2023-06-22

The Effects of a Peer-Mediated Social Skills Intervention on Children With Autism Spectrum Disorder

Shannon Elizabeth McConaghie
Brigham Young University

Effects of a Peer-Mediated Social Skills Intervention on Children With Autism Spectrum Disorder

Shannon Elizabeth McConaghie

A thesis submitted to the faculty of
Brigham Young University
in partial fulfillment of the requirements for the degree of

Master of Science

Blake Hansen, Chair
Cade Charlton
Terisa Gabrielsen

Department of Counseling Psychology and Special Education

Brigham Young University

ABSTRACT

Effects of a Peer-Mediated Social Skills Intervention
on Children With Autism Spectrum Disorder

Shannon Elizabeth McConaghie
Department of Counseling Psychology and Special Education, BYU
Master of Science

The purpose of this study is to analyze the effects of a peer-mediated social skills intervention (PMI) on children 6-12 years of age diagnosed with autism spectrum disorder (ASD). Current literature discusses the effects of peer-mediated social skills interventions for children with ASD in schools and on the playground but has not been conducted in an Applied Behavior Analysis (ABA) clinic or in an Early Childhood Education/ABA-integrated preschool. Three dyads, each consisting of a typical peer and a target child diagnosed with ASD, participated in this study. The frequency of participants' initiations, responses, and continuations were collected throughout all phases, and levels of social anxiety were collected from both members of the dyad periodically using the Severe Measure for Social Anxiety Disorder Child Age (11-17) questionnaire (SMSAD). A multiple baseline across participants design featuring a baseline phase, peer training, intervention without materials, intervention with materials, and generalization probes was used to evaluate the effectiveness of the procedures on communication. The results demonstrate an increase in responses across two target children. The frequency of continuations increased for one target child and initiations increased in another target child. Levels of social anxiety decreased for two dyads while SMSAD questionnaire was not administered to the other dyad. The results of this study indicate that there may be a relationship between peer-mediated interventions and social anxiety levels. The results also indicate that peer-mediated interventions may provide positive outcomes in social interactions between children with ASD and neurotypical peers in ABA settings. Implementing peer-mediated interventions in ABA settings may provide opportunities that could ease the social transition from ABA services to an integrated setting by increasing the number of social interactions between children with ASD and their peers. Peer-mediated social skills interventions may have more of an impact on children who emit limited, independent interactions with peers.

Keywords: autism, social skills, peer-mediated, inclusive, Applied Behavior Analysis, conversation

ACKNOWLEDGMENTS

I would like to thank my chair, Dr. Blake Hansen, for his invaluable insight regarding PMI and conversation skills. He helped me navigate what research topics were important to me. I would like to express my gratitude to Dr. Cade Charlton for providing me guidance, direction, and for mentoring me. I would also like to thank Dr. Terisa Gabrielson for her inspiring teachings on behavior and autism and for being a source of encouragement. I would like to express my appreciation for my supervising Board Certified Behavior Analyst, Stephanie Call, for being an unmovable support, mentor, and friend. Lastly, I would like to thank my family and friends for their constant support in my efforts towards becoming a BCBA.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

DESCRIPTION OF THESIS STRUCTURE

This thesis, *The Effects of a Peer Mediated Social Skills Intervention on Children With Autism*, is written in a hybrid format. The hybrid format brings together traditional thesis requirements with journal publication formats. The Journal of Applied Behavior Analysis (JABA) requires all research articles to be formatted according to the latest APA guidelines. Research articles submitted to JABA are socially significant and include data describing individual target participants.

The preliminary pages of the thesis reflect requirements for submission to the university. The thesis report is presented as a journal article and conforms to length and style requirements for submitting research reports to education and behavior journals.

The literature review is included in Appendix A. The Institutional Review Board Approval Letter and Consent Form are included in Appendix B. In Appendix C, the conversation cards/prompts used in this study are included. The treatment fidelity form is provided in Appendix D and the Severe Measure for Social Anxiety Disorder Child Age 11-17 is listed in Appendix E. The Peer Training checklist and guide implemented in this study are included in Appendix F and the Parent Permission and Child Assent forms are provided in Appendix G.

Introduction

Autism Spectrum Disorder

Autism spectrum disorder (ASD) is a neurodevelopmental disorder that is diagnosed based on deficits in social communication, restricted interests, and repetitive behaviors. ASD ranges in symptom presentations and severity across individuals (American Psychiatric Association [APA], 2022). Current data estimates that 1 out of 36 children have ASD and there is a higher proportion of males diagnosed with ASD than females (Maenner et al., 2023). Children with ASD may face difficulties in inclusive settings, shared interests with their peers, as well as social withdrawal (Aldabas, 2020). Autism spectrum disorder may affect an individual's life in more ways than what the fifth edition (text revision) of the Diagnostic and Statistical Manual of Mental Disorders (DSM-5-TR; APA, 2022) lists as diagnostic criteria. (Hodges et al., 2020; Frampton et al., 2022).

Social Skills Deficits in Autism Spectrum Disorder

The DSM-5-TR delves into specific deficits in social communication and social interaction an individual with ASD may have including deficits in back-and-forth conversation, non-verbal communication, imaginative play, and difficulty building and maintaining friendships and other types of relationships (APA, 2022). Individuals with ASD struggle to overcome deficits in social skills such as poor eye contact, joint attention, lack of empathy, and difficulty interpreting body language (Schreiber, 2011).

Most children with ASD also experience speech and language delays, which may present a barrier to their conversational skills throughout their lives (Lord et al., 2018). Children with ASD have more difficulty interacting with peers in conversation. Beginning a conversation

(known as an initiations), responses, and maintaining a conversation (also called continuations) are limited in children with ASD (Koegel et al., 2005).

About 40% of children with ASD, ages 6-18 years old, suffer from an anxiety disorder, which is about double that of children without ASD (Vasa et al., 2020). Social anxiety is common in individuals with ASD and may magnify symptoms of ASD such as deficits in social interaction, communication, and the presence of restricted and repetitive behaviors (Lord et al., 2018). Anxiety symptoms may also be increased by ASD, such as fear of the unknown and social discomfort (Vasa et al., 2020).

Vasa et al. (2020) conducted a systematic review on the relationship between social anxiety and children/adolescents with ASD. The authors of the study analyzed the prevalence, correlation, and treatment for social anxiety in children and adolescents with ASD. The data from 16 out of 17 studies reviewed in Vasa et al. (2020) showed that children with ASD had higher levels of social anxiety than any of their control groups, some of which included children with Tourette's Disorder and other neurodevelopmental disorders. However, data were inconsistent when children with ASD were compared to children with psychiatric disorders. The data from these studies also demonstrate higher anxiety levels in children with deficits in social skills and they show a correlation between social withdrawal, one of the social deficits in children with ASD, and social anxiety levels (Vasa et al., 2020; Aldabas, 2020).

Social Skills Interventions for Autism Spectrum Disorder

Schreiber (2011) reviewed studies between the years 2000-2011 regarding social skills interventions for school-aged children and adolescents with ASD. Social skills interventions mentioned in Schreiber (2011) include Social Stories™, manualized instructional programs, non-

manualized programs, support groups, activity-based, parent or family-mediated, as well as peer mediated.

Social Stories™ have been shown to be effective for children with ASD, most likely due to strengths in verbal behavior. Although studies have proven Social Stories™ to be effective, current research is limited regarding maintenance and generalizability (Schreiber, 2011). While some studies demonstrate "promising results," non-manualized programs and support groups have "little empirical documentation" and require future research (Schreiber, 2011, p. 51-52). Studies utilizing activity-based interventions have demonstrated effectiveness in increasing social skills, generalization, and long-term maintenance. The studies that implemented activity-based interventions focused on "communication, task focus, and collaborative problem solving" (Schreiber, 2011, p. 55). Parent or family-mediated interventions demonstrated a large increase in reciprocal interactions and affect levels. The results from studies "suggest that children with ASD are capable of unprompted high-level reciprocal interactions, but they may need the contextual scaffolding provided by an adult facilitator to practice these skills in a mutually reinforcing way with peers" (Schreiber, 2011, p. 54).

After reviewing peer-mediated interventions, Schreiber (2011, p. 54) noted, "social interactions, reciprocal interactions, and to a lesser degree, on-topic verbalizations increased over time for children with autism while they were in the group with the trained peer. There were also increases in the time spent in social interactions and reciprocal interactions with familiar peers; however, all behaviors decreased when the children with autism engaged with stranger peers." A greater focus on generalization and maintenance in peer-mediated social skills interventions will be beneficial for future studies.

Peer-Mediated Interventions

Peer-Mediated Interventions (PMI) have been shown to be effective in promoting a variety of social skills, such as joint attention, communication, initiations, maintaining interactions, and turn-taking. This method also demonstrates effectiveness in decreasing social behaviors such as unresponsiveness, changing conversation topics, and inappropriate talking while also promoting generalization and maintenance of skills learned (Chan et al., 2009; Schmidt & Stichter, 2012). PMIs have also been shown to reduce social anxiety and increase social interactions in individuals with ASD (Michalek et al., 2020; Owen-DeSchryver et al., 2008).

All peer-mediated studies previously mentioned included children with ASD. In general, PMI works by first selecting and training peers. Specific skills and techniques are taught to successfully communicate, interact, and maintain communicative interactions with their classmates with autism spectrum disorder (Zagona & Mastergeorge, 2016). Neurotypical peers are responsible for modeling appropriate behaviors, prompting the target child when needed, and providing reinforcement (Chan et al., 2009). In our current research study, the peer will continuously act as a natural model and will be trained to provide reinforcement and necessary prompts to increase reciprocal interactions from the target child.

The target child and peer will then attend a session in a supported environment with a teacher, therapist, or Board Certified Behavior Analyst (BCBA). In this setting, the peer will have access to teaching, prompting, and reinforcement provided by the trained adult (Sperry et al., 2010). In our current research study, the target child and peer will take turns reading ten total conversation cards while the author will be present to provide support.

After the target child's and peer's data is stable within the supported environment, PMI is then implemented in the natural setting with available materials to promote social interactions between the target child and peer (Jung et al., 2008; Sperry et al., 2010). Peer-mediated interventions are highly supported by evidence and demonstrate effectiveness between both males and females with ASD from preschool-aged to adolescence (Zhang & Wheeler, 2011). PMI is a unique intervention in that it works very well in inclusive settings. PMI can be incorporated into day-to-day activities and can be used across subjects and skills that the teacher/BCBA is targeting. Using peers as interventionists relieves the burden placed on teachers and allows for an increased opportunity for generalization to occur. Interacting with various peers while building skills may increase the possibility of generalizing across different settings (Aldabas, 2020).

In a study conducted by Chen (2022), a PMI was implemented to improve classroom routine behavior in children with ASD as well as decreasing maladaptive behaviors. The results indicate a functional relation between PMI and the increase in appropriate classroom routine behavior. While there are many PMI studies conducted in the inclusive classroom that may focus on behavioral or Applied Behavior Analysis (ABA) principles, there is no research that focuses on the use of PMI in an ABA clinic or in an Early Childhood Education (ECE)/ABA-integrated setting. Incorporating peers into ABA clinics may ease the transition into traditional school settings. If "friendship and engagement with peers" by the age of nine are associated with "access to integrated school programs," children with ASD may benefit from peer-mediated social skills interventions in clinical ABA settings (Lord et al., 2018, p. 511). Or more boldly, incorporating the clinical ABA setting into traditional preschool settings to increase opportunities for social interaction and access to peer models as well as an introduction to the

school classroom. Friendship and social interaction are predictors of adult outcomes in terms of independence, decreased symptoms, and stronger adaptive skills (Lord et al., 2018). We found no research regarding the use of PMI in ABA clinics or ECE/ABA-integrated settings. Therefore, this literature review will be focused on the effects of PMI on children with ASD across settings.

Further study would be needed to determine the most effective ratio between the number of peers and the target child with ASD. Determining the effectiveness of a peer-mediated social skills intervention on individuals with other disabilities in the ABA or ECE/ABA setting would be another advantageous study to broaden our knowledge of applying PMIs to support individuals with disabilities.

