8-21-2017

Using discrete trial to teach functional play skills

Courtney Marie Furtaw
Rowan University, cfurtaw20@gmail.com

USING DISCRETE TRIAL TO TEACH FUNCTIONAL PLAY SKILLS

by

Courtney Marie Furtaw

A Thesis

Submitted to the
Department of Interdisciplinary and Inclusive Education
College of Education
In partial fulfillment of the requirement
For the degree of
Master of Arts in Special Education
at
Rowan University
August 11, 2017

Thesis Chair: S. Jay Kuder, Ed. D.

Acknowledgments

I would like to acknowledge my fiancé, Lamar, for always supporting me and believing in me throughout all my research and writing for this thesis. I would also like to thank my school and students for allowing me to work with them and collect data on the effectiveness of discrete trial.

Abstract

Courtney Marie Furtaw
USING DISCRETE TRIAL TO TEACH FUNCTIONAL PLAY SKILLS
2016-2017
S. Jay Kuder, Ed. D.
Master of Arts in Special Education

This study examined the effects that discrete trial training could have on the functional play skills of four male preschool students diagnosed with autism. In order to determine the effectiveness of discrete trial training as an intervention, baseline data was first collected for two weeks on the four students through observations of a thirty minute group playtime in the morning of their MD preschool classroom. The baseline data demonstrated that all four students were only engaging in functional play for a limited amount of time. Next, a discrete trial training program was created for each individual student focusing on functional play skills. The teacher implemented discrete trial training as an intervention method for seven weeks. During these seven weeks, the four students continued to be observed once a week during the thirty minute group playtime to monitor how often each student was engaging in functional play. The results over the seven weeks demonstrated an increase in the amount of time all four students engaged in functional play. These results suggest that discrete trial training can increase the amount of time preschoolers spend engaged in functional play skills during group playtimes.

Table of Contents

Table of Contents (Continued)

List of Figures

Figure Page

Chapter 1

Introduction

Today, it is estimated that one in every 68 students are diagnosed with autism across the United States (Autism and Developmental Disabilities Monitoring Network, 2016). Autism is a developmental disorder that effects the cognitive, social, behavioral, and communication domains in the individual. For this reason, students diagnosed with autism typically experience difficulty communicating with others, learning new and abstract skills, and engaging in various types of play. In order to address the needs of students diagnosed with autism, many programs and interventions have been put into place beginning with early intervention and continuing into adult life programs, such as independent living skills and various types of vocational training. However, this study will focus directly on strategies that can be used to promote better play skills in preschool students diagnosed with autism.

The preschool population can be defined as students between the ages of three and five. These students are at the prime age when play skills begin to flourish. For a typically developing child, preschool years are when they begin to play with other children, socialize, and problem solve. These skills are critical for the development of all children. Unfortunately, since autism directly effects the social and communication domains of a child, preschoolers diagnosed with autism often have difficultly engaging in many forms of play including functional play and symbolic play.

Play Skills and Importance

The importance of play for all children is a well-researched and documented topic. Researchers Elizabeth Holmes and Teena Willoughby promote the importance of play for all children by explaining how play can help develop intellectual, language and communication, social, and emotional skills that ultimately "prepare the child for the many complex tasks of adult life" (Holmes & Willoughby, 2005, p. 156). Furthermore, some research even supports the idea that developing play skills is more important for students with autism than it is for typically developing students. It is believed that working on and improving the play skills of children with autism; can lead to overall improvement in the social and communication domains where delays are typically evident. Authors Sunhwa Jung and Diane Sainato support this belief by stating, "since deficits in social and communicative behavior are two of the defining characteristics of autism, play is often used as the context to improve these behaviors" (Jung & Sainato, 2013, p. 74). These authors continue to support the importance of play by reporting that "improvements in play skills also increased positive social interactions and decreased inappropriate behavior as collateral effects" (Jung & Sainato, 2013, p.74). It can also be argued that if play skills are not targeted and not improved upon, other areas of development may not improve and can even worsen for children who are diagnosed with autism. Lang et al. from Texas State University, defend this argument by stating that "deficits in play behavior can further exacerbate the social and communication delays experienced by children with autism" (Lang, O'Reilly, Sigafoos, Machalicek, Rispoli, Lancioni, & Fragale, 2010, p. 481). Preparing all children for adult life, improving the overall social communication domains where delays are typically evident for children

with autism, and preventing further social and communication delays in children with autism are just a few reasons why the study of play interventions are important.

Research Question

There has been much research done on the effectiveness of various play interventions for children diagnosed with autism. Some common interventions that are currently used and have been found to be effective through research are various types of modelling, including video-modeling, prompting, and reinforcement. However, one Applied Behavior Analysis (ABA) based strategy that has not yet been researched in regards to improving play skills is discrete trial. In order to begin to understand the effectiveness that discrete trial training may have for students with autism in the area of functional play, this study seeks to answer the following question. Can discrete trial training increase the amount of time preschoolers spend engaged in functional play skills during group playtimes?

In order to address this question completely, I plan to collect time interval data on four preschool students placed in a MD self-contained classroom in Egg Harbor Township, New Jersey. The four students range in age from three to five and all have a diagnosis of autism from a developmental pediatrician. Through my observations, all four students struggle to engage in functional play; they prefer to engage in repetitive and sensory-stimulatory behaviors such as spinning, jumping, flapping, scattering objects, and lining up objects. To record these behaviors, baseline data will be collected for thirty minutes a week for three weeks. An interval time of one minute will be used, so that every minute the students' behaviors will be recorded to determine if they are engaged in

functional play or another behavior. Once the baseline data is collected, then the students will begin receiving instruction on functional play through discrete trial training.

Discrete trial is a well-known method primarily used to teach students with autism and other disabilities. This method is characterized by a highly structured, teacher-led teaching environment (Ghezzi, 2007). Typically, during discrete trial, students will work in a one-on-one setting with a teacher. The teacher will provide an instruction or direction to the student and wait for the student to respond. Prompting is used as required depending on the student's response to help the student complete the task or respond correctly. Another important part of discrete trial is the use of positive reinforcement. When a student completes a task as directed or responds correctly, the teacher will immediately provide access to a positive reinforcer to increase the likelihood of that same response/behavior occurring again. For this study, the discrete trial training will focus on functional play skills. For example, the teacher may provide a direction for the student to lace beads, stacks blocks, or push cars. The student will be given ten seconds to follow the direction, and then if the student does not respond or engages in a different behavior the teacher will prompt the student to complete the functional play skill. Each skill will be repeated five times a day for each individual student.

Once discrete trial training is put in place for several weeks, the students will then be given opportunities to engage in group playtimes again. Similar to the baseline data, I will collect data at a one minute interval to record the students' behaviors during these group playtimes. Finally, the baseline data and post-intervention data will be compared

for each individual student to determine if discrete trial training increased the amount of time the students spent engaged in functional play.

Hypothesis

Discrete trial has been found to be highly effective for young learners with autism (Ghezzi, 2007). Discrete trial can also be used to teach a variety of skills. In the article, *Discrete Trials Teaching*, author, Patrick Ghezzi, explains that Discrete Trial can be used to teach both procedural knowledge and declarative knowledge (Ghezzi, 2007). Procedural knowledge focuses on how to do things or complete certain tasks; whereas declarative knowledge refers to the ability to answer questions, recall facts, and provide knowledge to others when asked to do so. With this understanding of discrete trial in mind, I believe that discrete trial can be used as an effective intervention method to increase functional play in preschool students with autism because functional play could be considered procedural knowledge and the population of my study (preschool students with autism) has responded positively to discrete trial in the past. Furthermore, I hypothesize that the majority of the students in this study will increase the amount of time they spend engaged in functional play during group playtimes once discrete trial training is implemented on an individual basis.

Justification for Focus on Functional Play

I targeted functional play specifically for several reasons. First, there are many various types of play (e.g. functional, symbolic, parallel, cooperative, etc.). In order to make this research manageable, I narrowed down play skills by choosing one to focus on: functional play. Functional play can be defined as playing with toys as they are meant to

be played with. Some examples include, pushing a train on a train track, stacking blocks, lacing beads, and putting puzzle pieces into a puzzle. Another definition used to describe functional play is, a behavior that occurs when a child uses "a toy in a manner consistent with its intended function preserving the unique physical properties of the toy"(Lang, O'Reilly, Rispoli, Shogren, Machalicek, Sigafoos, & Regester, 2009, p.484). Even with the use of this definition, functional play is still a somewhat broad topic, however, it is much more feasible than researching multiple types of play.

The second reason I chose to focus on functional play skills is because I have seen a need for improvement in this area over my past three years as a preschool teacher in a self-contained classroom. From my observations, students often engage in repetitive and sensory- stimulatory behaviors, rather than functional play. As I conduct this research, I hope to see an increase in functional play, since my students currently struggle with this skill.

Another reason I chose to focus on functional play skills is because in many ways functional play skills are the basics, which other play skills are built upon. For example, in order to pretend to be a conductor picking up people on a train, children first need to put the train onto the track or put the people onto the train; both which are functional play skills. Since many of my students have difficulty with functional play skills, it seems logical to start with this beginning play skill, before analyzing other play skills.

