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THE EFFECTIVENESS OF PEER TRAINING TO INCREASE COMMUNICATIVE RESPONSES BY PEERS WITH DISABILITIES

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RESPONSES BY PEERS WITH DISABILITIES

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THESIS
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A thesis submitted in partial fulfillment of the
requirements for the degree of Master of Science in Education in the
College of Education
at the University of Kentucky

By

Amanda Landherr Taylor

Lexington, Kentucky

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2022

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RESPONSES BY PEERS WITH DISABILITIES

ABSTRACT OF THESIS

Individuals with disabilities often have social and communication deficits which impact their development of social relationships. Therefore, individuals with disabilities need additional supports and interventions to gain appropriate social and communication skills. Research demonstrates that peer-mediated interventions are an effective way to help increase social interactions between students with disabilities and students without disabilities. There has been research to support that peers can successfully be taught how to use AAC devices and how to initiate and respond to peers with disabilities. Some of the positive effects of peer-mediated intervention include an increase in social communication skills, inclusion, and increased use of communication devices. The S'MoRRES© strategy was developed as a tool to help teach and supports peers as they learn to communicate with individuals with disabilities. The investigator trained typical peers how to create opportunities for communicative interactions with their peers with disabilities, using S'MoRRES© as a guide. The dependent variables of the study were peer fidelity implementing the communication strategies and the target student responses. There were two students with disabilities and six peers from general education population. All six peers were able to implement the communication strategies with fidelity and the number of target student responses increased. The results suggest that peers can successfully be taught and implement strategies to communicate with individuals with disabilities.

KEYWORDS: peer-mediated interventions, S'MoRRES© strategy, individuals with disabilities, communication deficits, peer training

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04/08/22
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COMMUNICATIVE RESPONSES BY PEERS WITH DISABILITIES

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Section 1: Introduction

Over the past 20 years, researchers have extensively studied socio-communicative behaviors in individuals with disabilities. Social relationships are embedded throughout everyone's daily life. Children with disabilities often have deficits in social and communication skills which inhibit the development of social relationships. Children with communication deficits are at a higher risk for social isolation (Therrien et al., 2016) and often lack the necessary skills to express their wants, needs, interests, and feelings with others (Downing et al., 2015). Such challenges create multiple barriers to social relationships for children with communication needs. Often, individuals with disabilities require augmentative and alternative communication (AAC) modes to be able to achieve functional communication. AAC can enhance communication for individuals who are non-verbal or who are minimally verbal. AAC is used for individuals that need help communicating; examples of AAC include an application on an iPad or a switch. AAC is a mode of communication other than verbal communication of spoken words and phrases; it allows individuals to communicate their requests, make comments, take turns, and learn new vocabulary (Thiemann-Bourque et al., 2017). AAC can include aided or unaided systems. Aided systems can include communication boards, speech generating devices, and picture exchange systems Unaided systems are non-spoken communication and can include facial expressions, gestures, and sign language.

Therrien et al. (2016) conducted a literature review examining the effects of interventions that promoted peer interactions among children who use AAC. They found that there are three categories for barriers to social interaction: (a) intrinsic, (b) peer, and (c) environmental. First, they described intrinsic barriers as motor and language skills,

personality deficits, and motivation to interact with peers. Second, they describe peer barriers to include the fact that some individuals view individuals with disabilities as less desirable to talk to for a variety of reasons (e.g., lack of time in inclusive settings, peer unfamiliarity, a general level of discomfort around individuals with disabilities). Therrien and colleagues also reported that children with disabilities frequently report experiencing bullying. Third, they described the environmental barrier as a lack of access to communication supports, such as AAC.

Oftentimes, there is a lack of exposure and familiarity of AAC for the neurotypical peer. Martinez et al. (2021) conducted a systematic review of peer-mediated interventions to address social competence needs of young children with autism. This review stated that federal mandates require children with disabilities be educated in their least restrictive environment. Research from this review showed a 21% increase in the number of children with disabilities being educated in the general education classroom from 2000-2018. However, placing students with disabilities in the general education classroom does not ensure meaningful or positive peer interactions, if any social interactions with peers at all. Individuals with disabilities who exhibit communication and social communication deficits are more likely to become socially isolated due to challenging behaviors, negative or limited interactions with peers and adults, and lack of supports to engage in meaningful engagement and interaction with peers. For children with disabilities to experience quality levels of social interactions, additional supports may be necessary.

Many neuro-typical children can develop social competence, defined by Martinez et al. (2021) as "the ability to successfully achieve interpersonal goals using social

behaviors that are appropriate to the social contexts in which they are used and it develops early in childhood as children interact with peer," (p. 218) by observing and engaging in interactions with peers in high-quality environments. AAC users are able to learn appropriate social skills such as initiating and responding to peer interactions through observation, engagement, and repeated exposure in a high-quality environment. Individuals with disabilities need additional supports and interventions to learn appropriate social and communication skills.

In addition to physical needs, behavioral challenges, and safety, many of these individuals use AAC devices and have limited verbal language. Individuals who use AAC, may require support and prompting from adults or peers. This prompting is necessary to support various interactions (access to wants and needs, social interactions, access to educational activities). The types of prompting needed can include verbal prompting, modeling, gesture prompts, and physical prompts. Peer mediated interventions are an evidence-based practice in increasing social communication skills for elementary and middle school students (Wong et al., 2015). Ackerman et al. (2020) conducted a study on a peer-mediated intervention package for high school students with autism or intellectual disability, some were AAC users and some used verbal language, that found evidence to support prompting as an effective strategy for increasing social communication. However, these prompting strategies must be in place in order for this to occur. Peer networks, a form of peer mediated interventions, consist of non-disabled peers paired with peers with disabilities. The goal of these "networks" is to provide support socially for peers with disabilities and by doing so, create a push for more inclusive practices across school and community settings. These networks typically take

place in settings where social learning opportunities are present in the natural environment and seek to target social engagement skills such as initiating, responding, and maintaining social interactions (Kamps et al., 2014). It is necessary to provide explicit instruction and support to peers such as disability awareness, social or communication skill instruction (e.g., learning strategies for promoting communication), and student specific information (Downing et al., 2015). By providing explicit instruction and support to peers, the opportunities for successful social relationships between non-disabled peers and peers with disabilities is greater.

Thiemann-Bourque et al. (2017) conducted research on the combination of speech-generating device interventions and peer-mediated interventions to incorporate AAC to promote social engagement with typically developing peers. These are both successful evidence-based interventions that have been proven to increase social communication for children with disabilities. The authors found that typically developing peers could successfully be taught how to use the same speech generating device as their classmates with disabilities and that with peer training, peers could be taught how to initiate and respond to peers with disabilities by using their speech generating device. Following peer training, immediate effects were observed for the target students; the number of initiations and responses for trained peers and target students in the study increased for each target student (Thiemann-Bourque et al., 2017). It is important to note that peers may require different levels of training and training on a variety of topics. There are a variety of topics that peers may need to be trained on prior to providing interventions. This could include teaching peers to respond, initiate, and maintain interactions, as well as teaching peers how to use AAC devices (Kamps et al., 2014).