Purpose of This Study

This study will be studying the effects of a peer-mediated social skills intervention on children diagnosed with ASD. Specifically, this study is aimed to address the following questions:

1. Are peer-mediated social skills interventions effective for children diagnosed with ASD in increasing the frequency of responses, initiations, and continuations in a conversation in an ABA setting?
2. Is there a relationship between peer-mediated social skills interventions and decreasing social anxiety levels in children diagnosed with ASD?

Method

This study and its methods were approved by Brigham Young University's Institutional Review Board. Parent permission forms and child assent documents were signed before beginning the study. Parent permission forms were emailed to all parents for them to sign and

physically hand in to the author. The child assent document was read aloud and explained to all participants by the author before receiving their signatures.

Participants

Participants in this study included three children diagnosed with ASD between the ages of 6-12 and three neurotypical peers between the ages of 9-12. A dyad included one male with ASD and one neurotypical female. Participants included three males with ASD and three neurotypical females, through a local preschool. See Table 1 for demographics of all the participants as well as each dyad's relationship prior to the beginning of this study.

Inclusion criteria included English as the primary language of all participants and a fourth grade reading level minimum. All participants of this study attend a local school in Utah, United States. The three target children were required to have a parent-reported diagnosis of ASD. Participants with ASD were also receiving ABA therapy, which requires a formal diagnosis of autism to qualify for reimbursement of services. ASD participants may also be recipients of ongoing services such as speech, occupational, and/or physical therapy. Three neurotypical peer models were included in this study. Peer models with an individualized education program (IEP) were excluded from this study. There were no other exclusions regarding health status, sex, ethnicity, or education status. Parent permission forms and child assent documents were signed before beginning the study. This study and its methods were approved by Brigham Young University's Institutional Review Board.

Interventionist

The author was a Behavior Analyst in Training in her master's degree program for Applied Behavior Analysis to become a BCBA. At the time of this study, she had worked in

ABA therapy for two years and has received approximately 2,500 hours of concentrated supervision from a supervising BCBA.

Setting

This study was conducted in a local, private school in Utah, United States. This school was based on an ECE/ABA-integrated model. The school conducted an after-school, integrated ABA program for children who attend public elementary school during the day. This after-school program was held from 4:00-5:30 pm Monday-Friday. In this study, sessions were held during the after-school program. Sessions for this study were held in a room that had minimized distractions that was approximately 200 square feet. Office desks, a table, and chairs were present in the room.

Materials

Materials used for this study included a laptop with a Zoom™ application, a webcam, conversation cards, copies of the Severe Measure for Social Anxiety Disorder (Social Phobia) - Child Age 11-17 questionnaire, and a pencil and paper for data collection.

Measures

Data was collected from each participant, including neurotypical peers and children with ASD. The author collected data in-person at the participants' school. Measures in this study included the frequency of initiations, responses, and continuations as well as social anxiety levels.

Observations

The author took frequency of initiations, responses, and continuations throughout baseline, intervention, and generalization probes with the use of tally marks on a piece of paper. Frequency data consisted of the number of initiations, responses, and continuations from both the

target child and peer in 10-minute sessions, one to five times daily. The frequency of responses, continuations, and initiations are the primary measure of this study. Decisions to change phases were made based on this measure. Interobserver Agreement (IOA) data of these observed measures were taken from video recordings of sessions throughout baseline, intervention, and generalization probes.

Initiations. This observational measure was defined as vocal attempts to start a conversation with their partner. This included questions, introducing a new topic, or saying their partner's name to direct their attention to their own vocal behavior.

Responses. The author defined responses as any comments emitted or provided answers to questions posed by their partner. Non-verbal responses were not counted.

Continuations. This observational measure was defined as any vocal behavior that provided more information than what the partner asked for or expounded on the introduced topic (e.g., telling a story).

Social Anxiety

Social anxiety data were collected by the author using the Severe Measure for Social Anxiety Disorder Child Age 11-17 (SMSAD) questionnaire and a piece of paper to track frequency. The SMSAD questionnaire, produced by the American Psychiatric Association, demonstrates reliable, internal validity with a total alpha of 0.86 – 0.94 (Carlton et al., 2022). Using the listed questionnaire, the social anxiety levels of two peers and two target children were collected before/after baseline, after peer training, and after the last session of the study. One peer and one target child in Dyad 2 were not administered the SMSAD questionnaire because they did not meet the age requirement of the questionnaire (11-17).

Interobserver Agreement

Interobserver agreement (IOA) was collected and calculated by the author and a graduate research member using total count (Cooper et al., 2019). The graduate research member had worked as a Registered Behavior Technician in ABA therapy for approximately one year at the start of this study.

Twenty percent of all sessions were calculated for IOA across all participants and all phases and probes. On average, IOA for this study was 75.9% with a range of 20.0% – 100%. Initiations had an IOA of 93.1% with a range of 80.0-100%. Responses had an IOA of 87.2% with a range 73.9% - 100% and continuations had an IOA of 47.5% with a range of 20%-100%.

Treatment Fidelity

Treatment fidelity was tracked with the use of a data sheet at each session. Each step was listed out for the author to check off including scripts for the beginning and end of the session, supplying the proper materials, and data collection. See Appendix D for the attached treatment fidelity form. Treatment fidelity was 100% throughout all phases and probes.

Research Design

A multiple baseline across participants design (Baer et al.,1968) was used to evaluate the effects of PMI with our target population. A multiple baseline design across participants can be used to demonstrate how conversing with a trained peer will promote social skills by increasing the number of reciprocal interactions. The independent variable was the peer-mediated social skills intervention, and the dependent variable was the frequency of responses, continuations, and initiations per session.

Visual Analysis

The effectiveness of this peer-mediated intervention was determined by the low, stable baselines and the increase of social interactions (initiations, responses, and continuations) during intervention. As the first target child (Jeffery) started intervention, the next target child (Andrew) remained in baseline until Jeffery demonstrated an increase in frequency of social interactions for one to two sessions. The same process was repeated for the third target child (Dan). Clear changes in trend, level, and variability across target children were visually analyzed for an increase in one of the conversational skills before the intervention was introduced.

Procedures

The intervention was a peer-mediated intervention (PMI) to increase social skills and decrease social anxiety. Throughout the study, each session took place in an office at the participants' local school. The author attended each session in person at the participants' school. Sessions lasted 10 minutes and were held each day until a change in the frequency of responses, continuations, and initiations occurred.

Baseline

During baseline, the author did not provide any verbal prompts on how to respond, initiate, or continue a conversation to any participants. The target child and typical peer were given three conversation cards each and were instructed to, "Have a conversation with each other for 10 minutes. Take turns reading and answering the questions on the cards. I will let you know when the 10-minute timer is done." During the target child's and peer's conversation, the author recorded the frequency of initiations, responses, and continuations emitted from both the typical peer and the target. When baseline data showed minimal, discernible trends, a clear level, and

consistent variability based on visual analysis, a generalization probe was then conducted, followed by peer training.

Intervention

Peer Training. All peers were trained by the author in person in a 1:1 ratio at the participants' school. The peer training sessions were 30 minutes and took place in the same school office used throughout the rest of the study. Peers were trained to emit initiations, responses, and continuations in a conversation. Training sessions consisted of 5 trials per concept with at least 90% accuracy. After verbal explanation of each skill, the skill was mastered through role-play with the graduate research member. The author included interests of the target were included as well as examples and non-examples of accurate responses. When peers achieved mastery, intervention was implemented. The peer was also trained on communication styles specific to their partner.

Intervention Sessions. During baseline, the author did not provide any verbal prompts on how to respond, initiate, or continue a conversation to any participants. Data collection in the intervention phase occurred until the data proved stable.

The first data point of intervention was conducted without the use of conversation cards to clearly see the effects of intervention on the frequency of initiations, responses, and continuations. The following data points within the intervention phase were conducted with the use of conversation cards.

The target and peer were given three conversation cards each and were instructed to, "Have a conversation with each other for 10 minutes. Take turns reading and answering the questions on the cards. I will let you know when the 10-minute timer is done."

During the target child's and peer's conversation, the author recorded data regarding the frequency of initiations, responses, and continuations. To conclude the session, the target child will be asked to leave, and the peer was provided feedback from the author. After intervention data showed minimal, discernible trends, a clear level, and consistent variability based on visual analysis, a final generalization probe was conducted.

Generalization Probes

Generalization probes were individual, 10-minute sessions conducted before and after baseline, after peer training, and at the conclusion of the study. Generalization probes were conducted without the use of conversation cards. The dyad was instructed: "We would like you two to have a conversation with each other for 10 minutes. I will let you know when the 10-minute timer is done." During the conversation, the author recorded the frequency of initiations, responses, and continuations emitted from both the typical peer and the target child. After the session without conversation cards had concluded, the dyad transitioned into the baseline phase.

Results

The frequency of initiations, responses, and continuations emitted by each target child are displayed in Figure 1. Table 2 lists the average of initiations, responses, and continuations emitted per session as well as the range. Figures 2 and 3 demonstrate the social anxiety levels of Dyad 1 and Dyad 3.

Jeffery

Initiations

The initiations emitted by Jeffery were relatively lower than the other two targeted skills. The trend was stable throughout baseline and intervention. The level of initiations remained mostly unchanged from baseline to intervention. Baseline and intervention data have minimal

variability with a range of six to 14 initiations. Interesting to note, Jeffery's initiations increased to a high level in the last generalization probe, with a frequency of 26 initiations.

Responses

Jeffery's responses during baseline demonstrated variability in baseline with a stable level and a small downward trend. There is an upward trend in intervention with a higher level than baseline. His responses show a drastic change from the first generalization probe in intervention to the last generalization probe, ranging from 26 to 49. After intervention was implemented, the responses returned to the same level as baseline data and then steadily increased to a level higher than baseline data. The data indicates that the intervention increased the frequency of responses emitted by Jeffery and the effect was most pronounced in the last generalization probe.

Continuations

The frequency of Jeffery's continuations showed no changes in level from baseline to intervention with slight variability throughout. His continuations ranged from 13 to 30 in baseline and 18 to 29 in intervention. He emitted an average of 22 continuations during baseline and 23 continuations during intervention.

Andrew

Initiations

Andrew's initiations were minimal during the baseline phase, ranging from zero to three. There is an increase in level from baseline to intervention with a range of three to nine. Andrew increased from an average of 1.0 initiations per session in baseline to 6.4 initiations per session in intervention.

Responses

The data from Andrew's responses showed low variability in baseline, ranging from zero to 18. However, there is a clear change in level from baseline to intervention with an increasing trend throughout intervention and a range of 21 to 37. After the implementation of intervention, there is a relatively steep increase in responses emitted from Andrew and remains stable until the last generalization probe.

Continuations

Andrew's frequency of continuations remained at the same level throughout the study. There was no change in trend and variability was minimal. Andrew had an average of 2.2 continuations emitted during baseline and an average of 6.0 continuations emitted during intervention. However, the baseline range was zero to seven and the intervention range was zero to nine.

Dan

Initiations

Throughout the study, the level of Dan's initiations remained unchanged. The data demonstrated low variability and a stable trend throughout baseline and intervention. His initiations ranged from 10 to 14 in baseline and two to 15 in intervention. Dan decreased from an average of 11.8 initiations per session in baseline to 8.5 initiations per session in intervention.

Responses

Dan's responses remained stable with low variability throughout baseline, ranging from 11 to 26. There was no change in level from baseline to intervention with higher variability. Responses emitted during intervention ranged from 10 to 24. Dan emitted an average of 18.8 responses per session in baseline to 17.5 responses per session in intervention.

Continuations

The frequency of continuations emitted by Dan remained stable during baseline with low variability, ranging 17 to 23. After the implementation of intervention, there was a change in level from baseline with an increasing trend. Dan's frequency of continuations was relatively high when compared to Jeffery and Andrew. During the first session after intervention was implemented, Dan's continuations increased to 38 and then returned to baseline level in sessions 10 and 11. His continuations then increased throughout sessions 12-14, ranging from 33 to 40.

Social Anxiety Levels

In Figure 2, there is a steady decrease in social anxiety levels in Jeffery and Emree. In session 11, Emree scored a zero for social anxiety levels. There is a notable decrease in Dyad 3's social anxiety levels displayed in Figure 3 from session 1 to session 5. In session 14, there is a slight increase in social anxiety levels in both Dan and Heidi. However, Heidi and Dan's social anxiety levels decreased overall.