Finally, there is a need to focus on functional play skills because children with autism have difficulty acquiring these play skills (Williams, Reddy, & Costall, 2001). Once an effective intervention is put in place and students improve functional play skills,

most likely, other play skills with also increase and improve, as functional play skills are essential for other types of play to occur, as mentioned earlier.

Implications

The outcomes of this research study will be beneficial for teachers as well as students with autism. If the outcomes determine that discrete trial was successful in increasing the amount of time preschool students with autism spend engaged in functional play, then discrete trial will be another teaching method and intervention option for teachers to use with preschool students who have autism. This is particularly important because many early learners with autism have difficulty learning new skills and typically require a highly structured and consistent learning environment. Discrete trial will also be helpful to teachers because teachers can target individual students who have difficulty with functional play skills, since discrete trial is typically carried out in a one-on-one setting.

More importantly, students will definitely benefit from the use of discrete trial to teach functional play skills. It is important to continue expanding the interventions and strategies that are currently used because all students learn differently, and there is no one strategy that works for all students. Discrete trial will provide another way for students with autism to learn and practice functional play skills. Over time, as students develop functional play skills they will also develop better language and social-communication skills and then can continue to work on other types of play such as symbolic play and cooperative play. By working on functional play, students are also working on attentiveness to task and problem solving. Discrete trial can be used as a strategy to teach functional play skills, which will ultimately improve other skill areas such as language,

social communication, attentiveness, and problem solving that will follow the student and remain important throughout their life.

In summary, this study will look at the effects of discrete trial training to determine if discrete trial can lead preschool students to engage in functional play for longer periods of time. I am hopeful that this research will provide teachers and specialists with another effective intervention strategy to use with preschool students diagnosed with Autism who lack developmentally appropriate functional play skills.

Chapter 2

Research Review

Researchers have identified and studied many types of play. Elizabeth Holmes and Teena Willoughby (2005) reported observing sixteen different types of play when observing children between the ages of four and eight (Holmes & Willoughby, 2005). In another article compiled to review previous research on play, Sunhwa Jung and Diane Sainato (2013) discuss six different types of play. Just to name a few, some types of common play are functional, parallel, cooperative, and pretend (symbolic). These types of play vary greatly from one another in features and incorporate different skills.

Play skills typically become more advanced over time. As a child gets older and continues to develop, research has shown that "play serves increasingly more complex and vital functions" (Lang, et al., 2009, p. 481). Beginning with the most basic, functional play, is the basis for play where a child plays appropriately with a single or multiple toys. A more specific definition of functional play defines it as a behavior that occurs when a child uses "a toy in a manner consistent with its intended function preserving the unique physical properties of the toy" (Lang, et al., 2009, p. 484). Some examples of this are pushing a car or train, stacking a block, and rolling a ball. Typically, parallel play will follow functional play in developmental sequence. Parallel play incorporates more skills because in this type of play the child is now attending to another child's play activities and imitating the activities with the toys. For example, one child might see another child putting people into a toy car and then the first child will imitate and put people into the car that they are playing with. Elizabeth Holmes and Teena

Willoughby consider parallel play to be occurring when a child is "playing within three feet of others, using similar materials, but not playing with them" (2005, p. 159). As development continues and play skills progress, the student will then begin to engage in play activities with other students. This is known as cooperative play, where students begin to share toys, share ideas, create games, and begin to follow simple rules. Holmes and Willoughby provide an example of cooperative play as children work together to complete one puzzle and refer to cooperative play as "group play" and describe it as "playing with others with a common purpose to the activity; interacting socially" (2005, p. 159). Around this time, children also begin engaging in pretend play, also known as symbolic play. With this type of play, children might pretend people are flying through the air by holding them up or pretend to eat food by holding an empty plate to their face. Russell Lang and his colleagues explain that symbolic play is "advanced" and explain that this level of play encompasses many skills. Their definition of symbolic play is an action that includes any of the following "the use of one object to stand for another object (e.g. a hairbrush used as a microphone)," an action that "appears to use something that is not present (e.g. strums an imaginary guitar)," an action that "uses a toy figure as if it were capable of performing actions (e.g. makes a teddy bear dance and sing)," an action that "uses a toy as a prop (e.g. a book becomes a ramp for a car),"or the child "adopts a role or persona that does not belong to the child (e.g. acts as if they are a parent, teacher, or super hero)" (Lang, et al., 2009).

Most children will engage in all of these types of play as they progress through typical development. However, since children with autism struggle with social interactions and communication many times they will have difficulty engaging in one

specific type of play, if not all types of play. Jeff Sigafoos and his colleagues described this difference in development in 1999 by stating that "whereas the vast majority of normally developing children readily acquire sophisticated play skills without deliberate or systematic instruction, young children with developmental disabilities often have considerable problems related to play" and that "inappropriate play is a defining characteristic of autism and deficits in the amount and type of play have long been noted among children with developmental disabilities" (Sigafoos, Roberts-Pennell, & Graves, 1999, p. 148). In order to address the difficulties students with autism face in regards to play, it is important to first target beginning skills and work on skills that would be acquired first from a developmental stand-point. For this reason, this current research is targeting the improvement of functional play skills specifically. As mentioned earlier, functional play is one of the most basic forms of play, and is the basis for play where a child plays appropriately with a single or multiple toys. Other researchers, have also agreed on the importance of functional play. Supporting this, in 2006 Hine and Wolery explain that "toy play is an essential forerunner for symbolic play and perhaps for social play" (2006, p. 83). In this statement, the term toy play is used in place of functional play, however, since functional play is focused on using a toy in the manner it is designed for, it can also be considered toy play. Once students make progress in functional play and can engage in functional play independently then they will have the basis for other play skills to emerge, which will ultimately improve overall social and communication development.

Challenges with Play

Since functional play seems to be a simple skill, many people may wonder how many children with autism really struggle with functional play, why do children with autism have difficulty with functional play, and if the children are not engaging in functional play or another type of play with the toy, then what are the children doing? Much research has been conducted through observations of children with autism playing, to answer these questions and there are many behaviors that have been recorded other than play.

Children with Autism and Play

In a study conducted in 2005, it was found that students with autism only engaged in functional play for 25% of the time (Holmes & Willoughby, 2005). The researchers looked at the play skills of 17 children diagnosed with autism between the ages of 4 and 8. Each child was observed during free play time in a mainstreamed classroom for five sessions. Each session lasted five minutes. When the data was combined, it was found that the children with autism engaged in functional play about 25 percent of the time. Based on this percentage, the researchers explained that the students with autism were playing below their expected ability based on chronological age. Most of these students were in kindergarten, 1st, or 2nd grade and therefore are considered school age. However, the researchers describe the students as playing at a preschool level, providing evidence that children with autism struggle to develop play skills (Holmes & Willoughby, 2005).

Similar to the findings in the 2005 study, another study conducted in 1999 by Jeff Sigafoos and his colleagues found similar results. In this study, 13 preschool aged

children with developmental disabilities, including autism, were observed during play time in a special education preschool classroom. The children were observed playing twice a year for three years. Each observation lasted thirty minutes and was also video recorded. Then the video recordings were analyzed to determine how often the children engaged in functional play. The researchers referred to functional play as appropriate play in the study and gave it a broad definition that included independently using a toy in a manner for which it was intended such as, rolling a truck along the floor or putting pieces into a puzzle (Sigafoos, Roberts-Pennell, & Graves, 1999). Based on Sigafoos' definition of appropriate play, he is referring to functional play because functional play occurs when a child plays with a toy appropriately, how the toy was intended to be played with. Once the video recordings were analyzed, it was determined that functional play was observed during approximately 20% of each 30-minute observation (Sigafoos, et al., 1999). When the researchers tracked the progress over three years they also noted that there was little overall change; therefore, no progress was made in play skills (Sigafoos, et al., 1999). Furthermore, Sigafoos and his colleagues emphasized the lack of progress by explaining that considerable deficits in play skills remained evident for the children (Sigafoos, et al., 1999). The fact that children are only engaging in functional play about 20% of the time and that over three years little improvement was made in functional play is very concerning and warrants the use of interventions to improve functional play skills.

Since functional play skills have been shown by multiple research studies to be a difficult and limited task for children with autism to acquire, it is also noteworthy to examine some of the specific challenges that may contribute to the difficulty in functional

play. One specific challenge for students with autism is the urge to engage in self-stimulatory behaviors and repetitive actions, also referred to as stereotypy behaviors rather than functional play. Some of these behaviors include jumping, flapping, rocking, gazing of eyes from side to side, repetitive clapping, and spinning or objects repeatedly. Children with autism may also have difficulty engaging in functional play as they may have a tendency to sit unoccupied and not engage in any play activity spontaneously. They may sit near the play activity but stare into the distance or watch other children play but remain unengaged as an onlooker. Finally, children with autism may engage in functional play less often because they may not understand how to engage with toy objects in a new way unless instruction is provided. All three of these behaviors (self-stimulatory, remaining unoccupied or as an onlooker, and difficulty with new play actions) have been noted in various research studies.

