple-baseline design was implemented across settings to demonstrate experimental control. This design included two experimental phases: (A1) baseline; (B1) intervention, applied across three public school settings. A multiple-baseline across settings design involves systematically introducing treatment to each setting in a staggered fashion, one at a time, until treatment is in place in all settings. Functional relations are demonstrated when changes in dependent variables occur when, and only when, the independent variable is introduced.

A multiple-baseline arrangement allows the researcher to avoid withdrawal of treatment or intervention when it would not be ethical to withdraw or reverse treatment (Gay, Mills, & Airasian, 2012).

Using the multiple-baseline design, a minimum of three data points were collected per phase until data were stable via visual inspection before beginning the next phase of the intervention. Data collection began by collecting baseline data in all settings (i.e., recess, lunch, and snack). Once data were stable in the first setting (i.e., recess), the intervention was introduced to the target participant in the first setting only, while baseline data for the two remaining settings continued to be collected (i.e., lunch, snack). Intervention began in the second setting began after at least three sessions in the first setting (i.e., staggered) and data in the second setting were stable.

Embedded within the multiple-baseline, a multiple-probe technique was used to continue to collect data in settings in which the intervention had been implemented. Multiple-probe designs are useful when continued data collection is desirable without requiring that data be collected on a continuous basis (i.e., every session). The multiple-probe is a convenient arrangement for demonstrating experimental control, especially when combined with more powerful designs (e.g. the multiple baseline across settings design, as used in the current study).

**Dependent Variables**

Frequency data were collected on social initiations and responses for both the target and peer-network members. Additionally, the average frequency of AAC use per session, for each phase of the study, was recorded. All dependent variables were recorded, as operationally defined (see Definitions). Data collection was completed with the aid of a video recording device, frequency data sheet, and research journal.

**Inter-observer Agreement**

Inter-observer agreement (IOA) refers to the consistency of scoring across two or more independent observers (Gay, Mills, & Airasian, 2012). The teacher-researcher reviewed the video recorded social skills lessons alongside the designated inter-observer reliability partners (i.e., research assistants). Research assistants were trained in data collection procedures and practiced recording data with the teacher-researcher before conducting IOA sessions.

Once the research assistants demonstrated point-by-point reliability of 85% or above, IOA was completed for a minimum of 20% of all baseline, intervention and probe sessions. During these viewings, the teacher-researcher and research assistants used a customized data sheet, with the operational definitions of each target behavior visible throughout the viewing. These operational definitions stated the topography of each target behavior to be observed, to increase the likelihood that reliability of data collection across observers remained consistent (see Definitions). These data sets were then compared to one another to determine the amount of agreements and disagreements between observers.

**Procedures**

Data were collected over the course of the 2016-2017 school year. The time of day the social skills group met remained consistent throughout the duration of this study, once initial schedule conflicts were resolved. Social skills lessons focused on initiating and responding to peers, cooperating, and engaging in positive interactions during the presented activity. Activities varied with the settings; however, all activities were designed based on the target student's interests.

**Pre-Baseline.** During pre-baseline, the teacher-researcher obtained research approval before completing pre-baseline assessments (IRB: see Appendix A). Once the appropriate permissions were obtained (see Appendices B-D), indirect and direct assessments were administered, and peer network member selection was completed. Indirect and direct assessments were completed during pre-baseline to serve as a reference to compare scores to the second administration of these assessments, post-

intervention. Results obtained during pre-baseline also assisted in the planning of instructional and activity sessions. Each assessment described in this section was administered during pre-baseline and post-intervention, unless otherwise described.

Direct Assessments. The first assessment was a social skills checklist developed by Quill (2000). This assessment consisted of rating social skills using a Likert scale (1 - Not applicable; 2 - Never; 3 - Sometimes; 4 - Often; 5 - Always) to assess the participant's current level of social functioning. Data for this assessment were recorded during the first and last video sessions.

The second assessment was the Checklist of Communicative Functions and Means (Wetherby, 1995). This assessment was administered to determine the participant's modes of communication (ranging from preverbal to verbal) for each communicative function identified on the assessment. Categories assessed included: (1) how to regulate another's behavior; (2) how to attract another's attention; and (3) how to direct another's attention. Data for this assessment were recorded during the first and last video session.

Indirect Assessments. In addition to these observation-based assessments, the teacher-researcher completed the Autism Social Skills Profile developed by Bellini (2006). This socials skills profile described behaviors that a child may exhibit during social interactions and required the observer to rate how often the child independently displayed these defined behaviors using a Likert scale (i.e., from "never exhibits the behavior" to "always exhibit behavior").

Additional social functioning interviews were provided to the participant's general education teacher and parents (Bellini, 2006). The purpose of these interviews

was to evaluate the observed changes in social interaction for the participant in the general education and home setting. To create similar conditions for the pre-baseline and post-intervention administrations of the teacher interview, the interview questions were provided one week prior to the requested completion date during pre-baseline. This pre-exposure allowed the general education teacher to preview the questions prior to completion since prior knowledge of interview questions was assumed to be present during post-intervention administration of the teacher interview.

Reinforcement Assessments. A reinforcement assessment was administered during pre-baseline, to identify potential reinforcers for the target participant, to increase the likelihood that he would exhibit the desired social-communicative behaviors. The Reinforcement Assessment for Individuals with Severe Disabilities (RAISD) is a structured interview for caretakers, to get as much specific information as possible as to what the student may find reinforcing (Fisher, Piazza, Bowman, & Amari, 1996). The information gathered from this assessment was used to guide the items chosen for activities and additional preference assessments presented prior to intervention and probe phases.

In addition to identifying reinforcers for the target participant, a Reinforcement Inventory for Children (1993) was also given to the three selected peer models. This reinforcement inventory was a structured interview given directly to the peer network members. Peer network members were asked to rank a variety of potential reinforcers based on how much they liked the stated item (i.e. "Not at All" to "Very Much"). The information gathered from this assessment was used to guide the items chosen for the

activities and positive reinforcement provided at the end of each training sessions or social group.

  **Baseline.** Data on the target student and his selected peers were collected to assess baseline frequency for all dependent variables (i.e., social initiations, social responses, AAC use). Baseline sessions were conducted in the respective general education setting (i.e., recess, lunch, and snack time). A customized data sheet was used to record the frequency of social initiations and social responses (for both target participant and peer network members).

  In addition to these measures, the frequency of AAC use by the target student was recorded. At the completion of each baseline session, the teacher-researcher maintained a research journal describing the overall perceived quality of interaction. This data collection process was completed in all three general education settings during baseline phases.

  Once peer network members were identified, members were provided training on features of ASD, how to communicate with a friend with ASD, and how to interact with the target participant's AAC system. Providing the peer network members with relatable information about the participant's disability was employed to enhance the peer models' understanding of and sensitivity to the participant in this study. Brown and Conroy (2001) discussed the importance of combining social competence interventions that provide a basic understanding of the disability with interventions designed to provide increased opportunities to interact with the target student.

  Peer network training was provided during 25-min sessions, once a day, across 11 school days. Targeted social skills were selected based on current literature on social-

communicative behavior deficits in children with autism and social skills and previously

conducted research (Battaglia & Radley, 2014; Garrison-Harrell, et al., 1997; Kamps, et

al., 2002). These behaviors included initiating and engaging in a conversational response

sequence. In addition, peer-network members were taught how to use an AAC to initiate

and respond. Table 1 describes a complete list of lesson topics and the procedures used

during the peer training process, adapted from previous research (Garrison-Harrell, et al.,

1997).

During each training session, one skill-set was taught at a time. The sessions

began with the teacher explicitly stating the target social skill. Large visual information

charts were used to provide visual supports during each lesson. Each social skill was then

modeled (using an AAC when appropriate) and practiced by peer-network members for

approximately 10 min. While the peer network members displayed and practiced the

target social skill, the group was supervised, and the researcher provided frequent verbal

feedback to reinforce correct use of the skill(s) and compliance with the peer network

group rules.

After each training session, peers were provided a tangible reinforcer, as

determined by the reinforcement inventory. In addition, peers were taught how to

complete a self-monitoring sheet. Following each session, peers were provided a self-

monitoring sheet to reflect on their individual performance and level of engagement (see

Appendix E). The target social skill taught was then briefly reviewed before dismissing

peers back to their general education classroom.

**Intervention.** Once peer network members were trained and a stable baseline was

established in the first setting, the implementation of the peer network was introduced in

the first site (i.e., recess). All participants participated in social skills group lessons and activities to target conversation greetings (e.g., initiations, use of names), turn taking, and how to keep a conversation going during varying conditions within the social interaction (see Table 2). Peer network members were verbally reminded about their previously learned skills, as naturally occurring social opportunities presented (e.g., reminding peers how to respond when a friend "acts differently", such as offering headphones when he is covering his ears).

Prior to each session, visual aids were displayed and were easily visible to all participants (i.e., Paw Pals group sign; visual timer; visual information charts corresponding to lesson topic; token boards). Each social skills session was conducted in the same manner, following a lesson format adapted from previous research (Garrison-Harrell, et al., 1997). The preferred activities during the structured play times were selected based on the reinforcement interview (RAISD) that was administered during the pre-baseline phase.

The social skills groups were conducted in a separate classroom to provide a structured, instructional environment to teach the target social behaviors. The need to provide more intensive social skills training in a smaller environment was noted by McConnell et al. (1991), who demonstrated that intensive social skills training outside of the child's classroom was effective in teaching children specific social behaviors. This structured environment allowed for systematic delivery of teacher prompting as well as reinforcement. McConnell et al. concluded that this approach increased the child's ability to perform the skill during role-play scenarios and increased acquisition in other, untaught settings.

The first portion of the lesson (direct instruction) was provided in a structured setting (library), for 20 min. This longer duration of time provided time to accommodate target student specific needs, as response rates were low and often required additional prompting (i.e., verbal, visual, gesture prompts) to evoke a response. The participant and three peer models were arranged into a small group, surrounding the visual chart (i.e., visual chart depicting lesson information) and visual aids. The arrangement of peer models changed with each new lesson, to ensure the participant was provided opportunities to interact with each peer model. Materials for the activity were distributed along with the peer model self-monitoring sheet. The peer self-monitoring sheet was reviewed at the beginning of the session to expose the peers to the behaviors expected of them but was not completed until the end of the lesson. A visual timer was then set for 20 min, during which direct instruction (e.g., explicitly stating the components of each skill) and modeling (e.g., role-play of various social situations) of the target social skills were provided (see Table 2).

The structured-play portion of the lesson was then provided in the respective setting receiving the intervention treatment, for 15 min (see Table 2). Following a brief 5-minute skill review, all participants were told they had 10 min to practice being a good friend and were prompted to use the skill that was taught during the earlier lesson. Since the structured-play portion of the session occurred later in the day (1 hour and 35 minutes apart from the instructional portion), visuals and target skills were briefly reviewed before beginning the 10 min of structured-play. This 10-min session served as an opportunity for the participant and peer models to engage in the target social behavior. A visual timer was set, and the session was video recorded for data collection purposes.

Corrective feedback and positive reinforcement (e.g., behavior -specific praise, tokens, edibles, tangibles) were provided to the participant and all peer models as the skills were taught and practiced in each setting, throughout the intervention phase of the study. After the 10-min session, peer models were asked to complete their self-monitoring sheet. The participant and peer models were also provided individualized reinforcement for their participation.

Recess Setting. The activity for the recess setting was chosen based on the results of the reinforcement assessments administered during pre-baseline. All the peer members reported to like LEGO© blocks "very much" and would elaborate on their interest when questioned how much they enjoyed playing with LEGO© blocks. MacGyver was observed to select LEGO© blocks as his activity during unstructured play times in the special education classroom and during inside recess in the general education classroom. In addition, parents reported LEGO© blocks as one of his highest preferred activities on the Bellini Parent Interview.

During the first two recess sessions, the procedures and rules of LEGO© group were instructed and practiced (adapted from Owens, et al., 2008). Both portions of these lessons were conducted in the library, to provide a structured, learning environment.

In the present study, the division of labor roles were assigned and presented on a visual card as follows: 1. Engineer ("I help show my friends where they can put the block"), 2. Supplier ("I help my friends find the right pieces"), 3. Builder ("I put the blocks together. I help my friends"), and 4. Support Manager ("I tell my friends when they are doing a great job. I help my friends remember the rules"). To ensure these were accessible to both the peer network members as well as the participant, a familiar icon

was paired with each role. These role cards were visible during all instructional and structured play sessions in the recess setting.

The roles remained the same within each session, however peers rotated after each session. To prevent frustration during this activity, MacGyver remained the Builder for each session. The teacher-researcher asked this of the peer network members, as a gesture of friendship prior to the participant's arrival. All three peer network members expressed their approval of this "rule" and were recorded to later make comments regarding this being something "a good friend would do" to help MacGyver learn how to make friends.

The role of the Support Manager served as an additional source of positive reinforcement during structured play sessions. The Support Manager was instructed to "oversee" the group to help his friends when they forgot a "rule" and to tell his friends when they were following the rules (e.g., "Good job getting his attention", "Good job talking, MacGyver!", "Awesome!"). In addition to this verbal praise, the Support Manager began delivering MacGyver's edible reinforcer, after the first few sessions. This transition naturally occurred by the Support Manager reaching out to retrieve the reinforcer from the teacher-researcher. The teacher-researcher obliged, as the goal was to fade teacher-researcher supports out when possible.

Lunch Setting. Using results from the RAISD, the teacher-researcher created visual topic cards (5 in. by 5 in.) with images of MacGyver's highly preferred characters, food items, and familiar LEGO© sets (including pictures of sets used in the recess setting). There were four sets, varying in quantity and separated by topic category. Each set was bound with a small metal loop for easy navigation during social interactions and

portability. The topic categories included: 1. Star Wars©, 2. Pokémon©, 3. LEGO© sets, and 4. preferred lunch food.

Peer network members were explicitly instructed how to gain MacGyver's attention and how to present questions in a manner that MacGyver could independently respond (e.g., "Do you like the helicopter? Yes or no?", "Do you like grape or strawberry jelly? You pick."). In addition, peers were instructed how to provide a verbal model as part of a question (e.g., "Do you need help? Say, 'help'). Using these skills, peer network members used the visual topic cards to provide a visual along with their questions (e.g., "Who is this?", "Look! It is Yoda. Can you say, 'Yoda'?). The repetitive nature of the peer training lessons allowed these question-based prompts to become script-like, creating a consistent and predictable social environment.

Snack Setting. The activity for the snack setting was similar to the activity in the lunch setting. Using results from the RAISD assessment, visual topic cards were created with images of MacGyver's highly preferred characters, food items, and familiar LEGO© sets (including those used in the recess setting). Food items were customized to include foods the target student typically brought with him for snack and lunch-specific food items were removed from the visual card set.