Discussion

The overall purpose of this study was to analyze the effects of a peer-mediated social skills intervention on children with ASD (ages 6-12) in an early childhood education/ABA-integrated setting. The specific findings of each research question will be addressed below.

The first research question examined in this study was if a peer-mediated social skills intervention (PMI) was effective for children diagnosed with ASD in increasing the frequency of initiations, responses, and continuations in a conversation in an ABA setting. According to the results displayed in Figure 1, a functional relation cannot be identified between PMI and the frequency of initiations, responses, and continuations in children with ASD. Each participant showed a different effect of PMI on conversational skills. Jeffery demonstrated an increase in

responses, Andrew showed an increase in responses and initiations, and Dan demonstrated an increase in continuations.

After the implementation of intervention, Jeffery's responses increased from an average of 25.8 responses per session in baseline to 35.8 responses per session in intervention. Jeffery's initiations and continuations remained unchanged. The increase of responses may be due to the increase in total social interactions emitted from his peer combined with the removal of conversation cards during the generalization probes. The highest change in level displayed in Figure 1 was from the first generalization probe during intervention to the last generalization probe during intervention, ranging from 17 to 49. The conversation cards may have limited the number of topics that the dyad found mutually interesting. Therefore, Jeffery demonstrated an increase in responses during the generalization probes most likely due to the mutually reinforcing topics introduced by Emree, Jeffery's peer.

Andrew's response behavior also increased from baseline to intervention. According to the results displayed in Table 2, he increased from an average of 5.8 responses per session in baseline to 29.0 responses per session in intervention. Andrew's frequency of initiations also increased from baseline to intervention. He increased from an average of 1.0 initiations per session in baseline to 6.4 initiations in intervention. Andrew's peer, Megan, demonstrated a significant increase in initiations and responses following peer training. Her initiations in baseline ranged from 3 to 13, which then increased in intervention from 20 to 39. Her range of responses increased from 0 to 8 in baseline to 12 to 21 in intervention. During peer training, the author utilized role-play, modeling, and behavior-specific feedback to increase Megan's total social interactions. The author introduced Megan to Andrew's interests and instructed her on how to encourage Andrew to respond by using the phrase, "guess what?". Megan's increase in

total social interactions, her introduction of reinforcing topics, and her use of the phrase, "guess what?" may have influenced the increase of Andrew's frequency of responses and initiations.

Dan's frequency of continuations demonstrated a change in level from baseline to intervention. He increased from an average of 21.8 continuations per session in baseline to 32.2 continuations per session in intervention. Heidi, Dan's peer, demonstrated no change in level in initiations, responses, or continuations from baseline to intervention. During peer training, the author introduced Heidi to Dan's interests, such as movies and videogames, and provided some example questions she could ask him. Heidi's use of introducing topics reinforcing to Dan may have increased his continuation behavior.

The effect of PMI on initiation behavior in children with ASD has been inconclusive across studies (Owen-DeSchryver et al., 2008; Schmidt & Stichter, 2012). Initiation behavior increased in two out of three children with ASD who participated in Owen-DeSchryver et al.'s (2008) study while initiation behavior did not increase in any of the children with ASD in Schmidt and Stichter (2012). There may be several reasons for these results. The peer training session taught the neurotypical peers how to initiate and maintain a conversation. There is a possibility that after peer training, most of the initiations were emitted by peers and there was less opportunity for the targets to engage in initiation behavior. In this study, Andrew was 6 years old and averaged 1.0 initiations during baseline, with prompts provided from Megan. Jeffery and Dan were 12 years old at the time of the study and averaged 11.4 to 11.8 initiations during baseline, with and without prompts from their peers. From the demographics and the results listed in Table 1 and Figure 1, it is possible that the use of conversation cards and a model peer demonstrate a higher effect on younger, target children with limited, independent interactions with peers, such as Andrew.

The second research question evaluated the correlation between peer-mediated social skills interventions and decreasing social anxiety levels in children diagnosed with ASD. The Severity Measure for Social Anxiety Disorder Child Age 11-17 ranges from a minimum score of 0 to a maximum score of 40. According to Figures 2 and 3, there is a notable change in social anxiety levels in each target and peer throughout the implementation of PMI. Jeffery decreased from a social anxiety level of 16 to 7 after 10 PMI sessions. After five PMI sessions, Target 3 decreased from a social anxiety level of 20 to 9. After the 14th session, Target 3's social anxiety level increased from a 9 to an 11. However, Target 3 began the study with a level of 20 and ended with a level of 11. According to these results, there may be a relationship between PMI and social anxiety levels. The decrease of social anxiety levels may be due to a friendship or relationship forming throughout sessions. Each dyad spent 10 to 14 sessions together, totaling 1.5 to 2 hours of sitting at a table together, either in conversation or in silence. This does not account for any time spent together during breaks. The conversations and mutually reinforcing topics introduced may have also influenced social anxiety levels.

In this study, the peers that met the age criteria, Emree and Heidi, both saw a reduction in social anxiety levels. The reduction is smaller than that of their target partners, with the same assumption as Kaboski et al. (2015) that their baseline social anxiety levels were low. Kaboski et al. (2015) saw a decrease in social anxiety in seven out of eight participants with ASD. These results agree with this current study. According to Figures 2 and 3, there is a substantial decrease in social anxiety levels in Jeffery and Target 3. Interestingly, the peer models of Kaboski et al. (2015) did not see a decrease in social anxiety scores. The authors assumed that this was due to the peers' low social anxiety baseline scores.

Limitations

This study is subject to several limitations. The author was not blind to the conditions and the purpose of the study. Therefore, there is a possibility for observer bias. One limitation is that the study consisted of a small sample size. All the participants diagnosed with ASD were males, so females with ASD were not represented and may have shown different results. The social anxiety questionnaire used excluded the second dyad as the peer and target were too young to meet the inclusion criteria of the social anxiety questionnaire. Measures for social anxiety levels targeting children younger than 11 years old proved to be lengthy and were usually based on reports from parents or teachers. A short, effective measure targeting children ages 6-10 would be beneficial for future studies and implementation in the classroom. Another limitation is that the interobserver agreement (IOA) data was low. There may be several reasons for this. The conversations were recorded using a Zoom application on a computer. Not all the sounds/utterances emitted by the participants were audible on the Zoom video recording, which may have affected the IOA data. Future studies should use small, attachable microphones for each participant or have two researchers collecting data in person to accurately record data for IOA. The operational definitions of responses and continuations may not have been explicitly defined, affecting IOA data. Clearer operational definitions for responses and continuations will be needed for future studies.

Conclusions

Despite the limitations of this study and the need for additional research, it is hoped that this study will provide additional insight into the implementation of PMI in inclusive preschool settings, ABA clinics, as well as ECE/ABA-integrated settings. Conclusions from this study indicate that that PMI may have an effect on the frequency of initiations, responses, and

continuations that neurotypical peers and children with ASD emit, as well as their levels of social anxiety. It is hoped that a greater understanding of PMI will promote the implementation of this intervention across ABA clinics and ECE/ABA-integrated settings.

References

Aldabas, R. (2020). Effectiveness of peer-mediated interventions (PMIS) on children with autism spectrum disorder (ASD): A systematic review. *Early Child Development and Care, 190*(10), 1586–1603. https://doi.org/10.1080/03004430.2019.1580275

American Psychiatric Association. (2022). *Diagnostic and statistical manual of mental disorders* (DSM-5®). American Psychiatric Publications.

Baer, D. M., Wolf, M. M., & Risley, T. R. (1968). Some current dimensions of applied behavior analysis. *Journal of Applied Behavior Analysis*, *1*(1), 91–97. https://doi.org/10.1901/jaba.1968.1-91

Carlton, C. N., Garcia, K. M., Richey, J. A., & Ollendick, T. H. (2022). Screening for adolescent social anxiety: Psychometric properties of the severity measure for social anxiety disorder. *Child Psychiatry & Human Development, 53*, 237–243. https://doi-org.byu.idm.oclc.org/10.1007/s10578-021-01120-x

Chan, J. M., Lang, R., Rispoli, M., O'Reilly, M., Sigafoos., & Cole, H. (2009). Use of peer-mediated interventions in the treatment of autism spectrum disorders: A systematic review. *Research in Autism Spectrum Disorders, 3*(4), 876–889. https://doi.org/10.1016/j.rasd.2009.04.003

Chen, Y. (2022). Implementation of a peer-mediated intervention to teach behavioral expectations for two students on autism spectrum and a student with ADHD in an inclusive elementary classroom in Taiwan. *Journal of Autism and Developmental Disorders.* https://doi.org/10.1007/s10803-022-05873-9

Cooper, J. O., Heron, T. E., & Heward, W. L. (2019). *Applied behavior analysis* (3rd ed). Pearson Education.

Frampton, S. E., Connolly, S. C., Landa, R. K., Shillingsburg, & A. M. (2022). Autism Spectrum Disorder. *Reference Module in Neuroscience and Biobehavioral Psychology*. https://doi.org/10.1016/b978-0-323-91497-0.00101-6

Hodges, H., Feealko, C., & Soares, N. (2020). Autism spectrum disorder: Definition, epidemiology, causes, and clinical evaluation. *Translational Pediatrics, 9*(Supp. 1). https://doi.org/10.21037/tp.2019.09.09

Jung, S., Sainato, D. M., & Davis, C. A. (2008). Using high-probability request sequences to increase social interactions in young children with autism. *Journal of Early Intervention*, *30*(3), 163–187. https://doi.org/10.1177/1053815108317970

Kaboski, J. R., Diehl, J. J., Beriont, J., Crowell, C. R., Villano, M., Wier, K., & Tang, K. (2015). Brief Report: A Pilot Summer Robotics Camp to Reduce Social Anxiety and Improve Social/Vocational Skills in Adolescents with ASD. *Journal of Autism and Developmental Disorders, 45*, 3862–3869. https://doi-org.byu.idm.oclc.org/10.1007/s10803-014-2153-3

Koegel, R. L., Werner, G. A., Vismara, L. A., & Koegel, L. K. (2005). The effectiveness of contextually supported play date interactions between children with autism and typically developing peers. *Research and Practice for Persons With Severe Disabilities, 30*(2), 93–102. https://doi.org/10.2511/rpsd.30.2.93

Lord, C., Elsabbagh, M., Baird, G., & Veenstra-Vanderweele, J. (2018). Autism spectrum disorder. *The Lancet, 392*(10146), 508–520. https://doi.org/10.1016/s0140-6736(18)31129-2

Maenner, M. J., Warren, Z., Williams, A. R., Amoakohene, E., Bakian, A. V., Bilder, D. A., Durkin, M. S., Fitzgerald, R. T., Furnier, S. M., Hughes, M. M., Ladd-Acosta, C. M.,

McArthur, D., Pas, E. T., Salinas, A., Vehorn, A., Williams, S., Esler, A., Grzybowski, A., Hall-Lande, J., Nguyen, R. H. N., … Shaw, K. A. (2023). Prevalence and characteristics of autism spectrum disorder among children aged 8 years - autism and developmental disabilities monitoring network, 11 sites, united states, 2020. *Surveillance Summaries, 72*(2), 1–14. https://doi.org/10.15585/mmwr.ss7202a1

Michalek, A., Phalen, L., Bobzien, J., Chen, C., Urbano, M., Hartmann, K., Okwara, L., Gorrepati, P., Deutsch, S., & Williams, T. (2020). Using a STEM activity to improve social communication interactions in autism spectrum disorder. *Preventing School Failure: Alternative Education for Children and Youth*, *65*(1), 38-47. https://doi.org/10.1080/1045988X.2020.1811627

Owen-DeSchryver, J. S., Carr, E. G., Cale, S. I., & Blakeley-Smith, A. (2008). Promoting social interactions between students with autism spectrum disorders and their peers in inclusive school settings. *Focus on Autism and Other Developmental Disabilities, 23*(1), 15–28. https://doi.org/10 .1177/10 88357608314370

Schmidt, C., & Stichter, J. P. (2012). The use of peer-mediated interventions to promote the generalization of social competence for adolescents with high-functioning autism and asperger's syndrome. *Exceptionality, 20*(2), 94–113. https://doi.org/10.1080/09362835.2012.66 9303