Overall, research has shown positive effects for peer networks and interventions, and that peers can "provide a facet of social instruction that is socially appropriate and age appropriate" (Ackerman et al, 2020 p. 8). According to Kamps et al. (2014), these positive effects can be seen in children with disabilities and their non-disabled peers; peer mediated intervention is shown to increase social communication skills, inclusion, and increased use of communication devices.

The success of a communication interaction between an AAC user and a communication partner is dependent on the skills of the communication partner (Senner & Baud, 2017). For individuals with significant disabilities or communication deficits, that use AAC, having an effective communication partner may require educating the communication partners first. Senner et al, found that educating significant (parents, teachers, peers) communication partners can be a benefit in increasing participation in daily interactions by individuals using AAC (2019). As stated previously, research has found that training communication partners can be used as an effective intervention strategy (Senner et al, 2019). Senner and Baud (2017) developed an eight-step instruction model to train key communication partners. These authors created a mnemonic to help teach and train staff with, S'MoRRES© (2017). The S'MoRRES© mnemonic included necessary strategies for building successful communicative interactions with AAC users. This model included the following strategies: (a) slow rate, (b) model, (c) respect and reflect, (d) repeat, (f) expand, and (g) stop. The authors found the eight-step instruction model to be effective in increasing the number of interactions between communication partners and AAC users, the amount of modeling on AAC by the communication partner, and reported more frequent slower speech and pausing by the communication partner.

The research around the use of peer-mediated interventions with AAC users building and maintaining social relationships and social communication is developing. Therefore, this study will be an important addition to this research, as well as provide teachers a strategy to possibly use peer networks with their own students that have communication deficits. The purpose of this study was to evaluate the fidelity of peers implementing a communication training based on the S'MoRRES© strategy to increase the frequency of communicative responses between individuals with disabilities and same aged peers.

1. When peers are taught to create opportunities for communicative interactions with peers with moderate and severe disabilities (MSD) using a training based on the S'MoRRES© visual, will they successfully implement the procedures with fidelity?

2. When peers are taught to create opportunities for communicative interactions with peers with moderate and severe disabilities (MSD) using a training based on the S'MoRRES© visual, will children with MSD display an increase in communicative responses during general education activities?

Section 2: Research Questions

1. When peers are taught to create opportunities for communicative interactions with peers with moderate and severe disabilities (MSD) using a training based on the S'MoRRES© visual, will they successfully implement the procedures with fidelity?

2. When peers are taught to create opportunities for communicative interactions with peers with moderate and severe disabilities (MSD) using a training based on the S'MoRRES© visual, will children with MSD display an increase in communicative responses during general education activities?

Section 3: Method

Participants

Two elementary-aged students with MSD were invited to participate in this study. Inclusion criteria were as follows: (a) student must engage in low levels of social interaction with peers, (b) student must have an IEP with communication goals, (c) student must use an AAC device (students that were currently able to use device with teachers but not with peers to greet, express wants/needs, make comments), and (d) student must attend school regularly. In addition, six peers without disabilities were invited to be participants in the study. Peers without disabilities had to meet the following criteria: (a) be a classmate in the general education setting of the participant with disability and (b) attend school regularly. Inclusion was based on teacher observations and attendance records.

Two students with disabilities that had communication deficits and communicate using an AAC device (e.g., Proloquo2Go on an iPad) were identified for the study. The students that communicate using an AAC device can communicate with their classroom teacher and the speech language pathologist (SLP) but prior to the study, were not using their AAC device to communicate with peers in any form (e.g., initiating interactions, responding to peer-initiated interactions). There were three typically developing peers for each target student. These peers were selected from their general education class and were able to follow directions and stay on task. Parental consent was sent home to parents of all participants and then assent was gained from each participant. Human subjects approval was gained from the institutions review board prior to beginning the study.

Participant 1

Roscoe, was a male child with MSD. Roscoe was 7 years 11 months old and was in second grade. Roscoe received the majority of his instruction in a self-contained classroom for students with MSD. He attended morning meeting, related arts, lunch, and recess in the general education setting with his peers. He used verbal language and an AAC device with Proloquo2Go on an iPad to communicate his wants and needs. In addition to using an AAC device to communicate, he also communicated through facial expressions, gestures, verbal language and echolalic responses. Roscoe was able to write his first and last name, copy from a model, write two-three word sentences with picture prompts, complete addition problems with sums up to 25 and read basic sight words and simple sentences. He was unable to complete tasks independently without occasional teacher prompts. He used a visual schedule and a token reinforcement system each day. He was able to navigate the school with peer and adult support.

Roscoe's communication with his peers primarily consisted of saying hi or bye and echolalic responses. Roscoe enjoyed being in the general education classroom and interacting with his peers. He was noted by his MSD teacher and speech language pathologist to rarely use his AAC device to communicate in the general education classroom.

Peers of Roscoe

Three peers were chosen from Roscoe's general education class; Emily, Brad, and Mike. Each peer met the inclusion criteria listed above and was chosen through general education teacher recommendation and MSD teacher observation. According to their

general education teacher, each student chosen was on grade-level and did not display any challenging behaviors.

Participant 2

Steve was a male child with MSD. Steve was 6 years 9 months old and was in second grade. Steve received 60% of his daily instruction in a self-contained classroom for students with moderate and severe disabilities. He attended morning meeting, math, guided reading, related arts, lunch, and recess in the general education setting with his peers with adult support. He used verbal language and an AAC device, which was Proloquo2Go on an iPad, to communicate his wants and needs. In addition to using AAC to communicate, Steve also communicated through verbal language (majority of the time he spoke at an inaudible level), facial expressions, crying, screaming, and gestures. At home, Steve's family spoke two languages and English was not the primary language spoken at home. Steve was able to write his first and last name, read and write sight words, and basic sentences independently. Steve was able to write 2-3 word sentences with picture prompts, complete addition problems with sums up to 25 and complete subtraction problems with differences up to 10. He could read grade level books but had difficulty comprehending the books. He was unable to complete tasks independently. Steve used a visual schedule, required teacher prompts and a token reinforcement system. He was able to navigate the school with peer and adult support.

Steve's interactions with his peers primarily consisted of no response or echolalic responses. Steve enjoyed being in the general education classroom and interacting with his peers but did not communicate with them often. He was noted by his MSD teacher

and speech language pathologist to rarely use his AAC device to communicate in the general education classroom.

Peers of Steve

Three peers were chosen from Steve's general education class: Dalton, Jordan, and Julia. Each peer met the inclusion criteria. According to their general education teacher, each student chosen was on grade-level and did not display any challenging behaviors.

