Using Behavioral Skills Training to Teach Peer Models: Effects on Interactive Play with Students Who Have Moderate to Severe Disabilities

THESIS

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Abstract

This study examined the effects of using Behavioral Skills Training (BST) to train peer models on the percent of intervals engaged in interactive play by students with moderate to severe disabilities in the classroom. The percent of intervals engaged in interactive play was measured by direct observation using partial interval recording. The percent of procedural steps implemented correctly by peer models after receiving BST was measured via a checklist data sheet which aligned with the peer models' task analysis. The participants of this study consisted of four students with multiple disabilities (target students) and four typically developing students (peer models). The target students were between the ages of six and eight. The peer models were all age twelve. Two separate multiple-baseline across participants designs were used to evaluate the effectiveness of BST on the peer models' implementation of the procedural steps over time and the target students' percent of intervals engaged in interactive play. Findings indicated that BST was an effective method for teaching all four peer models to implement procedural steps for interactive play to mastery and that mastery was maintained over time. Findings also indicated that using BST with the peer models resulted in an increased percentage of intervals engaged in interactive play for all four target students. Three out of four target students maintained increased engagement in interactive play over time. Both the target students and the peer models were able to generalize their skills to novel activities and play partners.

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Chapter 1: Literature Review

Social Skill Deficits in Students with Moderate to Severe Disabilities

Research has brought to the public's knowledge that individuals with moderate to severe cognitive disabilities often have difficulties not only with academic skills, but also with adaptive behavior skills (Kemp, 2016; Pitchford, 2018; Simpson et al., 2016). The umbrella of adaptive behavior includes skills such as communication and social interaction. Students with moderate to severe disabilities generally have trouble establishing and maintaining friendships, are often excluded from various play activities as a result of their cognitive or physical abilities, and have generally limited social interaction with same-aged peers without disabilities. Within the current study, three main categories of significant disabilities were represented by the target student participants: Autism Spectrum Disorder (ASD), Intellectual Disability (ID), and Multiple Disabilities (ID-Cerebral Palsy (CP)). All three disability categories have their own characteristics and deficit areas when it comes to social skills.

The Individuals with Disabilities Education Act (IDEA) defines Autism as "a developmental disability significantly affecting verbal and nonverbal communication and social interaction, generally evident before age 3, that adversely affects a child's educational performance" (U.S. Department of Education, 2017). There has been a multitude of research done on the "impairment in social skills" and difficulties within social contexts for individuals with ASD to make it a well-known characteristic of the disability (Kemp, 2016). Students with severe ASD often have "infrequent or no engagement in social interaction with peers" (Lee et al., 2007) and "few social initiations and responses to initiations of others" (Kemp, 2016). Limited social skills for students with ASD often result in social exclusion despite being physically

included with typical peers, difficulty establishing friendships, and trouble maintaining relationships with typical peers (Simpson et al., 2016).

Intellectual Disability according to IDEA is defined as "significantly subaverage general intellectual functioning, existing concurrently with deficits in adaptive behavior and manifested during the developmental period, that adversely affects a child's educational performance" (U.S. Department of Education, 2017). Oftentimes, the social skills deficits of students diagnosed with ID are buried beneath the significant intellectual delays that are present. Individuals with ID, like those with ASD, have deficits in social skills that are part of the delay in adaptive behavior characterized in the very definition of the disability category. "Research has shown that students with ID have more difficulties in sustaining social interactions than their typically developing peers" (Bortoli & Brown, 2008). There is also research supporting that deficits in the social skills of individuals with ID correlates to an overall lower quality of life, as peer acceptance and social connectedness is less occurring (Nota et al., 2007).

Individuals with Multiple Disabilities according to IDEA can be characterized as having "concomitant impairments (such as mental retardation-blindness, mental retardation-orthopedic impairment, etc.), the combination of which causes such severe educational needs that they cannot be accommodated in special education programs solely for one of the impairments" (U.S. Department of Education, 2017). Similar to students diagnosed with ID, social skills for students with multiple disabilities are often placed in order of priority below self-help skills, independent life skills, and/or pre-academic or academic skills. Many children with moderate to severe multiple disabilities are "unable to effectively interact with their peers" because of their limited social skills (Knapczyk, 1989).

The overall trend of social skill deficits observed by the research amongst students with a range of moderate to severe disabilities emphasizes the importance of teaching social skills to students with moderate to severe disabilities using effective interventions.

Importance of Social Skills Instruction

The development and acquisition of social skills and a child's ability to positively interact with their peers is viewed as a "fundamental element of early childhood" by researchers (Brown et al., 2001). Social skills are critical for children's overall success in their "social, emotional, and cognitive areas of life" (Otero et al., 2015). Social skills enable children to be successful and function both in and out of the school setting (Lynch & Simpson, 2010; Sullivan & Sadeh, 2015). The development of social skills, therefore, is even more critical for those children whose disability predisposes them to deficits in a variety of social and communication skills, as they are more "at risk for peer interaction difficulties and poor peer relationships during early childhood" (Brown et al., 2001). Social skills instruction beginning at a young age for those students who demonstrate deficits is necessary for their acquisition of social skills (Pitchford, 2018).

The focus on social skills instruction has recently become more prevalent as a result of several factors, including the push for inclusion and positive inclusion outcomes, as well as the observance of social isolation of students with moderate to severe disabilities. According to sociometric status research done in the 1980s, individuals with moderate to severe disabilities are more likely to be rejected and less likely to be accepted by classmates than their peers without disabilities (Farmer et al., 1996). This social isolation experienced by individuals with moderate to severe disabilities, in turn "prevents the formation of social relationships, which are essential for early social development" (Lee et al., 2007).

Since the enactment of the Education of All Handicapped Children Act (EAHCA) of 1975 and other laws such as IDEA, more students with moderate to severe disabilities are being included in not only public schools, but also mainstreamed into general education classes with their typically developing peers with support (Kemp, 2016). Including students with disabilities with their peers without disabilities has not only been proven beneficial for improving academic skills, but also for "promot[ing] social skills and social interaction" between the two student groups (Kemp, 2016). As a result of this push for inclusion, an emphasis on social skills instruction has increased in an attempt to promote positive social interactions in inclusive environments and overall "positive inclusion outcomes" (Kohler et al., 2007) for students with and without disabilities (Knapczyk, 1989).

Social skills are now a recommended component of intervention packages for students with moderate to severe disabilities; however, it is critical that the interventions used to teach social skills are effective (Kemp, 2016). Research has found a variety of strategies that have been effectively used to improve social skills and social interactions between students with disabilities and their peers without disabilities. Such strategies include social stories, social comic strips, role playing, naturalistic interventions, social skills training, video modeling and modeling, prompting, reinforcement, and peer-mediated interventions (PMI) (Kemp, 2016). Many educators and researchers have begun looking into interventions that have a peer interaction component, such as PMI, because of the "critical nature of young children's peer-related social competence" (Brown et al., 2001). Importance is being placed on using social skills interventions which utilize "modeling and social reinforcement" strategies (Bellini, 2011), "increase students' motivation to interact with adults and peers" (Taylor, 2013), promote generalization and maintenance of the social skills being taught, and which take place within the

natural setting, such as the classroom or playground (Pitchford, 2018). PMI is an intervention which incorporates all of these recommended components of effective social skills instruction (Alwahbi, 2017).

Peer-Mediated Intervention

PMI Background and Definition

Peer-mediated interventions are "grounded in the framework of Vygotsky's sociocultural theory" which states that social interaction amongst peers plays a large role in overall learning and cognition (Simpson et al., 2016). Peer-mediated interventions are those which utilize and train peer models in an effort to improve the social interactions and overall social skills of individuals with disabilities. PMI involves training peers to use a varying number of strategies in order to "facilitate interaction with children with autism or other developmental disabilities" (Goldstein et al., 2007). During PMI, the peer models become the interventionists who model, prompt, and reinforce desired social behaviors for the targeted students with disabilities in the natural setting with minimal supervision from practitioners (Alwhabi, 2017; Simpson et al., 2016). There are four main steps involved in PMI including selecting the peer models, selecting the targeted social behaviors for students with disabilities, training the peer models, and progress monitoring (Battaglia et al., 2014). PMI provides ample opportunities for students with disabilities to contact naturally occurring social reinforcers, which increase the likelihood of generalization and maintenance of improved social behaviors over time and across novel activities, peers, and settings (Battaglia et al., 2014).

There are several advantages to using PMI over adult-mediated interventions. To begin, PMI utilizes peer models as interventionists which decreases the demand placed on educators (Battaglia et al., 2014). Although PMI may require more work in the forefront of

implementation, once peer models are taught to initiate and respond to social interactions using specific strategies to mastery, the need for adult support decreases and peer models can fully serve as social skills intervention agents (Battaglia et al., 2014). Another advantage to using PMI is that they can take place in a variety of natural settings including the self-contained special education classroom, sensory room, playground, and general education classroom. This allows students with disabilities more opportunities to practice applying their social skills in naturally occurring social contexts (Battaglia et al., 2014). An additional advantage to using PMI over adult-mediated interventions is that students with disabilities are provided with opportunities to learn social skills by "simply observing and interacting with their peers" without disabilities (Harris et al., 2009). Not only does PMI have proven advantages for students with disabilities, but research also demonstrates that PMI has several advantages for typically developing peers. Using PMI helps typically developing peers "[learn] to accept and appreciate individual differences among peers", "[develop] leadership skills", and "[increase] self-confidence by being positive role models" (Harris et al., 2009).

In an article written by Odom and Strain in 1984, there were three types of peer-mediated interventions identified which included "peer-proximity, prompt and reinforce, and peer initiation" (Harris et al., 2009; Odom and Strain, 1984). Odom and Strain defined the peer-proximity model of PMI as interventions in which typically developing peers are put in an environment with their peers with disabilities and are instructed to interact or play (Odom and Strain, 1984). Prompt and reinforce models of PMI are defined as interventions in which typically developing peer models are taught prompting and reinforcing techniques in an effort to gain a desired behavior from their peers with disabilities (Kemp, 2016). Lastly, peer-initiation models of PMI are defined as interventions in which typically developing peer models are taught

to initiate social interactions with their peers with disabilities, leading to an increased number of opportunities for their peers with disabilities to respond (Hart et al., 2018; Odom and Strain, 1984). Most of the research studying PMI has used a combination of peer prompting and reinforcement and peer initiation in an attempt to "promote social interaction skills" in the natural setting (Harris et al., 2009).

During the 1970s and 1980s, original research was conducted by Strain and colleagues showcasing that when typically developing children were taught to initiate social interactions with their peers with Autism, improvement in overall social skills and social play resulted for the individuals with Autism (Goldstein et al., 2007). This initial research by Strain and colleagues was replicated and expanded upon by future research and has led to the recognition of PMI as a best practice in inclusive early childhood education settings (Goldstein et al., 2007; Robertson et al., 2003).