Schreiber, C. (2011). Social skills interventions for children with high-functioning autism spectrum disorders. *Journal of Positive Behavior Interventions, 13*(1), 49–62. https://doi.org/10.1177/1098 300709359027

Sperry, L., Neitzel, J., & Engelhardt-Wells, K. (2010). Peer-mediated instruction and intervention strategies for students with autism spectrum disorders. *Preventing School*

Failure: Alternative Education for Children and Youth, 54(4), 256–264. https://doi.org/10.1080/10459881003800529

Vasa, R. A., Keefer, A., McDonald, R. G., Hunsche, M. C., & Kerns, C. M. (2020). A scoping review of anxiety in young children with autism spectrum disorder. *Autism Research, 13*(12), 2038–2057. https://doi.org/10.1002/aur.2395

Zagona, A. L., & Mastergeorge, A. M. (2016). An empirical review of peer-mediated interventions: Implications for young children with autism spectrum disorders. *Focus on Autism and Other Developmental Disabilities, 33*(3), 131–141. https://doi.org/10.1177/1088357616671295

Zhang, J., & Wheeler, J. J. (2011). A meta-analysis of peer-mediated interventions for young children with autism spectrum disorders. *Education and Training in Autism and Developmental Disabilities*, *46*(1), 62–77. http://www.jstor.org/stable/23880031

Tables

Table 1

Participant Demographics/Dyad Dynamic

Dyad	Name	Age	Gender	Dyad Dynamic
Dyad 1	Jeffery	12	Male	Jeffery and Emree had been in the same after-school/summer program at the preschool for approximately 4 months.
	Emree	12	Female	
Dyad 2	Andrew	6	Male	Andrew and Megan had been in the same after-school program at the preschool for less than one month. The two had very limited, if any, interaction with each other prior to the study.
	Megan	9	Female	
Dyad 3	Dan	12	Male	Dan and Heidi had not met prior to the study.
	Heidi	11	Female	

Table 2

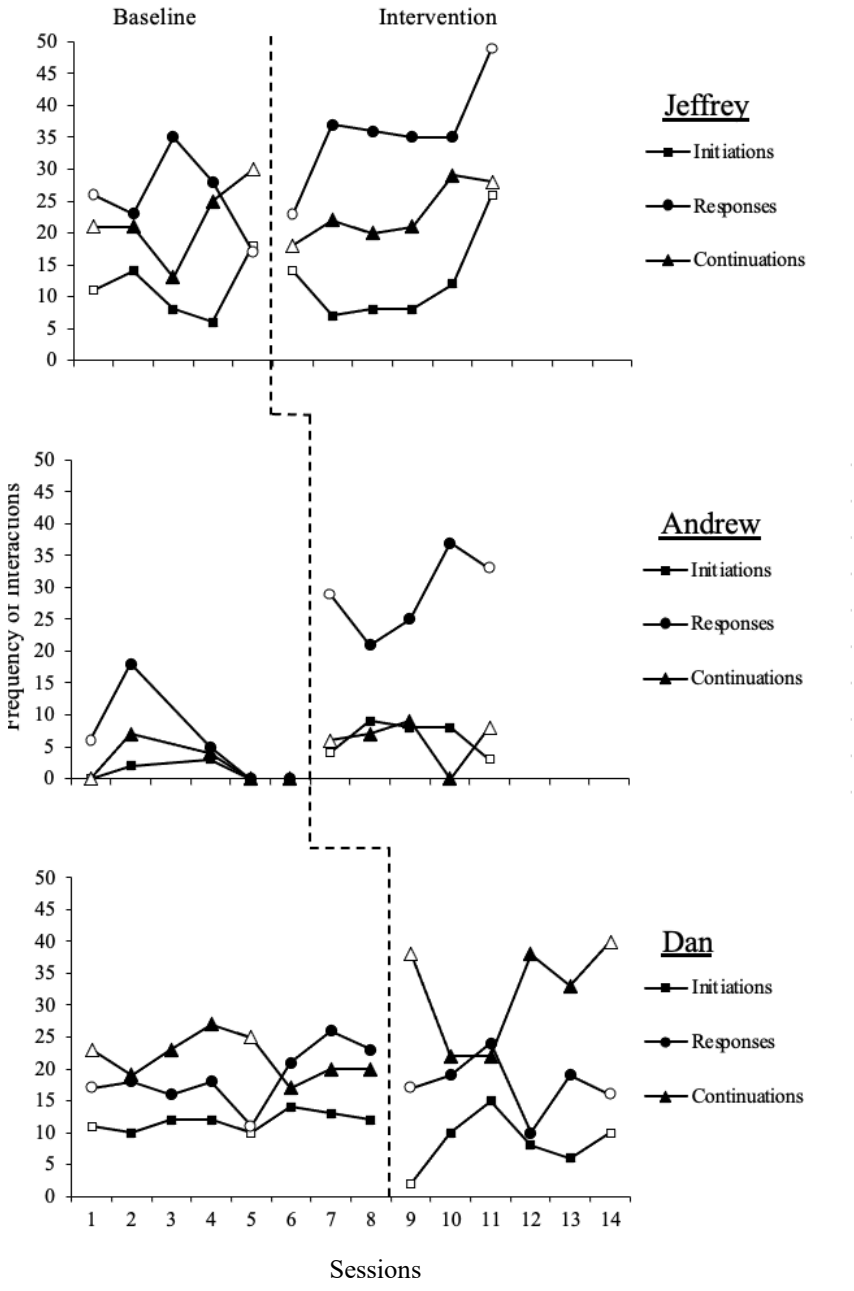
Average of Social Interactions Emitted by Target Children

Target	Measure	Baseline average (range)	Intervention average (range)
Jeffrey	Initiations	11.4 (6-18)	12.5 (7 - 26)
	Responses	25.8 (17-35)	35.8 (23 - 49)
	Continuations	22.0 (13-30)	23.0 (18 - 29)
Andrew	Initiations	1.0 (0-3)	6.4 (3 - 9)
	Responses	5.8 (0-18)	29.0 (21 - 37)
	Continuations	2.2 (0-7)	6.0 (0 - 9)
Dan	Initiations	11.8 (10-14)	8.5 (2 - 15)
	Responses	18.8 (11-26)	17.5 (10 - 24)
	Continuations	21.8 (17-27)	32.2 (22 - 40)

Figures

Figure 1

Communicative Responses From Target Children During All Phases



Note. Frequency of initiations, responses, and continuations emitted by children with ASD per session. The open markers represent the generalization probes, sessions without the use of conversation cards.

Figure 2

Social Anxiety Levels of Dyad 1

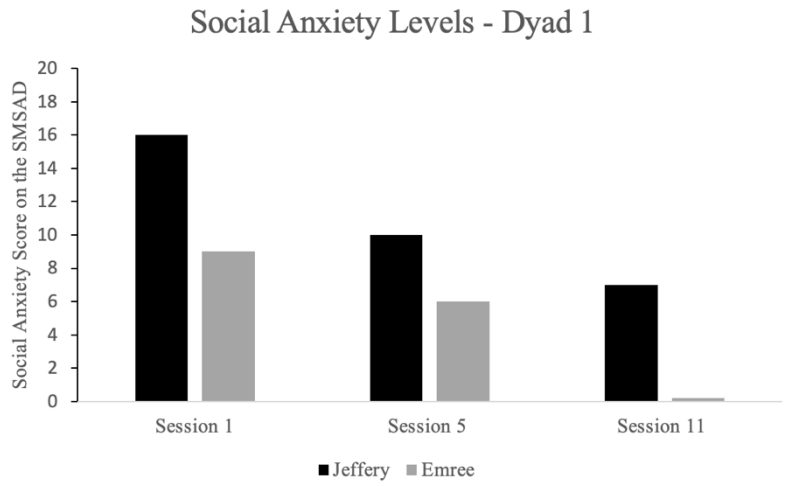
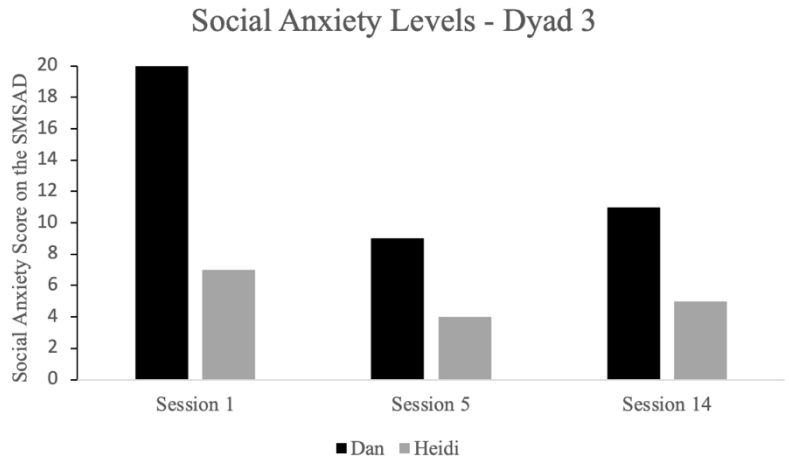


Figure 3

Social Anxiety Levels of Dyad 3



APPENDIX A

Review of the Literature

Autism Spectrum Disorder

Autism spectrum disorder (ASD) is a neurodevelopmental disorder that is diagnosed based on deficits in social communication, restricted interests, and repetitive behaviors. ASD ranges in symptom presentations and severity across individuals (American Psychiatric Association [APA], 2022). Current data estimates that 1 out of 36 children have ASD and there is a higher proportion of males diagnosed with ASD than females (Maenner et al., 2023). Children with ASD may face difficulties in inclusive settings, shared interests with their peers, as well as social withdrawal (Aldabas, 2020). Autism spectrum disorder may affect an individual's life in more ways than what the fifth edition (text revision) of the Diagnostic and Statistical Manual of Mental Disorders (DSM-5-TR; APA, 2022) lists as diagnostic criteria. (Hodges et al., 2020; Frampton et al., 2022).

Social Skills Deficits in Autism Spectrum Disorder

The DSM-5-TR delves into specific deficits in social communication and social interaction an individual with ASD may have including deficits in back-and-forth conversation, non-verbal communication, imaginative play, and difficulty building and maintaining friendships and other types of relationships (APA, 2022). Individuals with ASD struggle to overcome deficits in social skills such as poor eye contact, joint attention, lack of empathy, and difficulty interpreting body language (Schreiber, 2011).

Most children with ASD also experience speech and language delays, which may present a barrier to their conversational skills throughout their lives (Lord et al., 2018). Children with ASD have more difficulty interacting with peers in conversation. Beginning a conversation

(known as an initiations), responses, and maintaining a conversation (also called continuations) are limited in children with ASD (Koegel et al., 2015).

About 40% of children with ASD, ages 6-18 years old, suffer from an anxiety disorder, which is about double that of children without ASD (Vasa et al., 2020). Social anxiety is common in individuals with ASD and may magnify symptoms of ASD such as deficits in social interaction, communication, and the presence of restricted and repetitive behaviors (Lord et al., 2018). Anxiety symptoms may also be increased by ASD, such as fear of the unknown and social discomfort (Vasa et al., 2020).

Vasa et al. (2020) conducted a systematic review on the relationship between social anxiety and children/adolescents with ASD. The authors of the study analyzed the prevalence, correlation, and treatment for social anxiety in children and adolescents with ASD. The data from 16 out of 17 studies reviewed in Vasa et al. (2020) show that children with ASD had higher levels of social anxiety than any of their control groups, some of which included children with Tourette's Disorder and other neurodevelopmental disorders. However, data were inconsistent when children with ASD were compared to children with psychiatric disorders. The data from these studies also demonstrate higher anxiety levels in children with deficits in social skills and they show a correlation between social withdrawal, one of the social deficits in children with ASD, and social anxiety levels (Vasa et al., 2020; Aldabas, 2020).

Briot et al. (2020) conducted a study with 79 individuals with ASD, with and without intellectual disabilities, ages 6-18, analyzing the relationship between ASD and social anxiety. The results of their study indicate that while there is an 11.7% to 29.2% prevalence of social anxiety in individuals with ASD, social anxiety may be a separate condition from ASD and should be specifically targeted and treated. The results of this study also describe a correlation

between social anxiety levels and age in individuals with ASD (Briot et al., 2020). The findings in Vasa et al. (2020) show that higher anxiety levels are present in the early years of life and the data indicates that anxiety in young children increases with age (Vasa et al., 2020).

