The Effects of Reinforcement and Peer-Mediated Instruction on the Task Engagement of Children with Disabilities in Preschool Inclusion Setting

Thesis

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Abstract

This study examined the effects of reinforcement and peer-mediated instruction on student with disabilities' task engagement in a preschool inclusion setting**.** The target student participants were selected to participate because they typically played alone and showed a need for the intervention according to their classroom teachers. The peer model participants were selected because they demonstrated success with social skills such as cooperative play and joint attention while attending to an activity. After baseline data were collected, peer models completed behavior skills training for prompting instruction. At the conclusion of each session of training, a probe was completed to assess the amount of prompts each participant prompted in a 5-minute session. The criteria to move onto the intervention was to have each peer prompt 5 total times in one session. Criteria was met and each participant pair completed the intervention. A multiple baseline across participant pairs was used to evaluate the effectiveness of the intervention. Findings indicated reinforcement and peer mediated intervention improved the task engagement for students with disabilities

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Fields of Study

Major Field: Educational Studies

Area of Emphasis: Special Education, Applied Behavior Analysis

Table of Contents

List of Tables

List of Figures

Chapter 1. Introduction

Early childhood is a time for children to grow and develop. Play is an essential developmental domain at this stage (Lifter et al., 2011; Mahatmya et al., 2012). These skills are vital to lead children into future education and life experiences**.** Early childhood play "consists of spontaneous, naturally occurring activities with objects that engage attention and interest" (Lifter et al., 2011, p. 283). Development of play is for children to obtain skills that will impact their future education and life experiences. For instance, children learn social rules and begin to play cooperatively with their peers during preschool. In addition, children learn how to engage in social settings with others (Mahatmya, 2012).

There is a lack of educational experiences to gain social norms and practice social behaviors with children who experience delays in social skills. (McCollow & Hoffman, 2019). Due to this, teachers and practitioners should focus developing play skills in young children with delays and disabilities (Lifter et al., 2011). Engagement is critical in both structured and unstructured activities for children with a disability to acquire the necessary skills to develop milestones. The physical and social environments of a classroom help promote child engagement (Whaley & Bennett, 1991); however, these qualities are a stepping-stone to guide children to increase their engagement during structured activities. In addition, teachers' facilitation of play has an impact on a child's

play skills in in early childhood (Singer et al., 2014). Papacek et al. (2016) describe strategies when setting up the physical and social environments in the classroom. These strategies include choosing appropriate toys, child grouping, adult facilitation, and social stories. In the description, adult facilitation includes reinforcement and prompting throughout the play session.

Play literature concludes children with disabilities are delayed in their play skills, play is an important developmental domain, and systematic adult interventions and focusing on play skills are effective for developing play skills. (Lifter et al., 2011; Hall, 2020). There are multiple strategies and intervention to increase a child's play skills and ultimately have a positive impact on their social development. Interventions include environmental, integrated play groups, peer implemented, play materials, assistive technology, modeling and prompting, discrete trial training and much more (Movahedazarhouligh, 2018).

Peer Mediated Interventions

Peer mediated intervention (PMI) is a systematic behavioral technology of social training for children with disabilities (Odom & Strain, 1984). Kohler and Strain (1990) stated that peer assisted interventions can teach diverse skill through many settings. "Peer mediated intervention is designed to increase the social engagement with peers for children and youth" (Sperry et al., 2010, p. 257). "Play provides opportunities for positive interactions with peers and adults. When peers are engaged with the same toys in the same way, they are more likely to talk and interact with each other" (Lifter et al., 2011, p. 290).

PMI includes three types of approaches, prompting and reinforcing, initiation, and proximity. Peer proximity includes peer models who are instructed to play with the target child or teach the target child a skill. In this type of PMI, the peer models do not obtain training. During the peer initiation intervention, peer models are instructed to initiate play with the target student. This could include asking the target child to play or by handing a toy to the target child to initiate play interaction. Peer models are trained to provide an instruction prompt or provide reinforcement following at interaction between the peer model and target child during the peer prompting and reinforcement type of PMI. Peers may provide both prompting and reinforcement or individually (Odom & Strain, 1984).

Many studies have been conducted to extend the literature utilizing each type of peer-mediated intervention. These studies have been conducted with a span of a variety of age levels ranging from young children to high school students. Of the interventions reviewed, three studies were completed with young children (Watkins et al., 2015). One study made the use of PMI strategy of initiation. Ganz and Flores (2008) taught children with Autism scripted phrases for play themes as well as trained peers to use visual instruction cards to initiate interactions. The other two peer-mediated intervention studies with young children utilized the PMI strategy of prompting and reinforcing with initiation (Jung et al., 2008, Katz & Girolametto, 2013). Of these two studies, peers were trained to reinforce play interactions with target participants. They also included strategies to have peers initiate play. More research of prompting and reinforcing peer-mediated intervention with young children should be conducted.

Early findings of PMI showed effectiveness in the clinical setting (Odom, 1984) and have transitioned into the classroom. PMI "has the potential to provide multiple learning opportunities and promote experiences for spontaneous interactions between children" (Harris et al., 2009, p. 45). The Division of Early Childhood recommends the use of peer-mediated interventions to teach skills and to promote child engagement and learning (Division for Early Childhood, 2014) in early childhood settings.

Much of the PMI interventions have been focused on increasing the academic and social skills of students with Autism (Bene et al., 2014). Peer mediated social interventions have shown to increase interactions of children specifically the autism population (Watkins et al., 2015). Bene et al. (2014) meta-analysis indicated that there is evidence showing PMI's as an effective intervention for children with Autism through the evaluation of 13 reviewed studies. Odom and Strain concluded in their 1984 review that PMI is used with children, and with majority of the children being diagnosed with Autism. In the past 3 decades, practitioners have continued to focus PMI's on children with Autism. Hall (2020) concluded in her study; researchers should focus on children who do not have Autism including typically developing children while conducting peer-mediated interventions.