Often during snack, students were observed to bring treats to celebrate birthdays, holidays, and other special occasions. To simulate typical snack time activities observed during baseline, the teacher-researcher provided snacks, during each intervention session, for the target and peer network participants to share with one another. Due to changing curriculum requirements, the general education class did not participate in a structured snack time during intervention sessions, as they did during baseline sessions. With this

change, the peer network group was moved to the all-purpose room of the general education area. A table and chairs were provided to simulate similar conditions to the classroom, minimizing potential confounding variables.

Participants would begin the session by greeting their peer with ASD. Once MacGyver responded to their greeting, peers and target student took turns passing the snack items out to the group members. In addition to the social prompts described in the lunch setting, peers would ask the target student if he would like one of the special treats (e.g., "Do you want a cookie? Yes or no?" while presenting the item as a visual cue). If MacGyver did not immediately respond, a second peer would then provide additional prompts to support a response. Once the snack was passed out, peers then utilized the visual topic cards to socially engage the target student.

Before each research session, the 10-min video of the target student and network peers was reviewed. During this viewing, data was recorded for the frequency of each target behavior for all participants and a research journal entry was completed to describe the perceived quality of the interaction as well as any extraneous factors (see Appendix F).

Token Economy.  A token reinforcement system was implemented, beginning on November 30. Charlop-Christy and Haymes (1998) described tokens as "secondary reinforcers that acquire their reinforcing properties through association with primary reinforcers". During intervention sessions of this study, highly preferred characters were utilized as generalized reinforcers (i.e., the tokens), for both the peer network members as well as the target student. Images were chosen based on the reinforcement assessment administered during pre-baseline. While this was a new system to the peer network

members, the target student was familiar with the process of receiving tokens with a delayed access to the primary reinforcer.

Primary reinforcers for the target student to "earn" were determined using a direct preference assessment (e.g., goldfish, gummy bears, stickers), prior to the session and provided immediately following the session. These reinforcers were paired with verbal behavior-specific praise and other gestures (e.g., helping friends, talking to friends, etc.), secondary reinforcers.

Since the peer models were already receiving a tangible reinforcer at the end of each session, their token reinforcer board was used as a visual. Peer network members were provided behavior-specific praise paired with the presentation of the earned token. Peer network members then used their tokens on a point-based system. Peers earned 1 point for each time they filled up their token board with token reinforcers (5 tokens).

Before each session, peer network members were asked to set a goal of how many points they thought they could earn, while using the target skills during the social skills group. The teacher-researcher helped guide this conversation, encouraging them to choose a realistic goal that could be met within the allotted time. Peers then were given tokens throughout the social skills group session. The designated goal was ensured to be met, if the peers demonstrated the target skills during the session. Points earned at the end of each session were then recorded on their goal sheets, tracking both the daily and overall accumulation of points.

At the onset of this point system, peers were instructed that if they met their daily goal every day, they would be rewarded with a class-wide party to celebrate "friendship".

Daily goals were consistently met, and a class-wide party was provided, following the last data session.

Multiple-Stimulus Without Replacement Assessment (MSWO). Identifying preferred items or activities is essential to effective implementation of instructional strategies.  DeLeon and Iwata (1996) reported preference assessments to be an effective approach to identify potential reinforcers. The teacher-researcher aimed to accomplish an increase in task motivation by administering a Multiple-Stimulus without Replacement Assessment (MSWO) to identify items or activities that would be highly motivating and likely to increase the participant's responsiveness (DeLeon & Iwata, 1996).

An MSWO was administered to the participant within 30 min prior to the instructional sessions in the intervention and probe phases (see Appendix G). Procedures for administering the MSWO were adapted from the procedures in an article written by DeLeon and Iwata (1996).

**Intervention Probes.** To assess the maintenance of the target social behaviors in previously-taught conditions, additional data were collected for each setting exposed to treatment, following the intervention phase in that setting. All intervention probe sessions were conducted by the research assistants, trained on the procedures. Peer network members and the participant were provided a brief priming lesson during the first 5 min of each session at which time they were reminded to talk to their friends and to make sure all members of the peer network were included in the conversations. The same visuals were displayed at each setting as in the previous social skills group sessions (e.g., Paw Pals, token economy boards and tokens earned, visual timer). All conditions in the intervention probe sessions were identical to those in intervention sessions, with the

exception that the teacher-researcher left the session after the 5-minute primer, omitting the instructional portion of the social skills lessons.

**Treatment Fidelity**. A measure of treatment fidelity was completed during this study, to ensure effective and consistent treatment was provided during each session across all three settings. Treatment fidelity was collected for each peer network training and intervention session to assess whether the researcher completed each step of the respective procedures. Each session was video-recorded and reviewed post-session by the teacher-researcher as well as the research assistants. These checklists were completed as the video played to ensure all procedures were followed and content was covered. Two checklists outlining these components were completed by the teacher-researcher on all sessions during peer training and intervention. For a minimum of 20% of the sessions both the teacher-researcher and research assistants completed the checklists to obtain a measure of treatment fidelity

Table 1. Adapted Peer-Network Training Procedures. Descriptions of the procedures include lesson topics in the order they were instructed.

| Peer Network Training Procedures | |
| --- | --- |
| Sequence of Steps | Description of Procedures/Lesson Topics |
| Selection of peer network members | Friendship Rating Scale, Peer Nomination Questionnaire, Teacher Selection |
| Establish time and dates for training sessions | Two weeks of training; 10-15 min instruction, 10 min role-play |
| Begin training sessions | |
| What is autism? (1 session) | How does autism effect a child's behavior?; How does autism effect a child's ability to communicate?; Modeling and discussion of behavioral and communication characteristics of autism; Self-monitoring |
| Why do we have friends? (2 sessions) | What are characteristics of a good friend?; What do you like to do with friends?; Purpose/functions of friendships; Modeling and role-playing of friendships; Self-monitoring |
| How to talk to your friends. (2 sessions) | How to communicate with a friend that does not talk; How to use an augmentative communication system to talk to a friend; Modeling and role-playing with augmentative communication system; Self-monitoring |
| How to talk to your friends, cont. (2 sessions) | Initiating, responding, and keeping it going; How to use an AAC to initiate, respond, and keep conversations going; Modeling and role-playing; Self-monitoring; Viewing of AAC example videos |
| How to talk to a friend when you don't understand what he is doing (2 sessions) | What to do when a friend acts different; How to communicate with your friend when he won't communicate with you (with an AAC); Modeling and role-playing; Self-monitoring |
| How to talk to your friends while working on activities (2 sessions) | How to work and play in LEGO© group; How to talk to my friends during lunch; How to talk to my friends during snack; How to initiate, respond, and keep the conversation going during these activities with an AAC system; Modeling and role-playing; Self-monitoring |

Table 2. Social Skills Group Adapted Lesson Procedures (Garrison-Harrell, et al., 1997).

| | |
|---|---|
| Total Duration | 35 min; Two sessions: 1- 20-minute session; 1- 15-minute session |
| First 20 min | Visual aids provided<br>Teacher states skill(s)—Group repeats (choral)<br>Teacher says each component of the skill(s)—group repeats (choral)<br>Modeling of skill<br>Student-to-student practice of skill(s)<br>Review skills and give feedback<br>Provide specific reinforcers/tokens to group members as target social behaviors are demonstrated |
| Last 15-minutes | Brief review of target skill(s)— 5-minutes<br>Tell all group members they have 10-minutes to play with their friends<br>Clarify the rules: 1. Stay in your group, be nice to your friends, and be polite; 2. Practice the skills that you just learned; 3. Make sure all friends in your group are playing<br>Set visual timer for 10-minutes<br>Students participate in 10-minutes of structured play<br>Corrective feedback provided when incorrect use of social skill us displayed<br>Behavior-specific praise when correct use of the skill is displayed<br>Provide specific reinforcer to target participant as target social behaviors are demonstrated<br>Provide self-monitoring sheets to peer participants<br>Provide specific reinforcers to peer members |

# CHAPTER IV: RESULTS

The results of this study demonstrated a functional relation between the intervention (i.e., peer network) and the frequency of social interactions (i.e., initiations and responses; AAC use) to and from students with ASD and their typically developing peers. The increases in social interaction were substantial, as indicated by comparing frequencies of social interactions across all participants and conditions. The intervention was also determined to serve as a functional, effective strategy for students with ASD who use AAC systems as their primary mode of communication.

In addition to the positive effects observed for the target student, in all three settings, all peer network members also demonstrated an increase in social initiations and social responses directed toward the target student (see Figures 1-4). Notable increases in imitation and verbalization development were also observed and recorded in the research journal once the intervention was implemented. This section will present results for all indirect and direct assessments and data on initiations and responses for all participants. Next, the target participant's use of his AAC device will be discussed (see Figure 5) and then qualitative data will be presented and analyzed. Finally, treatment fidelity, Inter-Observer Agreement (IOA), social validity, and consumer satisfaction results will be presented.

## Direct and Indirect Assessments

Results of the indirect and direct assessments were completed to assess MacGyver's current level of social functioning both pre- and post-intervention.

**Autism Social Skills Profile.** As seen in Table 3, results of the pre-intervention social profile indicated significant social functioning deficits in the areas of social reciprocity and social participation/avoidance. In addition, the target student displayed several social behaviors considered to be detrimental to the student's ability to engage in social interactions. When interpreting data in Table 3, note that data are divided into the respective rating category, but context should be considered when concluding whether skill is a deficit.

Social deficits that were a concern included skills such as taking turns during an activity, maintaining the "give-and-take" of conversations, recognizing facial expressions of others, helping others, initiating greeting with others and responding to greetings of others, responding to questions directed toward him, interacting with peers during both structured and unstructured activities, and allowing peers to join him in activities. Behaviors that were classified as being detrimental to social interactions included an inability to recognize nonverbal cues and an inability to read cues to end conversations. MacGyver was also noted to engage in socially inappropriate behaviors (i.e., screaming, pushing people and items away, dropping to the floor, and hand flapping in the abdomen area).

Table 4 depicts MacGyver's social skills profile completed during intervention probe sessions. Results suggest the intervention was successful in teaching social reciprocity, social participation, and decreased some existing detrimental social behaviors. While improvements were not observed across all skills measured on the social skills profile, improvements were noted for all skills previously listed as concerns in the pre-intervention assessment.

For example, MacGyver was observed to independently engage in the following skills during intervention probe sessions: taking turns during an activity, maintaining the "give-and-take" of conversations, recognizing facial expressions of others, helping others and accepting help from others, initiating greeting with others and responding to greetings of others, responding to questions directed toward him, interacting with peers during both structured activities, engaging in one-on-one social interactions, and allowing peers to join him in activities.

**Teacher Interview of Social Functioning.** The pre-intervention interview (Bellini, 2006) completed by the general education teacher described MacGyver as a "happy child", as he was typically observed to be "smiling and galloping down the hallways". The general education teacher noted that she did not observe MacGyver to initiate interaction with her or any of his classmates, despite their efforts and desire to engage him in conversations and activities. His teacher noted lack of eye contact and expressive communication as his "biggest obstacle in establishing social relationships", explaining that she had not observed him to demonstrate these skills in the classroom or recess setting. MacGyver's teacher also stated that she has observed MacGyver to play with LEGOS © during before-school child care, noting MacGyver's focus to detail and ability to "create intricate structures and designs". She also described some disruptive behavior displayed in her class during snack time (e.g., tapping on metal desk and making noises with his mouth).

Following the last intervention probe data session, the general education teacher was provided with the same interview form and asked to complete, noting any changes since her last interview. Results of this interview indicated observed changes in

MacGyver's social functioning. MacGyver was reported to maintain eye contact "more than in the past", though was still described to be "brief" and "solicited". The teacher also reported that although she hadn't observed MacGyver to "seek any one friend", the response from her class was overwhelming: "My students all love him. I have had to ask them not to overwhelm him and only one or two at a time interact with him".

**Parent Interview of Social Functioning.** To assess MacGyver's social functioning in the home setting, the Parent Interview of Social Functioning (Bellini, 2006) was provided to his parents before and after intervention.

The pre-intervention interview reported MacGyver to engage in parallel play, noting that he often would play with his cousins but was not observed to have any other close relationships with peers. Parents reported that MacGyver did make eye contact with others in home setting and at times and did appear argumentative when disagreeing with others. While he did not utilize verbal language consistently, parents did report MacGyver to verbalize one-word requests for highly preferred items/activities, however he had not been observed to request assistance from others. MacGyver's typical social interaction was described as, "mostly one-sided, people talk to him, but he mostly listens", demonstrating some ability to respond but not initiate conversations.

In the home setting, MacGyver's social functioning had been reported to change significantly since the pre-intervention interview. When asked how many friends MacGyver had, parents stated, "Outside of school, MacGyver now expresses far more interest in his cousins when he didn't before". MacGyver's interest in other social games also increased, as he was reported to play "hide and seek" with his cousins on a regular basis, demonstrating the ability to join in on-going activities. Though he was still

observed to have some difficulty with turn taking and initiating, he had been observed to initiate on a few occasions. Parents also reported an observable decrease in perceived fear or distress regarding social interactions. Before intervention was implemented, MacGyver was observed to become overwhelmed in large crowds and avoid social situations at times. After intervention, parents report these behaviors to rarely occur, if at all.

MacGyver's social communication skills were reported to have increased in the areas of asking questions, requesting tangible items and requesting assistance from others (using AAC and gestures). In addition to an increase in his AAC use at home, parents also described changes in MacGyver's tone of voice, describing "lots of inflection" whereas before, he was reported to use the "same inflection". Although conversations were reported to remain mostly "one-sided", parents noted a meaningful change in his ability to initiate adults. Initiation of interactions with adults were described as, "getting close to them, grinning, and making deliberate eye contact".

Regarding interests, MacGyver was described to engage in interest-based play such as spinning objects, filtering light, and building "spinners" out of LEGOS© and K'Nex ©, prior to intervention. After intervention, parents reported MacGyver to still show interest in these activities, but he was observed to engage in "typical play" more often.

**Social Skills Checklist**. Results of this assessment indicated that MacGyver increased his overall social skills. During the first session in baseline, MacGyver was observed to "never" engage in the following skills: spontaneously responding to one or more peers, initiating to one or more peers, continuing to interaction once it has begun,

inviting or imitating other children's actions, or giving materials to other children. Skills that were "sometimes" observed included: peers seeking out child for social play, following instructions given by other children, sharing materials, and staying within close-proximity to the group or activity.