Others

The investigator of the study was the certified MSD classroom teacher in the school. The MSD teacher had worked in this position for 4 years. She had a bachelor's degree in Special Education in Moderate to Severe Disabilities and was working towards a Teacher Leader Master's in Special Education. She worked closely in her building with the general education teachers and related service providers to ensure appropriate inclusion and to modify curriculum content for her students. Two paraprofessionals were trained by the MSD teacher to collect interobserver agreement data (IOA) and procedural fidelity data. One of the paraprofessionals had worked in the MSD classroom for 16 years and had worked with the MSD teacher leading the study for 4 years. The second paraprofessional had worked in MSD classrooms for 8 years and had worked with the MSD teacher leading the study for 4 years. Both paraprofessionals had experience collecting data for academics, social, communication, and behavior goals.

Settings

This study took place in an elementary school in a southeastern state where children with and without disabilities were taught in the same classrooms. The sessions

took place in the related arts classrooms (i.e., music room, art room, gym, computer lab, or general education classroom) during an activity designed by the related arts teacher. The related arts classes were designed to have a whole group lesson at the beginning of the class followed by small groups for hands on activities. This study occurred during the small group hands on activities. The instructional arrangement of the small group sessions varied depending on the related arts class. In art class, two peers sat next to the target student and the other peer sat directly across from the target student. For music class, the three peers sat or stood next to the target student. In technology class, when they were in the computer lab, two peers sat on each side of the target student and one peer sat across from the target student; when they were in their general education classroom, two peers sat next to target student and the other peer sat directly across from the target student. Physical education was held in the gym and the peers arranged themselves next to the student or near the student (approximately 1 meter away) depending on the activity of the day.

Materials

The materials in the study included peer training session materials which included copies of the laminated S'MoRRES© visuals (Figure 1, Peplinski, 2021), and one AAC device to practice on in an empty hallway. For the intervention sessions of the study, materials included the target student's AAC device, a copy of the S'MoRRES© visual, and activity related materials available in the room during each activity.

Figure 1

S'MoRRES© Training Visual

S'MoRRES

S	Slow Down (duh.)
Mo	Model (point while doing self and parallel talk)
R	Respect & Reflect (respect *how* student initially communicated and model on AAC/verbally)
R	Repeat (frequently repeat their utterances)
E	Expand (build up) (repeat, rephrase, and build upon what student said)
S	Stop (pause to allow student to respond)

S'MoRRES © Jill Senner & Matthew Baud   -   Visual created by Carolyn O'Hearn

Additional materials included data collection sheets. The data collection sheets are shown in Appendix A and Appendix B and include the peer training script, peer training procedural fidelity checklist, peer intervention data sheet, student response sheet, and peer intervention procedural fidelity sheet. Lastly, writing utensils, a handheld timer, and a 3-ring binder with data collection sheets were used in the study.

Dependent Variable

The primary dependent variable of this study was the fidelity of peer implementation of a teacher led communication training based on the S'MoRRES© strategy (specifically, the Model, Respect/Reflect, Repeat, and Expand components) to increase communicative interactions between peers and students with disabilities.

Procedural fidelity of peer implementation was measured by a checklist which consisted of seven questions that could be scored yes, no, or not applicable for each student interaction that occurred during intervention sessions (see *Appendix C*).

The secondary dependent variable was the target student responses (see *Peer Training* section below). This can be defined as the communicative reply made by the target student following a peer's interaction. The data collection sheet for target student responses (see *Appendix C*) codes specific student response types. The types of communicative replies are greeting, question, comment, request help, request tangible, no response, or other.

Measurement System

The primary dependent variable was measured using the peer fidelity checklist (see *Appendix C*). The peer fidelity checklist was scored by taking the total number of yeses recorded and dividing them by the total number of steps, this produced a percentage of peer fidelity. The secondary measure used was the count of target student responses per session, data were collected on the student response data sheet (see *Appendix C*). Each intervention session was a minimum of 10 min and the first five opportunities for interactions during that time frame were scored.

Experimental Design

This study used a multiple probe design across participants single case research design to evaluate the procedural fidelity of peer implementation of the peer communication training to increase the frequency of communicative responses between individuals with disabilities and same aged peers (Gast et al., 2018). Multiple probe

designs are used to investigate the effectiveness of interventions through replication across participants. Multiple probe designs are rigorous in their evaluation of threats to internal validity, which is necessary for establishing experimental control (Gast et al., 2018). Experimental control is demonstrated when changes in behavior are shown when and only when the intervention is introduced to the participants in the study. Specific threats to internal validity include history, maturation, and testing. In this study, steps were taken to ensure threats to validity were controlled. The threat to history was controlled by collecting probe data for participants that were not in intervention. Maturation threats were tested by collecting probe data in untrained tiers. Testing was controlled through conducting intermittent probes instead of continuous baseline data. At the beginning of the study, all participants participated in probe sessions. When data were stable, the first participant entered intervention. Participants not receiving intervention, participated in probe sessions intermittently. Participants participated in probe sessions prior to intervention and participants that were not receiving intervention, participated in probe sessions a minimum of once every eight sessions until they began intervention. Mastery criterion for the study was one at least one session at 80%. The goal was to increase target student's chances for increased communication. When the first participant met mastery criterion, the next participant began intervention. Once the second participant met mastery criterion, the next participant began intervention. This continued until all participants received intervention.

Procedures

Probe Procedures

Probe sessions were conducted prior to intervention. Probe sessions took place to determine the fidelity of peers implementing the S'MoRRES© communication strategies as taught during the peer training. Probe data were collected until data were stable across tiers prior to introducing the intervention. Probe sessions lasted 10 mins once the small group activity began. Probe data were also collected to determine the number of interactions that occurred between each peer and the target student.

During probe sessions, prior to the start of the session, the investigator instructed peers to engage with target student (e.g., "Do you want to work with me?", "Can you help us finish this last piece of the robot?") three times during the class time, the investigator prompted the peers during the session if they did not make attempts to interact with the target student. If needed, the investigator gave prompts to the peers for specific questions to ask during the sessions. The investigator recorded the following:(a) did peer initiate a conversation with target student, (b) did peer respond to target student following their response, (c) if the target student did not respond, did the peer do one of the following: repeat themselves, model on their device, make a statement of assumption or assistance, (d) if the target student said something incorrect or off topic, did the peer model the correct response/ more appropriate response on their AAC device, and (e) if the investigator had to provide prompt, did the peer respond with an interaction with target student. The investigator also recorded the types of peer and target student interactions. The types of responses were coded as follows: greeting (G), asks a question (Q), comment (C), requested help (H), requested something tangible (T), no response (NR), and other (O). After the initial continuous probes, intermittent probe procedures

began. Intermittent probe procedures occurred at a minimum of every eight sessions for the untrained peers.