Effects of PMI Found in Previous Research

PMI has been proven to be effective in addressing a variety of social behaviors and improving social skills deficits for individuals with disabilities "with different functioning levels and ages" (primarily those with Autism) across multiple settings (Battaglia et al., 2014; Kemp, 2016). Reviews of the literature on PMI have found conclusive results determining PMI to be "effective for increasing a variety of social skills, including joint attention, communication, initiations, maintaining interactions, and turn taking" (Chan et al., 2009). Similarly, in a literature review conducted by Odom and colleagues in 2003, researchers found that PMI "[has] a long history of support" and is considered "one of the more effective interventions available for addressing the social behavior" of individuals with disabilities, with a focus on children with ASD (Odom et al., 2003). A review of the literature done by McConnell in 2002 found that out

of five different types of interventions targeting social skills, "peer-mediated procedures represented the largest and best developed interventions available for addressing the social interaction skills of young children with Autism" (Kohler et al., 2007). A review of the literature conducted by Dart and colleagues in 2014 analyzed 29 studies and found that PMI was "moderately effective" in improving target students' behavior for a variety of skills, including social skills" (Dart et al., 2014).

There have been many individual studies, in addition to meta-analyses, that have shared such findings. In a study done by Strain and colleagues in 1977, PMI was used to train peer models to initiate social interactions using phrases such as '"Come play"' and '"Let's play ball"' with their peers with Autism (Strain et al., 1977). The study found that "peer initiations produced increases" in the social interactions of all five participants (Kohler et al., 2007)

Another study done by Lee, Odom, and Loftin in 2007 used PMI to train six elementary-aged students to use the strategies of "sharing, suggesting play ideas, assisting, and being affectionate" to encourage their peers with Autism to engage in social interaction for increasing amounts of time (Lee et al., 2007). The results of the study found PMI to be effective in increasing "the amount of time each target students spent in a social interaction during the structured-play session" (Lee et al., 2007). The intervention effects also "generaliz[ed] to two novel peers, as well as a novel setting" (Lee et al., 2007).

A study by Robertson and colleagues in 2003 used a multiple-baseline across behaviors design to evaluate the effects of PMI on on-task behavior, interactive play, and appropriate participation of target students with disabilities. The experimenters modeled three steps for peer models: 1) singing the song 2) talking about what children were doing during the song to clarify desired behavior and 3) providing verbal cues to children. Once the peer models mastered the

three steps, they implemented their training on a non-target student. Once they demonstrated their ability to apply the steps in practice with mastery, they began implementing the intervention with targeted students. The results of the study indicated that PMI was effective in increasing target students' on-task behavior during routine activities, interactive play, and appropriate participation in circle and story time. (Robertson et al., 2003)

A study by Knapczyk done in 1989, sought to evaluate the effects of PMI which used "regular education mentors to improve the cooperative play behavior of students with moderate [intellectual disabilities]" (Knapczyk, 1989). Experimenters began peer mentor training by demonstrating techniques such as verbal and physical prompting and modeling that peer mentors could use to help facilitate cooperative play in their mentees. The experimenters provided feedback to peer mentors until they could demonstrate mastery of the demonstrated techniques. The results of the study indicate that PMI "can effectively improve social interaction" between regular education and special education students in natural settings (Knapczyk, 1989). (Knapczyk, 1989)

In a study by Harper and colleagues from 2008, researchers taught the components of Pivotal Response Training (i.e. gaining the attention of their peer, varying the presentation of activities, narrating their play, providing praise to peers, and taking turns) to typically developing peer models in an effort to improve the social interactions of their classmates with Autism at recess time. During PRT training, peer models were given a "visual training card and cue card" (Harper et al., 2008). A new strategy was taught each day, but the previously taught strategies were reinforced alongside the training on the new strategy (Harper et al., 2008). Results of the study demonstrated that PRT was effectively used by peer models and that there

was an increase in social skills, specifically social interactions and turn-taking, for peers with Autism observed at recess time (Harper et al., 2008).

Future Research Needed on PMI

Although research on PMI has increased in recent years, there is still a need for future research on PMI which uses class-wide or randomized peer models, has minimal adult oversight or play period supervision, and evaluates the use of PMI on individuals with moderate to severe multiple disabilities. Most of the research has been conducted on individuals with Autism, limiting the research out there on the effects of PMI for students with other significant disabilities. In addition, much of the research done on PMI has used specifically selected peer models, rather than a wide range of varying individuals. In many of the studies on PMI focusing on interactive or cooperative play, the play activities were structured and overseen by adults. Lastly, most of the research done on PMI has used partial components of Behavior Skills Training (BST) including modeling, role playing, instruction, and/or feedback; however, there is a lack of research done which evaluates the use of BST in its entirety as the sole method for conducting peer training within PMI.

Behavior Skills Training

BST Definition

Behavior Skills Training (BST) is a highly effective, research-supported training method that "helps people acquire skills" (Sawyer et al., 2017) (Clayton et al., 2018; Drifke et al., 2016; Fetherston et al., 2013; Kornacki et al., 2013; Rosales et al., 2009). BST is an active, evidence-based training method that is effective for teaching a variety of skills and allows individuals the chance to apply learned skills in practice through role-playing (Himle and Miltenberger 2004; Singh et al., 2017). BST as a training package consists of four necessary components:

instructions, modeling, rehearsal, and feedback. The instructions portion of BST can be delivered orally or in written form (e.g. task analysis or checklist) (Morgan et al., 2018). During instruction, individuals are taught the importance of the skills, the components of the skills, and how and when to implement the skills (Ervin et al., 2018; Singh et al., 2017). The modeling portion of BST can take place via video modeling or instructor demonstration (Morgan et al., 2018). During modeling, individuals are shown how to perform the desired behaviors or skills (Morgan et al., 2018; Singh et al., 2017). The rehearsal and feedback portions of BST usually go hand-in-hand as individuals have the opportunity to practice implementing the taught skills and receive specific, corrective feedback and praise on their performance (Singh et al., 2017). Rehearsal can be done via role-playing in different grouping arrangements and can include non-targeted individuals, instructors, or fellow participants as rehearsal partners. Training or parts of the training are then repeated until learners have achieved a pre-established criterion of mastery (Morgan et al., 2018).

Effects of BST Found in Previous Research

There have been many studies conducted using BST to effectively teach a variety of skills, including social skills, academic skills, vocational skills, safety skills, and instructional strategies (Clayton et al., 2018; Ervin et al., 2018; Fetherston et al., 2013; Morgan et al., 2018; Rosales et al., 2009; Sawyer et al., 2017; Shireman et al., 2016; Singh et al., 2017; Tarasenko et al., 2009). Previous research demonstrates that BST is a training procedure that not only increases the acquisition of a new set of skills, but also generalizes to untrained skill sets (Fetherston et al., 2013). BST has been used in previous research in both one-on-one and small group formats to effectively teach skills (Hogan et al., 2015; Singh et al., 2017; Tarasenko et al., 2009).

Much of the research done on BST has involved training school staff to implement instructional strategies or behavioral procedures. In a study by Fetherston and colleagues in 2013, researchers examined the effects of BST on staff acquisition, maintenance, and generalization of the implementation of discrete trial training, incidental teaching, and activity schedules through three separate experiments. The study also looked at BST's effects on students' behavior and whether or not the students generalized skills. The study found that BST had positive effects on staff and student behavior and that both staff and students were able to generalize and maintain their acquired skills. Social validity results from the study were also high, as staff members found the training to be effective and appropriate. (Fetherston et al., 2013)

A study by Rosales and colleagues from 2009 evaluated the effects of BST on the implementation of the first three phases of PECS, the maintenance of the effects, and the generalization of the effects. BST during this study consisted of instructions via a video and a verbal description of the checklist; modeling of each step of the checklist; rehearsal; and feedback during rehearsal. The study indicated that not only was BST effective in improving the accuracy of implementation of the targeted PECS phases, but that it resulted in generalization and maintenance of the skills. (Rosales et al., 2009)

In a 2015 study by Hogan and colleagues evaluated the effects of BST on the implementation of Behavior Intervention Plans (BIPs) by school staff. BST consisted of written instructions via a read aloud of the students' BIPs followed by modeling, rehearsal, and feedback of BIP procedures. The results of the study indicated increased performance in the implementation of BIPs following BST for all four participants. (Hogan et al., 2015)

A 2017 study by Sawyer and colleagues evaluated the effects of BST on the accurate implementation of evidence-based practices by pre-service teachers. BST in this study consisted of reviewing the steps of the evidence-based practices via verbal instructions, modeling the evidence-based practices for the pre-service teachers, and having pre-service teachers role-play in various groupings while receiving praise and corrective feedback until mastery levels were reached. Results of the study indicated that BST increased the accuracy of pre-service teacher implementation across all targeted evidence-based practices. (Sawyer et al., 2017)

Confirming the previously listed research findings on the effectiveness of BST on teaching school staff to implement a variety of instructional procedures, in 2018 Clayton and Headley evaluated the effects of using BST to improve three paraprofessionals' implementation of DTT procedures. BST in this study consisted of written instructions with a supporting list of expectations, modeling of the DTT procedures, rehearsal, and immediate feedback. The results of the study demonstrated that following BST, all three paraprofessionals increased the accuracy of their DTT procedure implementation to near perfect levels. The study also indicated that, although not directly targeted, students' behaviors also improved. (Clayton et al., 2018)

Although lacking, there is research that has used BST to teach adults with disabilities to complete vocational and work-related tasks. A study by Morgan and Wine from 2018 sought to evaluate the effects of BST on the acquisition of work-related skills for adults with disabilities. Morgan and Wine used BST to teach four specific restaurant skills (running a dishwasher, polishing and rolling silverware, bussing a table, and cleaning a restroom) to an 18-year old with disabilities at his job site. The individual was provided a task analysis that was used within BST. BST consisted of oral instructions emphasizing the steps of the task analysis, modeling, rehearsal, and feedback. The results of the study indicate that BST was effective in teaching the

individual the four restaurant skills needed at his job-site. The study also demonstrated that the skills acquired through BST generalized to new work sites and were maintained. (Morgan et al., 2018)

BST has also been an effective training method to teach typically developing children safety skills. A study by Tarasenko and colleagues from 2009 used peer trainers to implement BST in combination with In-Situ training of abduction prevention skills to their younger peers. Peer models implemented all four components of BST (instructions, modeling, rehearsal, and feedback) to younger peers and delivered in-situ training to those peers who did not demonstrate abduction prevention skills at mastery levels. Results of the study indicated that peer trainers successfully used BST in combination with In-Situ training to teach their younger peers abduction prevention strategies to mastery levels. The study also indicates that the younger peers were able to demonstrate their competency of the abduction prevention skills over time in natural settings. (Tarasenko et al., 2009)

Lastly, there is research supporting BST as an effective training tool for teaching social-emotional and social-communication skills to both adults and children with disabilities. A study by Shireman and colleagues from 2016 used BST to train adults with Autism to engage in appropriate play skills in order to increase the play skills of children with Autism and improve the overall rapport between the adults with Autism and the children with Autism. Each adult was trained to play with one child. The experimenter used BST to teach the adult with Autism to play with the child with Autism. BST in this study consisted of verbal instructions, as well as written instructions in the form of a handout that would be used as a visual cue for the adult throughout the remainder of the study; modeling; rehearsal; and feedback. Results of the study indicated that BST was effective in teaching the adults with Autism to play with the children

with Autism and that the children's social play skills, in turn, improved. The study also indicated that BST could be responsible for improvements in rapport between the adults and children with Autism as measured by the proximity observed between the two participants during play activities. (Shireman et al., 2016).

