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Peer-Mediated Intervention's Effectiveness for Students with Autism Spectrum Disorder

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Author Note

Stormie Lee has graduated from Idaho State University and is no longer a student.

Individuals diagnosed with autism spectrum disorder (ASD) remain underrepresented in many core classes such as mathematics and science due to common characteristics that affect social interactions, behaviors, learning abilities, and communication. According to the DSM-5-TR (2013), a deficit in social communication, social reciprocity, and restricted, repetitive interests are common for those diagnosed with ASD, which makes their interactions with other people difficult. Individuals with ASD are often interested in specific topics or objects and demonstrate repetitive behaviors that can affect their everyday life. Other symptoms of ASD can also adversely affect their ability to participate in everyday activities compared to a typically developing or developed person (National Institute of Mental Health, 2023). Evidence-based practices (EBP) when implemented correctly and with fidelity can support greater inclusion for students with ASD.

Beginning in the early 20th century, characteristics were being noticed and identified as autistic thinking (Bleuer, 1913). Leo Kanner began to observe children with differences in their behaviors in 1943 (Kanner, 1943). Kanner mentions the differences in each child regarding "the degree of their disturbances, the manifestation of specific features, the family constellation, and the step-by-step development in the course of years" (Kanner, 1943, p. 242). Following Kanner, Hans Asperger began to observe symptoms at certain ages, higher levels of intelligence, and underdeveloped emotional regulation abilities (Asperger, 1944). These researchers and their work led to improved research and recognition of ASD throughout the world.

With better diagnostics categories, the diagnosis rate and data has increased from 1:10,000 in the 1970s to 1:36 in 2020 (Centers for Disease Control and Prevention [CDC], 2020). Similar to recent studies, males are more likely than females to be diagnosed with ASD (CDC, 2020; see also National Academies of Sciences, Engineering, and Medicine, 2015). The Centers for Disease Control and Prevention (CDC) website provides diagnosis rates and the prevalence of ASD (CDC, 2020). There is no specific medical test that diagnoses children with ASD. Instead, doctors monitor developmental history and behaviors to make a decision about diagnosing a child (CDC, 2020).

INTERVENTIONS FOR AUTISM

While there is no cure for those with ASD, evidence based practices (EBP) can help those with ASD live a fuller life and integrate into society better (Hume et al., 2021). An evidence-based

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practice is "an instructional/intervention procedure or set of procedures for which researchers have provided an acceptable level of research that shows the practice produces positive outcomes for children, youth, and/or adults with ASD" (The National Professional Development Center [NPDC], 2023). The NPDC identified interventions and EBPs to specifically teach students with ASD skills and concepts to improve challenges associated with an Autism Spectrum Disorder. These interventions were identified based on extensive research that was conducted with various groups of individuals with ASD (Boutot, 2017).

In 2004, specific legislation was amended and passed which requires those educating children with ASD to use EBPs. The Individuals with Disabilities Education Improvement Act (IDEIA, 2004) requires educators to implement and use EBPs with fidelity when teaching students with disabilities. These EBPs need to be chosen based on the research that has been concluded about them and which practices have evidence that confidently suggests the practice will result in beneficial effects (Boutot, 2017).

To date, 28 interventions have been identified by the NPDC as EBPs (NPDC, 2017). The 28 interventions are researched and available for teachers to help children with ASD become successful and independent. However, the abundance of interventions is also challenging for general educators who may not be not familiar with evidence-based behavioral interventions. They are not adequately trained to implement them, and often do not have the time necessary to successfully use them in the classroom. Two recommended interventions in a classroom are social stories and visual support. Research shows; however, those interventions might not be as successful as anticipated (Zimmerman et al., 2020). Another intervention, identified by the NPDC, includes peer-mediated interventions (NPDC, 2017). These interventions also show success in teaching behavior and social skills (Busching & Krahe, 2020; Ledford & Wolery, 2013; Vanderbilt Kennedy Center, n.d.). Early and appropriate intervention is important in the growth and success of young children. Selection of this intervention can be difficult, but with accurate information, educators can provide students with skills necessary to be successful in the future. Required implementation time and monitoring of these interventions can seem daunting. However, with the use of peer-mediated interventions, teachers are allowed to continue with instruction while students with ASD are still learning important skills.

PEER-MEDIATED INTERVENTIONS

While children attend school, most time is spent observing peers (Busching & Krahe, 2020). As children get older, the influence of caregivers begins to diminish and peer influence is increased. When examining a classroom community, children who are higher in the room social status who had good prosocial behaviors affected the behavior of peers (Busching & Krahe, 2020). While peer modeling in a whole group is effective, it can only improve targeted behaviors with small group instruction. Before conducting small group peer-mediated interventions (PMI), children need to be selected as the peer model and receive some peer training (Ledford & Wolery, 2013). During small group instruction, the peer models are to be good friends to the child with the disability or the target behavior. They are also trained on the expectation from the teacher. These children are to be a great example for the child who is trying to reach a specific goal. Children, both with ASD and typically developing, eventually look to their peers for social acceptance and social behaviors (Busching & Krahe, 2020). Children look for friendships with those who have similar characteristics and interests. Adults may not be relatable when teaching prosocial skills compared to peers close in age and peers with similar interests. When implementing PMI, research suggests this is an effective support and intervention for students in the classroom. In a study,

peer-mediated intervention in small-group direct instruction showed to be effective. Children reached the target behaviors 100% during instruction. This is an improvement from 0% in the pre-instruction probe (Ledford & Wolery, 2013).