Odom (2019) explains future direction of PMI should be focused on combining this method with other evidence-based practices. Multi component peer-mediated interventions utilize a package intervention to extend research. Packages of these studies include, video modeling, direct skill instruction, feedback, self-monitoring, and rewards (Dueñas et al., 2021; Dueñas et al., 2019; Kamps et al., 2014; Loftin et al., 2008). To

date, there are a lack of PMI multi-component interventions with preschool students. Since 2019, Dueñas has investigated peer-mediated intervention with two other strategies to determine increase of social communication with young children with autism spectrum disorder. Dueñas et al. (2021) concluded that a multi component of peer-mediated intervention that consist of video modeling and self-management was an effective intervention to increase the frequency of social communication exchanges. Another study completed determined an increase of social communication exchanges with students with Autism that includes video modeling. Dueñas has extended the literature for peer-mediated intervention using a multicomponent with preschoolers. Future research is needed to determine multicomponent peer-mediated interventions and preschool students with a broader range of disabilities.

Behavioral Skills Training

Watkins (2015) concluded in the review a variety of procedures were used to train peers during peer-mediated intervention studies. Peer-mediated intervention requires a systematic training for peers. Storey et al. (1993) suggested for future research, documented training is essential to evaluate time and effort for training. Using a systematic approach would help extend the future research on PMI training.

The evidence-based practice Behavior Skills Training (BST) has been used to teach skills to teachers, staff, parents, and students (DiGennaro et al., 2018). BST steps include instructions, modeling, rehearsal, and feedback (Morgan & Wine, 2018). Instruction includes a description of the target behavior. These instructions could be orally given or written. The modeling step consist of the trainer demonstrating the

target skill and the rehearsal step included the trainee practicing the target behavior. Lastly, during the feedback step, the trainer provides verbal or written information about the rehearsal phase (DiGennaro et. al., 2018).

There are few studies to date that utilize BST to train peer models specifically in the early childhood setting. Covey et al. (2021) utilized BST to train middle school peer models to implement procedural steps of a play activity. The study measured percentage of procedural steps implemented correctly and percentage of intervals engaged in interactive play. The study included two intervention phases and a maintenance phase. The first intervention phase was BST with peer models and the second was interactive play activity. Results showed an increase of percentage of correct procedural steps completed by the peer models as well as an increase of intervals engaged by the target student.

Token Economies

Previous research indicates a focus of PMI should be evaluated with other evidenced based practices (Odom, 2019). Literature continues to show "a steady trend in research on token economies" (Ivy, 2017, p. 726) and continues to show effectiveness as a behavior modification technology. Token reinforcement has been an effective tool for teachers and practitioners for decreasing and increasing target behaviors (Hackenberg, 2009; O'Leary & Drabman, 1971). Token economies consist of three criteria: identifying target behaviors, identifying tokens and how to deliver them, and identifying back reinforcers for token exchange (Cooper et al., 2020). Token economies have been successfully implemented in a variety of settings and age demographics (Ivy et al.,

2017). In recent years, token reinforcement has been implemented as a behavioral intervention for increasing physical activity. Patel et al. (2019) measured intervals of moderate-to-vigorous physical activity when provided contingent and noncontingent tokens. During baseline condition participants were not provided tokens. The first phase of intervention, the participants were provided contingent tokens and during the second phase noncontingent tokens. Results indicate that contingent token economies were an effective intervention for increasing physical activity for preschool children. Alstot (2012) analyzed successful jump rope practice trials by implementing token economies with elementary school students. Results indicate the implementation of the token economy increased the number of successful jumps in 9 out of 10 of the participants.

Previous research demonstrates the positive effects on student outcomes when using peer-mediated instruction, behavioral skills training, and token economies. The purpose of this study was to examine the effects of a combined BST, PMI, and token economy package on acquisition, generalization, and maintenance of task engagement during play and to determine the acceptability of the intervention by the peer models and the teacher. Specifically, this study addressed the following questions.

1. Research Question 1: What are the effects of reinforcement and peer-mediated instruction on students with disabilities' task engagement in a preschool inclusion setting?
2. Research Question 2: Will the children maintain the task engagement level during structured center play?

3. Research Question 3: Will the children generalize the task engagement to another activity, environment, peer, or teacher?
4. Research Question 4: What are the children's opinions of the intervention package during structured activities?
5. Research Question 5: What are the teacher's opinions of the effects of the intervention package during structured activities?

Chapter 2. Method

This chapter presents the methods that were used in this study. The participants and setting are explained, and the experimenter and observer are identified. Additionally, this chapter describes the definition of dependent variables, IOA, social validity, and experimental design procedures.

Participants and Setting

The participants included in this study were preschool children enrolled in full day inclusion childcare in a Midwest metropolitan city. All students in the preschool inclusion classroom were invited to participant in this study. There were three students with disabilities and three peer model students who participated in this study. The target students were receiving special education services, and each had an Individual Education Program. Areas of services for the participants include social, adaptive, communication, fine motor, and gross motor. The target student participants were selected to participate because they typically played alone and showed a need for the intervention according to their classroom teachers. The peer model participants were selected because they demonstrated success with social skills such as cooperative play and joint attention while attending to an activity. Table 1 show demographics about the target students and the peer models.