Self-stimulatory, sensory stimulatory, and repetitive behaviors can also be referred to as stereotypy. The term stereotypy was used by researcher Russell Lang to describe repetitive behaviors such as “body rocking, and spinning or mouthing toys” exhibited by children with autism. Lang also describes the challenge that stereotypy behaviors present when he explains children with autism engage in significantly more stereotypic behaviors resulting in less appropriate play behaviors when compared to typical children with the same mental age (Lang, O”Reilly, Sigafoos, et al., 2010).Stereotypy behaviors reduce the amount of time children with autism engage in functional play, but also reduce the effectiveness of intervention strategies used to teach play skills, making these stereotypy behaviors even more challenging and important to address.

Lang, O'Reilly, Sigafoos, et al., (2010) observed four children with the diagnosis of autism found that they engage in stereotypy behaviors often. In many cases, the extent of the stereotypy was so prolonged, that it prevented the children from engaging in functional play altogether. One child engaged in stereotypy behaviors 77 percent of the time and did not engage in any functional play. The second child engaged in stereotypy 54 percent of the time and functional play 29 percent of the time. The third child engaged in stereotypy 98 percent of the time and did not engage in any functional play. The fourth child engaged in stereotypy 48 percent of the time and engaged in functional play 26 percent of the time (Lang, O'Reilly, Sigafoos, et al., 2010). The research not only shows the need for interventions to improve functional play skills, but also demonstrates that stereotypy behaviors have a direct and negative impact on functional play skills. The more stereotypy behaviors a child engages in, then the less functional play skills occur.

Stereotypy behaviors were also an apparent issue in other research studies concerned with functional play. When a review of research was completed, Jung and Sainato, 2013, found that the amount of time children with autism engage in play is often effected by the child's specific and restricted interests and stereotypic and repetitive behaviors. Furthermore, Sigafoos and his colleagues (1999) described inappropriate play behaviors that were observed when video recordings were taken of 13 preschool aged children with developmental disabilities. Some of the inappropriate play behaviors that were observed were stereotypy behaviors. For example, one child was observed to "mouth objects", one child engaged in "frequent stereotypic movements," and another child was observed "repeatedly spinning a book on the floor" (Sigafoos, et al., 1999, p. 157-158).

Besides engaging in stereotypy behaviors, children with autism also occasionally remain unengaged altogether or only participate as an onlooker. Rather than picking up toys or playing with toys, the children will sit passively, stare into the distance, or watch other children play from a distance, making them an onlooker. These behaviors were found to occur among the children with autism in the Holmes and Willoughby (2005) study discussed previously. The researchers found that the children with autism were "unoccupied" 8 percent of the time and participated only as "onlookers" 7 percent of the time (Holmes & Willoughby, 2005). When both of these percentages are combined, it can be stated that 15 percent of the time children with autism did not engage in any play or social activity, which is significantly different from typically developing children. If children with autism remain unengaged or unoccupied during play times, then functional play skills will not occur and the opportunity to develop new play skills will be limited, presenting a significant challenge to overcome when addressing play skills.

When the challenges of stereotypy behaviors and unoccupied or onlooker behaviors are combined, the impact on functional play skills is very significant. One researcher found that preschool children with developmental disabilities were only engaging in six minutes of functional play during a thirty minute session due to the interference of stereotypy behaviors and unoccupied behaviors (Sigafoos, et al., 1999). Sigafoos et al. (1999) reported that for 24 minutes out of each 30-minute observation period the children engaged in "nonplay and inappropriate behavior" (p.157). Nonplay refers to unoccupied behavior and inappropriate behavior refers to stereotypic behaviors. This research is evidence that stereotypy behaviors and unoccupied behaviors are definitely a challenge for children with autism to overcome in order to improve play

skills. This research is also vitally important to keep in mind when selecting an intervention to use to improve play skills. In order to improve functional play skills, stereotypy behaviors and unoccupied behaviors needs to be addressed and reduced.

A potential third challenge that must be addressed when focusing on improving functional play skills is the difficulty of performing new actions with toys in play. Similar to other areas of academics and life skills, children with autism may need direct instruction to acquire new skills, generalize skills to new settings or new materials, and refrain from engaging in repetitive or stereotypy behaviors. When direct instruction is not provided to children with autism to include new actions with toys, their functional play skills will most likely be limited. In a study by Williams, Reddy, and Costall (2001), 15 children diagnosed with autism ranging in age from 11 months to 5 years old were observed in play activities in their home setting. Then the results from these observations were compared with results from observations of 15 typically developing children and 15 children with Down Syndrome. When compared, differences were seen in functional play. Furthermore, the children with autism were found to engage in new functional acts the least when compared to the group of typical children and the group of children with Down Syndrome (Williams, Reddy, & Costall, 2001). The comparisons also showed that the children with autism struggled to engage in elaborated functional acts and produces the least amount of these acts compared to the other two groups of children (Williams, et al. 2001). Based on this research, it may also be important for intervention strategies to incorporate new actions with toys for children with autism in order to improve overall functional play skills.

Functional play has been proven to be an area of general weakness for children with autism when adults or peers do not guide them or provide directions. Some of the specific challenges that limit functional play are stereotypy behavior, unoccupied behaviors, and difficulty incorporating new actions into play. All three of these behaviors have been observed in the majority of children with autism in various research studies. Even with all of the challenges discussed that children with autism may face (i.e. stereotypy behavior, unoccupied behaviors, and difficulty incorporating new actions into play) a few intervention strategies have been proven to be effective in improving and increasing functional play skills in children diagnosed with autism. These interventions are most likely successful because they have found ways to address stereotypy behavior, unoccupied behaviors, and difficulty incorporating new actions into play.

Intervention Strategies that Address Play Skills

One proven intervention strategy to use with children with autism when trying to increase or improve functional play skills is modeling. Modeling is a strategy where an individual will demonstrate how to perform a specific skill to another individual. In this case, an individual would model how to engage in functional play so that a child with autism could observe. Then when the child with autism goes to engage in play they can use the model as a basis and imitate the model provided. There are several types of modeling that exist today. One type of modeling is vivo modeling or live modeling, where a person models the activity live, right in front of student. This modeling could also consist of peer modeling or adult modeling. In peer modeling, a student would model a skill to another student, and with adult modeling, an adult or teacher would model the skill for the student. Varying from vivo or live modeling, is video modeling. Video modeling occurs when an

activity or skill is recorded and the student then watches the recorded video to observe the model. All of the various types of modeling have been proven moderately effective in teaching some play skills to children with autism.

Jahr, Eldevik, and Eikeseth (200l) used live modeling as an intervention to increase social interaction in cooperative play scenarios. The participants included six children diagnosed with autism ranging in age from 4 to 12. Before the intervention took place, all six children were inconsistent in cooperative play, in that they would not respond to the partner four times or more in a play session. Once the intervention began, the children would observe a teacher or peer engaging in cooperative play and then have an opportunity to imitate the scenario. All six children were able to master cooperative play, by responding in a turn-taking conversation and play activity for four responses. However, the amount of time it took for each child to master this play skill varied greatly. Two children were given verbal directions and descriptions along with the visual live model at the onset of the intervention, and these two children mastered the cooperative play scenarios the quickest, in 12 training play episodes and 30 training play episodes. The other participants did not receive the verbal descriptions right away, rather they only received a visual live model, without verbal input. In this time, all four participants were unable to master the cooperative play skill set. Then, training episodes were used again with the same four participants. This time, verbal descriptions were included with the modeling. Once the verbal descriptions were included in the modeling, all four participants were able to master the cooperative play skill set. Similar to the first two participants, the amount of time it took for the participants to master cooperative play varied between 6 play episodes and 21 play episodes. After the training was complete, probes were conducted monthly and found

that the participants were able to generalize the cooperative play skills to new settings and new peers who were not involved in the training sessions (Jahr, Eldevik, & Eikeseth, 2000). The participants also maintained the cooperative play skills for an average of ten months without receiving any trainings in between that time.

This research study reveals that live modeling can be effective in teaching play skills to students with autism, when verbal descriptions and directions are included in the model. It appears that if live modeling is used as only a visual, without verbal input, it is not an effective tool. The benefits to using live modeling based on this report are that it is able to reach the majority of children with autism because modeling worked for all six participants. It also was effective for a large age range between 4 and 12 years old. Modeling was also effective in teaching play skills in such a way that allowed for generalization to novel setting and new peers and maintenance on an average of ten months. Generalization and maintenance are definite advantages for interventions because children with autism generally have difficulty generalizing information and maintaining new information. However, even with the success of achieving cooperative play skills, generalization, and maintenance, further research should be conducted to determine the effectiveness with other play skills. Cooperative play is a more sophisticated play skill, and in this research study all six participants already demonstrate functional play skills. For this reason, I would question the effectiveness of modeling with other play skills including functional play skills until further research is conducted. Another drawback of modeling based on this research study, is that all the participants varied in the amount of time it took to master the skill set.