Training of peers

After initial probe sessions were completed and data were stable (a minimum of 3 sessions for all peers), peer training was conducted for the first peer by the investigator in an empty hallway. Peers were taught how to initiate, respond to, and reinforce communication attempts of children with disabilities using their AAC device. During training sessions, peers were taught how to interact with peers using the S'MoRRES© (see Figure 1) method developed by Senner and Baud (2017). Peers were taught to slow down when speaking to target student, model using the students AAC device when they were speaking, respect and reflect on how the student communicated and model on the students' AAC or verbally, repeat their utterances, expand on what the student said, and stop and pause to allow time for the target student to respond. Each peer was given opportunities to practice each skill using the AAC device. The investigator conducted role playing and offered support and praise throughout the training session. In addition to the S'MoRRES© method, peers were instructed on how to (a) use a specific AAC device, (b) trained on how to model using the AAC device, (c) stay near target peer, (d) initiation cues and wait cues for each individual child, (e) steps to playing or working with peer, (f) ways to reinforce peers, and (g) how to prompt peers. Peers were trained to fidelity to ensure they were able to implement the training. Peers had to meet the minimum criteria to begin intervention with the target student; the minimum criteria were that peers must demonstrate 100% of the steps independently on the implementation checklist. (see

Appendix C). At the conclusion of the training session, the investigator gave the children an opportunity to ask questions.

Roscoe and Steve had differing levels of abilities. Specifically, their communication skills, familiarity with their AAC device, and interpersonal skills. Listed below are specific aspects of the teacher-led training that were different for each participant.

Training of Roscoe's peers

Roscoe did not use his device as fluently and frequently as Steve. During the teacher-led peer training, specific additions were made that related to Roscoe. Peers were shown Roscoe's AAC device and how he used it to communicate, the investigator told how frequently he communicated using the device, and how they could use his device to model appropriate responses.

Training of Steve's peers

Steve used his AAC device to express himself (wants, needs, for classwork activities) throughout the day with his teachers. Prior to the study, he did not use his AAC device when interacting with peers. During the teacher-led training session, peers were shown his device and which words and phrases he frequently used. Peers were also taught that Steve spoke at a low volume and often would repeat what they said. The investigator modeled and gave the students an opportunity to practice through role playing. The peers practiced how to gain his attention before greeting (tap his shoulder, move so that they are directly in his line of sight) and to express when they could not hear him, The

investigator gave them phrases to use such as "Steve I did not understand, can you say that again?" and "Steve, can you say that louder, I cannot hear what you said."

Intervention with Peers

Intervention sessions were conducted once daily, each day of the week. Each intervention session lasted approximately 10 min, or until five opportunities occurred (whichever came first). The timer was started once the small group activities in related arts began. During intervention sessions, there was one peer and one target student. For each intervention session, trained peers had a visual cue card to remind them of the strategies they were taught. The investigator also had a copy of the cue card during intervention to hold up as needed. Sessions ended when the 10 min was up or when five opportunities occurred, whichever came first.

The intervention sessions began with the investigator reminding peers to engage with target students a minimum of 3 times during the hands on, class activity using the strategies they learned during peer training. During the hands-on activities, the peers initiated a conversation with the target students using previously learned statements or directives such as "do you want to take a turn", "do you want to help me", "do you want to work together." If the target student responded using AAC the peer was to respond to their interaction appropriately (e.g., responding verbally, handing them materials, letting them have a turn, expanding on their response). If the target student did not respond to the peer, the peer did one of the following: (a) repeated themselves, (b) modeled on their device, or (c) made a statement of assumption or assistance ("It seems like you do want a turn, here you try!" "I can help you choose which game we should play," "I like this game."). If the peer did not do one of the above strategies, the investigator gestured to the

S'MoRRES© visual to prompt the peer. If the target student said something incorrect, echolalic, or off topic on their AAC device (such as "I want to be all done.", "Cookies.", "home"), the peer modeled the correct or more appropriate response on their AAC device. If the peer did not model the correct or more appropriate response, the investigator gave a peer prompt either by gesturing to the S'MoRRES© visual or verbally prompting the peer on what to say. Data were collected on if the peer (a) initiated a conversation with the target student; (b) if the target student did not respond, did the peer do one of the following: repeat themselves, model on their device, or make a statement of assumption or assistance; (c) if the target student said something off topic or incorrect, did the peer model the correct / more appropriate response on their AAC device; and (d) if the teacher has to deliver a verbal or gestural prompt, did the peer respond with an interaction with target student. During the session, if the peer used each step taught in the training appropriately and the target student was not responding, the investigator would provide a prompt directly to the target student. If the investigator had to provide a prompt, that interaction was not scored on the data sheet. Data were also collected on the types of responses and the number of responses from the peers and target student. The types of responses were coded as follows: (a) greeting, (b) asks a question, (c) comment, (d) requested help, (e) requested something tangible, (f) no response, and (g) other. The sessions ended when 10 min was up or when five opportunities occurred, whichever came first (see Figure 4).

At the conclusion of each session, the investigator provided peers with verbal feedback. The feedback consisted of two things they did well during the session and one aspect they could improve on next time. Positive reinforcement in the form of verbal

praise was given at the end of the session. An example of positive reinforcement provided is "I like the way you asked Steve which part of the project he wanted to work on first and where the group should begin!" One example of feedback on what peers could improve on is "Next time, try to give Roscoe more time to respond before you model the correct response." If peers did not engage with target student during intervention at least three times, following investigator prompts, they would have had to be retrained.

Maintenance Procedures

Maintenance sessions trials were conducted every eight sessions following mastery criterion. Maintenance probes were conducted like the intervention sessions. During maintenance probes, the peers still received a reminder to engage with target student and feedback after the session regarding two things they did well and one thing they could improve on next time. The data sheets used for intervention sessions were also used during maintenance sessions.

Inter-observer Agreement

Two paraprofessionals, that worked in the MSD classroom, were trained to collect IOA data. Paraprofessionals collected IOA during sessions in the related arts setting. IOA data were collected using point-by-point on peer procedural fidelity. An agreement was recorded if both data collectors recorded the occurrence or nonoccurrence of the target behavior. A disagreement was recorded if one data collector recorded an occurrence or nonoccurrence and the other data collector did not. Once the number of agreements and

disagreements was calculated, the mean was calculated by dividing the number of agreements by the number of disagreements plus disagreements and multiplying by 100.

The following peer behaviors were assessed during intervention sessions: (a) did peer initiate a conversation with target student; (b) did peer respond to target student following their response; (c) if the target student did not respond, did the peer do one of the following: repeat themselves, model on their device, make a statement of assumption or assistance; (d) if the target student said something incorrect or off topic, did the peer model the correct response/ more appropriate response on their AAC device; and (e) if investigator had to provide prompt, did the peer respond with an interaction with target student.

IOA was collected for a minimum of 20% of sessions across participants and conditions with a minimum of 80% agreement. If the mean IOA was not 80% or above, the teacher would have had to review the definition, examples and nonexamples of the target behavior with the paraprofessionals. If IOA data were to have fallen below 80%, peers would have needed to be retrained.

Interobserver agreement was collected for 33% of baseline sessions for each participant in the study. IOA data were taken using the gross method on the number of target student responses. IOA was 100% accuracy during all baseline sessions. IOA was taken 20% of sessions for each participant during intervention. IOA for peer procedural fidelity across all sessions was 100%. IOA for number of target student responses was for all sessions was 100%.