In 1997, Lynn Fuchs and Doug Fuchs developed peer-tutoring program to be used in reading and in math instructions. Peer-Assisted Learning Strategies (PALS) allows students to take turns being the tutor while using structured and scripted activities in the previously mentioned school subjects (U.S. Department of Education, 2012). When using this program, the classroom teacher determines which students will be paired together based on their reading or math needs and current abilities. The student pairs are often rotated to allow students to work with different partners throughout instruction (Haas et al., 2019). PALS is a program that can meet different needs of students; however, the intention of this intervention strategy is to help students with learning disabilities improve their skills in math and reading (U.S. Department of Education, 2012).

PALS is a specific intervention with materials and training to improve skills in reading and math. PALS is curated with academic skills in mind. This program is distributed by Vanderbilt Kennedy Center for Research on Human Development (U.S. Department of Education, 2012). The Vanderbilt Kennedy Center also provides tips and resources for the overall concept of PALS, peer-based interventions. It defines this intervention as "evidence based practices that teach strategies to typically developing peers for facilitating social interactions with children on the autism spectrum," (Vanderbilt Kennedy Center, n.d.). These intervetnions are used to improve interpersonal skills, communication, and play skills. While the students on the autism spectrum are being taught new skills, typically developing peers are gaining important life skills as well. Peer-based interventions follow the same steps as PALS during the preparation process. Peers are selected based on certain characteristics that help the intervention be comfortable and successful. The selected peer is trained, like in PALS, to teach them certain skills to teach their peers. The interventions are then facilitated and structured to provide constant support for both peers and reinforcing appropriate mentoring and behaviors. Once the intervention is in place and facilitated activities have occurred, support can fade in order for the peers to work together through learning opportunities. This, like in PALS, provides the classroom teacher the opportunity to reach out and provide instruction to more students in the classroom (Vanderbilt Kennedy Center, n.d.).

INTERVENTIONS WITH ZONES OF REGULATION AND THE PYRAMID MODEL

The PMIs were designed using the Pyramid Model and the Zones of Regulation. With the model and the Zones of Regulation curriculum, the interventions were designed specifically for the social skills each student with ASD needed to learn. The Pyramid Model for Promoting Social-Emotional Competence in Infants and Young Children (Pyramid Model) is a framework designed for promoting healthy social and emotional development using evidence-based practices (National Center for Pyramid Model Innovations, 2022). This model was developed by federally funded research centers. The research centers are The Center for the Social and Emotional Foundations for Early Learning (CSEFEL) and Technical Assistance Center on Social Emotional Intervention for Youth Children (TACSEI). These centers designed this model to help children grow in the areas of social skills and challenging behaviors.

When determining which interventions and supports would be used, such as the Pyramid Model and the Zones of Regulation, multi-tiered system of supports (MTSS) and Positive Behavioral Interventions and Supports (PBIS) must be considered and implemented for best decision making. MTSS is a framework using data and instruction to provide instruction and

support to students with social, emotional, and behavioral needs. Not to be confused with response to intervention (RTI). RTI was initially implemented to help schools identify students in need of special education by teaching students with more intensive instruction and monitoring their progress. If the outcome was not as expected from the instruction, students would be referred to special education for further testing for an individualized education program (IEP) (Pendharkar, 2023). In contrast, MTSS includes the tiered framework to continuously support students to have positive outcomes from personalized and person-centered instruction and intervention. When using this framework, similar to the Pyramid Model, students are provided tiers of core instruction, supplemental interventions, and intensive interventions based on data and continuous progress monitoring. PBIS is also a tiered framework for supporting behavioral, academic, social, emotional, and mental health (Center on PBIS, 2024). The goal of PBIS is to improve the outcomes by working together as a school and with parents. To do this, the five elements of PBIS are emphasized and prioritized to promote a positive and safe school culture and having high expectations for all students. At tier 1, in MTSS, the Pyramid Model, and PBIS, teachers are expected to provide effective, universal teaching strategies to instruct and support all students to meet their needs (American Institutes for Research [AIR], 2024). When tier 1 is effective, most students benefit from core instruction and practices. At tier 2, supplemental interventions are provided to students who are identified, using data, as at risk in academic, social, emotional, and behavioral needs. Interventions designed and selected are to be aligned with the students and have positive effects for the desired outcomes (AIR, 2024). These interventions are to be implemented with fidelity with chances for the students to have more practice opportunities and appropriate, corrective feedback. Tier 3, in each of the models and supports, is for any student who is in need of more intensive supports and interventions. Students may be in need of this tier 3 instruction to improve outcomes. Any student, with an IEP or without, are able to receive tier 3 MTSS, PBIS, and Pyramid Model supports. At tier 3, individualized and person-centered instruction is provided following team communication and appropriate assessment has been completed (Center on PBIS, 2024).