The same rating scale was completed following the final intervention session in the snack setting. Results were significantly improved from rating scores during baseline, as many of the skills previously observed to "never" or only "sometimes" occur were observed "often" or "always" during the final video. Social skills observed "often" included: spontaneously responding to one or more peer, invite or imitate other children's actions, give materials to other children, and following instructions given by other children. MacGyver was observed to "always" remain near the group or activity and did not exhibit inappropriate behaviors during the session.

**Checklist of Communicative Functions and Means**. Results of this assessment indicated that MacGyver demonstrated more advanced communicative functions and means once intervention was introduced. During the first session in baseline, MacGyver was observed to utilize manipulating, pointing, showing, and proximity to request an item from a peer on the playground. No other interactions or attempts to communicate were observed during this session.

The same checklist was completed following the final data session in intervention (snack setting). Results indicated that MacGyver had gained more advanced communicative means, when compared to the results from the baseline administration. MacGyver was observed to use pointing, AAC, and an imitation of verbal prompt to request items from his peers. In addition, he was observed to use AAC and imitation to

greet a peer upon arrival to the group. These increases in communicative means demonstrate the effective results a peer network intervention can have on the communication skills of a student with autism.

**Friendship Rating Scale**. Pre- and post-intervention peer friendship rating scales were collected for the target student's general education classmates. When comparing to the peer rating results, MacGyver was rated a 4 (i.e., like to play with him "a lot") by four peers during baseline and thirteen peers after intervention. These results may indicate more peers in his general education class "wanted to play" with the target participant or wanted to play with him "more", following intervention.

## Baseline

Participants were observed in their general education class setting during lunch, recess, and snack. Data obtained across settings were consistently low in frequencies of social initiations, responses, and use of AAC device.

A minimum of three baseline sessions took place in each setting, prior to the selection of peer network members. This sequence in procedures was purposefully planned to avoid additional variables being present during the baseline phase of the study, as the process of peer selection involved discussing social-based topics such as friendships and identifying friends among their classmates (privately).

Results of the baseline data discussed in this section include average frequencies of social initiations and responses, range of social initiations and responses, and total frequencies of each target social behavior. Additionally, use of the augmentative and alternative (AAC) device by the target participant will be discussed.

**Recess Setting.** Baseline data were obtained across nine sessions, in the outdoor playground setting. All sessions were video-recorded and reviewed for data collection immediately following the session.

Target Participant. Data obtained across nine baseline sessions for frequency of social initiations averaged 0 per session, with a range of 0-2 initiations emitted by the target student. Data for social responses averaged 0.67 per session, with a range of 0-5 responses emitted by the target student. MacGyver initiated a total of 2 times and responded a total of 6 times throughout the duration of this phase. AAC use was not observed during baseline sessions in the recess setting, as gestures were utilized by the target student to initiate and respond to his peers.

Prior to intervention, MacGyver was observed to independently use his AAC device to initiate adults to request highly preferred edibles and tangibles, however he was not observed to utilize his AAC device spontaneously in any social interaction with peers. MacGyver was primarily observed to utilize communicative functions such as manipulating, giving, showing, and body proximity to request attention and objects/actions from both peers and adults in his environment.

Peer Network Members. Peer network members were not observed to initiate or respond to the target participant during data sessions in the recess setting.

**Lunch Setting.** Baseline data was obtained across 12 sessions in the lunch room, at the target participant's general education classroom assigned table. All sessions were video-recorded and reviewed for data collection immediately following the session.

Target Participant. Data obtained across 12 baseline sessions for frequency of social initiations and responses were 0 in all sessions. AAC use was not observed during

baseline sessions in the lunch setting, as MacGyver was not observed to engage his peers at all. It should be noted that the AAC device was accessible to MacGyver at all times, on the lunch table, located within his immediate arm reach.

Peer Network Members. Peer network members were not observed to initiate or respond to the target participant during data sessions in the lunch setting.

**Snack Setting.** Baseline data was obtained across 12 sessions in the general education classroom setting. All sessions were video-recorded and reviewed for data collection immediately following the session.

Target Participant. Data obtained across 12 baseline sessions for frequency of social initiations averaged 0.83 per session, with a range of 0-8 initiations emitted by the target student. Data for social responses averaged 1.42 per session, with a range of 0-12 responses emitted by the target student. MacGyver initiated a total of 10 times and responded a total of 23 times throughout the duration of this phase. It should be noted that this sudden increase in social communication occurred the last week of baseline in the snack setting.

This sudden increase in social initiations and responses could be an implication of stimulus and/or response generalization to an untaught setting, as the intervention had not yet been introduced to the snack setting (McConnell, 1991). Considering the design of the study, this could also be an indication of a loss in experimental control, suggesting a lack of functional control between the peer network intervention and the change in target social behaviors.

One instance of AAC use was observed during baseline sessions in the snack setting, other occasions of initiations and responses were in the form of gestures or verbalization (e.g., "yes").

Peer Network Members. During two data sessions in the snack setting, one of the selected peer network members (Peer 1) was observed to initiate an average of 1.56 times per session, with a range of 0-13 initiations emitted. Peer 1 initiated a total of 14 times. Social responses were not observed during these attempted initiations. The first session was the first session of baseline data in the snack setting and the second session was during the intervention phase in the recess setting. This timeline is important to consider when analyzing these occurrences, as the first occurrence has no previous social history whereas the second instance (with 13 initiations) was after peer selection and training had occurred. This may be an indication of skill generalization to an untaught setting.

**Intervention**

Results of the intervention data discussed in this section include average frequencies of social initiations and responses, range of social initiations and responses, and total frequencies of each target social behavior. Additionally, use of the augmentative and alternative (AAC) device by the target participant will be discussed. While the minimum data collection requirement was originally defined as three data points with an upward trend, this study collected more than the minimum before introducing intervention to each setting.

**Recess Setting**. Intervention data was obtained across seven sessions. All sessions were video-recorded and reviewed for data collection and progress monitoring, immediately following the session.

Target Participant. Data obtained across seven intervention sessions for frequency of social initiations averaged 2 per session, with a range of 0-4 initiations emitted by the target student. Data for social responses averaged 34 per session, with a range of 12-62 responses emitted by the target student. MacGyver initiated a total of 13 times and responded a total of 238 times throughout the duration of this phase. He was observed to use his AAC device a total of 51 times.

Peer Network Member 1. Data obtained across seven intervention sessions for frequency of social initiations averaged 44.29 per session, with a range of 11-80 initiations emitted by peer 1. Data for social responses averaged 9.43 per session, with a range of 1-35 responses emitted. Peer 1 initiated a total of 310 times and responded a total of 66 times.

Peer Network Member 2. Data obtained across seven intervention sessions for frequency of social initiations averaged 26.29 per session, with a range of 4-47 initiations emitted by peer 2. Data for social responses averaged 1.57 per session, with a range of 0-5 responses emitted. Peer 2 initiated a total of 184 times and responded a total of 11 times.

Peer Network Member 3. Data obtained across seven intervention sessions for frequency of social initiations averaged 32 per session, with a range of 13-56 initiations emitted by peer 3. Data for social responses averaged 2.29 per session, with a range of 0-

12 responses emitted. Peer 3 initiated a total of 224 times and responded a total of 16 times.

Lunch Setting. Intervention data was obtained across four sessions in the lunch room, at the target student's general education classroom assigned table. All sessions were video-recorded and reviewed for data collection and progress monitoring, immediately following the session.

Target Participant. Data obtained across four intervention sessions for frequency of social initiations averaged 3 per session, with a range of 1-5 initiations emitted by the target student. Data for social responses averaged 25 per session, with a range of 22-28 responses emitted by the target student. MacGyver initiated a total of 12 times and responded a total of 100 times throughout the duration of this phase. He was observed to use his AAC device a total of 64 times.

Peer Network Member 1. Data obtained across four intervention sessions for frequency of social initiations averaged 29 per session, with a range of 11-43 initiations emitted by peer 1. Data for social responses averaged 6.5 per session, with a range of 2-14 responses emitted. Peer 1 initiated a total of 116 times and responded a total of 26 times.

Peer Network Member 2. Data obtained across four intervention sessions for frequency of social initiations averaged 22.75 per session, with a range of 19-27 initiations emitted by peer 2. Data for social responses averaged 8 per session, with a range of 2-13 responses emitted. Peer 2 initiated a total of 91 times and responded a total of 32 times.

Peer Network Member 3. Data obtained across four intervention sessions for frequency of social initiations averaged 17.25 per session, with a range of 2-30 initiations emitted by peer 3. Data for social responses averaged 4 per session, with a range of 0-9 responses emitted. Peer 3 initiated a total of 69 times and responded a total of 16 times.

**Snack Setting**. Intervention data was obtained across four sessions in the general education classroom. All sessions were video-recorded and reviewed for data collection and progress monitoring, immediately following the session.

Target Participant. Data obtained across four intervention sessions for frequency of social initiations averaged 2.75 per session, with a range of 0-5 initiations emitted by the target student. Data for social responses averaged 52.5 per session, with a range of 33-74 responses emitted by the target student. MacGyver initiated a total of 11 times and responded a total of 210 times throughout the duration of this phase. He was observed to use his AAC device a total of 144 times.

Peer Network Member 1. Data obtained across four intervention sessions for frequency of social initiations averaged 24 per session, with a range of 17-36 initiations emitted by peer 1. Data for social responses averaged 23.5 per session, with a range of 9-53 responses emitted. Peer 1 initiated a total of 96 times and responded a total of 94 times.

Peer Network Member 2. Data obtained across four intervention sessions for frequency of social initiations averaged 31.5 per session, with a range of 10-74 initiations emitted by peer 2. Data for social responses averaged 17.75 per session, with a range of 1-59 responses emitted. Peer 2 initiated a total of 126 times and responded a total of 71 times.

Peer Network Member 3. Data obtained across three intervention sessions for frequency of social initiations averaged 44.33 per session, with a range of 21-62 initiations emitted by peer 3. Data for social responses averaged 20 per session, with a range of 15-29 responses emitted. Peer 3 initiated a total of 133 times and responded a total of 60 times. It should be noted that peer 3 moved the last week of intervention, therefore only three data points were obtained, slightly inflating the average initiations and responses.

**Intervention Probes**

Results of the intervention probe data discussed in this section include average frequencies of social initiations and responses, range of social initiations and responses, and total frequencies of each target social behavior. Additionally, average use of AAC will also be discussed.

**Recess Setting.** A multiple-probe technique was utilized to collect data during all recess post-intervention sessions. The purpose of this data set was to demonstrate the retention of the target social skills by measuring the participants' use of these skills throughout the remainder of the study.

Target Participant. Data obtained across three probe sessions for frequency of social initiations averaged 1.34 per session, with a range of 0-3 initiations emitted by the target student. Data for social responses averaged 33 per session, with a range of 28-36 responses emitted by the target student. MacGyver initiated a total of 4 times and responded a total of 99 times during these sessions. He was observed to use his AAC device 11 times.

Peer Network Member 1. Data obtained across three probe sessions for frequency of social initiations averaged 63.34 per session, with a range of 57-72 initiations emitted by peer 1. Data for social responses averaged 15.34 per session, with a range of 8-20 responses emitted. Peer 1 initiated a total of 190 times and responded a total of 46 times.

Peer Network Member 2. Data obtained across three probe sessions for frequency of social initiations averaged 36.33 per session, with a range of 28-44 initiations emitted by peer 2. Data for social responses averaged 8.67 per session, with a range of 3-14 responses emitted. Peer 2 initiated a total of 109 times and responded a total of 26 times.

Peer Network Member 3. Data obtained across three probe sessions for frequency of social initiations averaged 21.33 per session, with a range of 10-44 initiations emitted by peer 3. Data for social responses averaged 2.67 per session, with a range of 0-6 responses emitted. Peer 3 initiated a total of 64 times and responded a total of 8 times.

**Lunch Setting.** A multiple-probe technique was utilized to collect data during all lunch post-intervention sessions. The purpose of this data set was to demonstrate the retention of the target social skills by measuring the participants' use of these skills throughout the remainder of the study.

Target Participant. Data obtained across three probe sessions for frequency of social initiations averaged 3 per session, with a range of 1-4 initiations emitted by the target student. Data for social responses averaged 57.67 per session, with a range of 48-66 responses emitted by the target student. MacGyver initiated a total of 9 times and responded a total of 173 times during these sessions. He was observed to use his AAC device a total of 45 times.

Peer Network Member 1. Data obtained across three probe sessions for frequency of social initiations averaged 21 per session, with a range of 17-27 initiations emitted by peer 1. Data for social responses averaged 16 per session, with a range of 12-19 responses emitted. Peer 1 initiated a total of 63 times and responded a total of 48.

Peer Network Member 2. Data obtained across three probe sessions for frequency of social initiations averaged 18 per session, with a range of 13-26 initiations emitted by Peer 2. Data for social responses averaged 14.6 per session, with a range of 0-33 responses emitted. Peer 2 initiated a total of 54 times and responded a total of 44 times.

Peer Network Member 3. Data obtained across three probe sessions for frequency of social initiations averaged 14.67 per session, with a range of 6-22 initiations emitted by peer 3. Data for social responses averaged 23 per session, with a range of 19-27 responses emitted. Peer 3 initiated a total of 44 times and responded a total of 69 times.

**Snack Setting.** Due to time restraints in the district calendar (winter break), probe sessions in the snack setting did not occur.

**Self-Monitoring**

At the end of each session during peer training, intervention, and probes peers were asked to complete a self-monitoring sheet to reflect on their participation during the social group. The self-monitoring form included two open-ended questions ("What did we talk about?" and "What did I learn?") and two questions requiring a yes or no response ("Did I talk to my friends?" and "Did I have fun?"). The teacher-researcher briefly reviewed the form while passing them out to the peer network members. Once all

peer network members completed their form, they were provided access to the treasure box to choose one item.

**Frequency of AAC**

Data obtained across all baseline, intervention, and probe sessions for frequency of AAC use was collected. Since the total number of sessions was different for each phase, these frequency data were analyzed to determine the average AAC use for each setting in baseline, intervention, and probe phases. Standard deviations were also calculated to determine the variability of responses within each phase of the study. During baseline sessions, MacGyver was only observed to use his AAC device on one occasion. Once intervention was introduced, his AAC use increased significantly. In the recess setting, he was observed to use his AAC device an average of 7.29 times with a standard deviation of 3.55. The average frequency increased even more once intervention was introduced in the lunch setting. MacGyver used his AAC device an average of 7.87 times in the lunch setting with a standard deviation of 6.82.

MacGyver was observed to use his AAC device to initiate and respond an average of 11.17 times in the snack setting with a standard deviation of 9.67. During probe sessions in recess and lunch settings, his average AAC use continued to increase. MacGyver was observed to use his AAC device an average of 3.67 times in the recess setting, with a standard deviation of 3.21. In the lunch setting, he was observed to use his AAC device an average of 31.67 times with a standard deviation of 8.32. These low standard deviations indicate some variability within the settings, however these variabilities are not significant.