Peer Training Procedural Fidelity

Paraprofessionals were trained to collect procedural fidelity. Procedural fidelity data were collected for the peer training implemented by the investigator and on the investigator during intervention. Procedural fidelity was collected for both peer training sessions with a minimum of 80% agreement.

The following investigator behaviors during peer training were assessed: (a) met students in hallway for training, (b) had materials ready, (c) greet peers and introduce the training sessions, (d) show S'MoRRES© visual and AAC device, (e) go through each step on the S'MoRRES© visual, (f) give peer opportunity to practice using the device, (g) model on the device, (h) ask peers if they had an questions, (i) answer questions, (j) thank students for participating, and (k) give each peer a goal number of interactions. Procedural fidelity for peer training implemented by the investigator was 100% for target student 1 and 94% for target student 2.

The following investigator behaviors were assessed during intervention sessions: (a) did the teacher start the timer at the beginning of the session; (b) did the teacher instruct students to engage with target student 3 times, prior to the session beginning; (c) teacher provided prompts to engage if needed; (d) record the number of initiations made by peers; (e) teacher record types of communicative responses made by target students; (f) provide peers with verbal feedback at the conclusion of the session; (g) provide verbal feedback include two things the peer did well; (h) provide verbal feedback include one thing the peer could improve on; and (i) provide positive reinforcement in the form of verbal praise. Procedural fidelity was collected for 20% of sessions. Procedural fidelity for the investigator during baseline sessions was 89% and procedural fidelity for the investigator during intervention sessions was 99%.

Section 4: Results

All six peers that participated in the study reached mastery criterion. Mastery criterion was met if the participant had at least one session of 80%. The trained peers were able to implement the peer communication training with fidelity. In addition to implementing this strategy with fidelity, there was an increase in the number of communicative interactions between peers with and without disabilities. The data shown in Figures 2 and 3 illustrates each participant's progress throughout the study; the line graph shows the percent correct peer procedural fidelity, and the bar graph shows the number of target student responses. The data was visually analyzed for level, trend, stability, immediacy of effect, overlap and consistency of effect. Overall, all participants had low levels of responding during baseline with immediate or almost immediate changes in level and accelerating trends after training. Consistency of effect is demonstrated by the similar data patterns across tiers.

Peer Fidelity and Student Response

Roscoe and His Peers

Emily participated in a total of 10 sessions throughout the study. She had three sessions of baseline probes prior to training and intervention; those data were at a low level with a decelerating trend. After training, Emily's percent correct immediately increased with an accelerating trend, with no overlap. She mastered the procedures in 5 sessions and continued for 1 additional session until she reached 92%. She was also able to maintain her skills 2 sessions after mastery. Roscoe had 2 total responses during

baseline. After Emily's training, Roscoe's responses immediately increased with a level and trend similar to Emily's procedural fidelity.

Brad participated in a total of 13 sessions throughout the study. He had four sessions of baseline probes prior to training and intervention; those data were at a low level with a decelerating trend. After training, Brad's percent correct immediately increased with an accelerating trend, with no overlap. He mastered the procedures in 4 sessions and continued for 1 additional session until he reached 92%. He was also able to maintain his skills 1 session after mastery. Roscoe had 1 total response during baseline. After Brad's training, Roscoe's responses immediately increased with a level and trend similar to Brad's procedural fidelity.

Mike participated in a total of 15 sessions throughout the study. He had six sessions of baseline probes prior to training and intervention; those data were at a low level with a decelerating trend. After training, Mike's percent correct immediately increased with an accelerating trend, with no overlap. He mastered the procedures in 4 sessions and continued for 5 additi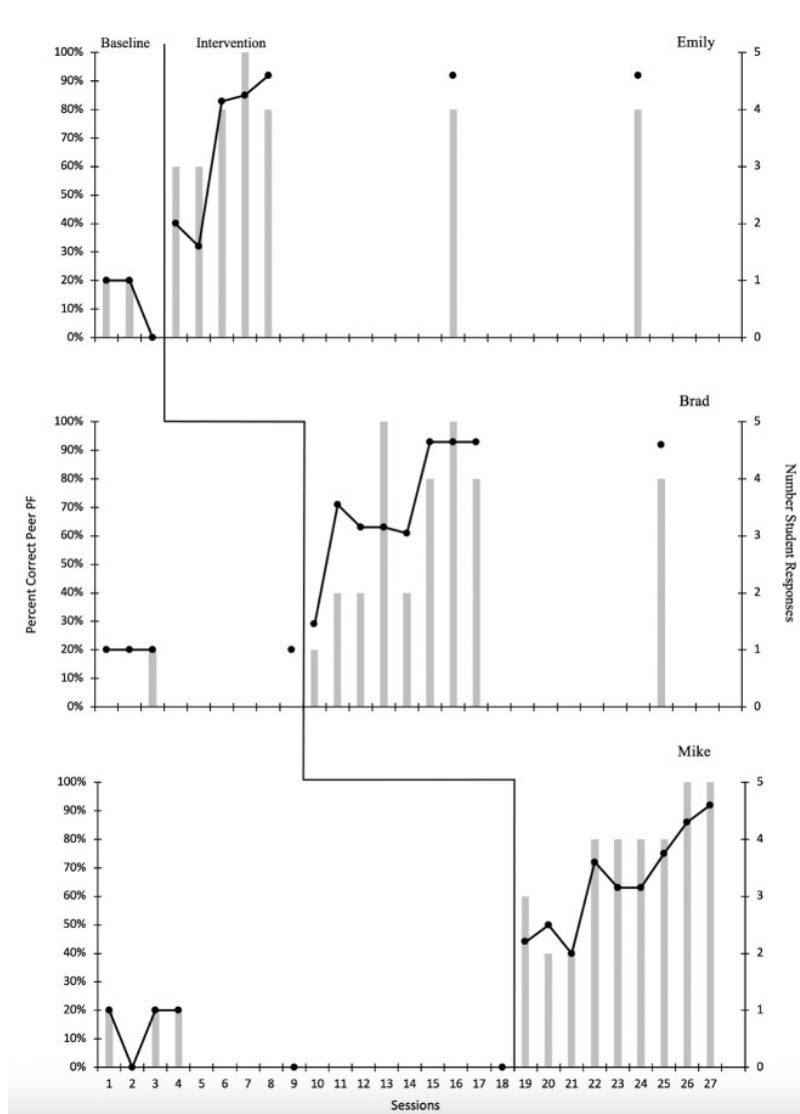onal sessions until he reached 92%. Roscoe had 3 total responses during baseline. After Mike's training, Roscoe's responses immediately increased with a level and trend similar to Mike's procedural fidelity. Mike did not participate in any maintenance probes prior to the conclusion of the study.

Figure 2

Graph of Results: Roscoe

Steve and His Peers

Dalton participated in a total of 10 sessions throughout the study. He had four sessions of baseline probes prior to training and intervention; those data were at a low level with one variable probe session. A fourth baseline probe was taken to ensure a decelerating trend. After training, Dalton's percent correct immediately increased with an accelerating trend, with no overlap. He mastered the procedures in 4 sessions. He was also able to maintain his skills 1 session after mastery. Steve had 1 total response during

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baseline. After Dalton's training, Steve's responses immediately increased with a level and trend similar to Dalton's procedural fidelity.