An additional study by Ervin and colleagues in 2018 used BST to train peer models how to appropriately respond to their peers' disruptive behaviors. BST within this study consisted of a discussion on the reasoning behind peers' disruptive behaviors and the importance of responding appropriately to such disruptive behaviors; modeling of appropriate responses; rehearsal; and corrective feedback. Results of the study demonstrated that BST was effective in increasing the appropriate responses of peer models to their classmates' disruptive behaviors. The study also indicated that a decrease in disruptive behavior of peer models and their classmates also occurred, although not directly targeted. (Ervin et al., 2018)

Research analyzing the components of BST as a training package has been done in efforts to evaluate which parts of BST are most effective in increasing the skill acquisition of participants. In a study by Kornacki and colleagues in 2013, rehearsal and performance feedback were found to be the necessary components of BST in acquiring mastery level skills (Kornacki et al., 2013). A study done by Drifke and colleagues in 2016 found that written instructions, even with modeling, was enough for participants to improve, but not to mastery levels. The researchers determined that the full BST training package (instructions, modeling, rehearsal, and performance feedback) are needed for participants to perform their best and reach mastery criterion. (Drifke et al., 2016)

Future Research Needed on BST

Much of the existing BST research has involved training practitioners and school staff to implement different instructional procedures, training typically developing children on safety skills, or training children with developmental disabilities social-communication skills. There has been little research done, however, on using BST in isolation to train same-aged peer models to improve the social interaction of their peers with disabilities as part of a peer-mediated intervention. An article by Mathews and colleagues from 2018 begins to scrape the surface of this idea. In their 2018 study, Mathews and colleagues evaluated the effects of using the Peer Model Education Curriculum (PMEC), which uses performance-feedback (PFB) and BST techniques, to teach typically developing peers to become social peer models for their peers with high-functioning Autism. Peer models were taught to initiate verbal peer interaction, prompt for targeted social skills, and deliver praise. The components of PFB and BST used in the training consisted of "direct instruction, demonstration, role-play, and corrective feedback by the researchers" (Mathews et al., 2018). The peer models engaged in role-play until mastery criterion was achieved. Results of the study indicated that using PFB in addition to BST were "highly effective in increasing the use of all skills taught to the peer models" (Mathews et al., 2018).

This current study extends upon the study by Mathews and colleagues by using BST in isolation as the sole training method during a peer-mediated intervention targeting social interaction. This current study also extends upon previous research by not only looking at the effects of BST on peer models' skill acquisition, but also on the target students' level of engagement in interactive play activities with their peer partner. This current study further extends upon previous research by using participants with a range of moderate to severe disabilities.

Chapter 2: Methods

This chapter provides an explanation of the methods that were used throughout the study. Specifically, this chapter presents the research questions, and provides a description of the participants, setting, materials, dependent variables, and experimental procedures.

Research questions

The purpose of the current study is to examine the effects of using Behavioral Skills Training (BST) to train peer models on the percent of intervals engaged in interactive play by students with moderate to severe disabilities in the classroom. The following research questions were investigated.

1. What are the effects of using BST to train peer models on the percent of intervals engaged in interactive play by students who have moderate to severe disabilities?
2. What are the effects of BST on the acquisition and maintenance of procedural steps implemented correctly by peer models?
3. What are the effects of BST of peer models on generalization outcomes for interactive play with students with moderate to severe disabilities?
4. What are the participants' opinions of the intervention?

Participants

There were eight total participants in this study: four peer models and four students with moderate to severe disabilities. All students attended a public school in the Midwest region of the United States. The four peer models selected for the study had two years of prior experience helping in the multiple disabilities classroom during independent work station time. The four peer models were selected by the classroom teacher based on their prior experience volunteering as a peer helper in the classroom and also because of their availability. When volunteering as a

peer helper in the classroom, the four selected peer models were observed to accept and implement teacher feedback, follow directions, and interact positively with the students with disabilities. The four peer models were Abby, Bethany, Megan, and Nicole. All of the girls were educated in the sixth grade general education setting and did not have disabilities. Table 1 shows demographic and school related information for each peer model.

Among the four students with moderate to severe disabilities, three were males and one was a female. Caleb is 8 years old and is in the second grade. He was diagnosed with an Intellectual Delay and Attention-Deficit/Hyperactivity Disorder (ADHD) and has Cystic Fibrosis. Caleb is partially verbal, using a combination of 1-2 word vocalizations and the LAMP app on an iPad as his primary modes of communication. Caleb receives most of his academic instruction in the self-contained multiple disabilities classroom setting. He is included in the general education setting with same-aged peers without disabilities for music, gym, lunch, recess, and reading. Quinn is 6 years old and is in Kindergarten. He was diagnosed with Cerebral Palsy and is serviced under the disability category Multiple Disabilities. He is non-verbal, using an Accent device as his primary mode of communication. He uses a wheelchair to move throughout his environment and has full use of his left arm and hand. He is able to use his right arm and hand, but sometimes needs reminders and physical cues to engage it. Quinn receives all of his academic instruction in the self-contained multiple disabilities classroom setting. He is included in the general education setting with same-aged peers without disabilities for music, gym, lunch, recess, and circle time. Rachel, age 6, was diagnosed with ASD, as well as Sanfilippo Syndrome (mucopolysaccharidosis type 111A/MPS III). Rachel is partially verbal, using a combination of 1-2 word vocalizations and the Go Talk Now app on an iPad as her primary modes of communication. Rachel is a kindergartener and receives all of her academic

instruction in the self-contained multiple disabilities classroom setting. She is included in the general education setting with same-aged peers without disabilities for music, gym, lunch, recess, and circle time. Kevin, age 8, was diagnosed with ASD and has a hearing impairment. He is non-verbal, using the LAMP app on an iPad as his primary mode of communication. Kevin is in the second grade and receives all of his academic instruction in the self-contained multiple disabilities classroom setting. He is included in the general education setting with same-aged peers without disabilities for art, library, music, gym, lunch, recess, and story time. Table 2 shows demographic and school related information for the participants with disabilities.

All eight students gave assent to participate in the study after parental permission had been received. Refer to Tables 1 and 2 for demographic and school-related information for each participant.

Setting

Data collection for both baseline and intervention sessions took place in the self-contained multiple disabilities classroom. The self-contained multiple disabilities classroom consisted of seven students. Peer models came into the multiple disabilities classroom four different times a day to assist students in a variety of activities. Direct observations of the duration of interactive play between peer models and students with multiple disabilities took place during structured free play time. Direct observation for the study took place during the second structured free play session of the day, which occurred in the afternoon.

The self-contained multiple disabilities classroom consisted of one teacher desk, two kidney tables for group instruction (with four to seven student chairs), seven student desks, a SmartBoard, three bookshelves, two student computer centers, a bathroom, a sensory room, and a kitchenette area with a sink. All throughout the classroom were visual activity schedules,

whole-class and individual behavior charts, data collection clipboards for staff use, picture symbols, and picture task analyses. In the self-contained multiple disabilities classroom there was one intervention specialist (the teacher) and two assistants. All four students with moderate to severe disabilities received most, if not all, of their academic instruction in the self-contained multiple disabilities classroom.

Experimenter and Data Collector

Experimenter

The experimenter for this research study is a master's degree student at The Ohio State University in the Applied Behavior Analysis (ABA) track of the special education program. The experimenter received a Bachelor of Science in Education Degree Special Education Moderate-Severe K-12 from The Ohio State University in 2013. She is in her sixth year of teaching in a public school district. One year was spent as a high school intervention specialist working with ninth through twelfth graders in a self-contained multiple disabilities classroom. For the past five years, she has been an intervention specialist in a self-contained multiple disabilities classroom working with students kindergarten through second grade. She is the classroom teacher and experimenter in this current study.

Data Collector

The data collector was the experimenter of the study. The classroom teacher/experimenter collected direct observation data on duration of interactive play during the afternoon structured free play session for each pair of participants. The classroom teacher/experimenter decided to collect the data for the experiment so that training for additional data collectors was not needed and so that there would be higher accuracy and reliability throughout the data collection process.

There was, however, an additional data collector specifically for Inter-Observer Agreement (IOA) and procedural integrity measures. The data collector for IOA and procedural integrity was a PhD student in the special education program at The Ohio State University. She was trained by the experimenter/classroom teacher on how to collect the data and thoroughly went through the definitions of the target behaviors to be observed.

Materials

Materials for BST of Peer Model

The materials used for BST of peer models included: an anchor chart describing the purpose behind the study and the steps of interactive play; picture icons; a prompt hierarchy visual; a task analysis of procedural steps; a teacher data sheet for recording the procedural steps implemented correctly by peer models; and activity materials (ball, blocks, cars).

Materials for Interactive Play Intervention

The materials used for the interactive play intervention conducted with both the peer models and students with multiple disabilities included: activity materials (ball, blocks, cars); MotivAider® used by the teacher to measure the duration of interactive play; picture icons; a task analysis of procedural steps; teacher data sheet for measuring duration of interactive play; teacher data sheet for recording procedural integrity.

Definition and Measurement of Dependent Variables

Percent of Intervals Engaged in Interactive Play

Interactive play was defined as joint interaction between the peer model and the student with multiple disabilities demonstrated by taking turns with the play materials. Examples of Interactive Play included rolling the ball back and forth with peer, taking turns building a structure of blocks with their peer, and taking turns racing cars with their peer. Behaviors that

did not fall under the definition of interactive play as defined by the study included parallel play (i.e., side by side, but not interacting) and isolated play (i.e., playing alone). Nonexamples of Interactive Play included the target students playing next to their peer but not sharing materials or taking turns, playing by themselves, or engaging with the play materials parallel to their peer (no peer model initiation).

Interactive play was measured by direct observation using partial interval recording. Data were collected every 10 seconds over a 5-minute observation time frame. A plus sign (+) was recorded for the interval if interaction occurred any time within the 10 seconds. A minus sign (-) was recorded for the interval if interaction did not occur. The experimenter used a MotivAider® timer set at a fixed interval of 10 seconds. The observation session began for the targeted pair when the cue "It is play time" was delivered by the experimenter. The observation session ended for the targeted pair after 5-minutes. A new pair, including a target student and a peer model, was observed every 5 minutes. Interactive play began when the peer student initiated the first interactive play attempt (i.e. rolling the ball, stacking a block, pushing a car). Interactive play ended when the target student exited the interactive play session demonstrated by leaving the area, turning away from the peer student, and/or refusing to take turns and share materials.