Table 1 Participant's demographics

Student	Gender	Age	Ethnicity	Peer/Target Student (TS)	Function level	Disability Category/ Educational Category
Ashley	Female	4	Caucasian	TS	Moderate	Down Syndrome/Developmental Delay
Kendal	Female	4	Caucasian	TS	Mild	Cerebral Palsy/Other Health Impairment
Luke	Male	5	Caucasian	TS	Moderate/ Severe	Multiple Disabilities
Alexis	Female	4	Caucasian	Peer	N/A	N/A
Gunner	Male	4	Caucasian	Peer	N/A	N/A
Nicole	Female	4	Caucasian	Peer	N/A	N/A

The study was conducted in an inclusion childcare setting in a midwestern metropolitan city. The center provides childcare for children from six weeks to five years of age. The childcare is open from 7:00 AM to 6:00 PM.

The study was conducted in a preschool classroom with children from three years to five years old. Ratio in the preschool classroom were 10 typically developing children and six children who had been diagnosed with a disability and were receiving educational services from their school district.

Experimental sessions and data collection were conducted during free choice time from 8:00 to 9:00 AM and from 3:00 to 4:00 PM daily. During this time, the students were assigned to small groups and selected free choice activities in different classroom learning centers. The teachers assessed each child through their free choice play using the Assessment, Evaluation, and Programming System Curriculum.

There were three teachers who were in the classroom daily with the children, all with their bachelor's degree and one who is enrolled in a master's program.

Experimenter

The experimenter is an Early Intervention Specialist and is the lead teacher in the preschool inclusive classroom. She has a bachelor's degree in Special Education K-12 (Mild) and Deaf Education K-12. She is currently enrolled in classes to obtain her master's degree. The experimenter has been teaching for seven years. The first two years she taught in a moderate-intensive classroom in a title one southern school district. The last five years, she has been teaching in the preschool inclusion setting.

Observer

Observer included a behavioral aide volunteer of the center. The observer is a master's student in Special Education with an emphasis of Applied Behavior Analysis and Visual Impairments. The Observer provided IOA and a model during the peer behavior skills training phase.

Materials

Materials for this study consists of token board, tokens, choice board of backup reinforcers, interval timer, blocks, backup reinforcers, and a dry erase marker. The Token

board was a printed board made from Microsoft Word with twelve 1 in. by 1 in. squares. The dry erase marker was used to highlight the criteria to earn backup reinforcer for each session. The choice board was also created in Microsoft Word which included pictures of backup reinforcers that were preferred items to each peer participant in the preference assessment. The free interval timer app was downloaded to the classroom I Pad for the use of this study. Each participant pair had a set of blocks to play and build with. Gunner and Luke used large soft blocks. Ashely and Nicole used mega blocks, and Alexis and Kendal used small colored wooden blocks. Classroom had all block materials accessible in the toy closet. Backup reinforcers were also supplied by the classroom. These included, Pokémon action figures, PJ Mask action figures, paint, paint materials, and YouTube on classroom I Pad for Kids Bop and The Learning Station song videos.

Definitions and Measurement of the Dependent Variables

The dependent variable for the target students in this study was percent of intervals of task engagement. Task engagement is defined as interaction with another and an activity. The dependent variable was measured using momentary time sampling. Each participating pair has a differentiating task engagement based upon teachers' report on the level of play the target student is currently exhibiting. In addition, each pair had differentiating blocks that were used. Listed below are each participant pair's definition of task engagement and type of blocks described.

Table 2. Pair engagement definition

Participating Pair	Block Type	Play Engagement Definition
Ashley & Nicole	Mega blocks	Building on the same structure together.
Luke & Gunner	Large square blocks	Joint attention on the blocks. Both eyes on the blocks at the same time.
Kendal & Alexis	Small wooden blocks	Taking turns building on the same structure

Each session was 5 minutes. The experimenter verbally invited both target student and peer model to play with blocks together. Once the peer model and the target participant were at the table with the blocks the session started, and the experimenter started the timer. The experimenter applied a 15 second momentary time sampling recording to measure the target participant's active engagement. In addition, the experimenter collected count data on the number of prompts the peer model attempted to make during each session using a token board. At the end of each session the total count was recorded on a data collection sheet. The experimenter collected anecdotal records. When the session timer was complete, the session was over. The target student and peer model were able continue playing with the blocks or they choose to interact with another activity, student, area, or teacher.

The peer-mediated instruction of prompting the target participants was measured by counting the number of tokens that the peer model received during each session. Each token counted as 1 prompt per session. The implementation of reinforcement was measured by the number of tokens on the peer token board received.

Interobserver Agreement

On 33% of the experimental sessions, a second observer was present to score time engaged in task engagement of the target students. The second observer observed the peer mediated instruction of prompting. The primary data collector and second observers scores were compared. Percent IOA was calculated by dividing agreements by agreements plus disagreements and multiplying by 100.

Procedural Integrity

Second observer to complete procedural integrity checklist during intervention sessions. Observer would document with a + or – if the step was completed. Percentage of steps implemented correctly would be calculated by the number of correct steps divided by the total number of steps implemented then multiplied by 100.

Experimental Design

A multiple baseline across participants design was used to examine the effectiveness of reinforcement and peer-mediated instruction on students with disabilities' task engagement in a preschool inclusion setting. The experimental phases are as follows: baseline, peer training, intervention, and generalization. The outcome of this study was assessed using a multiple baseline across participant's design. Generalization was conducted throughout the baseline and intervention phases.