The Zones of Regulation is a curriculum developed by Leah Kuypers (2011) to provide all students the opportunity to learn new regulation skills and continuously develop them. The curriculum teaches children to identify their emotions using four zones identified by colors: blue, green, yellow, and red. Each of these colors represents the feelings and emotions in the zone. Colors are used to provide students with a familiar visual to relate to their emotions and feelings. Students are taught what these emotions look like and feel like through opportunities to identify them in themselves and in others. When in the blue zone, students can expect to feel emotions that slow them down. These emotions include: sadness, tired, sick, or bored. If a student is demonstrating emotions that are similar to those previously mentioned, teachers across the school are able to address those using the blue zone to ask how the student might be feeling. The green zone is where students are ready to learn. This zone includes happy, calm, and focused. Teachers use opportunities through the day to identify green zone emotions and feelings to provide continuous instruction for students in need. The yellow zone is when students' emotions and behaviors may start to escalate. In this zone students can feel worried, frustrated, silly, or excited. Students can struggle to identify their emotions when in the yellow zone. Yellow, as a visual, provides students the opportunity to prevent more extreme behaviors by recognizing increasingly agitated emotions. The red zone is where students may be out of control of their emotions and escalate to the point of needing support. These feelings and emotions include elated, panicked, angry, or terrified. Red is a color relates to students in a way that represents those emotions. With

this visual, students are able to identify emotions and feelings that are difficult to navigate and can become worse without support. While one of the focuses of the Zones is to teach students to identify their emotions, it is also an important resource to teach students appropriate coping strategies and regulation skills.

The present study aims to determine the effectiveness of peer mediated interventions using the Pyramid Model and the Zones of Regulation curriculum. The Pyramid Model and Zones of Regulation were selected for this study to determine their effectiveness when used together as interventions for students with ASD. This study will follow three students with ASD in a rural elementary school in Idaho with different social skill goals. These students will continue to attend their regular general education classrooms while participating, daily, in small groups with other peers. This study is to extend previous research regarding peer interventions. It intends to identify the effectiveness of these interventions in small group instruction while generalizing skills and strategies into the general education classroom and school environment.

METHOD

RESEARCH DESIGN AND QUESTIONS

A single-subject, multiple baselines across participants research design was selected for the purpose of evaluating the effectiveness of peer interventions paired with the Zones of Regulation Curriculum with 3 elementary students diagnosed with ASD in general education classrooms (Byiers et al., 2012; Epstein & Dallery, 2022; Siegle, 2015). The data and percentages, for baseline and behaviors after the interventions, are reported through graphs.

The questions for the study are as follows.

1) To what extent does peer mediated interactions, combined with The Zones of Regulation curriculum, improve classroom participation for three elementary aged students with autism in inclusive educational settings?
2) To what extent does peer mediated interactions and Zones of Regulation curriculum affect the social integration (as defined by talking to adults and peers, appropriate jokes, and appropriate interactions with peers during recess) of elementary aged students with Autism in an inclusive classroom?

PARTICIPANTS

Students in a rural Idaho elementary school identified as having ASD and receiving special education services were purposefully selected.

Students were selected based on inclusionary criteria to include a) primary diagnosis of ASD, b) identified by the general education teacher as ‘off task’ or needing social skill improvement.

Student A is a 10-year-old Hispanic male with Autism enrolled in fifth grade. He has attended this school since he was in kindergarten. He has an IEP, but is of average intelligence. Student A does not receive services for his academics. He does qualify for speech and language services. He also qualifies for testing accommodations for state testing. Student A’s target behavior is difficulty talking to others, especially adults.

Student B is a 10-year-old Hispanic male in fifth grade. He is identified as having ASD. He has attended the same school since kindergarten and has had an IEP since then as well. He receives services for math and reading in a separate setting in the special education classroom.

Student B's target behaviors are his struggles with completing tasks and maintaining his attention in the classroom.

Student C is a 6-year-old Native American male in first grade with a diagnosis of ASD. He is also diagnosed with glaucoma and vision impaired. His mother has said he will eventually go blind. He wears glasses with a prescription to help with his vision and also has certain accommodations in the classroom to help him see. He is below grade level in academics compared to his typically developing peers. He receives services for reading and math in a special education classroom. He struggles with emotional regulation when he is overstimulated or overwhelmed with the classroom expectations. Student C's target behavior is his difficulty participating in the general education classroom for the entirety of the day and completing assigned tasks.