Video modeling has also been found to be effective in teaching children with autism play skills. Some researchers even believe that video modeling may more effect than vivo or live modeling (Hine & Wolery, 2006). In Hine and Wolery (2006), the researchers explain that video modeling has many advantages. Some of the advantages they describe are being cost effective, being able to depict many natural settings and situations, having the ability to create a perfect model through re-shoots until perfection is achieved, being able to use the same video repeatedly without needing models present, and using the same video with a variety of children to save time and treat more children (Hine & Wolery, 2006). With these known advantages, the researchers observed two girls with autism ranging in age from 30 months to 43 months to determine the effectiveness that video modeling could have when teaching play skills to preschool students with autism. Both girls attended an inclusion preschool where the observations occurred. First, both girls viewed two video clips that demonstrated appropriate play. The video was shown on a laptop and featured adult hands showing how to use materials in a sensory bin. In one video, the sensory bin contained gardening materials (soil, shovels, buckets, etc.) and in the other video, the sensory bin contained cooking materials (pots, food, etc.). Then both girls, were provided the same materials in the same sensory bin and allowed to play. Baseline data demonstrated that both girls engaged in stereotypic behaviors and repetitive actions when playing. The variety of play actions were also very limited; at most, each girl only produced two play actions for each scenario. Once the intervention, video modeling, began, one girl increased her play actions to at least 5 actions in both scenarios and the other girl increased her play actions in only one scenario (Hine & Wolery, 2006). The outcomes were that the teaching of new play behaviors was

successful in three out of four behavior sets “gardening for both girls, and cooking for Christine” (Hine & Wolery, 2006). In these three sets, the child was able to play with the toys functionally for a longer amount of time and engaged in new play behaviors that were appropriate. However, even with the advantages that video modeling offers and the success in three out of four behavior sets, I would judge video modeling as only moderately effective.

Three out of four behaviors sets would equal about 75 percent success rate for teaching functional play skills to preschool students with autism when using video modeling. This is good, but it was conducted with a very small sample size, two participants. The participants were also two girls between the ages of two and three, who were enrolled in an inclusion preschool classroom. Due to the sample size and characteristics of the participants, further investigations need to be conducted to determine the effectiveness of video modeling, with boys, older children, and children with autism who might be lower functioning than the two girls. The two girls used in this study were enrolled in an inclusion classroom, and many students with autism are enrolled in self-contained classrooms at the preschool level, which is why I believe the effectiveness of video-modeling on functional play skills can be questioned until further research is conducted.

Another type of intervention that has been used to increase play skills in preschoolers with autism is known as abolishing. Abolishing focuses on increasing the amount of time children engage in play by decreasing or stopping, abolishing, stereotypy behaviors. In Lang, O'Reilly, Sigafoos, et al. (2010), Lang and his colleagues explain that abolishing is an approach used to eliminate stereotypy behaviors by abolishing the child’s

motivation or want to participate in stereotypy and repetitive behaviors. The researchers believed that if the motivation for stereotypy behaviors was abolished then play interventions would be more successful, as students would not engage in stereotypy and would need to be redirected less often. (Lang, O'Reilly, Sigafoos, et al., 2010). To test the effectiveness of abolishing, the researchers observed four children with a formal diagnosis of autism ranging in age from 3 to 8 during play activities in their specialized school for children with developmental delays. When baseline observations occurred, the children were observed for a ten-minute session and it was noted that all four children engaged in stereotypic behaviors at a high rate, limiting the amount of time the children spend engaged in functional play (Lang, O'Reilly, Sigafoos, et al., 2010). During the intervention phase, all four children were given time to engage in stereotypic behaviors until satiation was reached, or the child stopped the stereotypic behavior voluntarily. Then the play intervention was introduced to the children. The researchers proposed that by allowing the children to become satiated with the stereotypic behavior their motivation levels to engage in stereotypic behavior would decrease during the play intervention; therefore, resulting in abolishment of stereotypic behaviors and an increase and improvement in play skills. The results from this study determined that the researchers' hypothesis was fairly accurate. For three out of the four children, when satiation of the stereotypic behavior occurred before the play intervention functional play increased and stereotypic behaviors decreased (Lang, O'Reilly, Sigafoos, et al., 2010).The only child this was not true for was named Rusty, and in his case, stereotypic behaviors decreased, but functional play did not increase.

Based on the results from the research, abolishing may be an effective way to increase the amount of time preschool children engage in functional play for three out of four children or 75 percent of cases. One issue with the abolishing intervention is that it is not practical to use in a classroom setting. In order for abolishing to be effective, a classroom routine would need to account for time for students to engage in stereotypic behaviors until satiation. For example, if a classroom currently has a thirty minute session of free play, the teacher would need to modify the class schedule so that ten to thirty minutes, depending on the students' needs, immediately before the play time is left opened so that all students could engage in stereotypic behaviors until satiation. During this time, no teaching or instruction would occur and students would be able to engage in self-stimulatory behaviors as much as needed. Most teachers try to maximize the amount of instruction time with students and would have a hard time finding extra time in their schedule to allow students to engage in stereotypic behaviors freely before providing instruction. For this reason, I think that other interventions and strategies should be explored in an attempt to increase the amount of time preschool students spend engaged in functional play.

Need for New Types of Intervention

Live modeling, video modeling, and the act of abolishing stereotypic behaviors have been researched and found to be moderately effective in teaching children with autism play skills. Unfortunately, each one of these interventions has some drawbacks and questionable qualities when it comes to teaching functional play skills to preschool students with autism. Live modeling has not been used to teach more basic play skills, such as functional play skills, and also takes a varying amount of time to master the skill

set depending on the student (Jahr, Eldevik, & Eikeseth, 2000). Video modeling was successful in teaching functional play skills to preschool aged children in three out of four play scenarios, but the study used a very small sample size that only contained two female students who are enrolled in an inclusion classroom (Hine and Wolery, 2006). In order for an intervention to be fully effective with the preschool autism population, it needs to be researched with a representative population of children with autism, include those with more significant disabilities. Video modeling may also be difficult for some teachers and therapists to use as it requires multiple adults (at least one to model and one to film) and the use of a video recorder and laptop or tablet for the students to access, resulting in a costly intervention. Finally, abolishing was also effective in increasing functional play skills for 3 out of 4 children with autism, but requires a change in classroom schedules for more free time for students, which may be impractical for teachers who want to maximize instruction time (Lang, O'Reilly, Sigafoos, et al., 2010). Based on previous research focused on live modeling, video modeling, and abolishing, another intervention model is needed to address all play skills, including functional play skills, for students in both inclusion settings as well as self-contained settings, that is also cost effective and practical for most classroom schedules and routines.

One novel approach to increasing functional play skills in preschool students with autism is adding a functional play program to discrete trial training. Discrete trial is an applied behavioral analysis- based (ABA) intervention used frequently to teach a variety of skills to students who have significant disabilities, including those with autism. Despite this, no research has been conducted on the effectiveness of discrete trial in teaching functional play skills specifically.

Discrete trial training appears to be an appropriate and conventional intervention for functional play skills because discrete trial has been successful with the target population, preschoolers with autism, is cost effective and only requires minimal materials. Discrete trial can also fit easily into current classroom schedules that already use discrete trial. Discrete trial will most likely be successful in increasing functional play because it also incorporates modeling and addresses stereotypic behaviors, which were found to be moderately effective in other research studies. Modeling will be used as a way to prompt students to engage in functional play and stereotypic behaviors will be addressed through redirection to functional play by prompting the students verbally, gesturally, and physically. The success of discrete trial with preschool age students who have autism in general functional and academic skills has been seen in previous research studies

In a review article by Patrick Ghezzi (2007), discrete trial is determined to be one of the most effective intervention strategies for young learners with autism. Ghezzi refers to discrete trial training as "remarkably effective" and explains that discrete trial training is an appealing intervention to use with young learners with autism because this intervention is able to discourage undesirable, interfering, behaviors such as stereotypy while simultaneously teaching and encouraging new and appropriate behaviors and skills (Ghezzi, 2007). Ghezzi also supports the use of discrete trial because it can be used to teach a variety of skills. Ghezzi explains that discrete trial can be used to teach both procedural knowledge and declarative knowledge (Ghezzi, 2007). Procedural knowledge focuses on how to do things or complete certain tasks; whereas declarative knowledge refers to the ability to answer questions, recall facts, and provide knowledge to others

when asked to do so. Both types of knowledge are very important to preschool age children with autism. For example, procedural knowledge may include learning how to wash their hands or get dressed, and declarative knowledge might include being able to answer question such as, what is your name and how old are you. In general, this research found discrete trial training to be effective because it can be used to decrease undesirable behaviors and increase new and appropriate behaviors, while teaching a variety of new skills, leading Ghezzi to encourage teachers to use discrete trial training as the "centerpiece" of a learning environment (Ghezzi, 2007).