Number of Procedural Steps Implemented Correctly by Peer Models

The second dependent variable for this study was the percent of procedural steps implemented correctly by peer models. Each procedural step of the interactive play activity was clearly defined in the task analysis presented to the peer models. There were 16 total steps of the interactive play activity task analysis. The 16 steps are listed in Appendix A. The percent of procedural steps completed accurately was measured for each peer model by marking a plus sign (+) for the step of the task analysis if the peer performed the skill with independence and 100%

accuracy. A minus sign (-) was recorded for the step of the task analysis if the peer skipped the step or required prompting to complete the step. The experimenter marked N/A next to any step that was omitted based on target student's behavior in the previous step. Data was collected via a checklist data sheet.

Independent Variable

The independent variable for this study was Behavioral Skills Training (BST) of peer models. Four peer models were trained to implement three interactive play activities with a student partner who had multiple disabilities. The three activities were rolling a ball back and forth, stacking blocks, and racing cars. BST of peer models for the interactive play activities included three steps: instruction, modeling, and rehearsal/feedback.

During instruction, peer models were taught why joint play interactions were important for the students in the multiple disabilities classroom. They were taught the 16 steps they would be required to implement using an anchor chart, picture task analysis, as well as active student instruction (ASR) and choral responding techniques.

During modeling, the experimenter modeled the three different interactive play activities for the peer models. The experimenter used the peer model to help with the demonstration. While modeling, the experimenter explained each step as it was performed, cuing peer models to follow along via the task analysis.

During rehearsal/feedback, peer models got the opportunity to practice the three activities. The experimenter acted as the target student and the peer model practiced going through each step of the task analysis with the experimenter. The experimenter provided immediate feedback in the form of praise for steps implemented correctly and immediate corrective feedback for steps implemented incorrectly.

Inter-Observer Agreement (IOA)

A PhD student from The Ohio State University trained in the procedures of the study collected IOA for 62% of total sessions including baseline, intervention, generalization, and maintenance. Trial-By-Trial IOA was collected to determine the percentage of agreement between the total duration of interactive play occurring between peer models and students with disabilities by the experimenter and a second, independent observer. Trial-By-Trial IOA were also collected to determine the percentage of agreement regarding the total number of procedural steps performed correctly by each peer model between the experimenter and a second, independent observer. This type of IOA measurement was used by the experimenter because of its conservative method of calculation. The PhD student collected data for both the duration of interactive play and procedural steps implemented correctly by peer models once a week on the same data collection sheet as the experimenter. See Appendix B and C for the data collection sheets used for Duration of Interactive Play and Procedural Steps of Peer Models. Trial-By-Trial agreement was calculated by dividing the number of trials where agreement occurred regarding the number of procedural steps implemented correctly or incorrectly by the total number of observed trials and multiplying by 100. The experimenter set an 80% minimum IOA criteria.

Procedural Integrity

Procedural integrity was calculated by using two separate procedural checklists to measure the percentage of the steps implemented correctly by the experimenter. One procedural checklist was used to measure the percentage of steps implemented correctly by the experimenter during BST and a second was used to measure the percentage of steps implemented correctly by the experimenter during the baseline, intervention, generalization, and maintenance Interactive Play sessions. See Appendix F and G for the two procedural integrity checklists used in the

study. The same PhD student who collected IOA data also collected the procedural integrity data. The PhD student watched the experimenter and recorded a plus sign (+) for steps completed correctly by the experimenter and minus sign (-) for steps skipped or completed incorrectly by the experimenter. Procedural integrity was measured through the percentage of procedural steps completed accurately by adding up the number of steps completed correctly and dividing by the total number of steps, then multiplying by 100. A criterion of 80% accuracy for procedural integrity was set by the experimenter. Procedural Integrity checks were completed for 21% of total sessions in the study.

Experimental Design

Two separate multiple baseline across participants designs were used in this study. The first focused on the peer models and BST intervention and the second focused on the students with multiple disabilities and the duration of interactive play intervention. In both designs, baseline data were taken to determine rates of behavior prior to intervention and to serve as a comparison for the intervention phases. Baseline data were taken on all participants prior to implementation of intervention. Students began intervention in a staggered format. Students were moved to intervention phase when they had a stable baseline. The participant with the most stable baseline began the intervention phase first. In order for another participant to start intervention phase, the last student put into intervention phase needed to have a stable or ascending trend of the duration of interactive play or a stable trend of 80% of procedural steps completed correctly or higher for peer models. While intervention conditions were applied to one participant, baseline conditions remained in effect for the other three participants. The lengths of the multiple baselines were varied to strengthen the overall design.

Participants were moved to the maintenance phase when enough intervention sessions were collected to demonstrate a trend in data. Three maintenance probes were completed for each pair of participants. The latency between the last intervention trial and the first maintenance probe was four weeks for three of the pairs and eight weeks for one of the pairs. The latency between the first maintenance probe and the following maintenance probes varied amongst pairs of participants as a result of availability and scheduling. At least three generalization probes were administered within the design for both peer models and target students. Stimulus generalization was conducted across activities and participants. Each pair was probed to see if they could generalize their skills across different untrained activities. These activities aligned with the procedural checklist steps that the peer models were trained to implement. Activities used for generalization included Poppa's Pizza Topple game, Legos, Jenga, and Spill the Beans. Each pair was also probed to see if they could generalize their skills when playing with a different target student or peer model.

Intervention

Baseline

Baseline data were collected in the self-contained multiple disabilities classroom using direct observation through partial interval recording. Data was collected every 10 seconds over a 5-minute observation time frame. A plus sign (+) was recorded for the interval if interactive play occurred any time within the 10 seconds. A minus sign (-) was recorded for the interval if interactive play did not occur. The experimenter used a MotivAider® timer set at a fixed interval of 10 seconds. The observation session began for the targeted pair when the cue "It is play time" was delivered by the experimenter. The observation session ended for the targeted pair after 5-minutes was over. A new pair, including a target student and a peer model, was observed every 5

minutes. Interactive play began when the peer student initiated the first interactive play attempt (i.e. rolling the ball, stacking a block, pushing a car). Interactive play ended when the target student exited the interactive play session demonstrated by leaving the area, turning away from the peer student, and/or refusing to take turns and share materials.

Participants were observed during afternoon structured free play time. During the baseline phase, no instruction was given to the peer models and no prompting or reinforcement was given to the students with disabilities. The experimenter simply set out play materials for the activity and told all eight participants "It is play time". Observation began after the cue was given by the experimenter. Baseline data was collected on the percentage of procedural steps completed correctly by peer models as well as the duration of interactive play between peer models and target students. Baseline data was collected for all participants until data were stable. At least one observation session for each of the three activities occurred during the baseline condition.

Intervention Phase 1: BST

The first intervention phase consisted of BST with peer models. Four peer models were trained to implement three interactive play activities (rolling ball back and forth, stacking blocks, and racing cars) with a student partner who had multiple disabilities. BST of peer models included three steps: instruction, modeling, and rehearsal/feedback. BST sessions were conducted in the multiple disabilities classroom with peer models during a 20 minute time block in the afternoon. Peer models were trained one at a time. The peer model with the most consistent baseline data began BST first. Students had to demonstrate 80% mastery of the procedural steps before they could begin implementing their skills with their target student. The next peer model began BST once the previously trained peer model conducted their first

intervention trial following training with a minimum of 80% accuracy. The four BST training sessions were consistent and were done at the same pace.

Step 1: Instruction. During instruction, peer models were taught why joint play interactions were important for the students in the multiple disabilities classroom. They were taught the 16 steps they would be required to implement using an anchor chart, task analysis, as well as active student instruction (ASR) and choral responding techniques.

Step 2: Modeling. During modeling, the experimenter modeled how to implement three interactive play activities. The experimenter used a peer model to help with the demonstration. While modeling, the experimenter explained each step as it was performed, cuing peer models to follow along via the task analyses.

Step 3: Rehearsal/Feedback. During rehearsal/feedback, peer models got the opportunity to practice the three interactive play activities. The experimenter acted as the target student and the peer model practiced going through each step of the task analysis. The experimenter provided immediate feedback in the form of praise for steps implemented correctly and immediate corrective feedback for steps implemented incorrectly.

The experimenter used a checklist to measure the percentage of procedural steps completed correctly by peer models. Peer models had to demonstrate mastery of the interactive play implementation by completing at least 80% of procedural steps correctly before implementing the steps with their target student. If peer models performed the procedural steps with less than 80% accuracy, retraining would need to occur. See Appendix A for the task analysis used during the BST phase.

Intervention Phase 2: Interactive Play Activity

Each peer model was randomly paired with a student with multiple disabilities. During phase two, Interactive Play intervention sessions were conducted in the self-contained multiple disabilities classroom setting during a 20 minute structured play time period in the afternoon.

During the Interactive Play intervention, peer models began implementing the procedural steps for one of the three trained interactive play activities after the experimenter cued "It is play time". Activities were implemented on a random schedule (rolling the ball, blocks, and racing cars) in order to promote generalization and experimental control. Sometimes, during the intervention phase only, peer models and/or target students were given the opportunity to select the activity they wanted to engage in for that session out of a choice of the three targeted activities. Peer models used their training and had access to their task analysis as support to accurately go through each step of the interactive play activity, including prompting students, reinforcing students, and providing corrective feedback.

The experimenter collected data on the duration of interactive play occurring with each pair of participants using direct observation through partial interval recording. Data was collected every 10 seconds over a 5-minute observation time frame. A plus sign (+) was recorded for the interval if interactive play occurred any time within the 10 seconds. A minus sign (-) was recorded for the interval if interactive play did not occur. The experimenter used a MotivAider® timer set at a fixed interval of 10 seconds. The observation session began for the targeted pair when the cue "It is play time" was delivered by the experimenter. The observation session ended for the targeted pair after 5-minutes was over. A new pair, including a target student and a peer model, was observed every 5 minutes. Interactive play began when the peer student initiated the first interactive play attempt (i.e. rolling the ball, stacking a block, pushing a car). Interactive

play ended when the target student exited the interactive play session demonstrated by leaving the area, turning away from the peer student, and/or refusing to take turns and share materials.

During this intervention phase, the experimenter also probed peer models for procedural integrity measures, making sure that they were continuing to implement the interactive play activity with 80% accuracy and conducting retraining as necessary. See Appendix A for the Task Analysis used during the Interactive Play Activity phase.

Maintenance

During the maintenance phase, the task analyses were removed from peer models and opportunities for retraining were not offered. The maintenance phase began five to ten weeks after the last intervention session. Three maintenance probes were completed for each pair of participants. The latency between the last intervention trial and the first maintenance probe was five weeks for three of the pairs and ten weeks for one of the pairs. The latency between the first maintenance probe and the following maintenance probes varied amongst pairs of participants as a result of availability and scheduling.