Model peers for the interventions were selected based on teacher recommendation. Teachers observed students in their classrooms and carefully selected students with appropriate social skills, behaviors, and self-regulation. Peer mentor A was selected based on their classroom behavior, "mellow" personality, and ability to complete their classroom work and continue to help others. Peer mentor B was selected based on their continued ability to help the student in the same class. They had been paired to help one of the participants with everyday classroom tasks. Peer mentor C was selected based on their interactions with one of the participants and other students in the classroom. They were quick to help and include other students in the classroom.

SETTING

The special education program services 39 students. Of these students, seven have ASD. There are three special education teachers, two paraprofessionals, and one behavior tech who provided individualized instruction and services to these students. All peer interventions took place in the special education classroom in a small group setting within an elementary school in southern Idaho.

MATERIALS

ZONES OF REGULATION CURRICULUM

The Zones of Regulation was introduced and used in the general education classroom. A poster outlining the zones was previously created. The poster included visuals and larger prints to accommodate the needs of abilities (see Figure 1).

SCRIPTS

Scripts were created for the peers to use during small groups and during general education settings. These scripts were designed specifically for each student in the study. The scripts and peer interaction ideas were selected based on each of the participants desired behaviors (see Figures 2-4). For the older peers, scripts with words and directions were used. For the students in first grade, the script included visuals and examples. These scripts were provided during the small group interventions and practiced throughout that time. They were not given during general education settings at that time.

VISUAL CUE CARDS

Visual cue cards were created for the students to use during small groups and will be used post-intervention during general education settings. Each of these cards were printed in color on cardstock paper (see images 5-7).

Figure 1
Zones of regulation

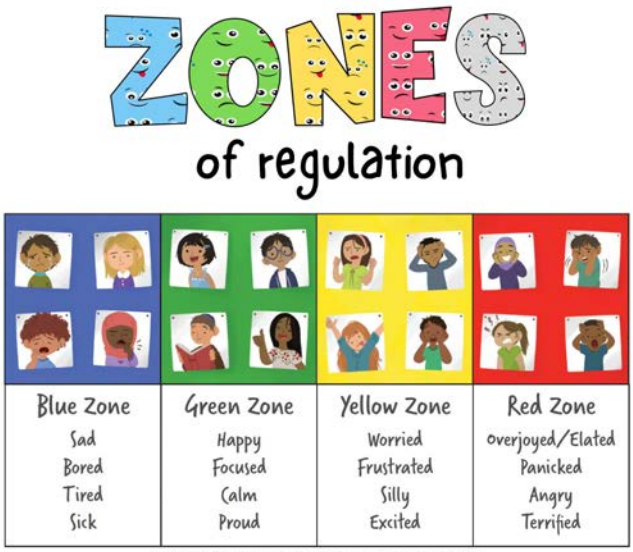

Image 1: Zones of Regulation poster for reference for participants

Figures 2-4
Scripts

Figures 5-7
Visual Cue Cards

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TOYS AND GAMES

Card games, STEM toys, and imaginative play toys were available for the small group interventions. The items selected for these groups were toys and games that practiced talking to others, maintaining attention, and staying on task. These were also used as reinforcement for when students worked well together during small group times.

Data Recording Form

Data was collected using event recording. This data collection form was used by the researcher during the baseline and intervention phase. Data was recorded based on the target and desired behavior occurring in the setting. Student B's and Student C's had similar target behaviors during the baseline phase. The researcher observed the duration of on task behaviors in the classroom. These behaviors were recorded using a duration recording form. Student A's behavior was recorded using a frequency and rate data form. Student A's target behavior was the total number of verbal responses he gave when addressed by an adult.

PROCEDURE

BASELINE PHASE

Baseline was conducted, Monday through Thursday, in the general education classroom in four day increments due to the school's four-day academic week. Data was gathered on the target behavior using rate and duration recording forms. Based on the research design selected, the baseline phase differed in length for each participant. Student A's baseline data was observed and recorded for four days while Student B's was recorded for eight days and Student C was recorded over 12 days. All data was recorded and analyzed.

INTERVENTION PHASE

First, the selected model peers were trained one on one in a special education setting. They were taught appropriate statements and introduced to scripts to help the participants improve desired behaviors. They were encouraged to begin to build a relationship with the participant to ensure a comfortable environment in the general education and special education classroom.

After the model peers were trained and expectations were taught, delivery of the intervention began. Delivery of the intervention, *with the researcher in attendance,* was weekly in a special education setting with the model peer and the participant. During this weekly instructional time, the peer models and participants were given the opportunities to play a game, participate in unstructured play, or simply converse with each other. The researcher stated the expectations of the classroom and allowed the peers to interact. The model peers were expected to use previous training to address certain behaviors and skills with the participants. They could use verbal reminders or visual prompt cards. If assistance was needed, the researcher would support the model peer and participant.

In the general education classroom, the model peer delivered the intervention throughout the day using prompts and encouraging statements. Visual prompt cards were only used during intervention times with the researcher. Verbal prompts were used during the general education times. The model peer encouraged the participants to participate in class or to verbally respond to others' questions or statements.