More specifically, the effectiveness of discrete trial when used to teach functional and academic skills to preschool students with autism is described by Din and McLaughlin (2000). In this study, the researchers chose four male special education students ranging in age from 3 to 4, to deliver discrete trial training to for at least seven months to a year. The discrete trial training process included getting the child's attention, giving a direction or request, waiting for student response, and then prompting as necessary to help student follow direction or answer request successfully, and finally providing a positive reinforcer. After each student response, data was collected to track progress. Each target was practiced repetitiously each day for an amount of ten times until mastery, when a new target or new skill would be introduced. Discrete trial was conducted between 40 minutes and an hour daily. The skills and targets taught to each student varied depending on the student's baseline assessment, IEP, and current needs, but all were focused on functional and pre-academic skills. Some similarities in the skills taught included following directions, identifying objects, body parts and action verbs (recognizing functional vocabulary, and speaking words and simple sentences if the child

was verbal (Din & McLaughlin, 2000). After seven months to a year, results were gathered and each child had made success in mastering a variety of skills. The research lists the specific skills each child mastered, however the list is very extensive since each child was working on different skills. In order to summarize the results, all four children were successful in mastering functional and pre-academic skills in varying amounts of time from (2 days to two months) depending on the child and skill being taught. The results indicated that all four children learned various functional and pre-academic skills, and two children learned to speak words and simple sentences (Din & McLaughlin, 2000).

Even though the results from this research seem very vague, I think it is important to note that all four participants were able to master over 11 targets successfully. In this research study, discrete trial was effective for 100 percent of the participants who were preschool students with autism, which is a huge success. This also supports the idea that discrete trial is a good option for intervention to use with preschool students who have autism. This research study focused on the improvement of functional and pre-academic skills, however, when a close examination is conducted of each individual student's progress, some play skills are also mentioned. For example, some students learned to pop bubbles, blow a whistle, put blocks in a container, and bang on a drum (Din & McLaughlin, 2000). All of these targets that were taught and mastered could be considered functional play skills, since the children were playing with the toy in an appropriate manner as the toy was intended to be played with. For this reason, this research study also suggests that discrete trial may be effective in teaching some

functional play skills to preschool students, but more research focusing on play skills specifically would be needed to ensure this conclusion is accurate.

Further research on discrete trial was conducted by Smith, Groen, and Wynn (2000). Fifteen children, 7 diagnosed with autism and 8 diagnosed with pervasive development disorder, ranging in age between 18 and 42 months received discrete trial training in their homes and in school. The sample population included twelve boys and three girls. Similar to the research conducted by Din and McLaughlin (2000), this research study also had students engage in highly structured discrete trials in a one-on-one setting. The discrete trials focused on a variety of skills that would help increase independence and prepare the children for school. The set of skills being taught included intellectual, adaptive, and socialemtional functioning, and were aimed at reducing the amount of assistance and special education services needed by the child (Smith, Groen, & Wynn 2000). Follow-up assessments were conducted to determine the effectiveness of the early intervention with discrete trial by comparing the results to another group of children who received early intervention through their parents who had parent training. The comparison revealed that the children who received discrete trial made more improvements in their IQ score, visual spatial skills, and language development (Smith, Groen, & Wynn 2000). Ultimately, the children who were taught using discrete trial had a statistically significant advantage over the group of children who were taught using parent training interventions (Smith, Groen, & Wynn 2000). In summary, the children who received discrete trial training performed better than the children in a parent training group at follow-up on measures of intelligence, visual-spatial ability, language, and academic achievement. (Smith, Groen, & Wynn 2000). The children who received

discrete trial training were also placed in less restrictive environment in school, such as inclusion rooms or general education classrooms with an aide. Whereas, many of the children who received parental training intervention were places in self-contained classrooms or inclusion rooms with an aide.

The results from the study Smith, Groen, and Wynn (2000) are overwhelming in favor of using discrete trial with preschool children. The results indicate that discrete trial can be effective in increasing many skills including language and intelligence. However, once again, play skills are not focused on specifically. The research article briefly mentions incorporating play, but never evaluates the improvement or expansion on play skills. The researchers simply stated that typically one year after the onset of discrete trials most of the children in the intensive treatment group "played appropriately with toys" (Smith, Groen, & Wynn 2000). This statement suggests that play skills were targeted and increased and improved, but does not give any specifics about the amount of success seen in play skills. Ultimately, discrete trial has been found effective for most preschool children with autism, but little research exists in regards to how effective discrete trial is in improving functional play skills for these children; creating a need for a research study that specifically focuses on the effectiveness of discrete trial on functional play skills.

Summary and Implications

Based on previous research, it can be hypothesized that preschool children with autism will struggle to engage in functional play. Holmes and Willoughby (2005) studied older children (up to 8 years old, as opposed to up to 5 years old) who were mainstreamed and found that these students engaged in functional play less than 25

percent of the time. Another consideration, is that Sigafoos, Roberts-Pennell, and Graves (1999) also found that preschool children with developmental disabilities only engaged in functional play about 20 percent of the time. Furthermore, the amount of functional play may actually be lower than 20 percent because the researchers admitted that their definition of functional play was a "rather broad definition" and may have resulted in a higher percentage of functional play (Sigafoos, Roberts-Pennell, & Graves, 1999). For this reason, when I observe preschool children, I am expecting to see a limited amount of functional play, possibly even lower than twenty percent of the time.

Research studies also suggest that stereotypy and unoccupied behaviors will be present while observing preschool students with autism, which may reduce the amount of time students engage in functional play. Implicating that in order to improve play, an intervention strategy will need to address and reduce the amount of time that the students engage in stereotypy behaviors and unoccupied behaviors. It can also be assumed that modeling and abolishing along with other interventions may work for some of these students, but not for all. For this reason, I am examining the possibility of using discrete trial as an intervention to specifically increase the amount of time preschool students spend engaged in functional play during group play times. Even though, there is not research on discrete trial being used specifically to teach functional play skills, discrete trial has been very effective in teaching most preschool students with autism a variety of other skills. With this is in mind, it appears that discrete trial has the potential to be a strategy to teach functional play skills to preschool children with autism.

Chapter 3

Methodology

Research Design

This is a quantitative, single subject study trying to determine if discrete trial training can be used to increase the amount of time preschool students with autism engage in functional play. Data were collected to determine the effects on each individual student.

Setting and Participants

This study included four male preschool students who attend a suburban southern New Jersey public school. The school district is fairly large and consists of four elementary schools (preschool to 5th grade), two middle schools (6^{th} to 8^{th} grade), and one high school. The school district serves approximately 7,700 students from grades preschool to 12^{th}. As students of the MD preschool program the four students attend school for five and half hours per day.

The multiple disabled (MD) preschool classroom these four students are a part of contains 12 students, 11 boys and one girl, and a special education teacher along with 5 paraprofessional aides. The students in the class vary in age, race, and disabilities. The class consists of students ranging in age from three to five; four students are three years old, two students are four years old, and six students are five years old. In regard to ethnicity, six students are Caucasian, one student is middle-eastern, one student is Asian, one student is African American, and three students are Hispanic. Two out of the twelve

children also live in a home where two languages are spoken. The disabilities and diagnoses represented in the class are autism, communication impairments, ADHD, and sensory processing disorder; eight students are diagnosed with autism, two are diagnosed with communication impairments, one is diagnosed with sensory processing disorder, and one student is diagnosed with both ADHD and sensory processing disorder. All 12 students receive ABA based instruction for five hours a day.

All of the students chosen for this study have been given a diagnosis of autism by their developmental pediatrician. All four students also have been evaluated by the school's child study team and given an IEP to address pre-academic skills in language arts and math, daily living skills, and social/emotional/behavioral skills. Depending on the students' abilities and needs, some also receive speech and language services and/or occupational therapy. All students included in the study have also been noted to struggle with engaging in functional play skills independently based on classroom observations and comparisons of peers within the same classroom. These four students show the most potential for growth in the area of functional play skills out of the students in the classroom.

Participant 1. F is a three year and six- month old Caucasian male who has been attending school for six months. F was given the diagnosis of autism at two years old and also received early intervention in his home. He now receives services in the MD preschool classroom and receives two twenty- minute individual pull-out speech sessions and two thirty- minute integrated (push-in) group speech sessions per week. F also receives one thirty-minute individual pull-out occupational therapy session per week. F is

a non-verbal student who has difficulty attending to tasks, making eye contact, responding to his name, and engages in self-stimulatory behaviors such as jumping and flapping very often.

Participant 2. G is a five- year old Hispanic male who has been part of an MD preschool classroom in the same school for two years. G was given the diagnosis of autism and receives speech and occupational therapies. G receives two twenty- minute individual pull-out speech sessions and two thirty- minute integrated (push-in) group speech sessions per week. G also receives one thirty-minute individual pull-out occupational therapy session per week. G is a verbal student that engages in frequent temper tantrums and attention seeking behaviors (yelling no, taking off shoes and socks, and laying on the floor). He also engages in self-stimulatory behaviors such as shaking his head side to side repeatedly, flapping arms, stomping feet, and making repetitive humming sounds.

Participant 3. R is a five- year old African American male student who has been receiving services in a MD preschool classroom for two years and four months. R receives two twenty- minute individual pull-out speech sessions and two thirty- minute integrated (push-in) group speech sessions per week. R also receives one thirty-minute individual pull-out occupational therapy session per week. R is a verbal student who struggles with staying seated, attending to tasks for more than five minutes, and communicating effectively with teachers and peers. R also commonly engages in repetitive motions with his hands or feet while also making repetitive sounds.