Procedures

Baseline. The experimenter collected baseline data on the duration of active play between peer models and target students during free play. Experimenter used momentary time sampling to collect the baseline. Peer models target behavior was measured by a frequency count procedure. The experimenter asked both the peer model and the target participant if they would like to play with blocks together at a table in the classroom. The experimenter started the timer when both the peer model and the target participant at the table with the blocks. When the session timer was complete, the session is over. The target student and peer model could continue playing with the blocks or they choose to interact with another activity, student, area, or teacher.

Peer training with BST. In the first intervention phase, Experimenters used BST to teach peer models to implement task engagement activities and prompting with target students. Peer models were trained to implement prompting peer mediated intervention. After each session, the experimenter probed each peer and target student to assess the prompting the peer provides to the target student. The experimenter collected data by measuring the count of the prompts the peer model provides during the 5-minute interval. Criteria was set for the peer model to provide 5 prompts within the 5-minute interval with or without experimenter prompts. Once the criteria were met, the participants began the intervention phase.

Intervention. Prior to the intervention sessions, the experimenter conducted a preference assessment with each peer model. During the second intervention phase, peer models implemented the previously mastered procedural steps to teach target students

task engagement. The duration of interactive play between peer model and target students was measured by experimenters using momentary time sampling recording. The baseline and intervention phases of the study lasted 20 weeks including two weeks for peer model training. During each session, the participants interacted together for a total of 5 minutes. Sessions occurred two times per week. Experimenters recorded the number of prompts peer models deliver to target students per session using count measurement procedures by token economy. Data from the two intervention phases was compared relative to each other as well as relative to baseline levels of behavior to determine the effectiveness of the intervention.

Generalization. Generalization probe was assessed when target student and peer model engaged in different activities. Generalization probes were conducted during play intervention and baseline phases. At least one generalization probe was conducted for each pair of participants during each phase.

Social Validity. A social validity questionnaire will be given at the end of the intervention for teachers, and peer models. The questionnaire determined if the intervention was deemed effective and relevant for the classroom. The teacher questionnaire included five items to be answered by the teacher at the completion of the intervention. The questionnaire was scored on a 5-point rating scale (1-No, 2-Less, 3, Neutral, 4-More, 5-Most). The social validity questionnaire also had one open ended question for teachers to complete.

The participants answered social validity questions through verbally stating “yes” or “no” when asked a question. Scores will be documented by counting the number of

“yes” and “no” responses. The more “yes” responses indicate the more accepting the intervention was in the classroom.

Chapter 3. Results

This chapter presents the results of interobserver agreement (IOA), procedural integrity, student outcomes, and social validity.

IOA

IOA was calculated for the dependent variable during baseline and intervention conditions by a second trained observer for at least 33% of all phases. IOA was calculated by dividing agreements by agreements for task engagement then adding disagreements and multiplying by 100. IOA across all participating pairs and all phases of the experiment was 95**%**.

Procedural Integrity

Second observer completed one procedural integrity checklist during one session of intervention. Observer only completed one due to scheduling conflicts. The results of the checklist were 100%.

Task Engagement

Ashley and Nicole. The first participating pair was composed of participants Ashley (target student) and Nicole (peer model). Task engagement definition for this pair included building on the same structure. Ashley and Nicole's baseline was steady with a slight upward trend. Ashley's engagement during intervention increased to 10% immediately and ended at 30% engagement at the end of the end of the intervention. This is an increase from her baseline engagement. Nicole prompted Ashley once during the first session of baseline. After intervention, Nicole prompted Ashley a minimum of 7

times during the 5-minute sessions. Nicole's prompts in probe and intervention required a prompt from the experimenter during the first two sessions. The criteria for number of prompts during the session was set based on BST intervention phase. Nicole met the criteria each session and received her backup reinforcer. Nicole and Ashley were also assessed during an unstructured dramatic play session during both baseline and intervention. Reinforcement, experimenter prompting, and token board was not present during these sessions. Nicole was able to generalize her BST training to this different activity. Nicole prompted Ashley during the intervention generalization 5 times total.

Table 3. Nicole number of prompts

Session	Number **prompted** prompts given by peer to target student	Number **unprompted** prompts given peer to target student
1	N/A	1
2	N/A	0
3	N/A	0
4	N/A	0
5	N/A	0
6	1	5
7	3	3
8	0	6
9	0	6
10	0	6
Baseline generalization	N/A	0
Intervention generalization	N/A	5

Table 4. Nicole's probe prompts

Probe session	Number of prompts given by peer to target student
1	1
2	5
3	8

Luke and Gunner. The second pair was composed of participants Luke (target student) and Gunner (peer model). Task engagement for Luke and Gunner was to have joint attention on the building blocks. Each participant would be looking at the blocks at the same time. The baseline data shows an outlying data point that overlaps with two intervention data points. Luke's engagement percentage during intervention maintained an increase level from his baseline sessions. During baseline, Gunner prompted Luke 4 times in the first session and then did not prompt in the remaining baseline sessions. Criteria for the number of prompts were based on BST intervention. Results of the number of prompts are below in Table 5. The criteria for Gunner each session was 6. During intervention, Gunner prompted up to a total of 12 times during each session. Gunner required prompting from the experimenter at the beginning of each session. Gunner and Luke were assessed during an unstructured dramatic play activity during baseline. Gunner and Luke both left the center prior to the completion of the intervention generalization probe. More data must be conducted to determine if the intervention was effective in increasing task engagement for Luke.