Data during the intervention phase was collected after four days for Student A. The intervention phase for this student was 12 instructional days. Student B received intervention after

8 days of baseline observation. This phase was observed for 8 instructional days. Student C received interventions after 12 days of baseline observation and recording. He received 4 days of intervention and data recording.

INTERRATER AGREEMENT

The school's instructional coach was selected to observe and discuss the data collection during each phase of the study. In preparation for data collection, the researcher and the instructional coach discussed how the behavior would be recorded, what the desired behavior would look like, and how the data would be analyzed. The results of each of the observers were compared and discussed. The agreement reliability was calculated by adding together the total number of data points agreed on then dividing that total by the total number of data points. That number was then multiplied by 100 to determine the percentage of agreement. The instructional coach and the researcher had a total agreement of 100%.

INTEROBSERVER AGREEMENT

Three trained observers collected data and observed participants during the baseline and intervention phase of the study. The students' behaviors were observed and recorded based on the collection form and training each observer received. The inter-observer agreement (IOA) data were collected, recorded, and analyzed for all participants and both phases.

DATA ANALYSIS PROCEDURES

Visual analysis is the most applied and often used data analysis used in single-case research (Gast & Spriggs, 2010). Data was analyzed for the intervention package, peer mediated intervention and Zones of Regulation Curriculum on the dependent variable using between-condition analyzation. The researcher used this to determine the level and trend of the targeted behaviors after the peer-mediated interventions were introduced. For this study the dependent variable measures (percentage of targeted behaviors) were graphed for each session across participants and phases. Three concepts, mean, trend, and variability were analyzed for each student.

RESULTS

RESEARCH QUESTION 1

The first research question in this study was: to what extent does peer mediated interactions, combined with The Zones of Regulation curriculum, improve classroom participation for three elementary aged students with autism in inclusive educational settings?

Figure 1 depicts each of the participants' baseline percentages of targeted behaviors followed by the percentage of desired behaviors after peer-mediated interventions were implemented. These percentages were calculated by duration data recording. Time was recorded by seconds. Time (seconds) on a task was divided by the total amount of time observed. That number was then multiplied by 100 to provide a percentage of desired behavior during an observation. Table 1 depicts the analysis of the collected data. This table includes the mean and the ranges of the percentages of the students' desired behavior. Student A showed an increase in desired behaviors after interventions were implemented compared to the targeted behavior of avoid conversation with others. Student B showed high variability in on task behaviors. His target behaviors of being off task in the classroom did not show an increase or decrease following

interventions. Ultimately, there was a slight increase in the baseline data mean and the intervention means. Student C also showed an increase in desired, on task behaviors in the classroom. The targeted behaviors of off task behaviors improved with peer-mediated interventions.