Lower levels of social anxiety may be reported among individuals with ASD as they may struggle with identifying their internal states of anxiety. Data from current studies also show that parent-reported anxiety was higher than the child's teacher report (Vasa et al., 2020). There may be issues surrounding the assessment of social anxiety in individuals with ASD (Schiltz et al., 2019).

Loneliness and Friendships in Individuals With Autism Spectrum Disorder

In Frampton et al. (2022), individuals with ASD reported the desire for friendships and an increase in social groups but data shows that these individuals face barriers, lacking in communication skills, and struggle to develop relationships outside of their immediate family (Frampton et al., 2022). The results from Frampton et al.'s (2022) study show a feeling of loneliness across participants, a precursor to depression. One in four adolescents and adults with ASD struggle with depression (Frampton et al., 2022). In Bauminger and Kasari's (2000) study, children with autism scored low in subcategories regarding companionship, security, and help. All of the participants with ASD identified at least one friend to the researchers. However, many of their mothers described the imbalance between their child's desire for relationships and actual relationships. Many mothers also described that the social interactions their child does have with a peer are mostly through mediums that require minimal interaction, such as video games.

Adolescents with ASD have more difficulty interacting with peers in conversation. They demonstrate low frequencies of initiations, responses, and continuations and have difficulty in sustaining social interactions (Koegel et al., 2015). These challenges can be linked to "the greater

complexity of peer relationships, a growing drive toward identity exploring, a lack of availability and knowledge of what services are available, as well as an uncertainty about the balance of responsibility between themselves and those who support them" (Gantman et al., 2011, p. 1094).

Gaining the skills required for gaining and maintaining relationships is important for independence in children with ASD, especially before the age of 9. By the age of 9, "friendship and engagement with peers, often associated with access to integrated school programs, predicts adult outcome in terms of independence and decreased symptoms, as do stronger adaptive skills" (Lord et al., 2018, p. 511).

Social Skills Interventions for Autism Spectrum Disorder

Schreiber (2011) reviewed studies between the years 2000-2011 regarding social skills interventions for school-aged children and adolescents with ASD. Social skills interventions mentioned in Schreiber (2011) include Social Stories™, manualized instructional programs, non-manualized programs, support groups, activity-based, parent or family-mediated, as well as peer mediated.

Social Stories™ have been shown to be effective for children with ASD, most likely due to strengths in verbal behavior. Although studies have proven Social Stories™ to be effective, current research is limited regarding maintenance and generalization (Schreiber, 2011). While some studies demonstrate "promising results," non-manualized programs and support groups have "little empirical documentation" and require future research (Schreiber, 2011, p. 51-52). Studies utilizing activity-based interventions have demonstrated effectiveness in increasing social skills, generalization, and long-term maintenance. The studies that implemented activity-based interventions focused on "communication, task focus, and collaborative problem solving" (Schreiber, 2011, p. 55). Parent or family-mediated interventions demonstrated a large increase

in reciprocal interactions and affect levels. The results from studies "suggest that children with ASD are capable of unprompted high-level reciprocal interactions, but they may need the contextual scaffolding provided by an adult facilitator to practice these skills in a mutually reinforcing way with peers" (Schreiber, 2011, p. 54).

After reviewing peer-mediated interventions, Schreiber (2011, p. 54) noted, "social interactions, reciprocal interactions, and to a lesser degree, on-topic verbalizations increased over time for children with autism while they were in the group with the trained peer. There were also increases in the time spent in social interactions and reciprocal interactions with familiar peers; however, all behaviors decreased when the children with autism engaged with stranger peers." A greater focus on generalization and maintenance in peer-mediated social skills interventions will be beneficial for future studies.

Introduction to Peer-Mediated Interventions

Peer-Mediated Interventions (PMI) have been shown to be effective in promoting various social skills, such as joint attention, social networking, non-verbal social skills, communication, initiations, maintaining interactions, and turn-taking in a more naturalistic approach (Aldabas, 2020; Harper et al., 2008). This method also demonstrates effectiveness in decreasing social behaviors such as unresponsiveness, changing conversation topics, and inappropriate talking while also promoting generalization and maintenance of skills learned (Chan et al., 2009; Schmidt & Stichter, 2012). PMIs have also been shown to reduce social anxiety and increase social interactions in individuals with ASD (Michalek et al., 2020; Owen-DeSchryver et al., 2008).

Using neurotypical peers as models for the target child has proven to be effective and may be more motivating than using teachers and other adults as interventionists (Harper et al.,

2008). PMI frees up time and demand placed on teachers while requiring the target and peer children to be more independent, decreasing prompt dependency (Covey et al., 2021).

Peer modeling is a core component of PMI. Peer modeling is a natural, effective, and cost-efficient technique for promoting social behavior in children with autism (Charlop et al.,1983). Peer modeling alone is insufficient in aiding individuals with autism to make a long-lasting, generalized change in social behavior (Weiss & Harris, 2001). While there are limitations in peer modeling's effectiveness in generalization and endurance, there is valuable data demonstrating its value in methods such as PMI. In the Charlop et al. (1983) study, the effect of peer modeling on children with autism was analyzed. During the modeling condition of this study, the children with autism demonstrated several instances of novel social behavior, including hugging, kissing, good eye contact while smiling, as well as engaging in behavior that was beneficial to their peers (Charlop et al., 1983).

PMI works by first selecting and training peers. Specific skills and techniques are taught to successfully communicate, interact, and maintain communicative interactions with their classmates with ASD (Zagona & Mastergeorge, 2016). "In this role, peers may take on a number of duties, such as modeling appropriate behaviors, implementing prompting procedures, and reinforcing target behaviors" (Chan et al., 2009, p. 877). In our current research study, the peer will continuously act as a natural model and will be trained to provide reinforcement and necessary prompts to increase reciprocal interactions from the target child.

The target and peer will then attend a session in a supported environment with a teacher or therapist in which the peer will have access to any reinforcement, teaching, or prompting provided by the trained adult (Katz & Girolametto, 2013; Sperry et al., 2010). In our current

research study, the target and peer will take turns reading six total conversation cards while the therapist will be present to provide reinforcement and prompting as needed.

The next step of PMI would be to implement the targeted skills into the natural setting. The teacher or therapist should set up the environment to encourage social interactions with meaningful activities and materials (Jung et al., 2008; Sperry et al., 2010). For the purpose of this study, the effects of generalization were not studied.

Effects of Peer-Mediated Interventions Across Age Groups

Goldstein et al. (1992) studied the effects of PMI on social skills in preschoolers. Fifteen children total participated in the study. Four of them were autistic and one had a history of prenatal drug exposure. All target children had significant language, social, and cognitive deficits. Interesting to note is that all target children were male. This could be attributed to the fact that ASD in females tends to be diagnosed later than in males. The target children and their typical peers in the study were grouped into triads, one target child, one typical male peer, and one typical female peer.

PMI has also been proven to be effective in adolescents with ASD. In a study conducted by Schmidt and Stichter (2012), they formed target-peer dyads with adolescents ages 11-14. The participants consisted of three target adolescents and three peers in the 6th and 7th grades. While other PMI studies consisted of small participant sizes, Kasari et al. (2015) consisted of 137 children with ASD, not including their typical peers. The Kasari et al. (2015) study produced interesting results that are not explicitly demonstrated in other studies. Groups consisting of children from different grades and classes proved to be more effective in increasing peer acceptance and engagement during outside play than groups of children with and without ASD from the same classroom (Kasari et al., 2015). However, Battaglia and Radley (2014) state that

peers are more effective when they are from the same class as the target child. Battaglia and Radley (2014, p. 5) also state that "peers of the same age, older peers, or a combination of same-aged and older peers in interventions are effective for increasing social interactions." In this study, the peers and target children were paired based on age and who the teacher thought would get along. Dyad 1 were the same age, the peer of Dyad 2 was one year younger, and the peer of Dyad 3 was three years older.

Effects of Peer-Mediated Interventions Across Settings

PMI is a unique intervention in that it works very well in inclusive settings. PMI can be incorporated into day-to-day activities and can be used across subjects and skills that the teacher or Board Certified Behavior Analyst (BCBA) is targeting. Using peers as interventionists relieves the burden placed on teachers and allows for an increased opportunity for generalization to occur. With the use of PMI, children with ASD "have a wide variety of interaction opportunities that increase the possibility of generalizing skills to different settings" (Aldabas, 2020).

Sperry et al. (2010) describe five steps for implementing PMI in the classroom. These steps include: (a) peer selection, (b) training and supporting peers across two phases, consisting of teaching peers to recognize and appreciate individual differences and commonalities between "typical" and ASD peers, then introducing specific strategies one at a time and practice with an adult trainer, (c) implementing a daily structured session between peers and ASD students, (d) implementing strategies in a variety of classroom and school settings, and (e) extending initiations across the day to allow for generalizations to begin through an embedded intervention and class-wide peer buddy system.

One way to help children with autism to generalize social skills and to achieve the highest outcomes is to implement the intervention in the natural environment (Bellini et al., 2007). By implementing a social skills intervention in the natural environment, the individual would be able to practice with peers in a familiar setting and generalize across settings. Training peers in the natural environment has also been shown to increase social interactions (Schmidt & Stichter, 2012).

Most research surrounding PMI is conducted in the classroom or on the playground. Goldstein et al. (1992) focused on social skills during play with preschoolers in their preschool classroom. Kasari et al. (2015) focused on engagement during play on the playground with preschoolers.

While there are many PMI studies conducted in the inclusive classroom that may focus on behavioral or Applied Behavior Analysis (ABA) principles, there is no research that focuses on the use of PMI in an ABA clinic or in an Early Childhood Education (ECE)/ABA-integrated setting.

Incorporating peers into ABA clinics may ease the transition into traditional school settings. If "friendship and engagement with peers" are associated with "access to integrated school programs," children with ASD may benefit from peer-mediated social skills interventions in clinical ABA settings (Lord et al., 2018). Or more boldly, incorporating the clinical ABA setting into traditional preschool settings to increase opportunities for social interaction and access to peer models as well as an introduction to the school classroom. Friendship and social interaction are predictors of adult outcome in terms of independence, decreased symptoms, and stronger adaptive skills (Lord et al., 2018).

While there are many PMI studies conducted in the inclusive classroom that may focus on behavioral or ABA principles, we found no research regarding the use of PMI in an ABA clinic or setting. Incorporating peers into ABA clinics may ease the transition into traditional school settings. If "friendship and engagement with peers" by the age of nine are associated with "access to integrated school programs," children with ASD may benefit from peer-mediated social skills interventions in clinical ABA settings (Lord et al., 2018, p. 511). Or more boldly, incorporating the clinical ABA setting into traditional preschool settings to increase opportunities for social interaction and access to peer models as well as an introduction to the school classroom. Friendship and social interaction are predictors of adult outcomes in terms of independence, decreased symptoms, and stronger adaptive skills (Lord et al., 2018).

Benefits for Neurotypical Peer Models

Research shows that there are many benefits for the neurotypical peer when implementing PMI. Peers gain skills in leadership and self-efficacy as well as enjoyment in interacting with children with ASD (Owen-DeSchryver et al., 2022). Peers also demonstrate an increase in language capacity and performance (Owen-DeSchyver et al., 2022).

Researchers recommend collecting data on the peers and their behaviors and perceptions and monitoring any changes. This data will help teachers and BCBAs to make appropriate adjustments and to recognize if any additional peer training or any other support is needed (Chen, 2022).

One concern from implementing a peer-mediated intervention is that the target individual will be further socially excluded by the paired peer and the remaining class (Chan et al., 2009). Carefully choosing peers is an antecedental way to help prevent social exclusion from occurring.

Bellini et al. (2007) recommends that peers should have a "positive or neutral history with the target child."

Strategies for Choosing Peers

Goldstein et al. (1992) don't explicitly state a clear process of choosing peers among a preschool-age population. However, the study does mention that the peers were observed over the course of a few days prior to the study. These observed peers demonstrated "communicative interactions with other peers during play; however, they rarely initiated interaction with a classmate with disabilities" (Goldstein et al., 1992). The selected peers were tested in various domains including cognitive, language, and language comprehension. All the peers were required to meet pre-determined criteria on the previously listed domains.