Table 5 Gunner number of prompts

Session	Number **prompted** prompts given by peer to target student	Number **unprompted** prompts given peer to target student
1	N/A	4
2	N/A	0
3	N/A	0
4	N/A	0
5	N/A	0
6	N/A	0
7	4	7
8	3	9
9	2	10
10	2	7
Baseline generalization	N/A	0

Table 6 Gunner probe prompts

Probe session	Number of prompts given by peer to target student
1	1
2	5
3	8

Kendal and Alexis. The third participating pair was composed of participants Alexis (peer model) and Kendal (target student). Task engagement definition for Kendal was to take turns while building together using small wooden blocks. Kendal and Alexis completed two baseline sessions. Due to Kendal's school attendance, the participation pair left the study. In prediction with the study's results, Kendal's engagement would increase. In the 2 baseline sessions Kendal did not engage in her target behavior.

Table 7 Alexis number of prompts

Session	Number **prompted** prompts given by peer to target student	Number **unprompted** prompts given peer to target student
1	N/A	0
2	N/A	0

Social Validity

Following the completion of the study, the teacher was asked to complete a questionnaire to rate the extent to which they felt the intervention was effective in increasing task engagement for students with disabilities and the feasibility of the peer-mediated intervention. The teacher who completed this questionnaire was the general education teacher. The experimenter was his co-teacher in the classroom. Results showed positive remarks for the intervention package in the childcare classroom. The questions and answers are as follows:

1. The intervention was successful in increasing the engagement of children with disabilities during play.
   Yes No

2. I would use the intervention package (token board, reinforcement, and peer mediated instruction) again in your classroom.
   Yes No

3. I notice an increase of engagement during another center.
   Yes No

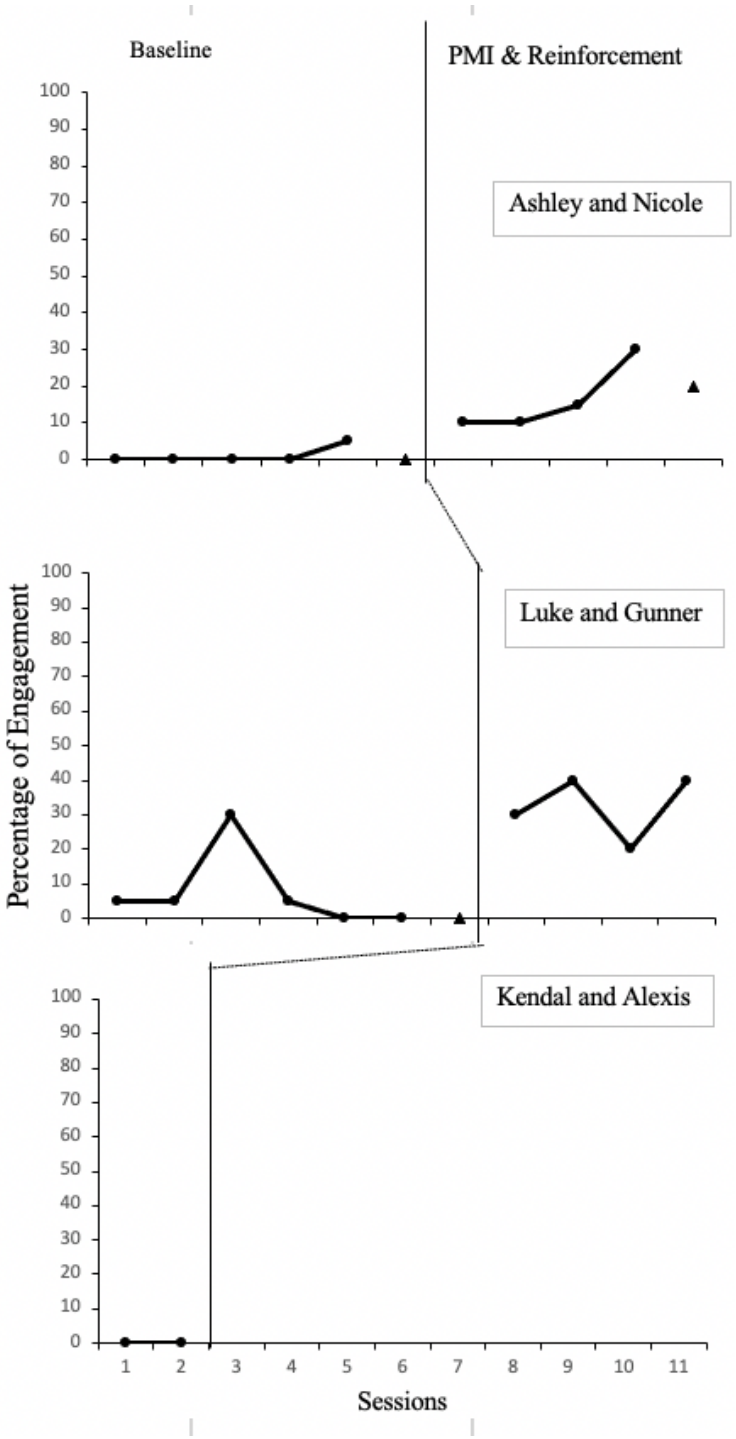
4. The intervention package (token board, reinforcement, and peer mediated instruction) was easy to implement in the center.
   1 2 3 4 **5**
5. Do you have any recommendations for future intervention?
   "With this implemented on a small-scale basis, I would have loved to see it done as a whole class study. With it being successful with just a small sample size, the

overall goal of getting every kid involved with this study would prove to be successful."