Generalization

Generalization probes were conducted throughout the Interactive Play Intervention Phase across activities and participants. Each student with disabilities was probed to see if they could generalize their interactive play skills to other peer models and other activities. Each peer model was probed to see if they could generalize BST to other students with disabilities besides the one they had been paired with. Each pair was probed to see if they could generalize their skills across different untrained activities. These activities aligned with the procedural checklist steps that the peer models were trained to implement. Activities used for generalization included Poppa's

Pizza Topple game, Legos, Jenga, and Spill the Beans. At least three generalization probes were administered within the design for both peer models and target students.

Social Validity

Two social validity measures were conducted for this study: 1) the social appropriateness of the procedures and 2) the social importance of the effects. The social appropriateness of the procedures and importance of the effects were assessed at the end of the study via a questionnaire. Through a series of multiple choice questions, the questionnaire served to measure the acceptance of the intervention by the participants, as well as whether or not participants felt the study had important effects on their confidence playing with their peers with and without disabilities.

At the end of the study, peer models were asked to complete a social validity assessment to see how they felt about the study and how much they felt the BST intervention helped them engage in interactive play with students with multiple disabilities. Peer models answered five questions and ranked their opinions using the terms disagree, agree, or neutral. See Appendix E for the peer model social validity questionnaire. Peer models were expected to respond by circling how they felt about each statement: disagree, neutral, or agree. Before taking the questionnaire, peer models were given examples of what it means to be neutral (doesn't bother them, do not feel strongly either way, do not have feelings about the topic), agree (that is my opinion, that describes how I feel), and disagree (that is not my opinion, I do not feel that way). Peer models answered the questionnaire independently of one another and in different locations so they were not biased or pressured to answer a certain way.

At the end of the study, target students were asked to complete a social validity assessment to see how they felt about the study and whether or not they felt the study improved

their ability to play with their peers without disabilities. Target students answered 3 questions in a picture-based, multiple-choice format. For students who needed it, response cards were held at eye level and students touched a card or eyegazed towards a card to communicate their response. The response choices were "yes", "no", and "I don't know". The experimenter read aloud the questionnaire and directions to the target students one-on-one and presented the answer choices by either reading them aloud or holding the picture response cards at eye level for students to respond. Target students answered the questionnaire independently in a one-on-one format.

Table 1. *Student Information- Peer Models*

	Nicole	Bethany	Abby	Megan
Gender	Female	Female	Female	Female
Age	12	12	12	12
Grade	6^{th}	6^{th}	6^{th}	6^{th}
Ethnicity	Caucasian	Caucasian	Caucasian	African-American

Table 2. *Student Information- Students with moderate to severe disabilities*

	Kevin	Caleb	Quinn	Rachel
Gender	Male	Male	Male	Female
Age	8	8	6	6
Grade	2nd	2nd	Kindergarten	Kindergarten
Ethnicity	Caucasian	Caucasian	Interracial (Caucasian and African-American)	Caucasian
Diagnosis	ASD	Intellectual Delay and ADHD	Cerebral Palsy and Multiple Disabilities	ASD; MPS III
Communication Style	Non-verbal; LAMP app on iPad	Partially verbal; Vocalizations plus LAMP app on iPad	Non-verbal; Accent device	Partially verbal; Vocalizations plus picture symbols
Time in Gen. Ed. Setting	2 hours 8 min.	2 hours 8 min.	1 hour 45 min..	1 hour 45 min.

Chapter 3: Results

This chapter contains IOA results, procedural fidelity results, and social validity results, along with descriptions of each student's results shown in Figures 1 and 2.

IOA

A PhD student from The Ohio State University trained in the procedures of the study collected IOA for 62% of total sessions including baseline, intervention, generalization, and maintenance. Trial-By-Trial IOA was collected to determine the percentage of agreement between the total duration of interactive play occurring between peer models and students with disabilities by the experimenter and a second, independent observer. Trial-By-Trial IOA were also collected to determine the percentage of agreement regarding the total number of procedural steps performed correctly by each peer model between the experimenter and a second, independent observer. The PhD student collected data for both the duration of interactive play and procedural steps implemented correctly by peer models once a week on the same data collection sheet as the experimenter. See Appendix B and C for the data collection sheets used for Duration of Interactive Play and Procedural Steps of Peer Models.

Trial-By-Trial agreement was calculated by dividing the number of trials where agreement occurred by the total number of observed trials and multiplying by 100. The experimenter set an 80% minimum IOA criteria. This 80% agreement criteria was met on 100% of IOA sessions. An agreement of 100% occurred across 51% of IOA sessions. Therefore, there was high inter-observer reliability throughout this study.

Procedural Integrity

Procedural integrity was calculated by using two separate procedural checklists to measure the percentage of the steps implemented correctly by the experimenter. One procedural

checklist was used to measure the percentage of steps implemented correctly by the experimenter during BST and a second was used to measure the percentage of steps implemented correctly by the experimenter during the baseline, intervention, generalization, and maintenance Interactive Play sessions. See Appendix F and G for the two procedural integrity checklists used in the study. The same PhD student who collected IOA data also collected the procedural integrity data. The PhD student observed the experimenter and recorded a plus sign (+) for steps completed correctly by the experimenter and minus sign (-) for steps skipped or completed incorrectly by the experimenter. Procedural integrity was measured through the percentage of procedural steps completed accurately by adding up the number of steps completed correctly and dividing by the total number of steps, then multiplying by 100. A criteria of 80% accuracy for procedural integrity was set by the experimenter. Procedural Integrity checks were completed for 21% of total sessions in the study. The experimenter completed 100% of steps correctly on 87% of the procedural integrity checks completed by the PhD student.

Social Validity

Two social validity measures were conducted for this study: 1) the social appropriateness of the procedures and 2) the social importance of the effects. The social appropriateness of the procedures and importance of the effects were assessed at the end of the study via a questionnaire. Through a series of multiple choice questions, the questionnaire served to measure the acceptance of the intervention by the participants, as well as whether or not participants felt the study had important effects on their confidence and ability to play with their peers with and without disabilities. See Appendix D and E for the social validity questionnaires. Both peer models and target students completed their questionnaires independently of one another and in different locations so they were not biased or pressured to answer a certain way.

Peer models completed their questionnaires on their own, while the experimenter read aloud the questions and answer choices to target students to assist in their understanding.

Answers on the social validity questionnaire varied from student to student. All of the questions on both social validity questionnaires were worded positively towards the intervention. In analyzation of the questionnaires completed by the peer models, all four participants answered positively by circling *agree* on 60%-100% of questions. The lowest rating received on the questionnaires by the peer models was *neutral*. On three out of four questionnaires completed by the peer models, the statement *I liked having the Task Analysis to help me remind myself of the steps* was rated *neutral.* Nicole responded *neutral* to an additional statement *I liked being able to practice more if I needed to.* Bethany responded *agree* to all five statements on the questionnaire. These results demonstrate high social validity by peer models for the social appropriateness of the procedures. All peer models responded *agree* to the statement *I feel that I am better able to play with and help my peers with disabilities than I was before this study*, indicating high social validity results for the social importance of the effects by the peer models.

In analyzation of the questionnaires completed by the target students, all four participants answered positively by circling *yes* on 60%-100% of questions. All four participants responded *yes* to the statement *I liked playing with my peers without disabilities.* Three out of four participants responded *yes* to the statement *I liked participating in the study*, while Caleb responded *neutral*. These results demonstrate overall high social validity for the social appropriateness of the procedures by target students. All target students responded *agree* to the statement *I feel more confident playing with my peers than I did before this study*, indicating high social validity results for the social importance of the effects by target students.

Individual Results of Target Students

Caleb

The results in Figure 2 show an overall increase in the percent of intervals engaged in interactive play from an average of 6% in baseline to an average of 62.25% in intervention, and an average of 73.33% in maintenance. During baseline Caleb's percent of intervals engaged in interactive play had a downward trend beginning at 20% engaged and stabilizing between 0%-3% engaged for four consecutive data points. During intervention, Caleb's percent of intervals engaged in interactive play demonstrates some variability within an overall increasing trend that then decreases and stabilizes around 53%-57% engaged at the end of the intervention phase. There was a noticeable level change between Caleb's baseline phase data and intervention phase and maintenance phase data. Additionally, during maintenance Caleb's percent of intervals engaged in interactive play was highly variable, yet remained above baseline levels. Caleb was able to generalize his increased engagement in interactive play to novel activities (Poppa's Pizza Topple® game and Don't Spill the Beans® game) and novel play partners. Caleb had an average of 61.75% of intervals engaged in interactive play during generalization probes.

Quinn

The results in Figure 2 show an overall increase in the percent of intervals engaged in interactive play from an average of 14.44% in baseline to an average of 77.57% in intervention, and an average of 81.33% in maintenance. During baseline, Quinn's percent of intervals engaged in interactive play began stable at 0%-3% intervals engaged, then dramatically increased to 60% intervals engaged, then decreased again to 0%-10% intervals engaged. During intervention, Quinn's percent of intervals engaged in interactive play began at an increased level compared to baseline, yet variable. Quinn's percent of intervals engaged in interactive play then demonstrated a consistent downward trend. Quinn was absent for a month during the study to

attend a specialized learning program. This was unknown prior to selecting Quinn for the study. As a result of time, the experimenter was not able to collect more intervention trials to see if the trend of Quinn's data would change before ending the intervention phase. During maintenance, Quinn's percent of intervals engaged in interactive play was variable, yet remained above baseline levels. Despite this downward trend in data towards the end of intervention phase, there was still a noticeable level change between Quinn's baseline phase data and intervention phase and maintenance phase data. Quinn was only able to participate in one generalization probe as a result of his absence during the study. During this probe for generalzation, Quinn was able to generalize his increased engagement in interactive play to a novel activity (Poppa's Pizza Topple® game), remaining engaged in interactive play for 70% of intervals.

Rachel

The results in Figure 2 show an overall increase in the percent of intervals engaged in interactive play from an average of 8.5% in baseline to an average of 42.63% in intervention, and an average of 29% in maintenance. During baseline, Rachel's percent of intervals engaged in interactive play had slight variablility, yet generally low-level stabilization, ranging between 0%-23%. During intervention, Rachel's percent of intervals engaged in interactive play increases above baseline levels and remains increased, yet variable throughout the intervention phase. Additionally, during maintenance Rachel's percent of intervals engaged in interactive play drastically decreases back to baseline levels and then increases again, continuing with the trend of variability from the intervention phase. The level of Rachel's data increased in a positive direction from baseline phase to intervention phase. Only the first maintenance data point dropped back to baseline levels. Rachel was able to generalize her increased engagement in interactive play to novel activities (Roll and Play™ game and a puzzle) and novel play partners.

Rachel had an average of 36.66% of intervals engaged in interactive play during generalization probes.