One study selected peers based on social status and teacher judgment (Harrell et al., 1997). The study determined social status through a Likert scale ("How much do you like to play with each classmate 1 = not at all; 5 = a lot") as well as a questionnaire filled out by classmates that asked the following questions: "1) List three classmates you would like to invite your birthday party''; 2) ''List three classmates that are your good friends''; and 3) ''List three classmates you would like to play with on the playground'' (Harrell et al., 1997).

From these results, a "high-status peers" list was created and given to the teacher to review using four criteria: "1) Compliance with teacher requests; 2) Consistent School Attendance; 3) Possesses age-appropriate social skills; and 4) Possesses appropriate language skills" (Harrell et al., 1997, p. 243).

The remaining names on the list were then chosen as peers for the PMI. While there is no data proving that this method would prevent social exclusion, the authors of the study decided these steps would aid in preventing social exclusion from occurring (Chan et al., 2009). Harrell et

al.'s method of choosing peers is a logical one. The authors involved the teacher and family members in the process of choosing a peer for the target child. Depending on the adolescent and the surrounding situation, it would be interesting to specifically look at the target adolescent's responses and study the effects of choosing an accompanying peer.

Battaglia and Radley (2014) state that peers may include typical students as well as students with disabilities if they engage in and demonstrate developmentally appropriate play and social skills. One criterion for selecting peers is those who follow directions as they will be required to follow instructions from the teacher and/or the trained adult during intervention (Battaglia & Radley, 2014).

Sperry et al. (2010) came up with a checklist for teachers to follow when implementing PMII in early childhood settings as well as middle and high schools. Another study suggests choosing peers who "exhibit good social skills, language, and age-appropriate play skills, well-liked by peers, have a positive social interaction history with the focal child, be generally compliant with adult directives, be able to attend to an interesting task or activity for 10 min, be willing to participate, and attend school on a regular basis" (Sperry et al., 2010, p. 257). In this study, peers were recommended by their teacher based on Sperry et al.'s (2010) suggested characteristics, including peers who were willing to participate, could attend to a task for 10 minutes, and were well-liked by their peers. The conversations in this study were also chosen to be 10 minutes long to keep the sessions relatively short for both the peer and the target child to prevent burnout and to maintain engagement.

Peer Training

Sperry et al. (2010) begins peer training in groups of four or five in a quiet area of the classroom. The first topic focused on recognizing and acknowledging individual differences. The

peer group and the instructor discuss how students look different and like different things and how everyone has different needs and abilities. The instructor then steers the conversation toward ASD and the similarities and differences between students with ASD and their typical peers. All discussion and content varied depending on the age of the peers (Sperry et al., 2010).

The next phase of training focused on training each peer on specific skills and strategies and then practicing them with the use of role-play with the trained adult (Sperry et al., 2010). The strategies taught are flexible and may be adapted for the appropriate age group. For students in middle school, the topics may include initiations, responses, maintaining a conversation, taking turns, sharing, helping, asking for help, and inclusion in activities (Sperry et al., 2010). Sperry et al. (2010) recommend all teachers and therapists to focus on the primary needs of each child with ASD and then to incorporate direct instruction and modeling for their peers.

The teacher or therapist should instruct peers through verbal explanation, role play, demonstrations, prompts, suggestions, and gestural reinforcement during practice. At the end of a practice session, the teacher or therapist then provides explicit reinforcement and feedback. (Sperry et al., 2010).

Schmidt and Stichter (2012) began training three adolescent peers in a middle school classroom. The training took over six weeks and 40-minute sessions were held once a week.

The training included training on skills, modeling, role-play, feedback, and reinforcement (Schmidt & Stichter, 2012). Each session included a recap of the previous session, and each peer was reminded of their role in the intervention. To ensure that the peers were equipped with background information of individuals with ASD and accompanying deficits in social skills, Schmidt and Stichter (2012) utilized the Social Competence Curricula for Adolescents (SCI-A) in peer training.

The units in the SCI-A program include “recognition and expression of facial expressions, sharing ideas, turn-taking in conversation, recognition of feelings and emotions (self and others), and problem-solving” (Schmidt & Stichter, 2012, p. 99). After peer training was completed, Schmidt and Stichter (2012) conducted a weekly check-up session for six weeks to ensure the fidelity of intervention implementation and to provide feedback to each peer.

Conclusion

PMI is effective for males and females with ASD, from preschool to adolescence and has been shown to increase a variety of social behavior by increasing the number of opportunities to respond (Zhang & Wheeler, 2011; Aldabas, 2020). Many individuals with ASD have a higher prevalence of social anxiety that has shown to increase with age (Briot et al., 2020). PMIs may be an intervention that can be used throughout inclusive settings and ABA clinics as they have shown to reduce social anxiety and increase social interactions between individuals with ASD and their peers (Michalek et al., 2020; Owen-DeSchryver et al., 2008).

If “friendship and engagement with peers” by the age of nine are associated with “access to integrated school programs”, children with ASD may benefit from peer-mediated social skills interventions in clinical ABA settings (Lord et al., 2018, p. 511). Or more boldly, incorporating the clinical ABA setting into traditional preschool settings to increase opportunities for social interaction and access to peer models as well as an introduction to the school classroom. Friendship and social interaction are predictors of adult outcomes in terms of independence, decreased symptoms, and stronger adaptive skills (Lord et al., 2018). As there is no research regarding the use of PMI across ABA clinics or settings, this study is focused on the effects of PMI on children with ASD in an Early Childhood Education/ABA-integrated setting.

Further study would be needed to determine the most effective ratio between the number of peers and the target child with ASD. Determining the effectiveness of a peer-mediated social skills intervention on individuals with other disabilities in the ABA or ECE/ABA setting would be another advantageous study to broaden our knowledge of applying PMIs to support individuals with disabilities.

References

Aldabas, R. (2020). Effectiveness of peer-mediated interventions (PMIS) on children with autism spectrum disorder (ASD): A systematic review. *Early Child Development and Care, 190*(10), 1586–1603. https://doi.org/10.1080/03004430.2019.1580275

American Psychiatric Association. (2022). *Diagnostic and statistical manual of mental disorders* (DSM-5®). American Psychiatric Pub.

Battaglia, A. A., & Radley, K. C. (2014). Peer-mediated social skills training for children with autism spectrum disorder. *Beyond Behavior, 23*(2), 4-13. https://www.jstor.org/stable/26341235

Bauminger, N., & Kasari, C. (2000). Loneliness and friendship in high-functioning children with autism. *Child Development, 71*(2), 447–456. https://doi.org/10.1111/1467-8624.00156

Bellini, S., Peters, J. K., Benner, L., & Hopf, A. (2007). A meta-analysis of school-based social skills interventions for children with autism spectrum disorders. *Remedial and Special Education*, *28*, 153–162. https://doi-org.byu.idm.oclc.org/10.1177/07419325070280030401

Briot, K., Jean, F., Jouni, A., Geoffray, M., Moal, M., Umbricht, D., Chatham, C., Murtagh, L., Delorme, R., Bouvard, M., Leboyer, M., & Amestoy, A. (2020). Social anxiety in children and adolescents with Autism Spectrum Disorders contribute to impairments in social communication and social motivation. *Frontiers in Psychiatry, 11*(24). https://doi.org/10.3389/fpsyt.2020.00710

Chan, J. M., Lang, R., Rispoli, M., O'Reilly, M., Sigafoos., & Cole, H. (2009). Use of peer-mediated interventions in the treatment of autism spectrum disorders: A systematic

review. *Research in Autism Spectrum Disorders, 3*(4), 876–889. https://doi.org/10.1016/j.rasd.2009.04.003

Charlop, M. H., Schreibman, L., & Tryon, A. S. (1983). Learning through observation: the effects of peer modeling on acquisition and generalization in autistic children. *Journal of Abnormal Child Psychology, 11*(3), 355-366. https://doi.org/10.1007/BF00914244

Chen, Y. (2022). Implementation of a peer-mediated intervention to teach behavioral expectations for two students on autism spectrum and a student with ADHD in an inclusive elementary classroom in Taiwan. *Journal of Autism and Developmental Disorders.* https://doi.org/10.1007/s10803-022-05873-9

Covey, A., Li, T., & Alber-Morgan, S. (2021). Using behavioral skills training to teach peer models: effects on interactive play for students with moderate to severe disabilities. *Education and Treatment of Children, 44*, 19-30. https://doi-org.byu.idm.oclc.org/10.1007/s43494-020-00034-y

Frampton, S. E., Connolly, S. C., Landa, R. K., & Shillingsburg, A. M. (2022). Autism Spectrum Disorder. *Reference Module in Neuroscience and Biobehavioral Psychology.* https://doi.org/10.1016/b978-0-323-91497-0.00101-6

Gantman, A., Kapp, S. K., Orenski, K., & Laugeson, E. A., (2011). Social skills training for young adults with high-functioning autism spectrum disorders: a randomized controlled pilot study. *Journal of Autism and Developmental Disorders, 42*(6), 1094-1103. https://doi.org/10.1007/s10803-011-1350-6

Goldstein, H., Kaczmarek, L., Pennington, R., & Shafer, K. (1992). Peer-mediated intervention: Attending to, commenting on, and acknowledging the behavior of preschoolers with

autism. *Journal of Applied Behavior Analysis*, *25*(2), 289–305. https://doi.org/10.1901/jaba.1992.25-289

Harper, C. B., Symon., J. B. G., & Frea, W. D. (2008). Recess is time-in: using peers to improve social skills of children with autism. *Journal of Autism and Developmental Disorders, 38*, 815-826. https://doi.org/10.1007/s10803-007-0449-2

Harrell, L. G., 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), 241–256. https://doi.org/10.1177/108835769701200406

Hodges, H., Feealko, C., & Soares, N. (2020). Autism spectrum disorder: Definition, epidemiology, causes, and clinical evaluation. *Translational Pediatrics, 9*(1), 55-65. https://doi.org/10.21037/tp.2019.09.09

Jung, S., Sainato, D. M., & Davis, C. A. (2008). Using high-probability request sequences to increase social interactions in young children with autism. *Journal of Early Intervention*, *30*(3), 163–187. https://doi.org/10.1177/1053815108317970

Kasari, C., Dean, M., Kretzmann, M., Shih, W., Orlich, F., Whitney, R., Landa, R., Lord, C., & King, B. (2015). Children with autism spectrum disorder and social skills groups at school: A randomized trial comparing intervention approach and peer composition. *Journal of Child Psychology and Psychiatry*, *57*(2), 171–179. https://doi.org/10.1111/jcpp.12460

Katz, E., & Girolametto, L. (2013). Peer-mediated intervention for preschoolers with ASD implemented in early childhood education settings. *Topics in Early Childhood Special Education*, *33*(3), 133-143. https://doi-org.byu.idm.oclc.org/10.1177/0271121413484972

Koegel, R. L., Werner, G. A., Vismara, L. A., & Koegel, L. K. (2005). The effectiveness of contextually supported play date interactions between children with autism and typically developing peers. *Research and Practice for Persons With Severe Disabilities, 30*(2), 93–102. https://doi.org/10.25 11/rpsd.30.2.93

Lord, C., Elsabbagh, M., Baird, G., & Veenstra-Vanderweele, J. (2018). Autism spectrum disorder. *The Lancet, 392*(10146), 508–520. https://doi.org/10.1016/s0140-6736(18)31129-2

Maenner, M. J., Warren, Z., Williams, A. R., Amoakohene, E., Bakian, A. V., Bilder, D. A., Durkin, M. S., Fitzgerald, R. T., Furnier, S. M., Hughes, M. M., Ladd-Acosta, C. M., McArthur, D., Pas, E. T., Salinas, A., Vehorn, A., Williams, S., Esler, A., Grzybowski, A., Hall-Lande, J., Nguyen, R. H. N., … Shaw, K. A. (2023). Prevalence and characteristics of autism spectrum disorder among children aged 8 years - autism and developmental disabilities monitoring network, 11 sites, United States, 2020. *Surveillance Summaries, 72*(2), 1–14. https://doi.org/10.15585/mmwr.ss7202a1

Michalek, A., Phalen, L., Bobzien, J., Chen, C., Urbano, M., Hartmann, K., Okwara, L., Gorrepati, P., Deutsch, S., & Williams, T. (2020). Using a STEM activity to improve social communication interactions in autism spectrum disorder. *Preventing School Failure: Alternative Education for Children and Youth*, *65*(1), 38-47. https://doi.org/10.1080/1045988X.2020.1811627

Owen-DeSchryver, J. S., Carr, E. G., Cale, S. I., & Blakeley-Smith, A. (2008). Promoting social interactions between students with autism spectrum disorders and their peers in inclusive school settings. *Focus on Autism and Other Developmental Disabilities, 23*(1), 15–28. https://doi.org/10 .1177/10 88357608314370

Owen-DeSchryver, J., Ziegler, M., Matthews, A., Mayberry, M., & Carter, E. (2022). The reciprocity of peer-mediated interventions: Examining outcomes for peers. *School Psychology Review*. https://doi.org/10.1080/2372966x.2022.2039959

Schiltz, H. K., Magnus, B. E., McVey, A. J., Haendel, A. D., Dolan, B. K., Stanley, R. E., Willar, K. A., Pleiss, S. J., Carson, A. M., Carlson, M., Murphy, C., Vogt, E. M., Yund, B. D., & Van Hecke, A. V. (2019). A psychometric analysis of the social anxiety scale for adolescents among youth with autism spectrum disorder: Caregiver-adolescent agreement, factor structure, and validity. *Assessment*, *28*(1), 100-115. https://doi.org/10.1177/1073191119851563.