The peer models were also asked to complete a questionnaire to rate the acceptability of the intervention. The experimenter verbally stated the questions and the peer models responded by verbally stating "yes" or "no" to each question. Results showed positive for the acceptability of the intervention. Along with positive acceptability from the questionnaire, teacher reported peer models requested to play with their pair during daily classroom activities. The questions and answers are for each question are as follows:

1. Did you enjoyed earning stars to earn (Dance party/ Pokémon figures)? Yes and yes
2. Did you would like to earn (stars and dance party/Pokémon figures) in other activities in the classroom? Yes and yes
3. Did you enjoy playing with your friends while working to earn (stars and dance party/Pokémon figures)? Yes and yes

Figure 1 Percentage of task engagement



Chapter 4. Discussion

This chapter presents answers to research questions, limitations of the present study, implications for practitioners, and overall conclusions.

Research Question 1: What are the effects of reinforcement and peer-mediated instruction on students with disabilities' task engagement in a preschool inclusion setting?

The results indicate the intervention package of peer-mediated intervention, behavior skills training, and token reinforcement was effective in increasing task engagement for preschool students with disabilities. Ashley and Nicole's intervention condition shows a steady upward trend of Ashley's percentage of engagement per session. Ashley's engagement in building together in baseline condition was 0%, with a slight increase on the last baseline session at 5%. During the intervention condition, Ashley's engagement increase to 10% and had an upward trend in the last two sessions to end with 30% engaged. Concurrent with the percentage of engagement, Nicole's number of prompts increase after the completion of the behavior skills training with the use of token reinforcement. During baseline condition, Nicole prompted Ashley once during the first baseline session. Her prompts increased to 6 times during the intervention sessions.

Luke and Gunner's intervention phase showed an increase of engagement; however, their intervention data is variable. Thus, more data should be conducted to determine whether the intervention was effective at increasing Luke's task engagement. Gunner and Luke's baseline was variable and then showed a steady trend. The intervention phase showed an increase of engagement from the baseline phase with an

increasing variable trend. Luke was engaged during the intervention 20%, 30%, and 40% of the sessions. This showed an increase from baseline condition. There was one session of the baseline Luke was engaged 30%. Three more baseline sessions were completed after to show steady data.

The current study extends the current research of the package of peer-mediated intervention for preschool students. Previous research indicates utilizing PMI's with other populations besides autism spectrum disorder (Hall, 2020). This data suggests PMI's are an effective behavioral technology for preschool children with disabilities. Second, there is a lack of literature implementing a systematic training method with peer-mediated interventions (Covey et al, 2021). The study applies the behavior technology of BST. Using BST, this study extends the literature by systematically training peer models. Another way this study extends the literature is by examining a different age population to train peer models to provide prompts for target children. To date, there has been few studies that have applied BST to train preschool peer models. Of the studies completed, they have been targeted for middle school students (Covey et al., 2021). Literature in token economies concludes this behavioral technology has a positive effect across settings and participants (Hackenberg, 2009; Ivy et al., 2017). This study extends the literature for token economies as it pairs with other behavioral interventions.

Research Question 2: Will the children maintain the task engagement level during structured center play?

The study ended due to participants leaving the center ahead of the completion of a maintenance condition.

Research Question 3: Will the children generalize the task engagement to another activity, environment, peer, or teacher?

Generalization probes were completed during an unstructured dramatic play activity with Nicole and Ashley during baseline and intervention conditions. Gunner and Luke completed a generalization probe during baseline. Nicole and Ashley's probe indicated that Nicole generalized BST instruction to another activity with Ashley. Results are shown in figure 1.

Research Question 4: What are the children's opinions of the intervention package during structured activities?

Peer model participants opinions were obtained by a yes/no questionnaire. The questions were provided by the experimenter verbally to peer models to answer. The questions are documented on Appendix C. Overall, the peers had positive opinions about the study. The results of the peer's social validity questions are stated in chapter 3. In addition, the peer models would ask the teacher/experimenter during classroom activities to play with the target student.

Research Question 5: What are the teacher's opinions of the effects of the intervention package during structured activities?

The teacher's opinions were obtained by a written questionnaire. The teacher was asked to fill out and return to the experimenter. The experimenter documented the peer models responses. The questionnaire is documented on Appendix C. Overall, the teacher had a positive opinion about the study. The results of the teacher's questionnaire are

stated in chapter 3. Additional comment suggested future research for the intervention package be implemented with the whole class.

Limitations and Future Research

There are some limitations of this experiment future researchers should acknowledge. During the time of the study, the center's schedule was altered which included 4 quarantines for the participants due to an exposure of COVID 19. In addition, Kendal was absent for 3 weeks during the end of baseline and intervention phases. Due to this, Kendal and Alexis did not continue with the experiment after the second session of baseline. Along with participants schedules, classroom schedule was also a limitation found. As the experimenter was also the teacher in the classroom, it was difficult to pull only two students to complete the sessions. Other children in the classroom were coming up to the experimenter asking questions or requesting help. While the study was occurring, the center was functioning with limited staffing as well as a modified daily schedule. This was a limitation found in the study and future research should allow more resources such as staff to be present while implementing an intervention.

Another limitation was that no maintenance condition was conducted. Peer participants left the center prior to completion. Future research should allow for a maintenance condition to determine if the intervention package effectiveness would be maintained. By conducting a maintenance condition, future research would have a better experimental control.

Due to scheduling, a second observer only completed one fidelity checklist during the intervention to determine if the instructions given to the participants were completed

correctly. Future research should allow for a second observer to complete procedural integrity checklist to determine the parentage of correct steps.

Limitations during intervention condition includes experimenter providing a prompt to peer prior to prompting the target participant on most sessions. Experimenter provided more prompts during beginning sessions of intervention. Prompted and unprompted prompts are recorded in tables 3 and 5**.** As the study continued, the experimenter provided less prompts to peers with minimal prompts provided to Gunner. However, future research should continue to work towards less adult prompting during intervention.