It should be noted that MacGyver's use of his AAC device was higher in the lunch setting compared to recess setting. This may be due to the natural contexts of the environments, as lunch provides a static, structured setting. Consequently, this may have increased the number of opportunities to initiate and respond while seated at the lunch table. Comparatively, the recess setting was designed to be structured, however being outside, the area allowed for more movement within the environment.

While this intervention proved to be effective in increasing social responses from the target participant to his typically developing peers, it was not as effective in increasing social initiations by the target participant. This difference in effect could be due to the type of activity, as the activities chosen for this study were based on participant preferences. Future research may want to consider different activities that better facilitate turn taking, to further promote social reciprocity.

Overall, MacGyver increased his average use of his AAC device across all three settings. This significant increase, once intervention was in place, implies that there may be a functional relationship between a peer network intervention and the use of an AAC device by a student with autism.

**Inter-Observer Reliability**

All sessions were video-recorded to assist in conducting inter-observer agreement and fidelity of treatment of the intervention. Sessions were video-recorded by a research-assistant, using an iPad©. This was to allow the sessions to be recorded, whether the network members remained in the same area or become mobile in the recess setting. The secondary observers, two research assistants, helped with inter-observer reliability for all

dependent variables by watching videos and collecting data with the primary observer. During all IOA sessions, the operational definitions for each dependent variable were clearly posted, for easy reference throughout data collection.

Reliability for baseline sessions across all settings ranged from 92%-100% with an average of 99.5% agreement. Inter-observer reliability was completed for 47% of all baseline sessions. Reliability for intervention and probe sessions across all settings ranged from 89%-97% with an average of 91.86% agreement. Inter-observer reliability was completed for 34% of all intervention and probe sessions.

In addition to reliability for all dependent variables, inter-observer reliability was also conducted for treatment fidelity of peer training sessions and social skills groups (intervention sessions) to ensure procedures were consistently implemented and lessons covered all targeted topics and content. The secondary observers were trained on how to use the treatment fidelity checklists and each session was video-recorded and reviewed post-session by the teacher-researcher as well as the research assistants. These checklists were completed as the video played to ensure all procedures were followed and content was covered. The teacher-researcher completed two checklists outlining these components on all sessions during peer training and intervention. For a minimum of 20% of the sessions, both the teacher-researcher and research assistants completed the checklists to obtain a measure of Inter-Observer Agreement (IOA). Reliability for peer training session procedures 100% agreement. Reliability for intervention session procedures ranged from 91.7% to 100% with an average of 97.2% agreement. Reliability was completed for 27% of all training sessions and 20% of all intervention sessions (3 sessions each).

**Network Consumer Satisfaction**

Following the final data session, the teacher-researcher provided a consumer satisfaction survey to the peer network members and general education teacher.

The Network Consumer Satisfaction Survey completed by the participant's general education teacher asked questions regarding the participant's current level of social functioning and general, observable results of the study. Survey questions included questions such as: (1) Tell me what you liked/disliked about the network activities; (2) Did you observe an increase in social interactions for your students? (3) Would you be interested in your students participating in a peer network next school year? If not, why? (4) Did you observe an increase in student frustration or fatigue? If so, describe.; and (5) did you observe an increased awareness of other kids from the participant? (see Appendix H for complete list of questions).

A similar consumer satisfaction survey was provided to all peer network members at the completion of this study. Survey questions for peers included the following: (1) Tell me what you like about Paw Pals? (2) Was there anything that you did not like about Paw Pals?; (3) Do you want to be included in Paw Pals next year? If not, why? (4) What are some things that you want to do next year during Paw Pals?; and (5) Would you like to meet more next year, less next year, or about the same?.

Results of the consumer satisfaction surveys were overwhelmingly positive, regarding both target student changes since beginning the intervention and desire to continue peer networks in the future.

**Teacher Network Consumer Satisfaction Results.** Results of the teacher survey were positive, providing specific examples of observed student progress while also

examining the practicality of the intervention in the public-school setting. When asked what she liked about the network activities, she said, "the activities encourage socialization and interaction of special needs students and general education students. It is beneficial to both". Speaking to limitations of this intervention, she noted that "time was a major limitation in the educational setting, at times, for active socialization". Even with this restriction, continuation and increased time for the network activities was desired, encouraging further investigation into practical solutions.

Regarding MacGyver's increase in social interactions to and from peer models were reported to be "moderate to significant", noting observed increases in his independent initiations and responses to both peers and adults in the general education setting. A "moderate to significant" increase of MacGyver's language (verbal and AAC) and a "significant increase of awareness of other classmates and adults" were also reported. Finally, the classroom teacher felt the peer network experience was valuable for her students, stating, "It has so many beneficial factors: embracing differences, how to communicate, how to interact verbally or non-verbally, and how to develop and maintain a bond with someone".

**Peer Network Consumer Satisfaction Results.** All three peer participants reported liking the social skills group activities. When asked to tell what they liked about the activities, responses were positive: "We got to do Legos©. I like being friends with (target student)" and "We got to spend time with friends we haven't had a chance to spend time with". All peer participants responded "yes" they would be interested in participating in the group activities in the future and when asked what they would change, one peer suggested that there be "more teachers involved" and additional toys to

play with during group times. Another peer suggested to include, "more people like (target student) to help so more friends can be made" because he, "liked when (target student) was in the group because I like learning to talk with him". When completing the survey, one peer noted at the bottom, "I didn't think he was cool before Paw Pals but now I think he's cool". Overall, the peer participants reported to like the activity and learning how to interact with an individual with ASD and all participants said they would like additional time scheduled for the group to meet.

## Qualitative Analysis

In addition to the quantitative measures collected in this study, the teacher-researcher also recorded qualitative data. Qualitative measures included a research journal and a video transcription for each setting during intervention.

**Research Journal.** A research journal was maintained throughout the duration of this study. Anecdotal notes were made, following each session, noting general impressions about the session. Some of these noted impressions included whether peer interactions were positive or negative, if the social behaviors were info seeking or complimentary in nature, and any direct quote made by peers that indicated they were enjoying the time spent with the target participant. In addition to these general impressions, the teacher-researcher noted any confounding factors such as schedule conflicts, signs of frustration or fatigue, or any other information that may help guide the planning of future sessions. Finally, information regarding teacher-prep time was also recorded in order to help determine the feasibility of the intervention, within a practical setting.

During baseline, MacGyver was observed to engage in isolated play during recess (i.e., swinging or spinning objects on the playground set) and did not engage in eye contact or joint attention with his peers. At lunch, general education peers always surrounded him, however he was never observed to engage his peers. During snack, MacGyver was often approached by peers and sat in various seats in the classroom, allowing multiple opportunities to engage different peers. Higher frequencies of social behaviors were noted in this setting during baseline, perhaps due to the increased movement of peers around the room, which may have increased opportunities to initiate or respond to peers.

MacGyver was observed to initiate to the paraprofessional working with him, to request additional activities, actions, or food items (e.g., "more push" on the swing). He was not observed to respond, except for responding to the gesture "come here" when initiated by the paraprofessional.

Peer training sessions were generally successful, both in treatment fidelity and effect, as well as peer participant engagement. Peers were often observed to respond to instructional questions quickly, asked questions that were on topic, and gave multiple examples of each social skill that was both relevant to the lesson and their peers. Peers were noted to make several comments about "being excited" to play with MacGyver and asking, "how many more days" until they "got to play with him".

During intervention sessions, peers continued to remain engaged in the lesson material (i.e., responding and asking questions, looking at the focus of the lesson, and giving relevant examples). Peer network members were observed to approach and initiate MacGyver in novel settings and among peers that had not participated in the network

training. In addition, there were several instances of "confederate" peers approaching the teacher-researcher and peer network members, asking to join the group. This was a consistent comment throughout the duration of this study and accommodations had to be arranged to ensure these peers knew they could be friends with the group as well. During the social skills group sessions, a larger visual timer was used, and other peers were told that once the timer was complete, they could join the group. Several peers consistently waited and inquired about time remaining until they could join the group. In addition, Peers 1 and 2 consistently remained in the group, after the completion of the social skills group time.

During the last session in the recess setting, Peer 2 asked about other students on the playground that used AAC devices, "Where are their friends? They should all have friends like us!". Peer 1 and 3 then responded with comments about how they wanted to play with "other kids that use talkers" during recess. These comments may suggest a natural generalization of the taught social skills, as the peer network members were able to make connections and parallels between the target participant and other students with similar needs. Further research to investigate if these social skills generalize to untaught peers would be beneficial to this assumption.

The last week of this study, MacGyver brought in birthday party invitations for his friends in his general education class. His parents reported that this was his first birthday party where he invited friends from school and were nervous about the number of students that would attend. MacGyver passed invitations out to everyone in his class, smiling and galloping around the room as he handed out each one. The day of his party, his general education teacher and classmates hosted a birthday party for MacGyver.

Many students made cards and small gifts and others gave MacGyver gifts that were purchased with his specific interests in mind (e.g., gear set, Star Wars © LEGO© sets, etc.). In addition, parents reported eight students had attended his birthday party outside of school. Interestingly, none of the students in attendance had participated in the peer network group. Again, this may be an indication of generalization of the peer network intervention, to untrained peers.

Overall, interactions between MacGyver and his peers were positive and his social behaviors increased once intervention was introduced. Anecdotal data regarding feasibility of the intervention concluded that although the intervention is labor intensive in the beginning stages of the process, teacher-led prompts slowly fade as peer network members begin completing the procedures independently. To further assess feasibility, additional data would have been taken to assess further prompt fading procedures during probe sessions, if time had not been an issue.

**Video Transcriptions.** Video transcriptions of social interactions between MacGyver and his peers were completed for one session in each setting during intervention. Transcriptions were completed to provide observable evidence to support anecdotal notes made in the research journal by the teacher-researcher.

In the recess setting, Table 5 depicts a social interaction exchanged between MacGyver and his peers during the structured LEGO© activity. During this interaction, the peers demonstrate the instructed prompting script consistently and effectively, as evidenced by MacGyver's responses following the presentation of the peer prompt (e.g., "Do you like it? Yes or no?"; "Do you want help?"). Peers were also taught how to provide a verbal model by first gaining MacGyver's attention (i.e., using his name,

getting in line of sight, or using a gesture), and then modeling the word expected to be imitated (e.g., "Say, 'spaceship'"). In addition to the verbal model, peers observed the teacher-researcher using a gesture pointing to her throat when prompting MacGyver to "use his voice". This peer-discovered gesture became part of their prompting repertoire and was utilized frequently in later sessions, to evoke an imitation response from MacGyver in the social group setting.

Sharing of materials between MacGyver and his peers is evident in this transcript, indicating the preferred activity effectively facilitated opportunities to initiate and respond to peers, both gesturally and verbally. As supported in earlier research, utilizing preferred activities can be an effective approach to promote learning and change in behavior (Owens, et al., 2008).

In addition, peer delivered behavior-specific praise and preferred edibles can be observed during this interaction. Behavior-specific praise was instructed and modeled, as part of the peer training lessons, however delivery of the edible reinforcer was peer-initiated. Delivery of a preferred edible reinforcer became part of the "Support Manager" position within the structured LEGO© group activity, increasing peer opportunities to interact with MacGyver as well as pairing the peer with a known reinforcer. Pairing the peer with a preferred reinforcer (i.e., LEGOS© and an edible reinforcer) may have increased the likelihood that MacGyver would engage his peers in social interactions, specifically increasing the likelihood that MacGyver would request the desired item and/or edible item from his peers.

In the lunch setting, MacGyver was observed to utilize his AAC device at a higher frequency than during the recess setting. Table 6 illustrates the prompting

sequence taught to the peer participants, effectively being used during the structured lunch activity (i.e., conversation topic cards). Peers utilized naturally occurring social opportunities to evoke a response from MacGyver, using his AAC device.

The social interactions depicted in this video sample, represent the target participant responding to his peers to obtain a preferred food item and initiating his peers by stating the name of a preferred movie character. Prompting by peers included pointing to the AAC device and moving the device closer to MacGyver. As seen in Table 6, this prompting strategy was effective in evoking social communication behaviors from the target participant.

The snack setting activity was similar to the lunch activity, in that conversation cards were utilized and served as a visual prompt to evoke a response from the target participant. This video sample depicts each participant of the study engaging in a prompting sequence taught during the peer network training sessions (Table 7). Peer participants first gained MacGyver's attention, then presented a simple question paired with a visual of the topic being discussed. All three peers successfully engaged MacGyver, evoking a response that was on-topic and communicated using his AAC device.