Schmidt, C., & Stichter, J. P. (2012). The use of peer-mediated interventions to promote the generalization of social competence for adolescents with high-functioning autism and asperger's syndrome. *Exceptionality, 20*(2), 94–113. https://doi.org/10.1080/09362835.2012.66 9303

Schreiber, C. (2011). Social skills interventions for children with high-functioning autism spectrum disorders. *Journal of Positive Behavior Interventions, 13*(1), 49–62. https://doi.org/10.1177/1098 300709359027

Sperry, L., Neitzel, J., & Engelhardt-Wells, K. (2010). Peer-mediated instruction and intervention strategies for students with autism spectrum disorders. *Preventing School Failure: Alternative Education for Children and Youth, 54*(4), 256–264. https://doi.org/10.1080/10459881003800529

Vasa, R. A., Keefer, A., McDonald, R. G., Hunsche, M. C., & Kerns, C. M. (2020). A scoping review of anxiety in young children with autism spectrum disorder. *Autism Research, 13*(12), 2038–2057. https://doi.org/10.1002/aur.2395

Weiss, M. J., & Harris, S. L. (2001). Teaching social skills to people with autism. *Behavior Modification*, *25*(5), 785–802. https://doi-org.byu.idm.oclc.org/10.1177/0145445501255007

Zagona, A. L., & Mastergeorge, A. M. (2016). An empirical review of peer-mediated interventions: Implications for young children with autism spectrum disorders. *Focus on Autism and Other Developmental Disabilities, 33*(3), 131–141. https://doi.org/10.1177/1088357616671295

Zhang, J., & Wheeler, J. J. (2011). A meta-analysis of peer-mediated interventions for young children with autism spectrum disorders. *Education and Training in Autism and Developmental Disabilities*, *46*(1), 62–77. http://www.jstor.org/stable/23880031

APPENDIX B

Institutional Review Board Approval Letter and Consent Form

Memorandum

To: Blake Hansen
Department: BYU - EDUC - Counseling, Psychology, & Special Education
From: Sandee Aina, MPA, HRPP Associate Director
Wayne Larsen, MAcc, IRB Administrator
Bob Ridge, Ph.D., IRB Chair
Date: May 02, 2023
IRB#: IRB2023-073
Title: Effects of a Peer-Mediated Social Skills Intervention on Adolescents with Velo-Cardio Facial Syndrome and High-Functioning Autism Spectrum Disorder

Brigham Young University's IRB has approved the research study referenced in the subject heading as expedited level, categories 6 and 7. The approval period is from 05/02/2023 to 05/01/2024. Thereafter, continued approval is contingent upon the submission of a continuing review request that must be reviewed and approved by the IRB prior to the expiration date of the study. Please reference your assigned IRB identification number in any correspondence with the IRB.

Continued approval is conditional upon your compliance with the following requirements:

1. A copy of the approved informed consent statement and associated recruiting documents (if applicable) can be accessed in iRIS. No other consent statement should be used. Each research subject must be offered a copy or provided a way to access the consent statement.
2. Any modifications to the approved protocol must be submitted, reviewed, and approved by the IRB before modifications are incorporated into the study.
3. All recruiting tools must be submitted and approved by the IRB prior to use.
4. All data, as well as the investigator's copies of the signed consent forms, must be retained for a period of at least three years following the termination of the study.
5. In addition, serious adverse events must be reported to the IRB immediately, with a written report by the PI within 24 hours of the PI's becoming aware of the event. Serious adverse events are (1) the death of a research participant; or (2) serious injury to a research participant.
6. All other non-serious unanticipated problems should be reported to the IRB within 2 weeks of the first awareness of the problem by the PI. Prompt reporting is important, as unanticipated problems often require some modification of study procedures, protocols, and/or informed consent processes. Such modifications require the review and approval of the IRB.

If it is necessary to continue the study beyond the expiration date, you will need to complete the continuing review form and attach associated documents to renew the study. Continuing review documents should be submitted no later than two months before 05/01/2024. More information regarding the renewal process and lapses in approval can be found on the IRB website FAQ #8.

There is no grace period beyond the expiration date. In order to avoid lapses in approval of your research and the possible suspension of subject enrollment, please look for notifications prompting you to initiate a continuing review request. You will receive two prompts from iRIS to renew this protocol, the IRB requires time to review your documents so please be aware that requests made close to or on the expiration date will not be accepted.

Memorandum

To: Blake Hansen
Department: BYU - EDUC - Counseling, Psychology, & Special Education
From: Sandee Aina, MPA, HRPP Associate Director
Wayne Larsen, MAcc, IRB Administrator
Bob Ridge, Ph.D., IRB Chair
Date: June 09, 2023
IRB#: IRB2023-073
Title: The Effects of a Peer-Mediated Social Skills Intervention on Children with Velo-Cardio Facial Syndrome or Autism Spectrum Disorder

Brigham Young University's IRB has reviewed the modification submitted to update the title of the research study. The IRB determined that the modification does not increase risks to the research subject and the aims of the study remain as originally approved. The modification has been approved.

The approval of this protocol expires on 05/01/2024. All conditions for the continued approval period remain in effect. Any modifications to the approved protocol must be submitted, reviewed, and approved by the IRB before modifications are incorporated into the study.

APPENDIX C

Conversation Prompts

1) If you could go anywhere in the world, where would you travel?
2) Who is your best friend?
3) What would your perfect day consist of?
4) What is your favorite memory of us?
5) If you could be any animal, what would you be?
6) If you could meet anyone, dead or alive, who would you meet?
7) What is your dream job?
8) If you could only eat one food for the rest of your life, what would it be?
9) What was your favorite book when you were little?
10) What is your earliest memory?
11) Would you rather live on the beach or in the mountains?
12) Would you rather spend all day inside reading a book or outside with friends?
13) What is the best present you've ever been given by a friend or family member, and why is it the best?
14) What is the funniest prank you've ever played on someone?
15) Do you have a celebrity look-alike?
16) What is the most embarrassing thing anyone could ever do to you?
17) What is your earliest memory?
18) What's the funniest joke you know?
19) Which three people would you take with you to a deserted island?
20) How did you and your best friend meet?
21) What bad habit do you hate the most – snoring, persistent sniffing, or something else?
22) Which person that you met changed your life, and why?
23) Which is worse, a python or a tarantula?
24) What's your biggest fear, and why is it so?
25) Are you afraid of anything? If so, what?
26) Would you eat bugs for $100,000?
27) Do you have a fear of heights, water, or tight spaces?
28) What scary thing would you do to save your best friend's life?
29) Which is your favorite film?
30) What's your favorite color?
31) What's your favorite book?
32) Who's your favorite band or musician?
33) What's your favorite school subject?
34) What's your favorite song?
35) What's your favorite fruit?
36) Which candy do you like the most and why?
37) Which is your favorite letter of the alphabet and why?
38) What is your favorite number?
39) What's your favorite sport?
40) What is the weirdest thing you've ever eaten?

41) What is the one food you won't eat and why?
42) What is your favorite vegetable to eat?
43) Do you like spicy food?
44) Do you prefer savory snacks or sweets?
45) Hamburgers or pizza?
46) If you won $1 million, how would you spend it?
47) If you had one wish, what would you wish for?
48) If you could relive one day of your life, which would it be?
49) How would you decorate your room if you had one million dollars?
50) Which magical superpower do you wish you possessed?

APPENDIX D

Treatment Fidelity Form

Treatment Fidelity - Intervention	✓ Target	✓ Peer	✓ Therapist
1. *Therapist* gives social anxiety questionnaires to Target and Peer.			
2. Target and Peer fill out anxiety questionnaires.			
3. *Therapist:* "We would like you two to have a conversation with each other for 10 minutes. Take turns reading and answering the questions on the cards. I will let you know when the 10-minute timer is done."			
4. *Therapist* collects data.			
6. *Therapist* concludes session, "Awesome! We'll take a 10-minute break." *or* "That was fun! Thank you guys! I'll see you two tomorrow!".			
Initials & Date: __/__/____			

APPENDIX E

Severity Measure for Social Anxiety Disorder Child Age 11-17

Severity Measure for Social Anxiety Disorder (Social Phobia)—Child Age 11–17

Name:_____ **Age:** _____ **Sex: Male** ❑ **Female** ❑ **Date:**_____

Instructions: The following questions ask about thoughts, feelings, and behaviors that you may have had about *social situations*. Usual social situations include: public speaking, speaking in meetings, attending social events or parties, introducing yourself to others, having conversations, giving and receiving compliments, making requests of others, and eating and writing in public. **Please respond to each item by marking (✓ or x) one box per row.**

							Clinician Use
	During **the PAST 7 DAYS**, I have…	Never	Occasionally	Half of the time	Most of the time	All of the time	Item score
1.	felt moments of sudden terror, fear, or fright in social situations	❑ 0	❑ 1	❑ 2	❑ 3	❑ 4	
2.	felt anxious, worried, or nervous about social situations	❑ 0	❑ 1	❑ 2	❑ 3	❑ 4	
3.	have had thoughts of being rejected, humiliated, embarrassed, ridiculed, or offending others	❑ 0	❑ 1	❑ 2	❑ 3	❑ 4	
4.	felt a racing heart, sweaty, trouble breathing, faint, or shaky in social situations	❑ 0	❑ 1	❑ 2	❑ 3	❑ 4	
5.	felt tense muscles, felt on edge or restless, or had trouble relaxing in social situations	❑ 0	❑ 1	❑ 2	❑ 3	❑ 4	
6.	avoided, or did not approach or enter, social situations	❑ 0	❑ 1	❑ 2	❑ 3	❑ 4	
7.	left social situations early or participated only minimally (e.g., said little, avoided eye contact)	❑ 0	❑ 1	❑ 2	❑ 3	❑ 4	
8.	spent a lot of time preparing what to say or how to act in social situations	❑ 0	❑ 1	❑ 2	❑ 3	❑ 4	
9.	distracted myself to avoid thinking about social situations	❑ 0	❑ 1	❑ 2	❑ 3	❑ 4	
10.	needed help to cope with social situations (e.g., alcohol or medications, superstitious objects)	❑ 0	❑ 1	❑ 2	❑ 3	❑ 4	
						Total/Partial Raw Score:	
						Prorated Total Raw Score: (if 1-2 items left unanswered)	
						Average Total Score:	

APPENDIX F

Peer Training Checklist/Guide

Peer Training Procedures

Parts of a Conversation:

- Response: a verbal answer to the partner's question or statement.
- Continuation: continuing the conversation by adding a new idea or asking a question.
- Initiation: starting a conversation with a question or statement.

Types of Prompts: I = independent; FV = full verbal; PV = partial verbal; G = gestural; NR = no response

If the peer needs a prompt, run the trial again with behavior-specific feedback, models, and role-play.