Jordan participated in a total of 15 sessions throughout the study. He had five sessions of baseline probes prior to training and intervention; those data were at a low level with a decelerating trend. After training, Jordan's percent correct immediately increased with an accelerating trend, with no overlap. He mastered the procedures in 3 sessions and continued for 7 more sessions until he reached 92%. He was also able to maintain his skills 2 sessions after mastery. Steve had 1 total response during baseline. After Jordan's training, Steve's responses immediately increased with a level and trend similar to Jordan's procedural fidelity.

Julia participated in a total of 17 sessions throughout the study. She had five sessions of baseline probes prior to training and intervention; those data were at a zero-celerating trend. After training, Julia's percent correct immediately increased with an accelerating trend, with no overlap. She mastered the procedures in 3 sessions and continued for 9 sessions, reaching 75%, until the study ended. She did not reac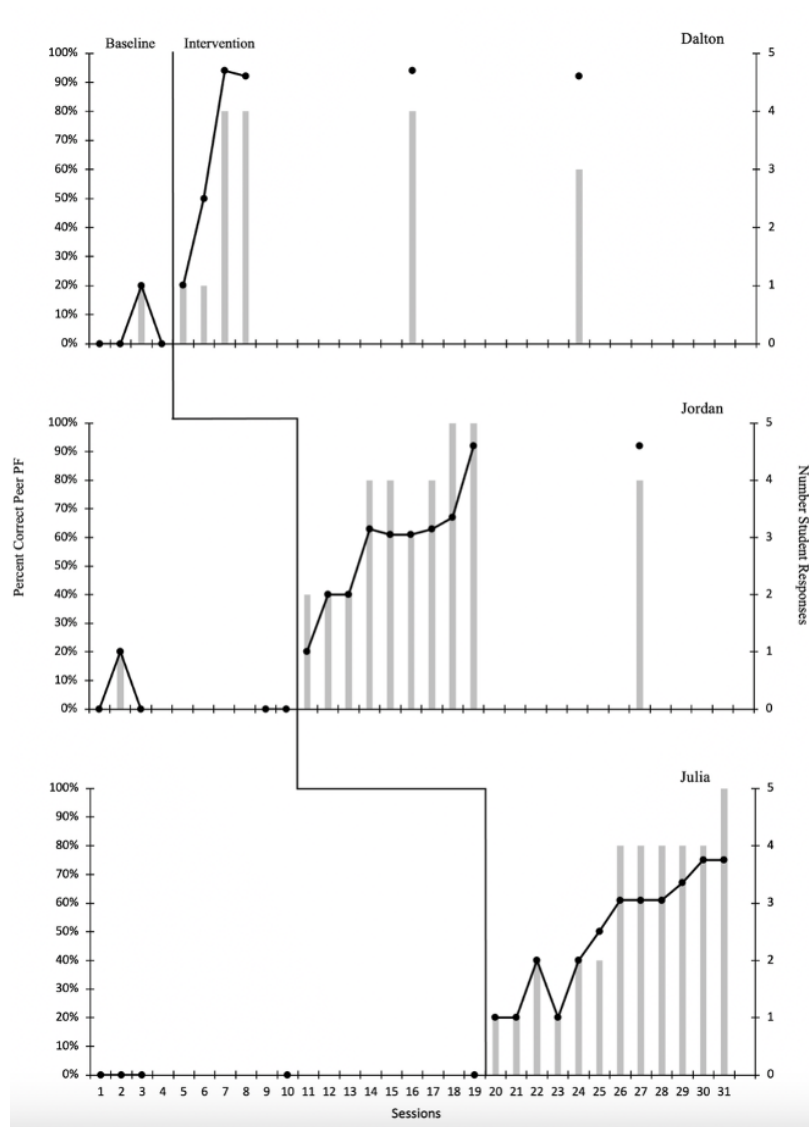h 92% due to the conclusion of the study. Steve had 0 responses during baseline. After Julia's training, Steve's responses immediately increased with a level and trend similar to Julia's procedural fidelity.

Figure 3

Graph of Results: Steve

Interaction Type

Throughout the study, data were recorded on the types of interactions between peers and target students. The following types of responses were coded and recorded: (a) greeting, (b) asks a question, (c) comment, (d) requested help, (e) requested something tangible, (f) no response, and (g) other. Table 1 shows the number of each interaction type recorded for peers and target students.

Table 1:

Peer and Student Interaction Types

Interaction Type	Roscoe's Peers	Roscoe	Steve's Peers	Steve
Greeting	22	22	23	22
Asks a question	55	7	39	1
Comment	22	21	5	8
Requested help	0	14	6	20
Requested something tangible	8	14	6	19
No response	0	17	0	3
Other	4	16	1	7

Section 5: Discussion

The purpose of this study was to evaluate the fidelity of peers implementing a communication strategy based on the S'MoRRES© strategy, to increase the frequency of communicative responses between individuals with disabilities and same aged peers. This study was effective in teaching peers to implement a communication strategy with fidelity and in increasing the number of communicative interactions between peers and individuals with disabilities.

This study is unique in the aspect of the intervention taking place in the general education setting from the start of the study. Typically, research investigating peer-interventions occurs in smaller settings such as in the special education classroom or in a setting with specific activities. This study took place in an inclusive setting where age-appropriate activities were assigned in related arts classes by the general education teacher.

Limitations

One limitation of the study is the frequency in which probe data were collected. According to the What Works Clearinghouse guidelines, for a multiple probe design to meet design standards without reservations, probe data need to be collected for a minimum of five sessions for all participants, three probe sessions immediately prior to intervention, and at least every eight sessions (Kratochwill et al., 2010). The meets design standards with reservation (a minimum of three probes for all participants, with one probe immediately prior to intervention, and at least one probe every eight sessions); with the low variability in baseline, this is a minor limitation.

Another limitation of the study was students with disabilities failing to communicate with peers using their AAC or spoken language. The two participants in the study could use their AAC device with adults (e.g., MSD teacher, speech language pathologist), but throughout the study they struggled to respond to their peers, which led to multiple teacher instances of teacher prompts. The investigator delivered a prompt to the target student if the peer had carried out each step of the communication strategy and the target student was still not responding. The responses on the graphs are unprompted responses. The investigator did not score the responses that required prompting. Future research should determine what level of peer training could alleviate this.

Practical Limitations

There were issues related to staffing, which made collecting IOA and procedural fidelity data difficult. Having two paraprofessionals approved to collect data per the institutional review board should allow for frequent data collection; however, they had other duties in the building and had to find coverage for those things. While enough IOA and procedural fidelity data were collected, it put a strain on the already limited resources (e.g., teacher absences due to COVID, overall teacher shortages).