Figure 8

Results across Participants

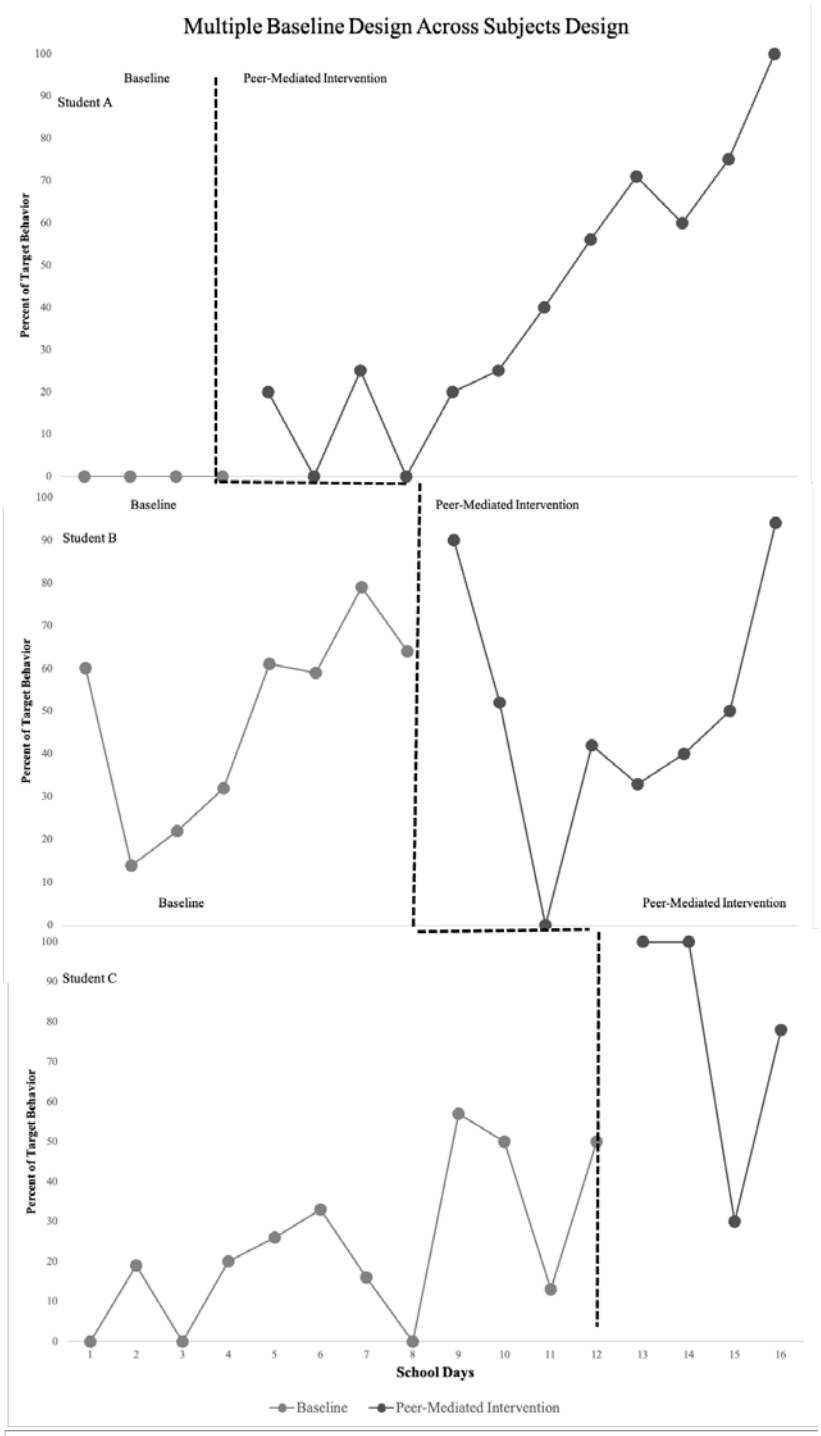

Figure 1. Percent of target behavior across participants

STUDENT A

The visual analysis of data for Student A showed a baseline mean of 0%. Over four observation sessions, the baseline data was stable with no variability. Following the introduction of the peer-mediated interventions, Student A demonstrated a substantial increasing trend in the desired behaviors. The behaviors' intervention mean increased to 41% from the 0% of targeted behaviors during the baseline phase of the study. Student A's percentages after the intervention ranged from 0%-100%. In the intervention phase of the study, Student A scored 0% in two observations. By day 16 of observations, the participant had scored 100%. The visual analysis of the data shows an increasing trend on the percentage value with moderate variability.

STUDENT B

The visual analysis of the data for Student B showed a baseline mean of 49% of targeted behaviors over 8 days of observation. The baseline data was not stable and had a high level of variability. The percentages of the baseline data ranged from 14%-79%. Following the introduction of the peer-mediated interventions, Student B demonstrated a slight increasing trend in average on-task desired behavior percentages in the classroom. The mean after interventions increase from 49% to 50%. The range of data during the intervention phase was 0%-94%. During the baseline observations, this participant did not score a 0%. During the intervention observations, this student scored a 0% during one of the observations.

This student's data shows high variability and unpredictability for the future behavior pattern improvement. During the intervention phase of the study, this student was experiencing extreme, unusual behaviors. The participant's medication was on backorder and he was not taking his medication during that time. It is believed this impacted the student's data and results of the study.

STUDENT C

The visual analysis of the data for Student C showed a baseline mean of 24% of targeted behaviors over 12 days of observation. The baseline data was not stable with some variability. The percentages of the baseline data ranged from 0%-57%. Following the introduction of the peer-mediated interventions, Student C demonstrated an increasing trend in on-task behaviors percentages in the classroom. The mean after interventions increased from 24% to 77%. The range of data during the intervention phase was 30%-100%. During three of the baseline observations, this participant scored 0% of target behaviors. During the intervention observations, the student did not score a 0% resulting in some increased desired behaviors. There is moderate variability in this student's scores so the future of the desired behaviors is not predictable.

Table 1

Data Analysis of the Participants

	Student A		Student B		Student C	
	Baseline	Peer-Mediated	Baseline	Peer-Mediated Intervention	Baseline	Peer-Mediated Intervention
Mean	0%	41%	49%	50%	24%	77%
Range	0-0	0-100	14-79	0-94	0-57	30-100

Table 1 Data analysis of the participants. Data includes the mean and range of percentages.

Percentage of non-overlap data is one of the most common forms of analysis in regard to the effect size in single-case research (Gast & Spriggs, 2010).

RESEARCH QUESTION 2

Social validity of research focuses on the acceptability of the treatment by actual or potential participants and professionals who implement the treatment (Berger et al., 2016). Interventions and treatments can reveal effectiveness in increasing desired behaviors or decreasing unwanted behaviors. However, the treatment can be found to be inappropriate and ultimately have a negative effect on the participants. The second research question addresses the social effects of the intervention. This questionnaire answers the second research question. To what extent does peer mediated interactions and Zones of Regulation curriculum affect the social integration (as defined by talking to adults and peers, appropriate jokes, and appropriate interactions with peers during recess) of elementary aged students with Autism in an inclusive classroom?

Using a survey from a previous study (Kocaoz et al., 2019), the teachers of the participants rated the intervention. The survey consisted of 15 questions regarding the effectiveness of the survey for the participants and the classroom. The questions were rated to determine the level of satisfaction and agreement with the intervention (see Table A1).