Participant 4. V is a three year and eight-month old Caucasian male with an autism diagnosis. V has been participating in the MD preschool classroom for eight months. V receives two twenty- minute individual pull-out speech sessions and two thirty- minute integrated (push-in) group speech sessions per week, but does not receive any occupational therapy. When V first began school, he was non-verbal, but now makes word approximations spontaneously and imitates words upon request. V has difficulty staying seated, attending to tasks, and communicating his wants and needs effectively. V also engages in self-stimulatory behaviors throughout the day including flapping, jumping, spinning objects, and lining objects up.

Procedure

Baseline data was collected on all four students for two weeks. During these two weeks, each student was observed once per week for thirty minutes during a group playtime in the students' MD preschool classroom. Toys were laid out on the classroom carpet and tables. During the observations, teachers and paraprofessionals did not provide directions, prompting, or positive reinforcement to the student being observed. Play materials used varied depending on the students' interests. F was observed playing with blocks, G was observed playing with cars, R was observed playing with puzzles, and V was observed playing with lacing beads and string. Data was collected at an interval of one minute using the sheet below. Functional play was recorded as occurring when the students played with toys as they are meant to be played with. For example, functional play included when the students stacked the blocks, laced beads onto the string, inserted puzzle pieces into the puzzle frame, and pushed cars. For each minute, if the student was

not engaging in functional play a comment was written under the column titled “other” describing the student’s actions at that time. Some common actions listed under “other” included jumping, staring- unengaged, flapping, and spinning toys (see Figure 1).

After the baseline data was collected, the intervention was implemented for seven weeks. Each of the four students was given instruction through discrete trial training on functional play with the specific toys (F- blocks, G- cars, R- puzzles, and V- lacing beads and string). Discrete trial training was provided to each of the four students by the special education preschool teacher who has four years of experience in ABA methodologies. Discrete trial training was conducted in a one-on-one setting. The teacher would take one student to the back table in the classroom or to the carpet in the classroom, depending on the play activity. F and V received discrete trial training at the table and R and G received discrete trial training at the carpet. Once in the one-on-one setting specific steps were followed throughout discrete trial training for all the students.

Step 1: The teacher would gain the attention of the student by calling the students name, tapping the student on the shoulder, guiding the student’s head toward the teacher to make eye contact, or asking “Are you ready?”

Step 2: Once the teacher captured the student’s attention, the teacher would present the materials or toys needed and give a direction or instruction, also known as an SD, to the student. F was told “stack blocks,” G was given the direction “play with cars,” R was directed to “do puzzles,” and V was told to “put on” referring to the beads.

Date:_____ Play Activity:_____

Procedure: For each minute, a check mark will be placed under functional play if the student is engaging in functional play. If the child is not engaging in functional play then no check mark will be placed in the column labeled functional play, but a description of what the child is doing will be placed under the column titled other.

Time	Functional Play	Other
9:20		
9:21		
9:22		
9:23		
9:24		
9:25		
9:26		
9:27		
9:28		
9:29		
9:30		
9:31		
9:32		
9:33		
9:34		
9:35		
9:36		
9:37		
9:38		
9:39		
9:40		
9:41		
9:42		
9:43		
9:44		
9:45		
9:46		
9:47		
9:48		
9:49		
9:50		
9:51		
9:52		
9:53		
9:54		
9:55		

Figure 1. Observation Instrument

Step 3: The teacher would wait for the student response. After ten seconds if the student did not engage in the activity, the verbal direction was given again. After another ten seconds, if the student still did not engage in the activity physical prompting was used to initiate the activity.

Step 4: The teacher would observe the child's response and activity and provide prompting when necessary. In most situations, the students' targets were time based. For example, V was expected to lace beads for thirty seconds and F was expected to stack block for thirty seconds. For this reason, the teacher would observe the student for the thirty seconds or other specified time in the discrete trial program. During the thirty seconds, if the student stopped playing, was not playing appropriately, or was engaging in self-stimulatory behaviors the teacher would provide prompting right away. Types of prompting included verbal prompting such as "push the car," physical prompting such as using hand-over-hand motions to make student stack blocks, modeling by demonstrating what to do, and a combination of these types of prompting.

Step 5: The teacher recorded if prompting was needed or if the student completed the target independently. P was written down to indicate prompting and I was written down to indicate independence.

Step 6: Once the student, demonstrated functional play for the designated amount of time positive reinforcement was provided to the student. Positive reinforcement included items that were highly motivating for the student such as edible items, access to trampoline, and sensory toys.

Step 7: Steps 1 through 6 were repeated at least five times on a daily basis for all students.

Step 8: Once discrete trial training was completed for the day, the teacher would look back at the data recorded from step 5 to check for independence. Once the student was independent on a specific target for at least 80 percent of the time for three consecutive days, the target was increased. For example, if the student was able to stack blocks for thirty seconds independently for three days in a row the target was increased to 45 seconds. This allowed the students to continually make progress and engage in play for longer periods of time. This process was continued for all seven weeks of intervention and some targets increased from thirty seconds to three minutes.

During the seven weeks of intervention, the students were also still being observed during group play time to determine if the discrete trial training was effective in carrying over into group playtime. Similar to the baseline data, the teacher would observe each student once a week for thirty minutes without providing directions, prompting, or positive reinforcement. The same set of toys and setting were used again. The students' behaviors were recorded once a minute using the same time interval data sheet as the baseline observations. After the seven weeks of intervention, all nine data points (two baseline data points and seven intervention data points) of time engaged in functional play from the time interval sheet were graphed for each student to show the individual child's progression over the seven weeks of intervention.

Variables

The independent variable in the study was discrete trial training as an intervention. This intervention remained consistent throughout the study and was aimed at increasing the amount of time the preschool students with autism engaged in functional play during group playtimes in the classroom. The dependent variable in the study was the amount of time the students engaged in functional play. This amount of time was dependent upon how successful discrete trial training was as an intervention for each individual student.

Chapter 4

Results

This quantitative, single subject study was conducted to examine the effects that discrete trial training had on four male preschool students diagnosed with autism in the area of functional play skills. More specifically, this study sought to answer the following question. Can discrete trial training increase the amount of time preschoolers spend engaged in functional play skills during group playtimes?

Before this study began, all four male students demonstrated difficulty in functional play, playing with objects appropriately and how they were intended to be played with, based on teacher observations in a MD preschool classroom. Baseline data was collected for two weeks on the four students through observations of a thirty minute group playtime in the morning of their MD preschool classroom. Then a discrete trial training program was created for each individual student focusing on functional play skills. The teacher implemented discrete trial training as an intervention method for seven weeks. During these seven weeks, the four students continued to be observed once a week during the thirty minute group playtime to monitor how often each student was engaging in functional play.

Individual Results

Figure 2 shows the results of baseline data and intervention data over the seven week period where Participant 1 received discrete trial training focusing on the skill of functional play. When baseline data was collected, Participant 1 only engaged in functional play with blocks for a maximum of five minutes and an average of two and

half minutes. During week 1 of the intervention, when discrete trail training was first implemented no increase in the amount of time spent engaged in functional play was recorded. However, every week from week 2 onward, the student did demonstrate an increase in the amount of functional play that he engaged in. During the second week of intervention, the student increased the amount of functional play by two minutes. During the third week of intervention, the student increased the amount of functional play by another minute. During the fourth week, it was recorded that the student increased the amount of time he engaged in functional play by six minutes. The fifth week resulted in a one minute increase, and the sixth week resulted in another one minute increase. By the seventh week, the student was engaging in functional play with blocks for twenty minutes during a thirty minute observation. This is a mean overall increase of 8 minutes from his baseline observations.

Figure 3 illustrates the results for Participant 2 during baseline data and intervention data over the seven week intervention time frame. During baseline observations, Participant 2 was only recorded to engage in functional play for four minutes during a thirty minute observation. During week 1, a four minute increase was made and Participant 2 was recorded engaging in functional play for a total of 8 minutes. During the second week of intervention, Participant 2 engaged in functional play for 15 minutes, which equals a seven minute increase. During the third week, it was recorded that the student increased the amount of time engaged in functional play by another two minutes. The fourth week resulted in a three minute increase and the fifth week resulted in a two minute increase. Observations of group playtime during the sixth week, demonstrated a one minute decrease in the amount of time the student engaged in

functional play. However, during the seventh week the student engaged in functional play for 23 minutes, which represents a mean overall increase of 14 minutes.