Implications

Research shows the importance of the back-and-forth conversations with peers to develop friendships (Therrien et al., 2016). Therefore, it is important to identify and implement interventions that will support peer interactions and build relationships with peers. In order to develop a relationship with peers, children need to create the bond through laughing, complaining, telling stories, and arguing (Therrien et al., 2016). Research shows that peer networks are a successful way to increase the frequency of

interactions between peers and individuals with disabilities as well as increase their use of an AAC device (Thiemann-Bourque et al., 2017).

Due to teacher and support staff shortages, peer-mediated interventions can help meet the social needs of students and possibly reduce the need for support staff in the general education setting. Having peer supports in place allows for students with disabilities to have more access to age-appropriate interactions as well as participation in activities. Peer supports also allow for more opportunities for social relationships to foster between individuals with disabilities and their same-aged peers. This study demonstrated that peers can learn to facilitate peer-to-peer interactions in the general education setting. As peers implemented the procedures with greater fidelity, students with disabilities increased their responding.

Lastly, this study took place in related arts classes. The related arts teachers were able to see a peer mediated intervention take place and they were able to see the how peers were communicating and interacting with students with disabilities. Therefore, this study demonstrates that related arts teachers can learn practical and functional strategies to help interact and facilitate interactions with students with disabilities. These teachers can help foster social exchanges between students and help promote inclusion in their own classes.

Future Research

Further research should be considered in order to replicate this study. A replication of this study could provide more research with older participants, various settings, and social interactions of children with disabilities that use AAC

Future research is needed to continue to develop successful peer-mediated interventions. Specifically, there is a need for more research regarding AAC interventions in the general education settings using peer supports. Future research on what types of interactions should be targeted when beginning a peer-mediated intervention to increase communication would help advance the goal and layout of future PMI designed by researchers and educators. For example, what is the best type of communicative interaction to target first: (a) initiations, (b) greetings, (c) commenting, or (d) requesting; this is particularly important for AAC users. In addition, future research should include effective measures for fading adult prompting and supports throughout peer-mediated interventions. Perhaps, future research could explore alternative strategies for teaching peers to communicate with individuals with disabilities. Research shows the limited social interactions with same aged peers in special education classroom, therefore a specific model for peer-mediated social communication interventions in the general education classroom should be further developed. Lastly, researchers should consider and investigate the idea of a shift in focus on teaching individuals with disabilities how to communicate the way their peers do to teaching typical peers how to functionally communicate with individuals with disabilities. This study is one example of how this can be done.

Conclusion

The positive effects of peer-mediated interventions are clear throughout the past twenty years of research. This study extends the research around effective peer training and provides a simple strategy to teach elementary aged students how to communicate with peers with disabilities, specifically peers with significant communication deficits.

Moving forward, educators and related service staff must continue to utilize peer supports. More importantly, it is crucial that peer-mediated intervention is planned and implemented to ensure an increase in social communication and interactions between peers with and without disabilities. Results from this study reveal the effects of peer training and the role it plays in increasing the number of social communication interactions, specifically through an increase in initiations and responses between peers with and without disabilities. As the number of children with disabilities continues to grow, the need for continued research remains. There has been evident progress over the last twenty years working towards improving social competence and communication for individuals with disabilities; it is pertinent to continue that path.

APPENDICES

Appendix A

Peer Training Script

Peer Training Script

Peer Training Steps	Completed	Notes
1. Meet peers in the hallway for training at specified time. (have materials ready and student device)	+ -	
2. Greet peers and say: *"Hello, thank you all for wanting to be a part of this training. I am Amanda Taylor and as you know I am one of R's teachers. I want to teach you all some ways you can communicate with R. R uses both his words and a device to help him talk. I am going to teach you about his device and ways that you can use it to talk to R in class."*	+ -	
3. Tell peers*: "It is important that what you learn about R and his device, remain confidential. This means that you cannot talk about what you learned about R with your other friends."*	+ -	
4. Get out SMoRRES visual for peers and say: *"This is a visual to help us remember the things I am going to teach you today."*	+ -	
5. Show peers student device and say: *"This is the device that R uses to help him communicate. I will show you how you can also use it."*	+ -	
6. Using the SMoRRES and the student device, go through the steps with them. *"First, we want to make sure we are not talking to fast when speaking with R. Next, you all can use his device to model for him while you are talking. Here is an example*	+ -	

	show students how to say- what do you want? Using the device Here, you all take a turning saying that on the device."*		
7.	Give peers a turn using the device to say something.	+ -	
8.	Next say: *"The other things we need to remember when communicating with R is that he communicates using his words sometimes and other times he uses the device, we need to respect both ways. We do not want to force him to talk to us using the device. When he does say something verbally or using the device we can repeat what they say and add more to it. Here is an example- if R uses his device and says "help" you could say "what do you need help with R? Do you need help with this (give option) or this (give another option)."* Model on device as you say this.	+ -	
9.	Say to peers: *"The last two things to remember when talking to R, expand or build on what he says. For example, if R says "put on glue" you can say "where do you want to put on glue? Can you show us?". Lastly, make sure you stop and allow R time to respond to what you are saying or asking. Sometimes he may need a couple extra seconds to respond to you."*	+ -	
10.	Say *"Now we are going to practice. I am going to pretend to be R, I want you all to try to interact by practicing what we just learned together. This way I can help you if you need it or if you have any questions."* Let them each have a turn to role play. Notes for role playing: have students practice: - Asking peer a question, offering help, and making a comment with a response, no response, and		

inappropriate response from teacher (playing peer)		
11. Ask peers: *"Does anyone have any questions? I know that was a lot of information in a short amount of time. I will be with you all in related arts if you need help or have any questions. I will also bring these visuals and place them on your work table as a reminder."* Allow time for peers to ask any questions.	+ -	
12. Say "*Thank you all for participating in this training today.*"	+ -	
13. Say "*The last thing I am going to do is give you a goal. This is going to be a goal for the number of times you interact with and talk to R!*" *Goals are peer and baseline dependent*		
Total		
Percentage		

Appendix B

Procedural Fidelity Data Sheet: Peer Training, Teacher

Procedural Fidelity Data Sheet: Peer Training

	Completed		Notes
	Yes	**No**	
1. Did the teacher: Meet peers in the hallway for training at specified time.	+	-	
2. Did the teacher have materials ready (training visual and student device)?	+	-	
3. Did the teacher: Greet peers and say: *"Hello, thank you all for wanting to be a part of this training. I am Amanda Taylor and as you know I am one of R's teachers. I want to teach you all some ways you can communicate with R. R uses both his words and a device to help him talk. I am going to teach you about his device and ways that you can use it to talk to R in class."*	+	-	
4. Did the teacher: Tell peers*: "It is important that what you learn about R and his device, remain confidential. This means that you cannot talk about what you learned about R with your other friends."*	+	-	
5. Did the teacher: Get out S'MoRRES© visual for peers and say: *"This is a visual to help us remember the things I am going to teach you today."*	+	-	
6. Did the teacher: Show peers student device and say: *"This is the device that R uses to help him communicate. I will show you how you can also use it."*	+	-	
7. Did the teacher: Use the S'MoRRES© visual and the student device, and go through the steps with them?	+	-	
8. Did the teacher: Give peer one a turn using the device to say something?	+	-	
9. Did the teacher: Give peer two a turn using the device to say something?	+	-	
10. Did the teacher: Give peer three a turn using the device to say something?	+	-	
11. Did the teacher say: *"The other things we need to remember when communicating with R is that he communicates using his words sometimes and other times he uses the device, we need to respect both ways. We do not want to force him to talk to us using the device. When he does say something verbally or using the device we can repeat what they say and add more to it. Here is an example- if R uses his device and says "help" you could say*	+	-	