Teacher A, the general education teacher of Student A, rated four questions "strongly agree." Two questions were rated "agree" and eight questions were rated "slightly agree." One question, "I like the procedures of this intervention package," was rated "slightly disagree. This teacher was not in strong agreement with the validity of the intervention. However, as an average, this teacher did agree this is an appropriate intervention for the skill being taught and the participant.

Teacher B, the general education teacher of Student B, rated 12 questions with "agree." Three questions were rated "strongly agree." This teacher did mention the increase of participation from the student during instructional times he would normally refuse to participate. She also stated there was an increase of social acceptance of Student B from the typically developing peers in the classroom. Overall, Teacher B agreed this is an appropriate intervention for the student and the skills being taught.

Teacher C, the general education teacher of Student C, rated six questions with "strongly agree." Nine questions were rated with "agree." The teacher mentioned the increased number of typically developing students imitating the model peer and supporting Student C in the classroom. The teacher stated the student was completing more classroom assignments and participating in learning activities and discussions. Overall, Teacher C agreed this intervention was appropriate and effective for the student and the skills being taught.

Overall, the teachers rated question 1 and question 6 with the strongest agreement. The teachers agreed this intervention was acceptable for the children's' developmental age. They also agreed that this intervention is suitable for the social skills that were identified and planned for. Two teachers strongly agreed this would be an intervention they would implement in their classroom. The teachers also agreed this intervention would be appropriate for a variety of students in the classroom. The teachers' results (Table 2) from the survey showed an overall agreement of peer-mediated interventions and outcomes. The data from the results of this survey were determined by analyzing each of the responses and finding the averages in each of the ratings. Each question was rated by the teachers, added by the researcher, and a rating average was determined. The individual surveys ratings were added together to determine the overall rating of the intervention for each teacher. The means of each of the questions were also combined and averaged to determine the overall rating between the three teachers.

Table 2
Teacher Rating Data

Table 2
Teacher Rating Data

Question	Teacher A	Teacher B	Teacher C	Average Rating
1	6	5	6	5.7
2	6	5	5	5.3
3	6	5	5	5.3
4	5	5	6	5.3
5	4	5	5	4.7
6	6	5	6	5.7
7	4	6	6	5.3
8	4	6	5	5
9	4.5	5	6	5.2
10	4.5	5	5	4.8
11	4	6	5	5
12	4	5	5	4.7
13	3	5	6	4.7
14	4	5	5	4.7
15	4	5	5	4.7
Total Rating Mean	4.6	5.2	5.4	5.1

DISCUSSION

This study was conducted to provide more data in peer-mediated intervention and its effect on target behaviors in the classroom. The results also provided more information about peer-

mediated interventions and social integration of students with ASD. The data and the results of the study indicated a relation between the intervention and the desired behaviors in the classroom.

The study and the results are similar to previous studies (e.g., Busching & Krahe, 2020; Ledford & Wolery, 2013; Sinclair et al., 2019). The results of this study also confirm previous studies' results of the relationship between peers and improvement of behaviors and classroom participation. This study differs, however, from the other studies in the target behaviors that were identified in the baseline phase. Previous studies analyzed the improvement of disruptive classroom behaviors with PMI. This study does not include disruptive behaviors, but instead analyzes the effects of PMI on task behaviors, classroom participation, and social interactions with adults.

This study was conducted with the intent of improving target behaviors of the selected participants. The participants were selected based on the ASD diagnosis and classroom teacher recommendation. After the participants were selected, peer models were selected based on positive prosocial behaviors and overall classroom behavior. The peer models were trained in separate sessions. During these, peer models were introduced to their expectations, scripts, and visual cards. After peer models were trained, participants received support from their peers in the classroom and one intervention session weekly with the peer model and the researcher. For some participants, there were immediate increases in desired behaviors. Other participants did not have a steady increase in desired behaviors. One participant, Student B, had outside factors affecting his mood, behaviors, and ability to focus. This student's medication was on backorder during the intervention phase of the data collection. It was difficult for this student to want to participate or be at school during this time. During the intervention phase for each student, the peer model was seated near the participant. This allowed them to feel comfortable around another student. Student A often looked to the peer model for support in the beginning days of the intervention phase. The reliance of the peer model eventually faded and his ability to communicate with adults improved across different settings. Classroom teachers reported increased participation in classroom activities, school subjects, and discussion by all of the participants when the interventions began.

The intervention not only improved desired behaviors and classroom participation, but it was recorded and stated by classroom teachers that inclusion of participants in the classroom setting increased during the intervention phase of the study. Students in each of the classrooms were reported as being more friendly with the participants during activities, free time, and recess. It was observed that the participants were becoming more comfortable with more students than just the peer models. Increased inclusion and acceptance of peers with ASD was reported by classroom teachers, school staff, and observed by the researcher.