Kevin

The results in Figure 2 show an overall increase in the percent of intervals engaged in interactive play from an average of 17.62% in baseline to an average of 80.11% in intervention, and an average of 87.66% in maintenance. During baseline, Kevin's percent of intervals engaged in interactive play had a dramatically variable start, ranging from 3%-97% engaged and then stabilized at 0% engaged for six consecutive data points. During intervention, Kevin's percent of intervals engaged in interactive play demonstrates variability with a level that is consistently higher than all but one of Kevin's baseline data points. During baseline, the spike in data occurred as a result of the rolling the ball activity, which was highly preferred and familiar to Kevin. During maintenance Kevin's percent of intervals engaged in interactive play was variable, yet remained consistent with intervention levels. Kevin was able to generalize his increased engagement in interactive play to novel activities (Poppa's Pizza Topple® game and Don't Spill the Beans® game) and novel play partners. Kevin had an average of 77.66% of intervals engaged in interactive play during generalization probes.

Individual Results of Peer Models

Bethany

The results in Figure 1 show an overall increase in the procedural steps implemented correctly from an average of 23.2% of steps correct in baseline to an average of 96.5% of steps correcct in intervention, and an average of 100% of steps correct in maintenance. During baseline, Bethany's percent of procedural steps implemented correctly had a downward trend that became variable, ranging between 7%-13% of steps correct. During intervention, Bethany's

percent of procedural steps implemented correctly dramatically increased to 91% of steps correct for two consecutive trials. The criterion for mastery was originally set at 100% steps correct for peer models. The experimenter conducted one retraining session for Bethany after the first two trials with 91% of steps correctly performed. Retraining resulted in an initial increase back to 100% mastery and then decreased again to 90% of steps correct. Therefore, criterion for mastery was adjusted to 80% to account for mistakes made by Bethany, as well as any future peer models. After retraining was implemented, Bethany's data beautifully stabilized at high levels between 90%-100% steps correct. Additionally, during maintenance, Bethany's percent of procedural steps implemented correctly remained at an increased, stable level of 100% steps correct. Bethany's data stabilized from baseline phase to intervention phase. Bethany demonstrated her ability to generalize the procedural steps taught during BST to novel activities (Poppa's Pizza Topple® game and Don't Spill the Beans® game) and novel play partners. Bethany had an average of 100% of procedural steps implemented correctly during generalization probes.

Abby

The results in Figure 1 show an overall increase in the procedural steps implemented correctly from an average of 46% of steps correct in baseline to an average of 95.71% of steps correct in intervention, and an average of 96.66% of steps correct in maintenance. During baseline, Abby's percent of procedural steps implemented correctly was dramatically variable, ranging from 13%-100% of steps correct, but ended with consistently downward trend for the last four consecutive data points within the baseline phase. During intervention, Abby's percent of procedural steps implemented correctly increased with slight variability, ranging from 80-100% of steps correct. Additionally, during maintenance, Abby's percent of procedural steps

implemented correctly remained at an increased level, again with only slight variability, ranging from 90%-100% of steps correct. The spike in Abby's baseline data was a result of the rolling the ball activity, which was familiar and required low effort. As a result of this spike, however, almost all of Abby's intervention phase data overlapped with the baseline data point from the rolling the ball activity. After the spike in baseline, the experimenter made the decision to remove the rolling the ball activity for the remainder of the baseline phase. Despite the overlap in data, the stability of Abby's data changed dramatically from baseline to intervention phase, stabilizing during intervention. Abby demonstrated her ability to generalize the procedural steps taught during BST to novel activities (Poppa's Pizza Topple® game) and novel play partners. Abby had an average of 100% of procedural steps implemented correctly during generalization probes.

Megan

The results in Figure 1 show an overall increase in the procedural steps implemented correctly from an average of 46.72% of steps correct in baseline to an average of 97.42% of steps correcct in intervention, and an average of 96.66% of steps correct in maintenance. During baseline, Megan's percent of procedural steps implemented correctly had a highly variable trend ranging from 13%-75% of steps correct. During intervention, Megan's percent of procedural steps implemented correctly stabilized at 100% of steps correct and then became only slightly variable, ranging from 90%-100% of steps correct. Additionally, during maintenance, Megan's percent of procedural steps implemented correctly started at 90% of steps correct and then stabilized at 100% steps correct for the final two maintenance probes. Megan's data stabilized overall from her baseline phase to her intervention phase. Megan demonstrated her ability to generalize the procedural steps taught during BST to novel activities (Roll and Play™ game and

a puzzle) and novel play partners. Megan had an average of 90% of procedural steps implemented correctly during generalization probes.

Nicole

The results in Figure 1 show an overall increase in the procedural steps implemented correctly from an average of 26.07% of steps correct in baseline to an average of 91.11% of steps correcct in intervention, and an average of 96.66% of steps correct in maintenance. During baseline, Nicole's percent of procedural steps implemented correctly had a highly variable trend ranging from 6%-80% of steps correct. During intervention, Nicole's percent of procedural steps implemented correctly increased in overall level, but remained variable, ranging from 80%-100% of steps correct. Additionally, during maintenance, Nicole's percent of procedural steps implemented correctly remained at intervention levels, but again had slight variability, ranging from 90%-100% of steps correct. Four data points from intervention phase overlapped with one of Nicole's baseline data points. This, like Abby's case, was a result of the rolling the ball activity being familiar and of easy effort. Despite the overlap in data, however, Nicole's data demonstrates an improvement in stability from baseline phase to intervention phase, which is desireable. Nicole demonstrated her ability to generalize the procedural steps taught during BST to novel activities (Poppa's Pizza Topple® game and Don't Spill the Beans® game) and novel play partners. Nicole had an average of 93.33% of procedural steps implemented correctly during generalization probes.

Figure 1. *Steps Implemented Correctly by Peer Model*

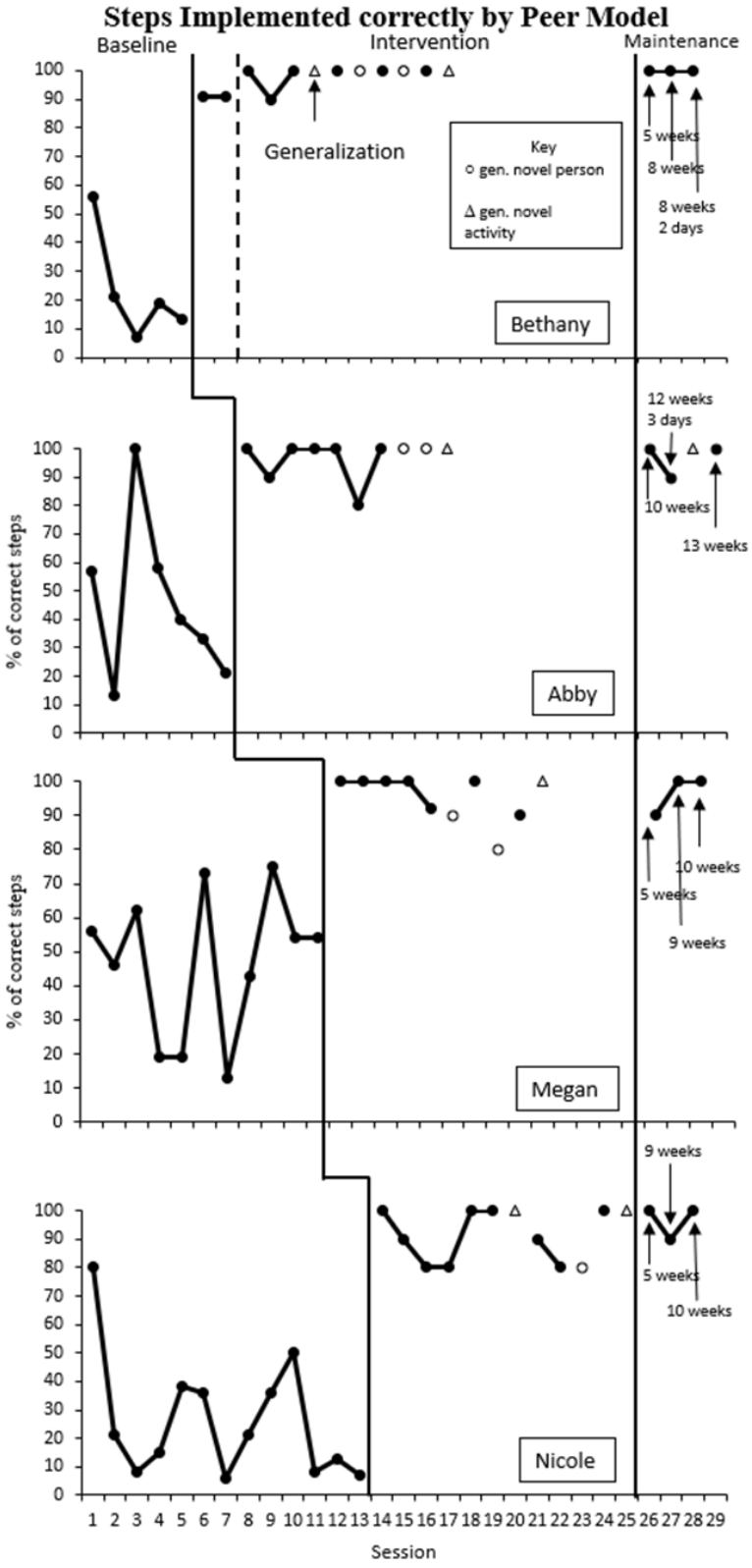
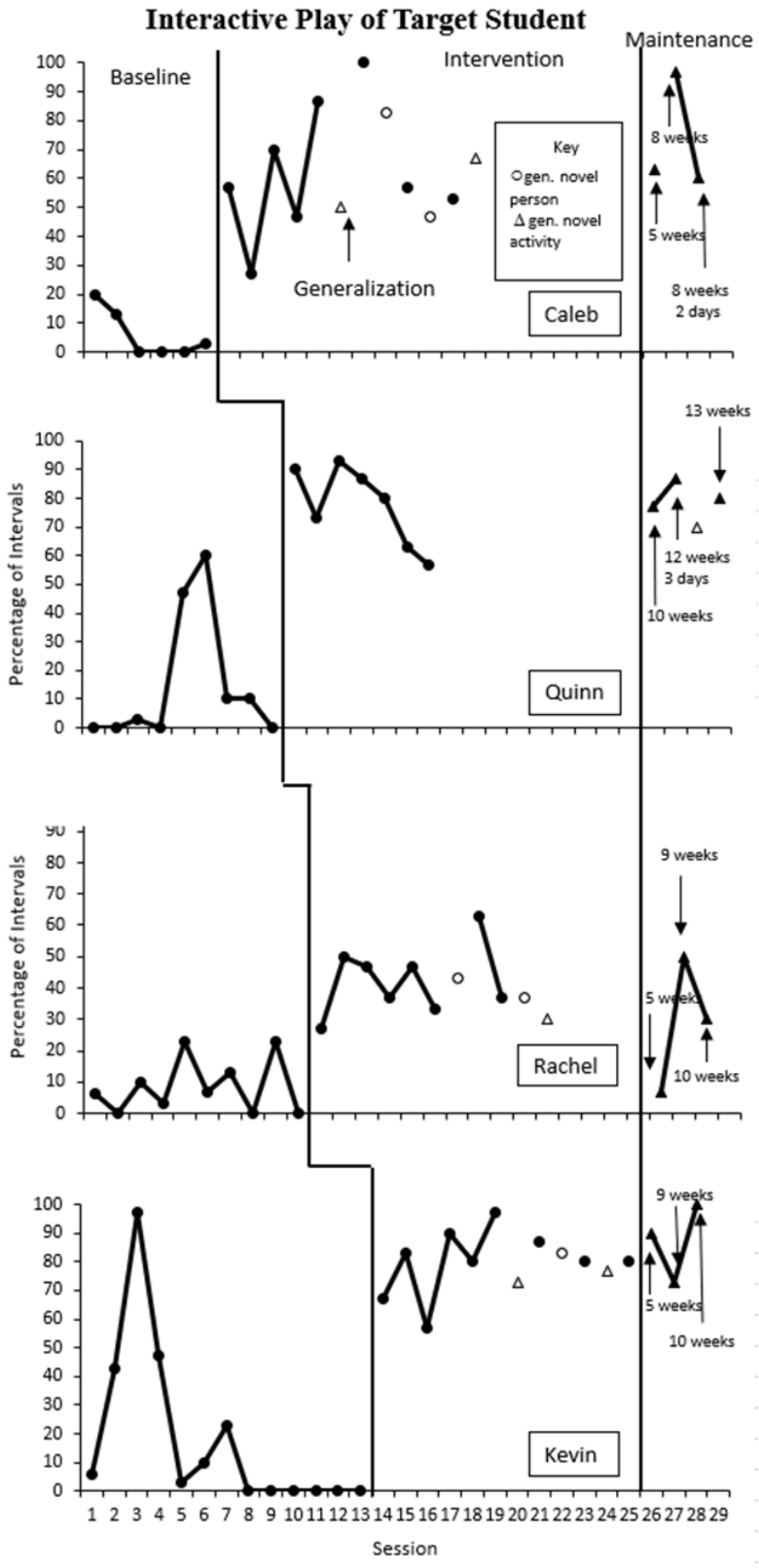