Table 3. Autism Social Skills Profile Results: Pre-Baseline.

| Very Often (4) | Often/Typically (3) | Sometimes/Occasional (2) | Never/Almost Never (1) |
|---|---|---|---|
| Responds slowly in conversation | Experiences positive peer interactions | Recognizes facial expressions of others | Invites peers to join him in activities |
| Engages in solitary interests and hobbies | Fails to read cues to terminate conversations | Requests Assistance from others (gesture) | Takes turns during games and activities |
| Ends conversations abruptly | Exhibits poor timing with social initiations | Maintains appropriate distance with peers | Maintains personal hygiene |
| Engages in solitary activities in presence of others | | Allows peers to join him in activities | Interacts with peers during unstructured activities |
| | | Responds to the invitations of peers to join them in activities | Asks questions to request information about a topic |
| | | Misinterprets intentions of others | Responds to questions directed at him by others |
| | | Experiences negative peer interactions | Interacts with group of peers |
| | | Engages in socially inappropriate behaviors | Maintains "give-and-take" of conversations |
| | | Is manipulated by peers | Expresses sympathy for others |
| | | | Talks about or acknowledges the interests of others |
| | | | Engages in one-on-one social interactions with peers |
| | | | Provides compliments to others |
| | | | Introduces self to others |
| | | | Politely asks to move out of his way |
| | | | Acknowledges the compliments directed at him by others |

Table 4. Autism Social Skills Profile Results: Post-Intervention

| Very Often (4) | Often/Typically (3) | Sometimes/Occasional (2) | Never/Almost Never (1) |
|---|---|---|---|
| Responds slowly in conversation | Experiences positive peer interactions | Invites peers to join him in activities | Maintains personal hygiene |
| Engages in solitary interests and hobbies | Fails to read cues to terminate conversations | Acknowledges the compliments directed at him by others | Asks questions to request information about a topic |
| Ends conversations abruptly | Exhibits poor timing with social initiations | Maintains appropriate distance with peers | Talks about or acknowledges the interests of others |
| Engages in solitary activities in presence of others | Maintains "give-and-take" of conversations | Misinterprets intentions of others | Provides compliments to others |
| Recognizes facial expressions of others | Interacts with peers during unstructured activities | Is manipulated by peers | Introduces self to others |
| Responds to the invitations of peers to join them in activities | Engages in one-on-one social interactions with peers | Engages in socially inappropriate behaviors | Politely asks to move out of his way |
| Takes turns during games and activities | Responds to questions directed at him by others | | Experiences negative peer interactions |
| Interacts with group of peers | Expresses sympathy for others | | |
| Allows peers to join him in activities | Requests Assistance from others (gesture) | | |

Table 5. Video Transcription for Recess Setting.

| Peer 1 | Peer 2 | Peer 3 | Target Participant |
|---|---|---|---|
| | "Do you want help?"-I | | |
| | | | "Help" (Verbal)-R |
| | "Good job, talking"-R | | |
| | (Gives Goldfish©)-R | | |
| | "Want help?"-I | | |
| | (Gives LEGO© piece)-I | | |
| | | | (Takes LEGO© piece)-R |
| "MacGyver say, 'spaceship'"-I "MacGyver say, 'spaceship'"-I | | | |
| | | | "Spaceship" (Verbal)-R |
| (Gives spaceship)-R | | | |
| | | | (Takes spaceship)-R |
| | "Do you like it? Yes or no?"-I | | |
| | "Say, 'Yes or no'"-I | | |
| | "Help?"-I | | |
| | | | "Yes" (Verbal)-R |
| | | | (Pulls on bag of Goldfish©)-I |
| | (Gives Goldfish©)-R | | |
| | "Good job speaking"-R | | |
| | | | (Takes Goldfish©) |

**Note**. I= Initiations and R=Responses

Table 6. Video Transcription for Lunch Setting.

| Peer 1 | Peer 2 | Peer 3 | Target Participant |
|---|---|---|---|
| | "Can you say, 'hello'?"-I | | |
| | (Points to AAC)-I | | |
| | | | "Hello" (AAC)-R |
| (Points to AAC)-R | | | |
| "MacGyver, do you need help?"-I | | | |
| (Points to AAC)-I | | | |
| | | | "I want peanut butter and jelly sandwich"-R |
| "You want peanut butter and jelly sandwich?"-R | (Helps open sandwich container)-R (Gives sandwich to MacGyver)-R | | |
| | | | (Takes sandwich)-R |
| | (Moves AAC closer to MacGyver)-I | | |
| | | | "R2D2" (AAC initiation)-I |
| | | (Helps look for R2D2 picture card)-R | |
| | | "MacGyver, look!-I | |
| | | (Shows picture card)-I | |
| | | "R2D2!"-I | |
| | | "Say, R2D2"-I | |
| | | | "R2D2" (AAC)-R |

**Note**. I= Initiations and R= Responses

Table 7. Video Transcription for Snack Setting.

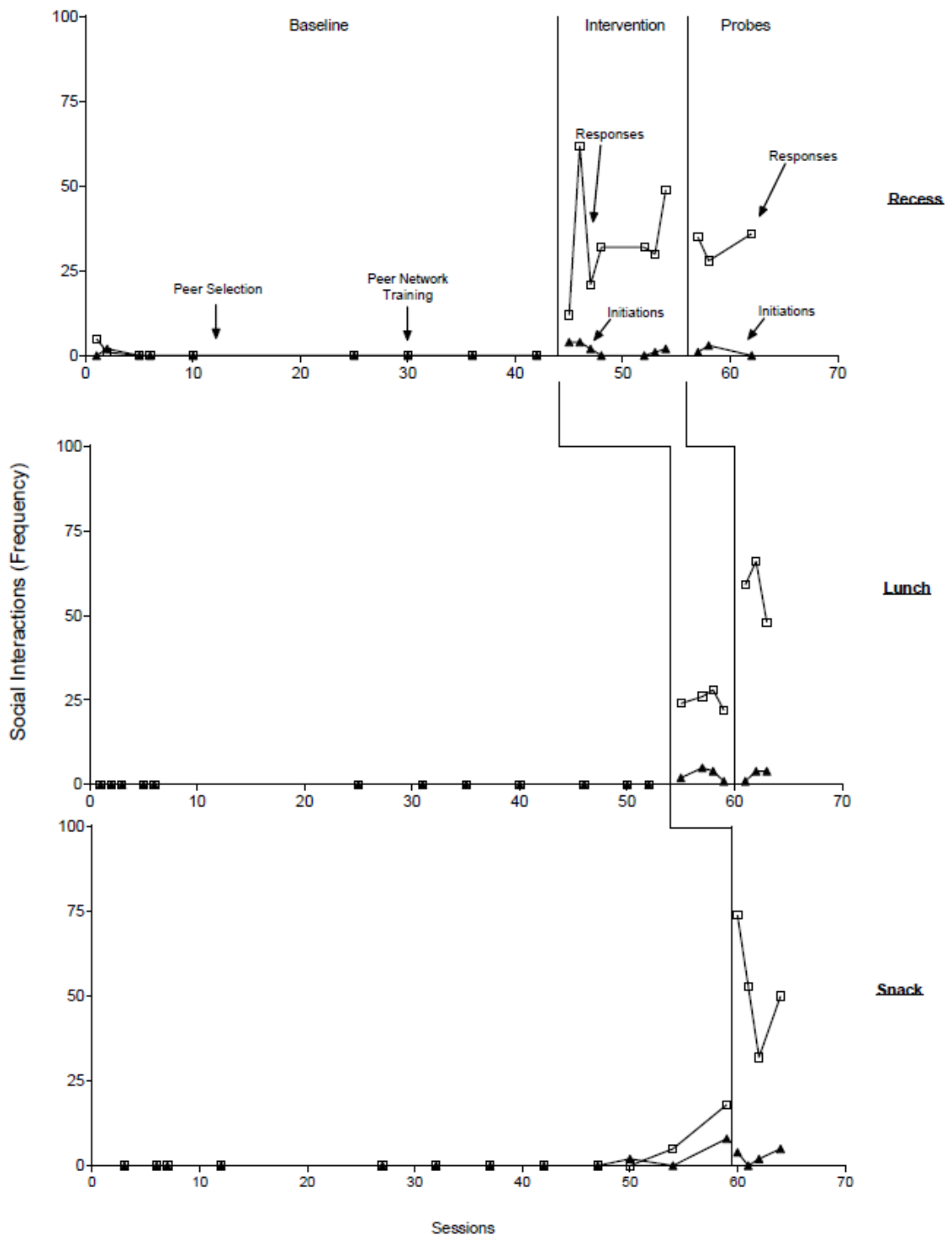| Peer 1 | Peer 2 | Peer 3 | Target Participant |
|---|---|---|---|
| | | "Can you say, 'spaceship'?"-I (Shows picture card)-I | |
| | | "Spaceship"-I | |
| | | (Points to AAC)-I | |
| | | "Spaceship"-I | |
| | | | "Spaceship" (AAC)-R "Spaceship" (AAC)-R |
| | "What is this?"-I | | |
| | "MacGyver"-I | | |
| | (Shows picture card)-I | | |
| | "MacGyver, who is this?"-I | | |
| | | | "Squirtle" (AAC)-R |
| | "MacGyver, can you say, 'Yoda'?"-I | | |
| | (Shows picture card)-I | | "Yoda" (AAC)-R |
| | (Laughs) "Yoda!"-R | | |
| "MacGyver, can you say, 'Pokémon ©'?"-I | | | |
| (Shows picture card)-I | | | |
| "Do you like Pokémon ©?"-I | | | |
| (Points to AAC)-I | | | "Pokémon©" (AAC)-R |
| | | "Good job, MacGyver"-I | |