PMI is an intervention that can be implemented in the classroom. This intervention improves student behavior through peer modeling and mediation. It provides a safe learning environment for students with ASD or students who have deficits in appropriate social skills. The findings of this study, similar to previous studies, provides data and evidence to support the use of this intervention to improve student classroom behaviors, as well as, social and academic skills.

LIMITATIONS

Several limitations may have impacted the results of this study. Only one intervention with the researcher was able to be scheduled each week. Due to scheduling conflicts, each student and model peer was able to be in one intervention session weekly. This limited the researcher's ability to provide support to the students more than once weekly. With more of these opportunities, the

desired behaviors could have increased. Student absences impacted the number of available days for data collection. This limitation also impacted the consistency of PMI in the classroom. Without the daily intervention, behaviors can be set back because of the change in schedule. Attendance during the study could have led to more observations during the intervention phase. There is a chance to observe a maintenance of the behaviors and skills with more opportunities to practice and collect data. One of the intervention days was on Halloween. This affected participation and on task behaviors because of the change in schedule and the anticipation of the upcoming parties in the day. Finally, beyond the researcher's control, a delay in medication availability impacted the abilities of one of the students in the classroom. On task behavior, social behaviors, and overall mood was affected during this time. Once medication was administered again, the behaviors and moods of the student returned to normal.

CONCLUSION & RECOMMENDATIONS

Replication and future research are recommended based on concluding data. Due to the limitations, it is important for this research to be done again. The limitations provide the research and future researchers the groundwork to avoid complications in the future. When using this groundwork and replicating this study, it is recommended to carefully select an appropriate time in the school year when students will be able to receive interventions regularly. With the number of interruptions and absences, some students' behaviors were not able to be observed for maintenance. It is also recommended that the research timeline be extended for determining the maintenance of the desired behavior in the classroom.

When selecting time in the school year, it is recommended that the research be completed months after school has started. Many students, with ASD and those without, demonstrate disruptive behaviors when becoming familiar with new teachers and environments. Over time, even without interventions, some targeted behaviors fade and eventually become extinct. It is important to have data and teacher recommendations about the target behaviors being selected.

It is also recommended that the researcher have transparent communication with parents during the time of the research. In the event something in a student's personal life may affect the results of the study, it is important to identify and log that information. It is also important to receive that information from the student's parents in order to correctly report the situation.

Many EBP are rooted in Applied behavior analysis (ABA) which is the "utilization of the basic principles of learning and motivation to address socially important problems" (Boutot, 2017, p. 80). Behavior analysis has three important principles to discuss and find the reasons why a behavior is occurring. The three principles are as follows: all behavior is learned, all behavior serves a purpose, and all behaviors are contextual (Boutot, 2017). These principles help guide adults to help the children with challenging behaviors. When using the analysis principles, educators are able to use early interventions to teach children appropriate behaviors and decrease the number of inappropriate behaviors.

Peer interactions and acceptance are crucial to any school aged child. This is an important developmental stage of each child. It is important to provide opportunities for students to gain these skills. It is also important to provide interventions for desired behaviors and skills based on what will be most beneficial for the student and those interacting with them. The findings of this research provide perspectives into the effectiveness of PMI in improving social and classroom behaviors. The results support the use of PMI as an appropriate intervention for students with ASD to develop social skills. It also supports the use of PMI to improve social interactions and

integration of students with ASD in a general education setting with typically developing students. Ultimately, the data indicates that PMI is a promising EBP to be used in any classroom environment.

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Appendix A

Table A1

Teacher Questionnaire

Questionnaire Statements	*Strongly Disagree*	*Disagree*	*Slightly Disagree*	*Slightly Agree*	*Agree*	*Strongly Agree*
1. This is an acceptable intervention package for the child's development age.	1	2	3	4	5	6
2. Most teachers would find this intervention package appropriate for social skills as well as the two identified.	1	2	3	4	5	6
3. This intervention package should prove effective in changing the child's social skills.	1	2	3	4	5	6
4. I would suggest the use of this intervention package to other teachers.	1	2	3	4	5	6
5. The child's developmental age is severe enough to warrant the use of this intervention package.	1	2	3	4	5	6
6. Most teachers would find this intervention package suitable for the beginning social skills identified.	1	2	3	4	5	6
7. I would be willing to use this intervention package in the classroom setting.	1	2	3	4	5	6
8. This intervention package would not result in negative side-effects for the child.	1	2	3	4	5	6
9. This intervention package would be appropriate for a variety of children.	1	2	3	4	5	6
10. This intervention package is consistent with those I have used in classroom settings.	1	2	3	4	5	6
11. The intervention package is a fair way to handle the child's social skills difficulties.	1	2	3	4	5	6
12. This intervention package is reasonable for the beginning social skills identified	1	2	3	4	5	6
13. I like the procedures used in this intervention package	1	2	3	4	5	6
14. This intervention package is a good way to meet the specified purpose.	1	2	3	4	5	6
15. Overall, this intervention package would be beneficial for the elementary school aged child.	1	2	3	4	5	6