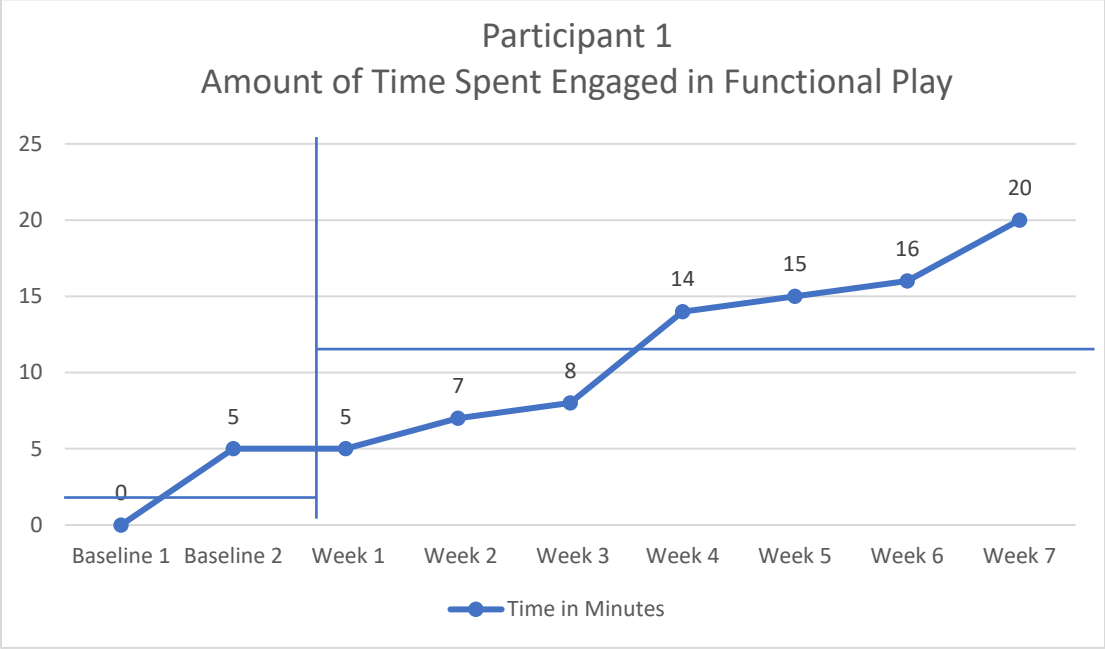

Figure 2. Participant 1 Amount of Time Spent Engaged in Functional Play

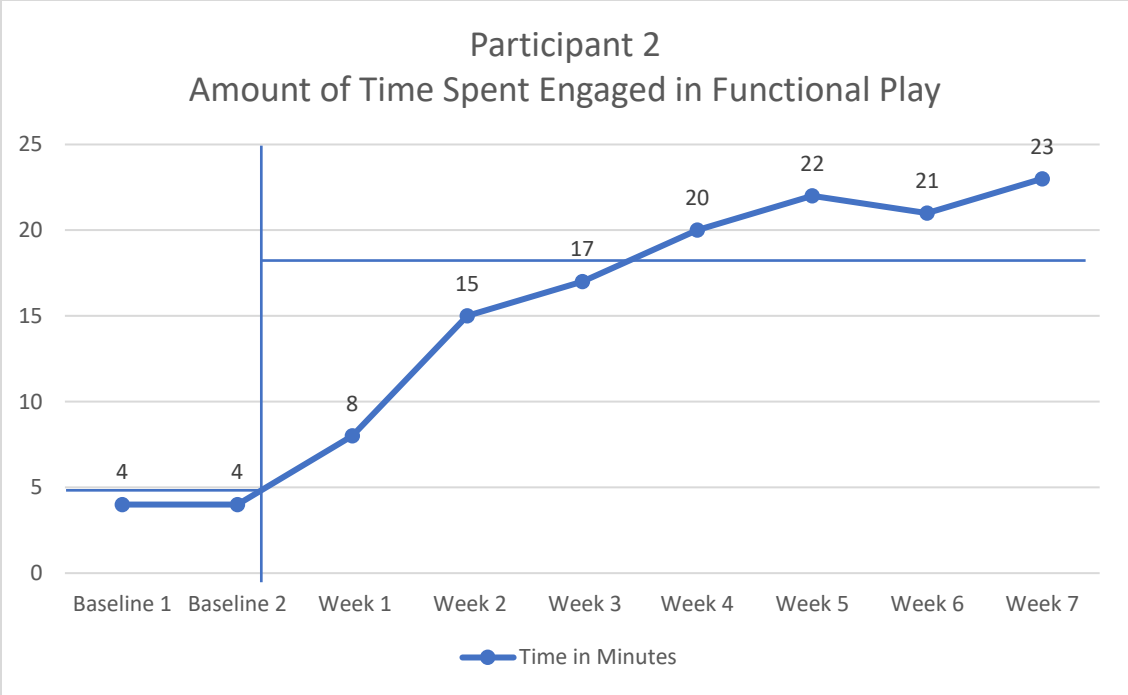

Figure 3. Participant 2 Amount of Time Spent Engaged in Functional Play

Figure 4 shows the results of baseline data and intervention data for Participant 3. Baseline observations, recorded that Participant 3 only engaged in functional play for three and four minutes during a thirty minute period. The first week discrete trial training was used as an intervention, Participant 3 increased the amount of time he spent engaged in functional play by two minutes. During the second week, a one minute decrease was observed resulting in five minutes spent engaged in functional play. The third week resulted in the largest increase of time, 12 minutes, to equal 17 minutes spent engaged in functional play. The fourth week resulted in another decrease of two minutes. During the fifth week, Participant 3 made a one minute increase, but during the sixth week, he had a two minute decrease in the amount of time he spent engaged in functional play. During

the final week, Participant 3 was observed to engage in functional play for 23 minutes which is a nine minute increase from the previous week and a 19 minute increase from baseline data. The overall mean increase from baseline was 10 minutes.

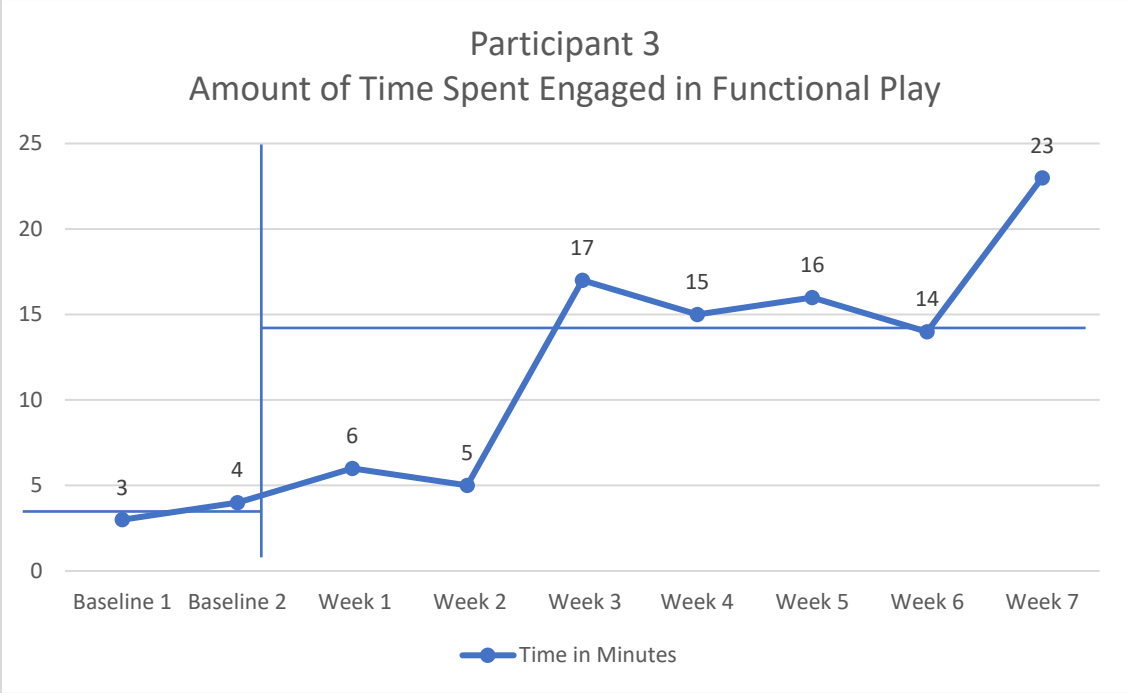

Figure 4. Participant 3 Amount of Time Spent Engaged in Functional Play

Figure 5 illustrates the results of Participant 4 based on observations from the baseline and intervention period. Baseline data recorded that Participant 4 would only engage in functional play for one or two minutes during a thirty minute playtime before any intervention was put in place. The first week discrete trial training began Participant 4 engaged in functional play for an additional four minutes. During the second week, his time increased by six minutes to equal 12 minutes of functional play. The third week

results in no change. During the fourth week, Participant 4's amount of functional play increased by two minutes. The fifth week also resulted in an increase of functional play by one minute. The sixth week's observation resulted in the most amount of time spent engaged in functional play, 17 minutes. The seventh week, demonstrated a decrease in functional play and totaled 16 minutes. Overall, by week seven's data, Participant 4 increased the amount of time spent engaged in functional play by at least 14 minutes from baseline data. The mean overall increase from baseline was 11.5 minutes.