**Note**. I= Initiations and R= Responses
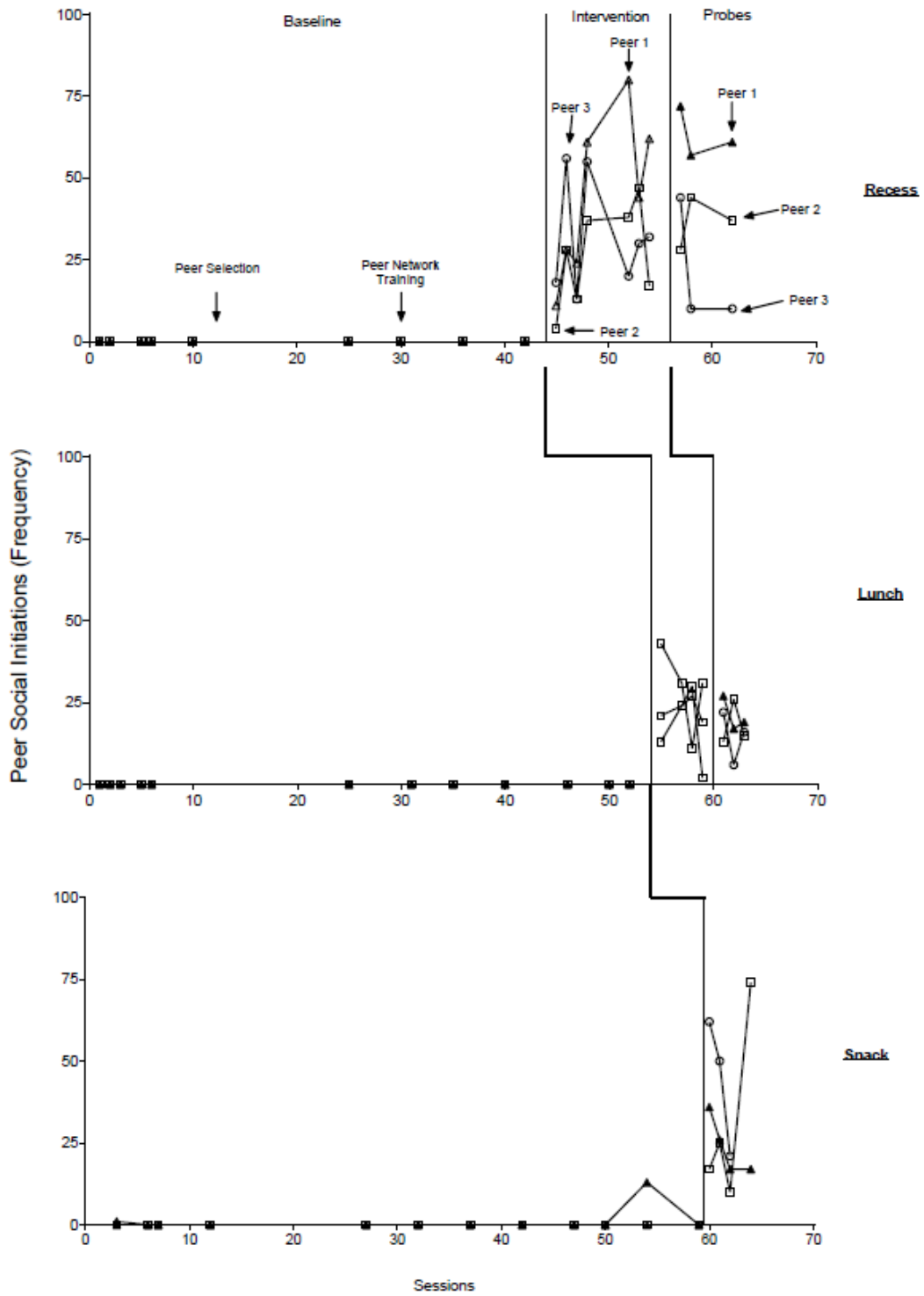
Figure 1. Target Participant Data.

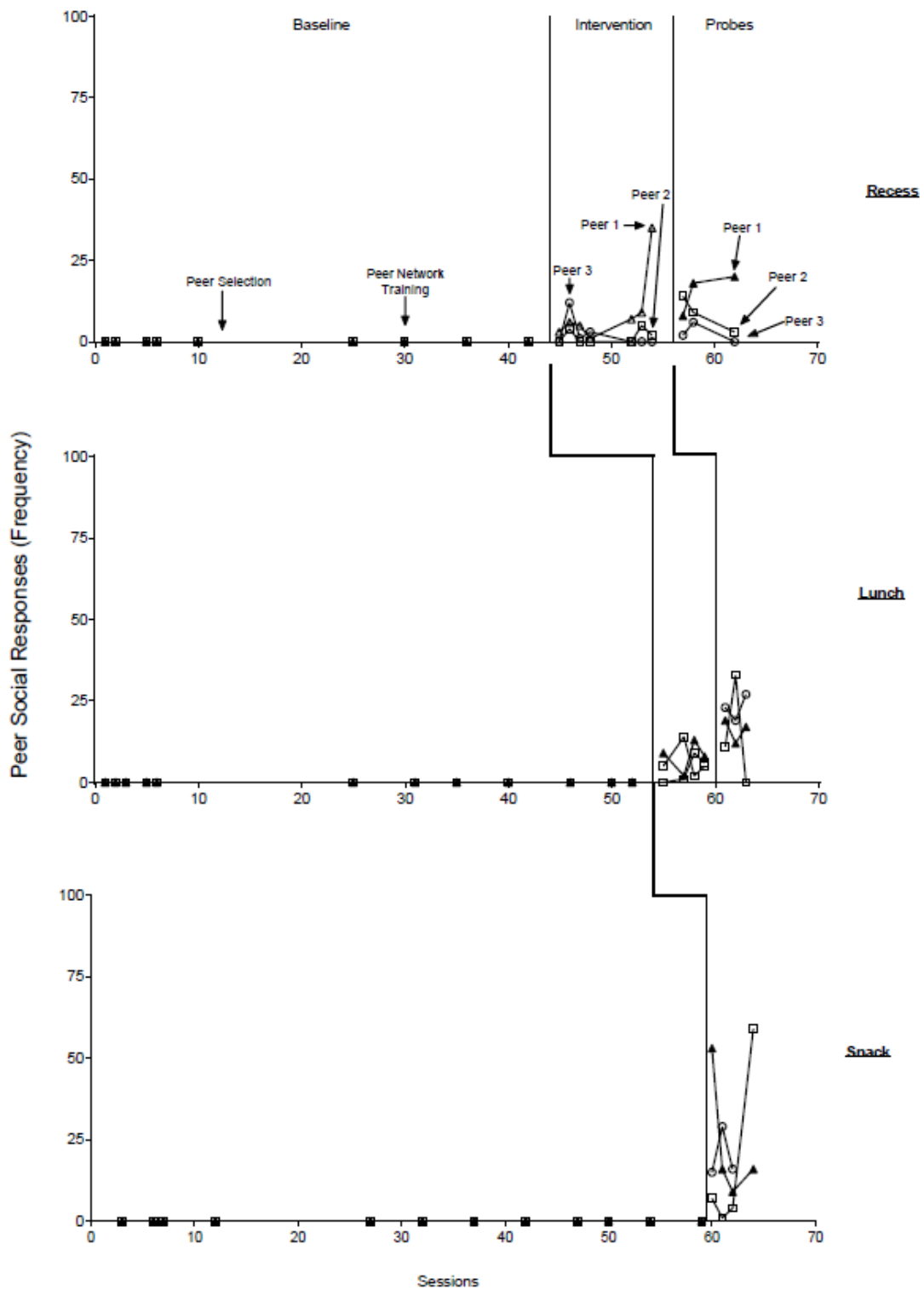Figure 2. Peer Network Initiation Data.
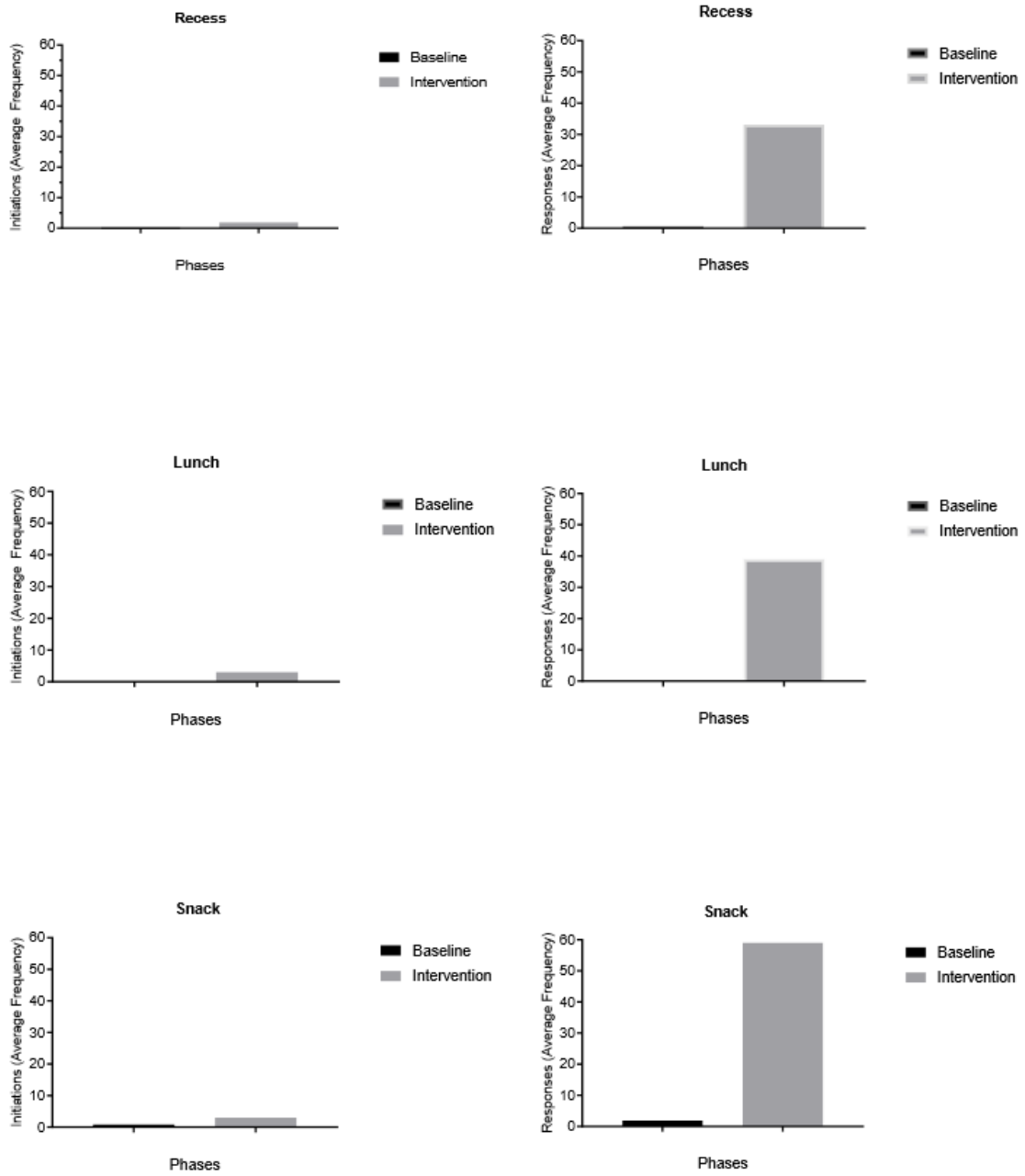
Figure 3. Peer Network Response Data.

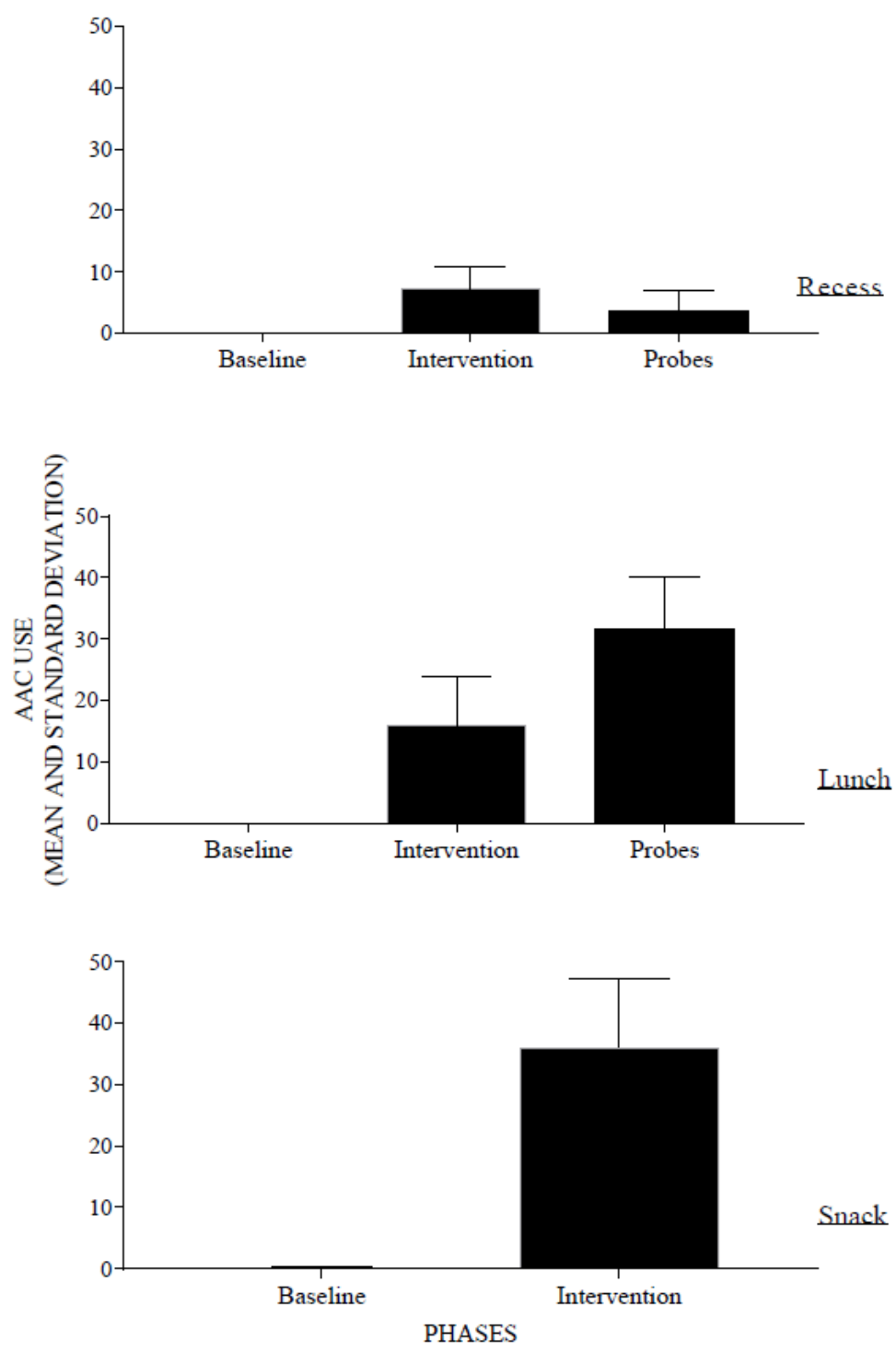Figure 4. Target Participant Average Initiations and Responses

Figure 5. Average Frequency and Standard Deviation of AAC Use Across All Settings

# CHAPTER V: DISCUSSION

This study focused on developing a peer network within a public-school setting to promote increased social-communication between a student with ASD and his typically developing peers. Research has shown the need for evidence-based practices for students with ASD in the school setting (McConnell, 1991). Previous research has evaluated the rate of evidence-based social skills interventions used in the public-school setting to be "low- to moderate", suggesting need for more research to determine why this may be happening and how these rates can be increased.

This study evaluated an evidence-based strategy aimed to increase social-communication skills for a student with ASD in the school setting. The intervention was implemented by the target participant's special education teacher, providing a unique perspective to discuss implications in the practical setting. Implementation of the peer network intervention resulted in increases in social initiations and social responses for all participants of the study, with notable increases in the target participant's use of his AAC device. The primary purpose of this study was to determine the effect of a peer network for social interactions to and from a participant with ASD, specifically an individual who utilized alternative forms of communication, such as a speech-generating device (SGD). The secondary purpose was to investigate and evaluate the feasibility of the peer network strategy as a practical tool for classroom teachers in the public-school setting.

This chapter will discuss the results of the study research findings in the context of implications for practice, with a qualitative analysis, evaluating overall social interactions and extraneous factors. First, the research questions will be addressed to

discuss how the results of this study extend the existing literature on peer network intervention for young children with ASD, specifically those who use alternative communication systems. Next, the functional relationship between the peer network intervention and social interactions for young children with ASD will be evaluated. Finally, this chapter will discuss confounding variables or limitations in this study, as well as suggestions for future research.

**Research Questions**

Results from this study helped provide answers to all the research questions and provided support for the research hypothesis. The first two questions from the present study focus on the functional relation between a peer network strategy and social initiations, responses, and use of AAC device during structured social groups. One study which examined this same relationship implemented a peer network to increase social communication behaviors for three students using augmentative communication systems (Garrison-Harrell, et al., 1997).

Similar to the present study, the frequency of social interactions was measured across multiple public-school settings. In both studies, once the intervention was introduced, immediate increases in the dependent variables were observed, indicating a functional relationship between the peer network interventions and the target behaviors. The primary differences between these two studies are the dependent variables being measured and the number of participants. While the earlier study also measured duration of interactions across three target participants, the present study focused on the frequency of social communication behaviors for one target student.

The first two research questions were answered through results reflecting the increase of social interactions for all participants of the study. Social initiations and social responses were assessed by observing the social interactions exchanged between the target student and his peers. The increases in social interaction were substantial, as indicated by comparing frequencies of social interactions across all participants and conditions.

From initial baseline to the final intervention phase of the study, MacGyver's initiation frequency in the first setting increased from a mean of 0 to a mean of 2, a mean of 0 to a mean of 3 in the second setting, and a mean of 0.83 to a mean of 2.75 in the final setting. The same positive trend can be observed for the target participant's social responses. From initial baseline to the final intervention phase, MacGyver's response frequency increased from a mean of 0.67 to a mean of 34 in the first setting, a mean of 0 to a mean of 0 to 25 in the second setting, and a mean of 1.42 to a mean of 52.5 in the final setting. This improvement in social interactions is consistent with previous research that showed improvements in social interactions (Haring & Breen, 1992; Garrison-Harrell, et al., 1997; Kamps, et al., 1997; Kamps, et al., 2002)

The third posed research question, "Does a peer network intervention increase the frequency of AAC use for a student with ASD?", was answered through the observable increase in AAC use from the target participant with AAC. Increases were noted to be significant from baseline (1) to intervention (259) phases, demonstrating a positive effect on alternative forms of communication. This finding is consistent with previous research supporting peer network interventions as an effective strategy to increase social

interactions for students with ASD, including those students who utilize AAC as their primary mode of communication (Garrison-Harrell, et al., 1997).

The fourth research question, "To what extent do the social effects of implementation of the peer network strategy, effect participants across multiple settings and activities within the general education setting?", addressed the need for these social communication skills to be present across multiple school settings and environments. This research question was answered through the effects of the intervention, as demonstrated in Figures 2 and 3. These findings are also consistent with previous research, validating the participation of typically-developing peers and peers with disabilities in a structured social group within the public-school setting (Kamps et. al., 1998)

The final research question was, "To what extent is a peer network strategy feasible for a teacher in a public -school setting?", was answered through the teacher-researcher anecdotal notes and qualitative analysis. Though the initial establishment of schedules, peer network selection/training, and creation of lesson materials was laborious, the intervention became more peer-led. Peers began taking over prompting, as they observed it modeled by the teacher-researcher. The teacher-researcher obliged any peer initiation to assume network responsibilities, eventually being completely faded from the interactions by the end of the intervention phase. Research-assistants were still present during the probe sessions, to assist with the delivery of positive reinforcement and video recording. Additional research, investigating this procedure effects without research assistance would be beneficial to the field of literature.

The help of research assistants with video recording, IOA, and facilitation of probe sessions alleviated the teacher-researcher with components directly related to the research-side of this study. Practical implications indicate a peer network intervention, could be a feasible intervention for teachers to utilize within public school settings to increase social interactions for students with ASD. Probe sessions demonstrated the potential for social groups to be primarily peer-led, depending on the specific student needs. Providing opportunities to interact with peers in positive, structured environments, with a facilitator present and peers carefully selected and trained proved to be an effective strategy to increase social interactions for students with ASD. This is a promising indication that peer networks are a feasible intervention implemented within the context of the school day.

It should be noted, the teacher-researcher obtained permission from the building administration for additional time with the students in the general education classroom, to provide peer training. This may not be a feasible accommodation in all school settings, which may require some adaptions to the current study procedures.

**Functional Relationship**

A functional relation was established between the peer network intervention and the improvement of social initiations, social response, and frequency of AAC use. Functional control of the intervention on the frequency of social interactions was determined to be strong, as increases were only present once intervention was implemented in the setting.

It should be noted, in the snack setting there was a slight elevation in the frequency of social initiations for the target participant. Though this is a possible loss of experimental control, the positive research implications may indicate generalization of skills to a new setting without direct instruction. The snack setting was similar to the lunch setting, in that it took place at a group table and involved visual topic cards paired with the activity of eating, a historically known social activity.

Aside from this possible loss in experimental control in the third condition, there were clear and dramatic changes between phases once the intervention was introduced, suggesting the existence of a functional relationship between the peer network intervention and increases in social interactions and AAC use.