Figure 2. *Interactive Play of Target Student*



Chapter 4: Discussion

Results of the present study demonstrated that using BST to train peer models was effective in increasing the percent of intervals engaged in interactive play by students with moderate to severe disabilities in the classroom. Although, results varied from student to student, each peer model demonstrated increased percentages of procedural steps implemented correctly after participating in BST and each target student demonstrated an increased percent of intervals engaged in interactive play. The results from this study suggest that BST is an effective method to teach a set of skills to typically developing peers in order to provide students with moderate to severe disabilities peer-mediated social interventions. The results of this study also suggest a correlation between the percentage of procedural steps implemented correctly by the peer model play partners and the target students' percent of intervals engaged in interactive play.

Research Questions

When looking at research question one, there were positive effects of using BST to train peer models on the percent of intervals engaged in interactive play by students who have moderate to severe disabilities. By using BST to teach peer models how to use least-to-most prompting and provide reinforcement in the form of praise when playing with students with moderate to severe disabilities, all four peer models showed an increase in the percent of procedural steps implemented correctly and were able to generalize and maintain such increased levels. The prompting and reinforcement provided by the peer models while playing with their peers with moderate to severe disabilities increased the overall percent of intervals engaged in interactive play by all four target students. A correlation between the percentage of procedural steps implemented correctly by the peer model play partners and the target students' percent of intervals engaged in interactive play are observed when comparing Figures 1 and 2. Correlating

patterns of stability and variability can be seen when comparing Figures 1 and 2 for each separate pair of peer models and target students.

In analyzing research question two, BST was an effective method for quick and significant improvements in the percent of procedural steps implemented correctly by peer models. All four peer models' average percent of procedural steps implemented correctly increased by at least 49.71%, with the highest increase being 73.33%. In addition, all four peer models successfully maintained increased levels over time, demonstrating that BST is an effective method for maintaining significant improvements in the percent of procedural steps implemented correctly by peer models over time.

Research question three has similar results to questions one and two. The findings of the study indicate that BST is an effective method for teaching steps in a way that would generalize to novel play activities and play partners. All four peer models successfully generalized the procedural steps taught to them during BST to novel activities and novel play partners, implementing the procedural steps with 80%-100% accuracy during generalization probes. As a result of generalized procedural steps by the peer models, and therefore consistent prompting and reinforcement procedures, the target students were also able to generalize their increased levels of interactive play to novel play activities and play partners.

Research question four was answered in analyzing the social validity questionnaire responses from both the peer models and target students. All eight participants responded positively (*agree* or *yes*) to 60%-100% of the statements. Results of the social validity questionnaires demonstrate high overall social validity for the social appropriateness of the procedures, as well as high overall social validity for the social importance of the effects by both peer models and target students.

Limitations and Future Research

Even with successful outcomes from the current study, there are several limitations that need to be taken into consideration.

First, procedural fidelity was only collected for 21% of sessions. This was due to the limited time the doctoral student was able to attend sessions and the inability to have someone else collect procedural fidelity data for the study. Additionally, the percent of sessions collected for procedural fidelity were impacted by the number of snow days, student's absences, and extended breaks during research. Ideally, procedural integrity measures should have been collected for at least 33% of sessions.

There were several limitations surrounding the school day and classroom schedule, as well as the schedule of the participants. Because this study was conducted in the natural setting of the classroom, the absences of target students and peer models throughout the duration of the study were unavoidable. However, the absences of participants, Quinn in particular, limited the amount of intervention trials and generalization probes that were able to be conducted. The timeline of research was limited by the school calendar, as the intervention phase had to be completed before the participants went on Winter Break so there was not a delay in intervention. This, again, limited the amount of intervention sessions and generalization sessions that could be collected for each participant, especially the last two participants to begin intervention phase. The peer models began daily play practice upon their return from Winter Break, limiting their availability for maintenance trials. Play practice was another reason the timeline was limited for completion of the intervention phase. The school day schedule and the classroom schedule served as additional limitations to the study. Data was collected at the same time each day, always during structured free play after lunch. There were three other play periods throughout

the school day in which data were not collected. Lastly, at the time the research was conducted, the experimenter was the only person in the room with several students, a few who were not a part of the study. This was a limitation because it could have led to distracted data collection.

Another limitation to the study was the operational definition of interactive play. The operational definition of interactive play had to be adjusted a couple of times during the study to clarify discrepencies in IOA. Despite these clarifications and refinement of the operational definition, there continued to be some subjectivity student to student throughout data collection. When completing the procedural steps checklist for the peer models, the same limitation arose, in which the experimenter had to use her judgement to determine whether some steps were not applicable or were not completed. This subjectivity within the procedural steps checklist led to the question of whether or not the task analysis was too stringent. When completing IOA and comparing the data, the experimenter and PhD student determined that some of the steps may not be necessary or even practical for the purpose of the study. For example, one of the steps required the peer models to prompt the target students to sit before initiating play. For some students, sitting was a behavioral or motor challenge that took time away from the actual engagement in interactive play. Also, for some of the activities sitting was not always appropriate or needed. The activity specifications may have been another factor serving as a limitation to the study. For example, some students preferred to bounce the ball or pass the ball rather than roll it, but the task analysis, operational definition, and BST specifically stated and taught peer models to roll the ball. This was one instance where the experimenter used her judgment and decided to focus on the actual occurrence of interactive play more than how the interactive play occurred.

There was quite a large age gap between the peer models and target students used in the study, the largest gap being six years. This was a limitation to the study, as it can be questioned whether or not the students used in this study as peer models can really be considered peers of the target students when they are so much older. One has to question whether the same results would have occurred if same-aged peers (six to eight year olds) would have been used as peer models instead of twelve year olds.

An additional limitation to the study was the choice to randomly pair target students and peer models versus strategically pairing them to see who would best complement one another. If training other practitioners to implement this study, one would most likely recommend that practitioners strategically pair their peer models with target students based on the peer models attributes and the target students needs. This randomization of pairing, therefore, could have limited this present study.

Ideally when using multiple activities to measure interactive play or another skill, one wants the activities to be of equal effort, interest, and ease for participants. However, as shown by the spikes in baseline with the rolling the ball activity, this was not the case in this present study, and therefore is a limitation to the study. The three activities selected for this study did not require equal effort from participants, were not of equal familiarity to participants, and were not of equal interest.

An additional limitation to the study was the fact thata there were no generalization probes taken during baseline phase. This is a specific limitation when it came to generalization to novel activities. Generalization probes to novel activities taken during baseline would have allowed experimenters to see whether procedural steps implemented correctly or the percent of intervals engaged in interactive play was a true demonstration of generalization of skills or if the

data was a result of the selected activity for generalization being highly preferred or of high interest to peer models and/or target students. Another thing to consider when discussing generalization as a limitation was the fact that the novel play partners for target students consisted of one of the other trained peer models. This causes one to question whether or not target students would have successfully generalized their high levels of interactive play to peer models who were not trained in prompting and reinforcing throughout the targeted activities.

The cue "it is play time" and presentation of the task analysis and play materials by the experimenter created a seemingly contrived play situation, which can be another limitation to this present study. This is a limitation that should be looked at and improved upon in future research by having the play time cue occur more naturally through target students checking their visual schedules indicating it is play time or even by peer models providing the cue.

Future research should look at the task analysis used during BST and determine ways to improve it so that it caters to mutliple target students, regardless of behavioral or motor needs. Future researchers should also consider teaching peer models to use specific and varying praise statements throughout interactive play sessions during BST as a tool for increasing target students' motivation to continue to engage in interactive play and perhaps engage in more creative play. Many of the peer models during this study used the same general praise statement (i.e., "good job") repeatedly, which was not very motivating for the target students. When peers used novel and specific praise statements (i.e. "Wow, you made that car go fast! Great job!"), target students were observed to engage in more creative play sessions (e.g. coming up with new games and new ways to push a car or stack the blocks that was still interactive). Perhaps future researchers could conduct a component analysis of the procedural steps taught to peer models

during BST to see which aspect (prompting or reinforcement) had the most influence on the increased engagement in interactive play amongst target students.

Future research should be done on the effects of BST of peer models on target students' improvement with other social skills, such as reciprocal conversations or maintaining of personal space. This current study only focuses on the effects of BST of peer models on target students' increased engagement in the specific skill of interactive play. Future component analysis research could also be done analyzing the effects of the training component of PMI over peer selection on the social interactions of students with moderate to severe disabilities. Lastly, future research could be done that analyzes the effects of training the target students in addition to the peer models using BST prior to engaging in interactive plaay sessions.