One last limitation is based on the social validity results. The experimenter worked in the classroom as the study. Peers and teachers might have responded to the questions based on their relationship with the experimenter. Future research should be implemented in classrooms where the data can be assessed objectively. Future studies should be implemented where there is no previous relationship with the staff and students in the center. This could also affect peer and target participant willingness to participant in the study.

Implications for Practitioners

As the trend of inclusion increases, early childhood and childcare classrooms are enrolling both peer models and students with disabilities. Effective intervention should be implemented to increase skills of students with disabilities. Teachers and practitioners could use this intervention package in their classroom to increase the engagement of students with disabilities. Teachers and practitioners should facilitate this in their

classrooms. One way for this to occur is to implement this intervention with the peer models in the classroom.

Teachers could also implement this package as a whole class intervention. As this study proved to be affected for a pair of children, the implementation whole group could reach more children in the classroom. There is a lack of time and resources in the early childhood classroom to pull individual children for intervention. Teachers could implement this intervention whole or small group as it will save time and resources to train and implement.

Peer models in inclusive settings may not naturally be reinforced to share or help others. Training peer models may not be enough to have the peers provide prompts. This study shows token reinforcement paired with BST was effective for reinforcing peers to prompt target students while playing. Teachers could implement this study to reinforce peer models to preform instruction to students with disabilities.

This intervention could serve as a foundation for children to build friendships. Learning to cooperatively play with others and skills to build friendships is acquired during the early childhood years (Mahatmya, 2012). Along with the peers' positive results on the social validity questions, teachers also reported peers requesting to play with the target participant throughout the day. Teachers and practitioners could use this intervention to allow peers and children with disabilities to get to know one another and to foster a friendship. By promoting friendships, the teacher would encourage an environment for children with disabilities to develop social skills.

Another implication for teachers and practitioners is to work towards generalization of this intervention. The current study shows this package was effective in improving engagement. It also showed effectiveness in generalizing engagement levels across different activities. The peer models were able to prompt target students while engaged in an unstructured dramatic play activity. Teachers should implement this intervention in different settings, activities, and different participant pairings.

A final application for teachers and practitioners is the usage of BST. Behavior skills training is a systematic approach to train peer models. Teachers and practitioners could apply BST while training peer models during peer-mediated interventions. Peer models would receive replicated training instructions as this study did by applying BST.

Conclusion

In conclusion, children with delays and disabilities require evidence-based interventions to increase their play skills. Peer-mediated interventions is one method to increase these skills. This study shows that the implementation of PMI was effective when paired with BST and token reinforcement in increasing children with disabilities engagement in a play task. The target participants engagement increased during this intervention. Behavior skills training was effective at training peer models to prompt while playing with the target participant. In addition, utilization of the token board was also effective in reinforcing the peer modeling during intervention. This intervention package could be applied in early childhood classrooms to improve skills in children with disabilities. Based on the results of this study, teachers and practitioners could apply this intervention with a small group or whole class to increase skills in children who are

delayed or have a disability. Implementation of the intervention could also serve as a foundation of friendship between target students and peers.

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Appendix A. Token Board

Figure 2 Token board

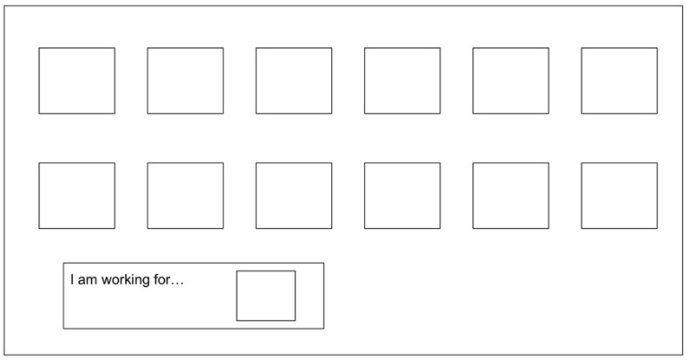
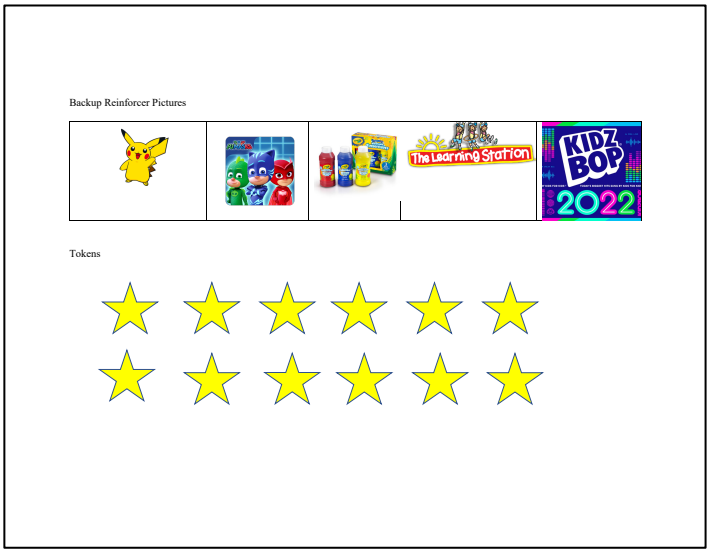