**Ethical Considerations**

The first ethical consideration about this study was primarily the process of acquiring the necessary parental permissions for student participation. The site of this study was in a public-school setting and the completion of inter-observer agreement requires video recordings of all data sessions. With this requirement, the teacher-researcher was exceptionally diligent to ensure all students' privacy, whether participating in the study or not, was respected and protected. The researcher took careful measures to navigate this ethical concern by identifying those students whose parents had not provided media release permission for school purposes. The researcher then ensured these students were not recorded throughout the intervention process.

Another ethical concern that was considered was about the research design being used in this study. For the purposes of this study, the teacher-researcher decided to

implement a multiple-baseline design to include two phases: Baseline (A1) and Intervention (B1). This design was chosen over a Reversal design, which includes a removal of the intervention or intervention package. The teacher-researcher determined it was not ethical to remove an intervention intended to increase social interactions from a student whose educational diagnosis has strong deficits in social skills. Specifically, in the case of the chosen participant, returning to baseline would have required the researcher to remove vocabulary from the student's communication device. This would have been equivalent to restricting communication and therefore was not implemented in this study.

**Confounding Variables**

There were a few confounding and extraneous variables important to note in this study. First, there was a break (fall break) and a notable schedule change over the course of two weeks to allow for district testing. This schedule change was during peer network training and did not affect the number of sessions per week but did impact the time of day the group was able to meet.

In addition to this schedule issue, sessions during intervention in the snack setting were required to be in a separate setting (just outside of the classroom). This snack setting was different from baseline; however, the change was necessary to accommodate the peer network members' daily academic schedule.

**Limitations**

The results of this study demonstrated a functional relationship; however, there were some limitations within this study that should be noted. First, there were no comprehensive language assessments administered before and after intervention. Although rating scales and other indirect assessments were completed, comprehensive data may demonstrate gains in a more developmental framework. In addition, the administration of the MSWO preference assessment was only administered prior to the instruction portion of the intervention session. Since the intervention sessions were divided into two sessions, the MSWO should have been administered again, prior to the structure-play portion of the session. This would ensure the selected preferred item from the first assessment was still a reinforcing item at the time of the second portion of the session.

A third limitation was the reinforcement system implemented in this study. While there were defined times when the teacher-researcher or research assistants were to deliver behavior-specific praise, a token, or an edible (i.e., immediately following the display of a target social behavior), the design should have defined a specific reinforcement schedule (e.g., fixed-ratio or one-to-one). This establishment of a reinforcement schedule would also allow for systematic prompt fading and further analysis of skill maintenance.

Finally, the last limitation noted in this study was the lack of inter-observer agreement (IOA) data for the frequency of AAC use by the target participant. This data was not reviewed by the research assistants, in isolation, however these instances were still recorded and reported during other data and IOA data sessions. Additionally, it

should be noted that the average frequency of AAC use might be inflated due to the recording of each auditory response (see Definitions). In comparison, peers' responses were recorded as units, not as each individual word, as in the case of the AAC operational definition.

The results of the current study further support research on a peer network intervention as an effective strategy to increase social behaviors for children with autism spectrum disorders (Battaglia & Ridley, 2014; Haring & Breen, 1992; Kamps, et al., 1992; Kamps, et al., 1997; Kamps, et al., 2002). Furthermore, this study extends current research to support this as an effective strategy for children using augmentative and alternative forms of communication (Kamps, et al., 1997). Future replication of students utilizing peer networks is essential to strengthen its effect on improving social behaviors and providing a feasible intervention that can be applied in the practical setting.

**Future Research**

The current study was a replication of previous studies that have investigated the effects of a peer network intervention on social communication behaviors (Battaglia & Ridley, 2014; Haring & Breen, 1992; Kamps, et al., 1992; Kamps, et al., 1997; Kamps, et al., 2002). Using the limitations from this study, suggestions for future research can be established including establishing a specific reinforcement schedule with a fading procedure in place, utilizing a more comprehensive approach to data analysis of social-communication behaviors, using pre- and post- language development assessments to better compare skill performances, and continuing to investigate the feasibility of the intervention in practical settings.

When developing plans to conduct future research that utilizes a peer network strategy, it should be considered to implement the study over a longer period of time. This additional time would allow the researcher to further analyze the maintenance effects of the intervention, while systematically fading out teacher (or research assistant) prompts. Establishing a specific reinforcement schedule would support the prompt fading process, while still supporting and monitoring participant performance.

Using a more comprehensive approach to data collection may be laborious unless computer software is utilized to assist. If computer software is not available, planning for additional time for data analysis would be beneficial to the overall investigation of the effectiveness of the intervention. Additional measures could include durations of interactions, frequency of vocal imitations/approximations, and whether the response was information-seeking or complimentary in nature. Perhaps one should consider a verbal behavior approach, to systematically teach to the developmental sequence of language.

To determine if the peer network intervention was solely responsible for increases in social behaviors, a component analysis should be conducted in future research. With additional variables such as the token economy, reinforcement schedules, and prompting procedures it is possible that these contributed to the change in social behaviors. A component analysis would compare the effect of each variable independently to determine if one was more successful than the other, or if it was necessary to include each component to achieve a more successful result.

Another suggestion for future research is to utilize pre- and post- intervention assessments that measure language development according to the developmental sequence. This additional assessment would allow for more concrete measures to

compare when analyzing language development over the course of the study. Implications of the effects may be beneficial for future areas of research that peer networks may be beneficial.

Finally, continued research into the practical use of a peer network strategy in a public-school setting is essential to determine if it is a feasible strategy for a teacher to implement independently. In the current study, research assistants aided in the components of the study that were procedure-based, but future research should attempt to complete the process with little to no assistance. This would give a better depiction of whether the strategy proves too laborious for practical, everyday use in the public setting.

When given opportunities to practice and improve social-communication behaviors using peer networks, individuals with autism spectrum disorders can have greater success in a variety of settings in their natural environment.

# REFERENCES

American Psychiatric Association. (2013). Retrieved March 27, 2018, from dsm5.org

Battaglia, A., & Radley, K. (2014). Peer-mediated social skills training for children with autism spectrum disorder. *Beyond Behavior*.

Bellini, S. (2006). *Building social relationships: A systematic approach to teaching social interaction skills to children and adolescents with autism spectrum disorders and other social difficulties*. Shawnee Mission, KS: Autism Asperger Publishing.

Bregman, J. D., & Higdon, C. (2012). Definitions and Clinical Characteristics of Autism Spectrum Disorders. In *Educating Students with Autism Spectrum Disoders* (pp. 13-45). New York, NY: Routledge.

Brown, W. H., & Conroy, M. A. (2001). Promoting peer-related social-competence in preschool children. In *Promoting social communication in children and youth with developmental disabilities* (pp. 173-210). Baltimore, MD: Brookes.

Centers for Disease Control and Prevention. (2016, July 11). Data and Statistics. Retrieved March 27, 2018. cdc.gov/ncbddd/autism/data.html.

Charlop-Christy, M. H., & Haymes, L. K. (1998). Using objects of obsession as token reinforcers for children with autism. *Journal of Autism and Developmental Disorders, 28*(3), 183-198.

DeLeon, I. G., & Iwata, B. A. (1996). Evaluation of a multiple-stimulus presentation format for assessing reinforcer preferences. *Journal of Applied Behavior Analysis, 29*(4), 519-533.

Department of Elementary and Secondary Elementary. (2016). Retrieved 2016.

Fisher, W. W., Piazza, C.C., Bowman, L.G., & Amari, A. (1996). Integrating caregiver report with a systematic choice assessment. *American Journal on Mental Retardation, 101*, 15-25.

Garrison-Harrell, L., Kamps, D., & Kravits, T. (1997). The effects of peer networks on social-communicative behaviors for students with autism. *Focus on Autism and Other Developmental Disabilities, 12*(4), 241-254.

Gay, L., Mills, G., & Airasain, P. (2012). Single-subject experimental research. In Educational research: Competencies for analysis and applications (Tenth ed.). Upper Saddle River, New Jersey: Pearson.

Haring, T., & Breen, C. (1992). A peer-mediated social network intervention to enhance the social integration of persons with moderate and severe disabilities. Journal of Applied Behavior Analysis, 25(2), 319-333.

Kamps, D., Dugan, E., Potucek, J., & Collins, A. (1999). Effects of cross-age peer tutoring networks among students with autism and general education students. *Journal of Behavioral Education, 9*(2), 97-115.

Kamps, D., Kravits, T., Gonzalez-Lopez, A., Kremmerer, K., Potucek, J., & Garrison-Harrell, L. (1998). What do peers think? Social validity of peer-mediated programs. *Education & Treatment of Children, 21*(2), 107-134.

Kamps, D. M., Leonard, B. R., Vernon, S., Dugan, E. P., Delquadri, J. C., Gerhson, B., . . . Folk, L. (1992). Teaching social skills to students with autism to increase peer interactions in an integrated first-grade classroom. *Journal of Applied Behavior Analysis, 25*, 281-288.

Kamps, D., Potucek, J., Lopez, A., Kravits, T., & Kemmerer, K. (1997). The use of peer networks across multiple settings to improve social interaction for students with autism. *Journal of Behavioral Education,7*(3), 335-357.

Kamps, D., Royer, J., Dugan, E., Kravits, T., Gonzalez-Lopez, A., Garcia, J., . . . Garrison-Kane, L. (2002). Peer training to facilitate social interaction for elementary students with autism and their peers. *Exceptional Children, 68*(2), 173-187.

Kanner, L. (1943). Autistic disturbances of affective contact. Nervous Child, 2(3), 217-250.

Locke, J., Rotheram-Fuller, E., & Kasari, C. (2012). Exploring the social impact of being a typical peer model for included children with autism spectrum disorder. *Journal of Autism and Developmental Disorders, 42*, 1895-1905.

Luyster, R. J., Kadlec, M. B., Carter, A., & Tager-Flusberg, H. (2008). Language assessment and development in toddlers with autism spectrum disorders. *Journal of Autism and Developmental Disorders, 38*, 1426-1438.

McConnell, S. R., Sisson, L. A., Cort, C. A., & Strain, P. S. (1991). Effects of social skills training and contingency management on reciprocal interaction of preschool children with behavioral handicaps. *Journal of Special Education, 24*(4), 473-495

McCormick, L., Frome Loeb, D., & Schiefelbusch, R. L. (1997). *Supporting children with communication difficulties in inclusive settings: School-based language intervention* (2nd ed.). Pearson Education.

Owens, G., Granader, Y., Humphrey, A., & Baron-Cohen, S. (2008). LEGO(R) therapy and the social use of language programme: An evaluation of two social skills interventions for children with high functioning autism adn asperger syndrome. *Journal of Autism and Developmental Disorders, 38*, 1944-1957.

Pickles, A., Simonoff, E., Conti-Ramsden, G., Falcaro, M., Simkin, Z., Charman, T., . . . Baird, G. (2009). *The Journal of Child Psychology and Psychiatry, 50*(7), 843-852.

Quill, K. (2000). *DO-WATCH-LISTEN-SAY: Social and communication intervention for children with autism*. Baltimore, MD: Brookes Publishing.

Reinforcement inventories for children and adults. (1993). Retrieved 2016, from http://www.aba-instituut.nl/back-site/upload/content/reinforcementinventory.pdf

Toth, K., Munson, J., Meltzoff, A. N., & Dawson, G. (2006). Early predictors of communication development in young children with autism spectrum disorder: Joint attention, imitation, and toy play. *Journal of Autism and Developmental Disorders, 36*, 993-1005.

Trottier, N., Kamp, L., & Mirenda, P. (2011). Effects of peer-mediated instruction to teach use of speech-generating devices to students with autism in social game routines. *Augmentative and Alternative Communication, 27*(1), 26-39.

United States Census Bureau. (2010). Retrieved November 30, 2015.

Wetherby, A. (1995). Checklist of Communicative Functions and Means. Retrieved 2016, from https://connectability.ca/Garage/wp-content/uploads/files/communicativeFunctionsChecklist.pdf

# APPENDICES

## Appendix A.  Human Subject Institutional Review Board Application

**Missouri State UNIVERSITY**

**OFFICE OF RESEARCH COMPLIANCE**

(417) 836-4132
Web site: http://orc.missouristate.edu
Federalwide Assurance (FWA) #4733

To: Linda Garrison-Kane
Counseling Ldrshp and Special Ed
HILL 438 901 S National Ave Springfield MO 65897-0027

**Approval Date:** 2/10/2016
**Expiration Date of Approval:** 2/09/2017

**RE:** Notice of IRB Approval by Expedited Review (under 45 CFR 46.110)
**Submission Type:** Initial
**Expedited Category:** 6.Voice/image research recordings
**Study #:** 16-0289

**Study Title:** The Effect of a Peer Network on Social Interaction for Students with Autism

This submission has been approved by the above IRB for the period indicated. It has been determined that the risk involved in this research is no more than minimal.

**Investigator's Responsibilities:**

Federal regulations require that all research be reviewed at least annually. It is the Principal Investigator's responsibility to submit for renewal and obtain approval before the expiration date. You may not continue any research activity beyond the expiration date without IRB approval. Failure to receive approval for continuation before the expiration date will result in automatic termination of the approval for this study on the expiration date.

You are required to obtain IRB approval for any changes to any aspect of this study before they can be implemented (use the procedures found at http://orc.missouristate.edu). Should any adverse event or unanticipated problem involving risks to subjects or others occur it must be reported immediately to the IRB following the adverse event procedures at the same website.

This study was reviewed in accordance with federal regulations governing human subjects research, including those found at 45 CFR 46 (Common Rule), 45 CFR 164 (HIPAA), 21 CFR 50 & 56 (FDA), and 40 CFR 26 (EPA), where applicable.

CC:
Marissa Letterman, Counseling Ldrshp And Special Ed

page 1 of 1

# Appendix B. Target Participant Permission Form

**Title: Peer Network**

Dear Parent,

**What is the purpose of the project?**
The purpose of this project is to assist students with autism learn how to engage in social interactions with their same-age peers in the general education classroom. The goal of this study is to show the effectiveness of a peer network on increasing social interactions for students with autism.

**What is a Peer Network?**
A peer network is an intervention that promotes generalization of social skills through utilization of peers as communication partners in the general education classroom. Peer networks are a non-invasive approach to encourage appropriate social interactions, in both academic and leisure activities, between students with autism and their peers. The observations are conducted by school staff with assistance from the Missouri State University staff.

**How does a peer network work?**
The peer network strategy is based on best practices for students with autism, and include instruction and modeling of appropriate social interactions within the context of an academic or leisure activity, as provided by the special education teacher. Interventions are implemented for specific students with autism as selected by the special education teacher. Once students learn how to appropriately interact with each other, the peer network becomes part of the everyday classroom routine. The use of peer networks encourages inclusion of students with autism in their general education classroom. This allows for both social and academic growth in students with autism as well as their peers.