★ **The peer will emit 3 RESPONSES with at least 90% independence.**

- Therapist modeled a response.
  - Example: "Tell me your favorite dessert."
  - *Peer provides answer.*
  - **"Oh, I love that flavor or You have great taste!"**

Circle Prompt Provided:

1) 1st trial with provided example (favorite dessert): **(I, FV, PV, G, NR)**
   - Behavior-specific praise/feedback
2) 2nd trial with a conversation card: **(I, FV, PV, G, NR)**
   - Behavior-specific praise/feedback
3) 3rd trial without a conversation card: **(I, FV, PV, G, NR)**
   - Behavior-specific praise/feedback

★ **The peer will emit 3 CONTINUATIONS with at least 90% independence.**

- Therapist modeled a continuation.
  - Example: "Tell me your favorite dessert."
  - *Peer provides answer.*

- **<u>"Why do you like that one? or "One time, my friend ate that and this happened…."</u>**

Circle Prompt Provided:

1) 1st trial with provided example (favorite dessert): **(I, FV, PV, G, NR)**
    - Behavior-specific praise/feedback
2) 2nd trial with a conversation card: **(I, FV, PV, G, NR)**
    - Behavior-specific praise/feedback
3) 3rd trial <u>without</u> a conversation card: **(I, FV, PV, G, NR)**
    - Behavior-specific praise/feedback

★ **The peer will emit 3 INITIATIONS with at least 90% independence.**

- Therapist modeled an initiation.
    - **<u>"Tell me your favorite dessert."</u>**
- *Peer provides answer.*

Circle Prompt Provided:

- 1st trial with provided example (favorite dessert): **(I, FV, PV, G, NR)**
    - Behavior-specific praise/feedback
- 2nd trial with a conversation card: **(I, FV, PV, G, NR)**
    - Behavior-specific praise/feedback
- 3rd trial <u>without</u> a conversation card: **(I, FV, PV, G, NR)**
    - Behavior-specific praise/feedback

Acknowledge the bx of individuals with VCFS + ASD:

- The peer will remind the target to take a card (if needed)

<u>Strategies during Peer Training:</u>

- **Verbal explanation**
- **Modeling**
- **Role-Play**
- **Behavior-Specific Praise + Feedback**

APPENDIX G

Parent Permission and Child Assent Forms

Parental Permission for a Minor - Target

Title of the Research Study: The Effects of a Peer-Mediated Social Skills Intervention on Children with Autism Spectrum Disorder.
Principal Investigator: Blake Hansen

Introduction

My name is Shannon McConaghie. I am a graduate student from Brigham Young University. I am conducting a research study about the effects of a peer-mediated social skills intervention on children diagnosed with Autism Spectrum Disorder. I am inviting your child to take part in the research because they have met the age and diagnosis criteria.

Procedures

If you agree to let your child participate in this research study, the following will occur:
• The study will take place at your child's school. Your child will be asked to participate with a qualifying classmate in 20-minute social skills sessions, held three times a day for a total of 4 days. The researcher will be conducting these sessions in-person at your child's school.
• If your child is 11-12 years old, your child will be asked to answer 9 questions online once per day to measure their social anxiety levels.
• During each session, your child will be asked to have a conversation with the same classmate at your child's school.

Risks

There is a risk of loss of privacy, which the researcher will reduce by not using any real names or other identifiers in the data collection or the written report. The researcher will also keep all data in a data encrypted online platform. Only the researcher will have access to the data. Data collected during the study will be kept for future research regarding peer-mediated interventions. All video/audio recordings, identifiers, and personal information will be deleted/destroyed at the conclusion of data collection.
There may be some social discomfort caused by silence or an unsurety of what to say during the conversation with the sibling/friend. Your child may answer only the questions that your child wants to. You or your child may stop the entire process at any time.
There is a risk of anxiety and stress. If any of the participants demonstrate signs of distress including but not limited to crying, eloping from the room, signs of discomfort, verbal protesting, etc., the graduate research member will terminate the session and contact the parent on how to best handle the situation.

Confidentiality

Your child's responses and information will be confidential. All identifiers and personal information will be stored on a data encrypted online platform only accessed by the researcher. A code name will be used with all data taken during sessions. Data collected during the study will be kept for future research regarding peer-mediated interventions.

All video/audio recordings, identifiers, and personal information will be deleted/destroyed at the conclusion of data collection.

Data Sharing
We will keep the information we collect about your child during this research study for analysis and for potential use in future research projects. Your child's name and other information that can directly identify them will be stored securely and separately from the rest of the research information we collect from them.
De-identified data from this study may be shared with the research community, with journals in which study results are published, and with databases and data repositories used for research. We will remove or code any personal information that could directly identify your child before the study data are shared. Despite these measures, we cannot guarantee anonymity of your child's personal data.

Benefits
There are no direct benefits for your child's participation in this study. However, your child may see an increase in conversational skills with their peers and a potential decrease in social anxiety.

Compensation
Your child will receive $20 cash for participating.

Questions about the Research
Please direct any further questions about the study to **Shannon McConaghie.** You may also contact **Blake Hansen** at **blake_hansen@byu.edu.** Questions about your child's rights as a study participant or to submit comment or complaints about the study should be directed to the Human Research Protection Program, Brigham Young University, at (801) 422-1461 or send emails to BYU.HRPP@byu.edu. You have been given a copy of this consent form to keep.

Participation
Participation in this research study is voluntary. You are free to decline to have your child participate in this research study. You may withdraw you child's participation at any point.

Child's Name:_____

Parent Name:_____ Signature: _____ Date:_____

Parental Permission for a Minor - Peer

Title of the Research Study: The Effects of a Peer-Mediated Social Skills Intervention on Children with Autism Spectrum Disorder.
Principal Investigator: Blake Hansen

Introduction

My name is Shannon McConaghie. I am a graduate student from Brigham Young University. I am conducting a research study about the effects of a peer-mediated social skills intervention on adolescents diagnosed with Autism Spectrum Disorder. I am inviting your child to take part in the research because they have met the age and reading criteria. Your child also meets the exclusionary criteria in that they don't have an Individualized Education Program (IEP).

Procedures

If you agree to let your child participate in this research study, the following will occur:

- The study will take place at your child's school. Your child will be asked to participate with a qualifying classmate in 20-minute social skills sessions, held three times a day for a total of 4 days. The researcher will be conducting these sessions in-person at your child's school.
- If your child is 11-12 years old, your child will be asked to answer 9 questions online once per day to measure their social anxiety levels.
- During each session, your child will be asked to have a conversation with the same classmate at your child's school.
- Your child will be asked to participate in a 1:1 "peer training" at your child's school, with the researcher in-person. The "peer training" will last 30-minutes and will consist of learning how to have a conversation with a friend. There will be one "peer training" session total.

Risks

There is a risk of loss of privacy, which the researcher will reduce by not using any real names or other identifiers in the written report. The researcher will also keep all data in a data encrypted online platform. Only the researcher will have access to the data. Data collected during the study will be kept for future research regarding peer-mediated interventions. All video/audio recordings, identifiers, and personal information will be deleted/destroyed at the conclusion of data collection.

There may be some social discomfort caused by silence or an unsurety of what to say during the conversation with the sibling/friend. Your child may answer only the questions that your child wants to. You or your child may stop the entire process at any time.

There is a risk of anxiety and stress. If any of the participants demonstrate signs of distress including but not limited to crying, eloping from the room, signs of discomfort, verbal protesting, etc., the graduate research member will terminate the session and contact the parent on how to best handle the situation.

Confidentiality

Your child's responses and information will be confidential. All identifiers and personal information will be stored on a data encrypted online platform only accessed by the researcher. A code name will be used with all data taken during sessions. Data collected during the study will be kept for future research regarding peer-mediated interventions.

All video/audio recordings, identifiers, and personal information will be deleted/destroyed at the conclusion of data collection.

Data Sharing
We will keep the information we collect about your child during this research study for analysis and for potential use in future research projects. Your child's name and other information that can directly identify them will be stored securely and separately from the rest of the research information we collect from them.
De-identified data from this study may be shared with the research community, with journals in which study results are published, and with databases and data repositories used for research. We will remove or code any personal information that could directly identify your child before the study data are shared. Despite these measures, we cannot guarantee anonymity of your child's personal data.

Benefits
There are no direct benefits for your child's participation in this study. However, your child may see an increase in conversational skills with their peers and a potential decrease in social anxiety.

Compensation
Your child will receive $20 cash for participating.

Questions about the Research
Please direct any further questions about the study to **Shannon McConaghie**. You may also contact **Blake Hansen** at **blake_hansen@byu.edu.** Questions about your child's rights as a study participant or to submit comment or complaints about the study should be directed to the Human Research Protection Program, Brigham Young University, at (801) 422-1461 or send emails to BYU.HRPP@byu.edu.
You have been given a copy of this consent form to keep.

Participation
Participation in this research study is voluntary. You are free to decline to have your child participate in this research study. You may withdraw you child's participation at any point.

Child's Name:_____

Parent Name:_____ Signature: _____ Date:_____

Target Child Assent (7-14 years old)

What is this research about?

My name is Shannon McConaghie and I am a student at BYU. I want to tell you about a research study I am doing. A research study is a special way to find the answers to questions. We want to find out more about improving conversations with friends and decreasing feelings of nervousness during conversations.

We are asking you to take part in this research study because we want to learn more about conversations with friends and measuring levels of social anxiety.

If you agree to join the study, you will be asked to:

1. You will have a conversation with a friend at your school, for 10 minutes 3 times a day. The study will last 4 days.
2. If you are 11-12 years old, you will answer 9 questions about social anxiety on the computer one time per day. The conversations will be recorded through Zoom. At the conclusion of the study, all videos will be deleted.

What can happen to me?

Sometimes things happen in research studies. Some of the bad things that could happen are boredom, nervousness, and not wanting to answer questions. You are always able to say "no" to something that you don't want to do.

We don't know if being in this study will help you. We hope you'll have greater friendships and confidence during conversations. We hope to learn something that will help other people someday.

At the end of the study, you will receive $20 cash.

Do I have other choices?

We will ask your parents for their permission for you to take part in this study. Even if your parents say "yes" you can still say "no". You do not have to join this study; it is up to you.You can say "yes" now and change your mind later. All you have to do is tell us you want to stop. No one will be mad at you if you don't want to be in the study or if you join the study and change your mind later and stop. Before you say yes or no to being in this study, we will answer any questions you have. If you join the study, you can ask questions at any time, just tell the researcher that you have a question.

If you want to be in this study, please sign and print your name.

Name (Printed):_____ Signature: _____ Date: _____

Peer Child Assent (7-14 years old)

What is this research about?

My name is Shannon McConaghie and I am a student at BYU. I want to tell you about a research study I am doing. A research study is a special way to find the answers to questions. We want to find out more about improving conversations with friends and decreasing feelings of nervousness during conversations.

We are asking you to take part in this research study because we want to learn more about conversations with friends and measuring levels of social anxiety.

If you agree to join the study, you will be asked to:

1. You will have a conversation with a friend at your school for 10 minutes 3 times a day. The study will last 5 days.
2. If you are 11-12 years old, you will answer 9 questions about social anxiety on the computer one time per day.
3. You will have a 1:1 training with the researcher at your school, for 30 minutes. There will be one training session total.

The conversations will be recorded through Zoom. At the conclusion of the study, all videos will be deleted.

What can happen to me?

Sometimes things happen in research studies. Some of the bad things that could happen are boredom, nervousness, and not wanting to answer questions. You are always able to say "no" to something that you don't want to do.

We don't know if being in this study will help you. We hope you'll have greater friendships and confidence during conversations. We hope to learn something that will help other people someday.

At the end of the study, you will receive $20 cash.

Do I have other choices?

We will ask your parents for their permission for you to take part in this study. Even if your parents say "yes" you can still say "no". You do not have to join this study; it is up to you. You can say "yes" now and change your mind later. All you have to do is tell us you want to stop. No one will be mad at you if you don't want to be in the study or if you join the study and change your mind later and stop. Before you say yes or no to being in this study, we will answer any questions you have. If you join the study, you can ask questions at any time, just tell the researcher that you have a question.

If you want to be in this study, please sign and print your name.

Name (Printed):_____ Signature: _____ Date: _____