Implications for Practitioners

This study showed that the use of BST to teach peer models to effectively prompt and reinforce students with moderate to severe disabilities during targeted play activities was effective in increasing the percent of intervals the students with moderate to severe disabilities spent engaging in interactive play. Teachers, therefore, should use BST within peer-mediated interventions in their classrooms. Teachers should also use peer-mediated interventions to increase their students interactive play skills and time spent engaged in interactive play with their peers without disabilities.

Conclusion

Overall this study was effective at increasing the time spent engaged in interactive play for four students with moderate to severe disabilities in a self-contained multiple disabilities classroom setting. This study was also effective in teaching four typically developing peer models to successfully prompt and reinforce students to engage in targeted play activities

through BST. Target students were able to increase the percent of intervals spent engaging in interactive play with their typically developing peers and were able to generalize and maintain increased levels. Following BST, peer models were able to increase the percent of procedural steps implemented correctly and were able to generalize and maintain increased levels. This study has helped increase the peer models' ability to interact and play with their peers with disabilities and has helped increase target students' confidence in playing with their peers without disabilities.

This study confirmed the findings from previous research conducted on BST that show BST as an effective tool to increase a variety of skills from baseline levels, promote generalization of those skills to novel responses and settings, and maintain increased levels over time. This study confirmed the findings from previous research that found PMI to be an effective method for increasing a variety of social skills in students with disabilities.

Students with moderate to severe disabilities can have a hard time engaging in interactive play with others. This study showed that a limited number of students with moderate to severe disabilities were able to increase their time spent engaging in interactive play when prompted and reinforced by their play partners without disabilities. This study can be practically implemented by self-contained classroom teachers.

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APPENDIX A: Peer Model Procedural Steps Task Analysis

1. Peer student invites target student to play.
2. Peer student shows target student the toy.
3. Peer student sits down and prompts target student to do the same using the verbal cue “sit down” paired with a picture symbol.
4. Peer student makes first interactive play attempt (i.e. rolling the ball, stacking a block, pushing a car) with target student.
5. Peer student waits for target student to reciprocate the interactive play (i.e. rolling the ball, stacking a block, pushing a car).
6. If target student reciprocates play, peer student praises the target student saying “I like how you [X], great playing!” paired with a high five or fist bump.
7. If target student does not reciprocate play, peer student prompts target student to reciprocate the play by using verbal cues paired with picture symbols.
8. If the target student does not reciprocate play after the verbal and visual cues, peer student hand over hands target student perform the play skill (i.e. rolling the ball, stacking a block, pushing a car).
9. If target students leaves the area, peer student cues the target student to come play using least to most prompting.
10. Peer student makes another interactive play attempt (i.e. rolling the ball, stacking a block, pushing a car).
11. Peer student waits for target student to reciprocate the interactive play (i.e. rolling the ball, stacking a block, pushing a car)
12. If target student reciprocates play, peer student praises the target student saying “I like how you [X], great playing!” paired with a high five or fist bump.
13. If target student does not reciprocate play, peer student prompts target student to reciprocate the play by using verbal cues paired with picture symbols.
14. If the target student does not reciprocate play after the verbal and visual cues, peer student hand over hands target student perform the play skill (i.e. rolling the ball, stacking a block, pushing a car).
15. If target students leaves the area, peer student cues for the target student to come play using least to most prompting.
16. Peer student makes another interactive play attempt (i.e. rolling the ball, stacking a block, pushing a car).

APPENDIX B: Experimenter Data Sheet for Percent of Intervals Engaged in Interactive Play

Percentage of Interactive Play: Partial Interval Recording Form

Participants Observed:_____

Definition of Interactive Play:
Joint interaction between the peer model and student with multiple disabilities demonstrated by taking turns with the play materials when initiated by the peer models.

Examples of Interactive Play: Rolling the ball back and forth with peer; Taking turns building a structure with blocks with their peer; Taking turns racing cars with their peer.
Nonexamples of Interactive Play: playing next to their peer but not sharing materials or taking turns; playing by themselves; engaging with the play materials parallel to their peer, in which play is not initiated by the peer model.

Total Observation Time: _____ **Length of each observation trial:** *5 minutes* **Length of each interval:***10 seconds*

Directions:
Use a stopwatch to time intervals. Begin recording data when the cue "It is play time" is delivered by the experimenter. Interactive play begins when the peer student initiates the first interactive play attempt (i.e. rolling the ball, stacking a block, pushing a car). Interactive play ends when the target student exited the interactive play session demonstrated by leaving the area, turning away from the peer student, and/or refusing to take turns and share materials. The observation session ends after 5-minutes or when the target student exits the interactive play session before the 5-minute mark.

Record a plus sign (+) for the interval if interactive play occurred any time within the 10 seconds. Record a minus sign (-) for the interval if interactive play did not occur.

Date	Interval #																													Total Times Behavior Occurred (+)
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	

Date	Interval #																														Total Times Behavior Occurred (+)
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	

APPENDIX C: Experimenter Data Sheet for Peer Model Procedural Steps

Behavioral Skills Training: Task Analysis Checklist

Participant:_____

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

Definition of INCORRECT Skills Implementation:
Performing the required skills with the need for prompting from the experimenter and less than 100% accuracy.

.

Directions:
Begin recording data when the cue "It is play time" is delivered by the experimenter. Stop recording data when all steps of the task analysis have been coded (either + or -).

Record a plus sign (+) for the step of the task analysis if the peer performed the skill with independence and 100% accuracy. Record a minus sign (-) for the step of the task analysis if the peer skipped the step or required prompting to complete the step. Record N/A if any step is omitted based on target student's behavior in the previous step.

Date:		
Steps	**Instructions**	**+/-**
1	Peer student invites target student to play.	
2	Peer student shows target student the toy.	
3	Peer student sits down and prompts target student to do the same using the verbal cue "sit down" paired with a picture symbol.	
4	Peer student makes first interactive play attempt (i.e. rolling the ball, stacking a block, pushing a car) with target student.	
5	Peer student waits for target student to reciprocate the interactive play (i.e. rolling the ball, stacking a block, pushing a car).	
6	If target student reciprocates play, peer student praises the target student saying "I like how you [X], great playing!" paired with a high five or fist bump.	
7	If target student does not reciprocate play, peer student prompts target student to reciprocate the play by using verbal cues paired with picture symbols.	
8	If the target student does not reciprocate play after the verbal and visual cues, peer student hand over hands target student perform the play skill (i.e. rolling the ball, stacking a block, pushing a car).	
9	If target students leaves the area, peer student cues the target student to come play using least to most prompting.	

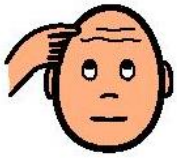
10	Peer student makes another interactive play attempt (i.e. rolling the ball, stacking a block, pushing a car).	
11	Peer student waits for target student to reciprocate the interactive play (i.e. rolling the ball, stacking a block, pushing a car)	
12	If target student reciprocates play, peer student praises the target student saying "I like how you [X], great playing!" paired with a high five or fist bump.	
13	If target student does not reciprocate play, peer student prompts target student to reciprocate the play by using verbal cues paired with picture symbols.	
14	If the target student does not reciprocate play after the verbal and visual cues, peer student hand over hands target student perform the play skill (i.e. rolling the ball, stacking a block, pushing a car).	
15	If target students leaves the area, peer student cues for the target student to come play using least to most prompting.	
16	Peer student makes another interactive play attempt (i.e. rolling the ball, stacking a block, pushing a car).	
% of steps implemented correctly (number of correct steps/total number of steps implemented x 100)		

APPENDIX D: Social Validity Questionnaire- Target Students

Date: _____

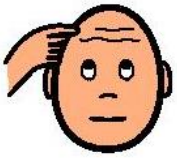
Social Validity Questionnaire

1. I liked playing with my peers without disabilities.



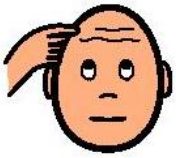
Yes **I don't know** **No**

2. I liked participating in this study.

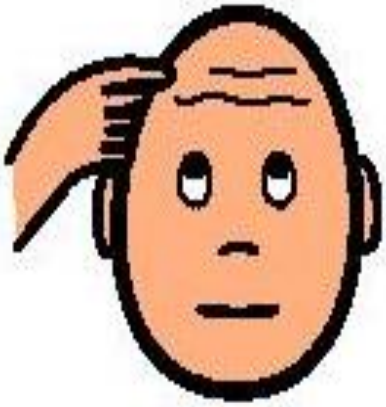


Yes **I don't know** **No**

3. I feel more confident playing with my peers than I did before this study.



Yes **I don't know** **No**



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APPENDIX E: Social Validity Questionnaire- Peer Models

Date: _____

Social Validity Questionnaire

1. I liked being taught how to implement play activities through instruction, modeling, and role-playing while getting feedback from the teacher.

Disagree **Neutral** **Agree**

2. I liked being able to practice more if I needed to.

Disagree **Neutral** **Agree**

3. I liked having the Task Analysis to help me remind myself of the steps.

Disagree **Neutral** **Agree**

4. I liked participating in this study.

Disagree **Neutral** **Agree**

5. I feel that I am better able to play with and help my peers with disabilities than I was before this study.

Disagree **Neutral** **Agree**

APPENDIX F: Procedural Integrity Checklist for BST

Procedural Integrity Checklist A- BST

Experimenter:_____

Observer: _____

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.

Date:	
BST Steps	**+/-**
Deliver instruction to peer models on the importance of joint play interactions for students with disabilities.	
Deliver instruction to peer models on the 10 steps of interactive play implementation using an anchor chart, picture task analysis, Active Student Responding (ASR), and Choral Responding.	
Show peer models a video model of the rolling the ball play activity and also model in real time the rolling the ball activity, talking through each step as it is modeled.	
Show peer models a video model of the stacking blocks play activity and also model in real time the stacking blocks activity, talking through each step as it is modeled.	
Show peer models a video model of the racing cars play activity and also model in real time the racing cars play activity, talking through each step as it is modeled.	
Place peer models into pairs and have them role play the three different play activities using their task analyses. Have them alternate being student and model. Provide praise and feedback during role playing as necessary.	
Assess % of steps implemented correctly by peer models using checklist and conduct retraining as necessary.	
% of steps implemented correctly (number of correct steps/total number of steps implemented x 100)	

APPENDIX G: Procedural Integrity Checklist for Interactive Play Sessions

Procedural Integrity Checklist B- Interactive Play Sessions

Experimenter:_____

Observer: _____

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.

Date:	
Interactive Play Activity Steps	**+/-**
Observe one peer/target student pair at a time (5 min. each)	
Provide peer model with task analysis visual cue.	
Give the following cue: "It is play time" and begin stopwatch.	
Record + if behavior occurs at all during the 10 sec. interval; Record - if behavior does not occur during the 10 sec. interval.	
Calculate duration of interactive play and record on data sheet.	
% of steps implemented correctly (number of correct steps/total number of steps implemented x 100)	