**What are the benefits of your child participating in the project?**
Your child may benefit from participation in the peer network. We expect to see improved engagement, learning, and social interactions with peers and teachers. Peer networks are a research-based practice for students with autism.

**Video Recording:** We may videotape samples of the classroom instruction and intervention for later review by the researchers and development team and for training purposes. This recording may only be accessed by members of the project or school district to inform development of the peer network program. It will only be used to ensure the fidelity of treatment and efficacy of the study.

**What are confidentiality procedures?**
Missouri State University supports the practice of protection for human participants taking part in our research programs. Your child has been given the opportunity to participate in a research study using an intervention program to teach appropriate social interactions in the upcoming school year. The following information is provided for you to decide whether you wish your child to participate in the measurement portion of the present study. You may refuse to sign this

form and not have your child participate in this study. You should be aware that even if you agree to participate, you are free to withdraw your child from the study at any time. If you do withdraw from this study, it will not affect your relationship with the school, the services it may provide to you or your child, or Missouri State University.

Your permission allows a copy of all information obtained from assessment and interventions to be provided to the Missouri State University faculty involved in this study. This information will be kept confidential in closed files at Missouri State University. All school policies on confidentiality will be followed. Information from assessments or observations shared in verbal or written reports only to the school staff who assist your child. These persons will have the information available for parents to review.

Sincerely,


Marissa Letterman
Ozark East Elementary
(417) 582-5906 ext. 3607
marissaletterman@mail.ozark.k12.mo.us



Dr. L. Garrison-Kane
Missouri State University
901 S. National Ave.
Springfield, MO
LGKane@MissouriState.edu
(417) 836-6960

**Title: Peer Network**

PARTICIPANT CERTIFICATION:

If you agree to have your child participate in this study please sign where indicated, then tear off this section and return it to the investigator. Keep the consent information for your records.

I have read this Consent and Authorization form. I have had the opportunity to ask, and I have received answers to, any questions I had regarding the study and the use and disclosures of information about my child for the study.

I agree to allow my child to take part in this study. By my signature I affirm that I am the parent/guardian of the child and that I have received a copy of this Consent and Authorization form.

I understand this means he/she may be observed and that information will be used to help the school and my child's teacher support my child.
I also understand that my permission allows for classroom observation of my child's performance.

_____
Child's first and last name


_____
Print Parent's name


_____        _____
Parent's signature                                      Date

With my signature I affirm that I have been given a copy of this consent form.

I understand that if I have any additional questions about my rights as a research participant, I may contact:

Marissa Letterman                          Dr. L. Garrison-Kane
Ozark East Elementary                   Missouri State University
(417) 582 5906 ex 3607                  LGKane@MissouriState.edu
marissaletterman@mail.ozark.k12.mo.us   417-836-6960

## Appendix C. Peer Model Permission Form

**PARENT CONSENT for PEER MODEL**

**Title: Peer Network**

DATE

Dear Parent,

Missouri State University supports the practice of protection for human participants taking part in our research. A teacher in your child's school is researching an intervention to increase the pro-social behavior of students at your child's school. The following information is provided for you to decide whether you wish your child to participate in the peer modeling portion of the study. You may refuse to sign this form and not have your child participate in this study. You should be aware that even if you agree to participate, you are free to withdraw your child from the study at any time. If you do withdraw from this study, it will not affect our relationship with the school, the services it may provide to you or your child, or Missouri State University.

**What is the purpose of the study?**

The purpose of this study is to improve the positive social behavior of elementary students who are diagnosed with autism.
Your child has been nominated by his/her classroom teacher as a candidate for a peer model, because he/she engages in, and is a "Peer Model" for positive social behavior. We are requesting permission to improve the social behavior in others, by using your child as a peer model.

**What is a Peer Network?**

Peer networks are a non-invasive approach to encourage appropriate social interactions, in both academic and leisure activities, between students with autism and their peers. The observations are conducted by school staff with assistance from the Missouri State University staff.

**How does a peer network work?**

Peer networks are based on best practices, and include the following:

1.  Training Sessions: Peer models will be taught specifically how to be a positive social behavior model. These sessions will occur during non-academic times.

2.  Social Skills Group Sessions: Peer models will then work with a student with a diagnosis of autism, modeling the positive social behaviors, during structured activities.

3. Data Sessions: Participants and peer models will be given the opportunity to interact with one another during a structured activity for 15 minutes per session. These sessions will be guided by the teacher-researcher to allow for positive feedback and assistance as needed.

**What are the benefits of your child participating in the project?**

All students who participate in the study may benefit from the training and intervention. We expect to see more positive social behaviors during peer-to-peer interactions throughout the study.

Your child's participation is voluntary and you are free to withdraw at any time without penalty. If you agree, the teacher-researcher will train your child how to be a great positive social behavior model,

**Video Recording:** We may videotape samples of the classroom instruction and intervention for later review by the researchers and development team and for training purposes. This recording may only be accessed by members of the project or school district to inform development of the peer network program. It will only be used to ensure that the study is beneficial to all participants and that the peer network is conducted effectively, based on best practices.

**What are confidentiality procedures?**

Missouri State University supports the practice of protection for human participants taking part in our research programs. Your permission allows a copy of all information obtained from assessment and interventions to be provided to the Missouri State University staff involved in this study. This information will be kept confidential in closed files at Missouri State University. All video recordings will be password protected and kept in a locked room. All school policies on confidentiality will be followed. Information from assessments or observations shared in verbal or written reports only to the school staff who assist your child. These persons will have the information available for parents to review.

If you agree to allow your child to participate, please sign the attached form and have your child return it to his/ her teacher. Should you desire any additional information or have questions, please call (417) 582- 5906 ext. 3607, or contact your child's teacher.

Sincerely,

Marissa Letterman                                    Dr. L. Garrison-Kane
Special Education Teacher                       Missouri State University Professor
Ozark East Elementary                            (417) 836-6960
(417) 582-5906 ext. 3607
marissaletterman@mail.ozark.k12.mo.us     LGKane@MissouriState.edu

## PARENT CONSENT for PEER MODEL

PARTICIPANT CERTIFICATION:

If you agree to have your child participate in this study please sign where indicated, then return this page to your child's teacher. Keep the consent information for your records.

I have read this Consent and Authorization form. I have had the opportunity to ask, and I have received answers to, any questions I had regarding the study and use and disclosure of information about my child for the study.

I agree to allow my child to take part in this study. By my signature I affirm that I am the parent/ guardian of the child and that I have received a copy of this Consent and Authorization form. I understand this means he/ she may be observed and that information will be used to help the school and my child's teacher and support my child. Assistance with positive social behavior support will be developed by the teacher-researcher with consultation from Missouri State University.

I also understand that my permission allows for video recorded observation of my child and sharing of school records with project staff.


_____

Child's first and last name


_____

Child's School


_____

Print parent's name


_____

Parent's signature


_____

Date

With my signature I affirm that I have been given a copy of this consent form.

I understand that if I have any additional questions about my rights as a research participant, I may call (417) 582-5906 ext. 3607.

## Appendix D. Principal Permission Form

**PRINCIPAL CONSENT**

**Title: Peer Network**

Dear Principal,

As part of my thesis project for my masters in special education in autism at Missouri State University, I plan to implement an intervention program to teach appropriate conversational skills for specific students with autism. These students are selected based upon a low-rate of social engagement with their same-age peers and parent permission. The following information is provided for informed consent to allow or disallow the study.

**What is the purpose of the project?**
The purpose of this project is to implement an intervention that promotes generalization of social skills through utilization of peers as communication partners, in the general education classroom. The study will focus on creating peer networks within three general education settings in order to promote inclusion and increase social communication, specifically for students with an educational diagnosis of autism. The project is to provide further research on the effectiveness of a peer network to increase the amount of social interactions exchanged between students with autism and their same-age, typically developing peers. Peer networks are an effective research-based practice for increasing social communication for students with autism. The intervention will not interfere with current IEP and will only enhance the progress on IEP goals. The resulting information may be disseminated at regional and national behavior conferences such as the Midwest Symposium for Leadership in Behavior Disorders or Association for Behavior Analysis International. This study is completed to meet thesis requirements for a master's degree in special education in autism.

**What is a Peer Network?**
A peer network is an intervention that promotes generalization of social skills through utilization of peers as communication partners in the general education classroom. Peer networks are a non-invasive approach to encourage appropriate social interactions, in both academic and leisure activities, between students with autism and their peers. The observations are conducted by the researcher and school staff involved in the students.

**How does a Peer Network work?**
The peer network strategy is based on best practices, and include instruction and modeling of appropriate social interactions within the context of an academic or leisure activity, as provided by the general education teacher. Interventions are implemented for specific students with autism as selected by the special education teacher. Once students learn how to appropriately interact with each other, the peer network becomes part of the everyday classroom routine. The use of peer networks encourages inclusion of students with autism in their general education classroom. This allows for social growth in students with autism as well as their peers. The intervention will not interfere with current IEP and will only enhance the progress on IEP goals.

**What are the benefits of your participation in the project?**
Students may benefit from participation in the peer network. Improved learning, classroom behavior and social interactions with peers and teachers is expected. Peer networks are a research-based practice for students with autism. This research will increase research-based effective instructional procedures for students with autism within your school.

**Video Recording:** We will use videotape samples of the classroom instruction and intervention for later review by the researcher and development team and for training purposes and primary data collection purposes. This recording may only be accessed by members of the project or school district to inform development of the peer network program. No personally identifying information will be disseminated. It will only be used to ensure the fidelity of treatment and efficacy of the study.

**What are confidentiality procedures?**
Your permission allows a copy of all information obtained from assessment and interventions to be provided to the Missouri State University staff involved in this study. This information will be kept confidential in closed files at Missouri State University with Dr. Garrison-Kane. An alias will be used for each student and no identifying information will be included. All school policies on confidentiality will be followed. Information from assessments or observations shared in verbal or written reports only to the school staff who assist each student. Parent permission will be granted through a separate permission form and will be provided access to all data and information collected upon request.

Should you desire any additional information or have questions, please contact my thesis advisory, Dr. Garrison-Kane at Missouri State University, LGKane@MissouriState.edu, (417-836-6960)

---------------------------------------------------------------------------------------------

**Title: Peer Network**

PARTICIPANT CERTIFICATION:

If you agree to participate in this study please sign where indicated, then tear off this section and return it to the investigator. Keep the consent information for your records.

I have read this Consent and Authorization form. I have had the opportunity to ask, and I have received answers to, any questions I had regarding the study and the use and disclosures of information about my child for the study.

I agree to take part in this study. I understand that information will be used to help the school. Assistance with behavior support will be developed by the school student support team with consultation from Missouri State University staff.

I also understand that my permission allows for classroom observation student performance and sharing of school records (discipline contracts) with research staff.

_____
Principal's first and last name

_____       _____
Principal's signature                                   Date

With my signature I affirm that I have been given a copy of this consent form.

I understand that if I have any additional questions about my rights as a research participant, I may contact

                    Dr. Garrison-Kane, Professor
                    Missouri State University
                    (417) 836-6960
                    LGKane@Missouristate.edu
                    901 S. National, College of Education
                    Springfield, MO 65897

## Appendix E.  Peer Self-Monitoring Sheet

Date: _____

Name:_____

### Self-Monitoring for Peer Network Training

**What did we talk about?**

_____

_____

**What did I learn to do?**

_____

_____

**Did I talk to my friends?**

      Yes           No

**Did I have fun?**

      Yes           No

# Appendix F. Data Collection Sheet

Date: _____  Setting: _____  Extraneous Factors: _____
Time: _____  Phase: _____

| # | P1 Initiation | P1 Response | P2 Initiation | P2 Response | P3 Initiation | P3 Response | TS Initiation | TS Response |
|---|---|---|---|---|---|---|---|---|
| 1 | | | | | | | | |
| 2 | | | | | | | | |
| 3 | | | | | | | | |
| 4 | | | | | | | | |
| 5 | | | | | | | | |
| 6 | | | | | | | | |
| 7 | | | | | | | | |
| 8 | | | | | | | | |
| 9 | | | | | | | | |
| 10 | | | | | | | | |
| 11 | | | | | | | | |
| 12 | | | | | | | | |
| 13 | | | | | | | | |
| 14 | | | | | | | | |
| 15 | | | | | | | | |
| 16 | | | | | | | | |
| 17 | | | | | | | | |
| 18 | | | | | | | | |
| 19 | | | | | | | | |
| 20 | | | | | | | | |

Eye Contact: Y / N  Y / N  Y / N
Joint Attention: Y / N  Y / N  Y / N

P1 Initiation Total: _____
P1 Responses Total: _____

P3 Initiation Total: _____
P3 Responses Total: _____

P2 Initiations: _____
P2 Responses: _____

AAC Use _____

TS Initiation Total: _____
TS Responses Total: _____

IOA: _____

## Appendix G. MSWO Preference Assessment

**Multiple-Stimulus Without Replacement (MSWO) Preference Assessment**

Pseudonym:
Date:
Time:
Data Collector:

Stimuli:
1.                                   Selected _____/_____ = _____ *100=_____%
2.                                   Selected _____/_____ = _____ *100=_____%
3.                                   Selected _____/_____ = _____ *100=_____%
4.                                   Selected _____/_____ = _____ *100=_____%
5.                                   Selected _____/_____ = _____ *100=_____%

| Trials ⇒ Selections ⇓ | 1 | 2 | 3 |
|---|---|---|---|
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5 | | | |

**Appendix H. Network Consumer Satisfaction Survey: Teacher**

**Network Consumer Satisfaction Survey**

1. Tell me what you liked about the Paw Pals activities?

2. Was there anything you did not like about the Paw Pals activities?

3. Would you be interested in your students participating in Paw Pals next school year? If not, why?

4. What are some things that you would want to see included in the Paw Pals activities next year?

5. Would you like to see the Paw Pals group meet more next year, less next year, or about the same? Why?

6. Did you observe an *increase* in social interactions between the peer models and MacGyver? If so, would you consider the change to be minor, moderate, or significant? Describe an instance in which you observed this change.

7. Did you observe an increase in MacGyver's use of language (verbal or Communication device)? If so, would you consider the change to be minor, moderate, or significant?

8. Did you observe an increase in the awareness of other classmates from MacGyver? If so, would you consider the change to be minor, moderate, or significant?

9. Did you observe an increase in frustrations (either MacGyver or peers)?

10. Did you observe an increase in observable fatigue (either MacGyver or peers)?

11. Do you feel this is a valuable experience for your students? Why or why not?

1

107