Figure 3 Backup reinforcers and tokens



Appendix B: BST Scripts

Ashley and Nicole

1. Instruction
    a. We want you and target student to build a house/car together
        i. State to peer "It would be great for you and Ashley to build together. Sometimes, Ashley might need a friend to tell her where to put the blocks or show her where to place the blocks. If Ashley doesn't put the blocks where you tell her, maybe you could build onto what she is building by asking her to build and then placing blocks onto her building."
        ii. "Ms. M and I will show you how to tell her or show her. Ms. M is going to pretend to be Ashley and I will pretend to be you! Listen to my words and watch my hands as I show her where to put the blocks." Sometimes Ashley might need you to tell her more to place the blocks onto the building that you are building together. You can continue telling her and showing her.
2. Modeling
    a. Experimenter and target student (TS) role play. Observer is target student and Experimenter is peer.
        i. Role play TS building her own building separately. Experimenter prompts and M follows prompt.
            1. "Ashley let's build blocks together. Can you put a block on top right here?" (Peer pointing to the area she would like TS to put the block. TS places block on the area. "Let's keep building together!"
        ii. Role play TS building her own building separately. Peer prompts and TS does not follow prompts.
            1. "Ashley let's build blocks together. Can you put a block on top right here?" (Peer pointing to the area she would like TS to put the block. TS does not follow direction continues placing blocks on her building.) "Ashely, can I build with you?" (Peer places block on Ashley's building."
3. Rehearsal
    a. Observer will be target student playing with peer model.
    b. When peer successfully prompts 5 times within a 5-minute session, behavior skills training is completed and moved onto second phase of intervention.
4. Feedback
    a. While rehearsing Experimenter will provide feedback via verbal prompts to peer model.

Gunner and Luke

1. Instruction
    a. We want you and target student to look at the blocks together while building.
        i. State to peer “It would be great for you and Luke to build together. Sometimes, Luke might need a friend to remind him to look at the blocks you are building. You can tell him and show him with your hands.”
        ii. “Ms. M and I will show you how to tell him and show him. Ms. M is going to pretend to be Luke and I will pretend to be you! Listen to my words and watch my hands as I show her where to look at the blocks. Sometimes, Luke might need you to tell him more to look at the blocks that you are building together. You can continue telling him and showing him.
2. Modeling
    a. Experimenter and Observer role play. Observer is target student (TS) and Experimenter is peer.
        i. Role play TS building her own building separately. Peer prompts and TS follows prompt.
            1. “Luke look at the blocks; let’s build a tower/house. (Peer pointing to the area she would like TS to look. TS looks at the blocks.”
3. Rehearsal
    a. Observer will be target student playing with peer model.
    b. When peer successfully prompts 5 times within a 5-minute session, behavior skills training is completed and moved onto second phase of intervention.
4. Feedback
    a. While rehearsing Experimenter will provide feedback via verbal prompt to peer model.

Appendix C: Social Validity Questions

Questionnaires for Teachers
Answer the questions

6. The intervention was successful in increasing the engagement of children with disabilities during play.
Yes No

7. I would use the intervention package (token board, reinforcement, and peer mediated instruction) again in your classroom.
Yes No

8. I notice an increase of engagement during another center.
Yes. No

9. The intervention package (token board, reinforcement, and peer mediated instruction) was easy to implement in the center.
1 2 3 4 5

10. Do you have any recommendations for future intervention?

_____
_____
_____

Questions for peer models:
Have peer models raise their hands if they agree. Experimenter will verbally state the questions. Experimenter will verbally prompt peer models to raise hands.

If they agree (yes/raise hand) or not (no/keep hands down)

4. You enjoyed earning (tokens) to earn (reinforcers)?
5. You would like to earn (tokens and reinforcers) in other activities in the classroom?
6. Did you enjoy playing with your friends while working to earn (tokens and reinforcer)?

Appendix D: Procedure Integrity Checklist

Procedure Integrity Checklist
Experimenter_____ Observer_____ Date:_____
_____

Definition of CORRECT Skills Implementation:
Performing the required skills with independence and 100% accuracy.

Definition of INCORRECT Skills Implementation:
Performing the required skills with less than 100% accuracy.

Directions:
Record a plus sign (+) if the step was completed with independence and 100% accuracy. Record a minus sign (-) if the step was skipped or completed inaccurately.

BST Steps	+/-
Deliver oral instruction along with visuals on staying on task and engagement for children with disabilities.	
Deliver instruction to peer models on prompting procedures.	
Show peer models a model of the prompting procedure.	
Place peer models and target participants into pairs and have peer participants practice and rehearse the interactive play procedure. Provide praise and feedback during rehearsal as necessary.	
Assess % of unprompted and prompted target behaviors correctly conducted by peer participants using data collection form and conduct training as necessary.	
% of steps implemented correctly (number of correct steps/total number of steps implemented x 100)	

Procedure Integrity Checklist
Experimenter_____ Observer_____ Date:_____
_____

Definition of CORRECT Skills Implementation:
Performing the required skills with independence and 100% accuracy.

Definition of INCORRECT Skills Implementation:
Performing the required skills with less than 100% accuracy.

Directions:
Record a plus sign (+) if the step was completed with independence and 100% accuracy. Record a minus sign (-) if the step was skipped or completed inaccurately.

Peer-mediated Steps	+/-
Ask each participant: "We have (activity) out, do you want to join your friend to play?"	
Observe one peer/target participant pair at a time (5-10 minutes each)	
Record peer models prompting delivery behavior.	
When there is an opportunity for peers to prompt the target participant, prompt the peer model to exhibit prompt procedures if the behavior did not occur within 5 seconds of the opportunity.	
Provide token on board within 3 seconds of peer providing prompt to target participant during intervention phase session.	
Calculate percentage of intervals of task engagement and record on data sheet and calculate the number of prompts the peer model provided the target participant during the session.	
% of steps implemented correctly (number of correct steps/total number of steps implemented x 100).	