"what do you need help with R? Do you need help with this (give option) or this (give another option)."		
12. Did the teacher model on the device how to say help?		
13. Did the teacher say to peers: *"The last two things to remember when talking to R, expand or build on what he says. For example, if R says "put on glue" you can say "where do you want to put on glue? Can you show us?". Lastly, make sure you stop and allow R time to respond to what you are saying or asking. Sometimes he may need a couple extra seconds to respond to you."*	+ -	
14. Did the teacher allow each peer to have a chance to role play?		
15. Did the teacher ask peers if they had any questions and allow time for peers to ask any questions?	+ -	
16. Did the teacher answer the questions of students if they had any?		
17. Did the teacher thank students for participating?	+ -	
18. Did the teacher give each peer a goal number of interactions?		
Total		
Percentage		

Appendix C

Peer Intervention Data Sheet and Student Response Data Collection Sheet

Procedural Fidelity Sheet: Intervention Peers

Date:	Yes No	Notes
1. Did the peer gain the students attention before initiating conversation?	+ - N/A	
2. Did the peer initiate a conversation with the target student?	+ - N/A	
3. If the student responds, did the student Respect how the student initially communicated?	+ - N/A	
4. If the student responds, did the peer respond using a Repeat or Expand strategy from S'MoRRES©?	+ - N/A	
5. If the target student did not respond, did the peer model using the S'MoRRES© strategy?	+ - N/A	
6. During the session, did the peer repeat the utterances of the student?	+ - N/A	
7. Did the peer provide at least (goal #) initiations for conversation with the target student?	+ - N/A	
Total		
Percentage		

Date:	Yes No		Notes
1. Did the peer gain the students attention before initiating conversation?	+ -	N/A	
2. Did the peer initiate a conversation with the target student?	+ -	N/A	
3. If the student responds, did the student Respect how the student initially communicated?	+ -	N/A	

4. If the student responds, did the peer respond using a Repeat or Expand strategy from S'MoRRES©?	+ - N/A	
5. If the target student did not respond, did the peer model using the S'MoRRES© strategy?	+ - N/A	
6. During the session, did the peer repeat the utterances of the student?	+ - N/A	
7. Did the peer provide at least (goal #) initiations for conversation with the target student?	+ - N/A	
Total		
Percentage		

Date:	Yes No	Notes
1. Did the peer gain the students attention before initiating conversation?	+ - N/A	
2. Did the peer initiate a conversation with the target student?	+ - N/A	
3. If the student responds, did the student Respect how the student initially communicated?	+ - N/A	
4. If the student responds, did the peer respond using a Repeat or Expand strategy from S'MoRRES©?	+ - N/A	
5. If the target student did not respond, did the peer model using the S'MoRRES© strategy?	+ - N/A	
6. During the session, did the peer repeat the utterances of the student?	+ - N/A	
7. Did the peer provide at least (goal #) initiations for conversation with the target student?	+ - N/A	
Total		
Percentage		

Date:	Yes No	Notes
1. Did the peer gain the students attention before initiating conversation?	+ - N/A	
2. Did the peer initiate a conversation with the target student?	+ - N/A	
3. If the student responds, did the student Respect how the student initially communicated?	+ - N/A	
4. If the student responds, did the peer respond using a Repeat or Expand strategy from S'MoRRES©?	+ - N/A	
5. If the target student did not respond, did the peer model using the S'MoRRES© strategy?	+ - N/A	
6. During the session, did the peer repeat the utterances of the student?	+ - N/A	
7. Did the peer provide at least (goal #) initiations for conversation with the target student?	+ - N/A	
Total		
Percentage		

Date:	Yes No	Notes
1. Did the peer gain the students attention before initiating conversation?	+ - N/A	
2. Did the peer initiate a conversation with the target student?	+ - N/A	
3. If the student responds, did the student Respect how the student initially communicated?	+ - N/A	
4. If the student responds, did the peer respond using a Repeat or Expand strategy from S'MoRRES©?	+ - N/A	
5. If the target student did not respond, did the peer model using the S'MoRRES© strategy?	+ - N/A	
6. During the session, did the peer repeat the utterances of the student?	+ - N/A	
7. Did the peer provide at least (goal #) initiations for conversation with the target student?	+ - N/A	

Total		
Percentage		

Student Response Data Collection Sheet

Student Initials _____   Date: -
                _____

Peer Initials _____

Time: _____   RA Class:
      _____

Interaction	1	2	3	4	5	6	7	8	9	10	Totals
Peer	G Q P C H P O	G Q P C H P O	G Q P C H P O	G Q P C H P O	G Q P C H P O	G Q P C H P O	G Q P C H P O	G Q P C H P O	G Q P C H P O	G Q P C H P O	

Notes:

Interaction	1	2	3	4	5	6	7	8	9	10	Totals
Student	G Q C H T NR O	G Q C H T NR O	G Q C H T NR O	G Q C H T NR O	G Q C H T NR O	G Q C H T NR O	G Q C H T NR O	G Q C H T NR O	G Q C H T NR O	G Q C H T NR O	

Notes:

Percentage											

Peer Interaction Code:			Student Interaction and Response Code: response types = verbal or using AAC device
G = greeting Q = peer asks student a question C = peer makes a comment to student H = peer offers help to student P= adult prompted peer (point to SMoRRES visual or verbal reminder) O = other			G = greeting Q = asks a question C = comment H = requested help T = requested something tangible NR = no response O = other

Appendix D

Procedural Fidelity Data Sheet: Teacher

Procedural Fidelity Training Sheet: Intervention- Teacher

	Yes	No	Notes
1. Did the teacher start the timer at the beginning of the session? (when hands on activity begins)	+	-	
2. Did the teacher instruct students to engage with target student 3 times, prior to the session beginning?	+	-	
3. Teacher prompts students to engage if needed.	+	-	
4. Did the teacher record the number of initiations made by peers?	+	-	
5. Did the teacher record the number of communicative responses made by target students?	+	-	
6. Did the teacher provide peers with verbal feedback at the conclusion of the session?	+	-	
7. Did the teacher provide verbal feedback include two things the peer did well?	+	-	
8. Did the teacher provide verbal feedback include one thing the peer could improve on?	+	-	
9. Did the teacher provide positive reinforcement in the form of verbal praise?	+	-	
Total			
Percentage			

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