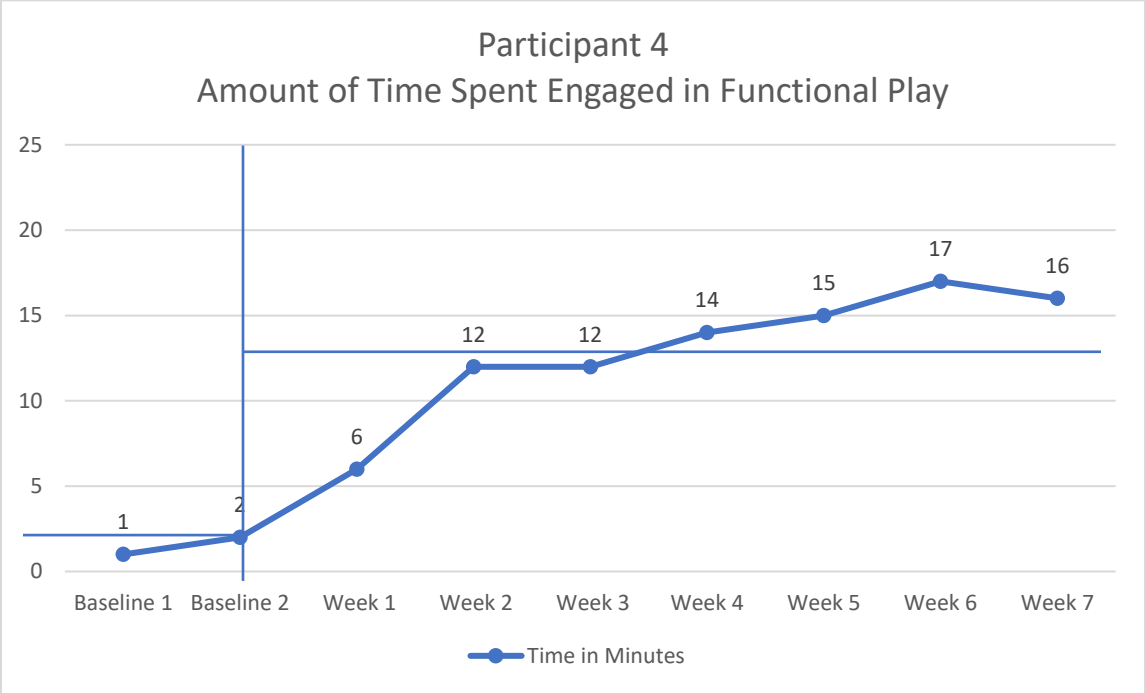

Figure 5. Participant 4 Amount of Time Spent Engaged in Functional Play

Group Results

Figure 6 illustrates all four participants' progress in the amount of time spent engaged in functional play when compared to the number of discrete trial training sessions that each student received. The number of discrete trial training sessions varies for each participant due to student absences, pull out services (speech and OT), and school events (assemblies, field trips, and fun day). Participant one received eight discrete trial training sessions during the seven week intervention. Participant 2 received 14 discrete trial training sessions during the seven week intervention. Participant 3 received 14 discrete trial training sessions and Participant 4 received ten discrete trial training sessions during the seven week intervention period.

Participant 1 demonstrated a two minute increase in functional play when he received his fourth discrete trial training session. He also demonstrated a seven minute increase in functional play when he received his sixth session of discrete trial training and a two minute increase after he received his eighth session of discrete trail training. Overall, the amount of time that Participant 1 spent engaged in functional play increased an average of 3.6 minutes for every two discrete trial training sessions he received.

Participant 2 was recorded to have a seven minute increase in functional play when he received his fourth discrete trial training session. The amount of time he spent engaged in functional play increased another two minutes after he received his sixth discrete trial training session and another three minutes after his eighth discrete trail training session. After his tenth discrete trail training session, Participant 2 was observed to engage in functional play for another additional two minutes, equaling a total of 22 minutes. Participant 2 did have a one minute decrease in the amount of time spent

engaged in functional play after his twelfth session, but after his fourteenth session his time increased by two minutes resulting in a total of 23 minutes. Overall, the amount of time that Participant 2 spent engaged in functional play increased an average of two and half minutes for every two discrete trial training sessions he received.

Participant 3 demonstrated a decrease of one minute when looking at time spent engaged in functional play after he received his fourth discrete trial training session. After his sixth session, there was a twelve minute increase in the amount of time he spent engaged in functional play. The observation after his eighth session of discrete trial training, revealed a two minute decrease in the amount of time spent engaging in functional play. Participant 3's tenth session of discrete trial training lead to an increase of one minute followed by another decrease of two minutes after his twelfth session of discrete trial training. After his final, fourteenth session, of discrete trial training Participant 3 engaged in functional play for an additional nine minutes. Overall, the amount of time that Participant 3 spent engaged in functional play increased an average of 2.8 minutes for every two discrete trial training sessions he received.

Participant 4 received a total of ten discrete trial training sessions. All of his sessions resulted in an increase of time spent engaging in functional play. After Participant 4 received his fourth discrete trial training session, he was observed to engage in functional play for an additional six minutes. He also demonstrated a two minute increase in functional play when he received his sixth session of discrete trial training and a one minute increase after he received his eighth session of discrete trail training. After his final, tenth, session, he also increased the amount of time he spent engaged in

functional play by another minute. Overall, the amount of time that Participant 4 spent engaged in functional play increased an average of 2.5 minutes for every two discrete trial training sessions he received.

The group results illustrate that all four participants increased the amount of time they could spend engaged in functional play by receiving discrete trial training sessions between 8 and 14 times over seven weeks. When individual times were averaged together, the amount of time that the whole group spent engaged in functional play increased an average of 2.8 minutes for every two discrete trial training sessions they received.

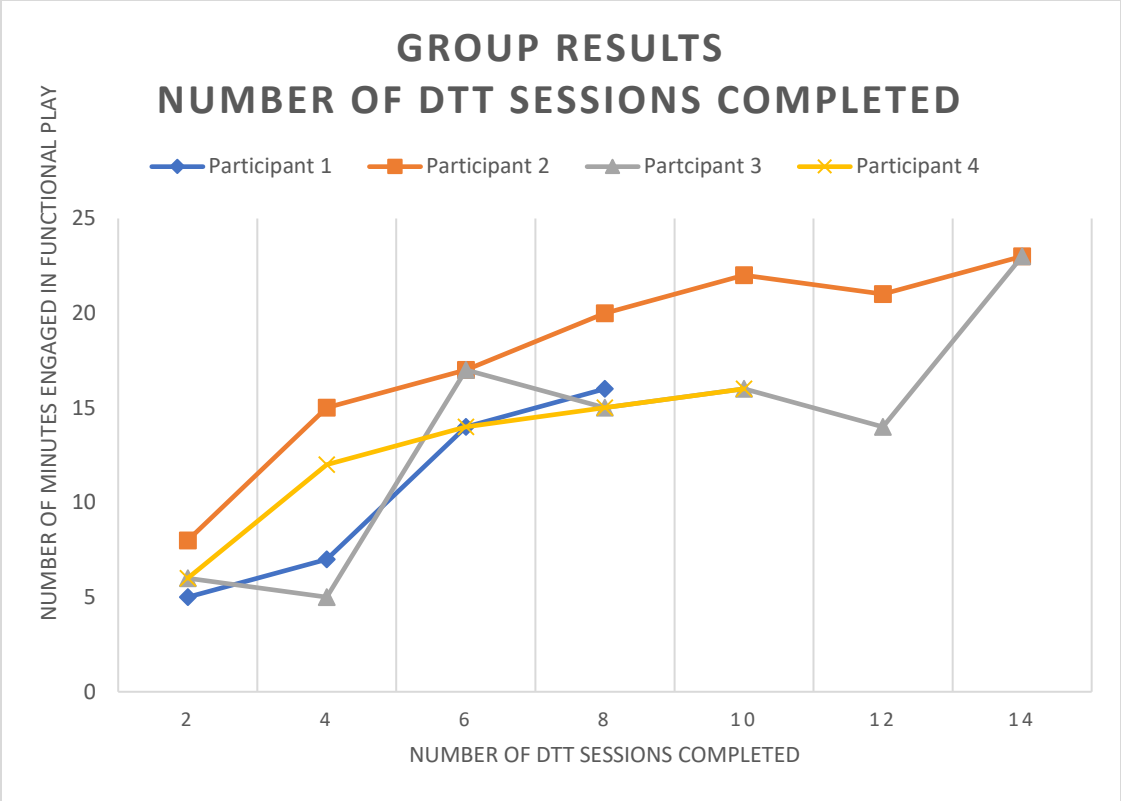

Figure 6. Group Results based on number of DTT Sessions completed

Chapter 5

Discussion

This study examined the effects of discrete trial training on the functional play skills of four male preschool students diagnosed with autism. The four students ranged in age from three to five and were placed in a preschool classroom for students with multiple disabilities in a southern New Jersey public school. Before the study began, all four boys struggled with engaging in functional play skills independently based on classroom observations and comparisons of peers within the same classroom. Functional play is defined as playing with toys appropriately in the manner that they were intended to be used. In addition, the participants engaged in other behaviors during play time such as self-stimulatory behaviors (jumping, flapping, stomping, humming, spinning objects, and lining up objects), limiting the amount of time they spent engaged in functional play. This study was designed to answer the following question. Can discrete trial training increase the amount of time preschoolers spend engaged in functional play skills during group playtimes?

In order to answer this question, baseline data was first collected for two weeks on the four students through observations of a thirty minute group playtime in the morning of their MD preschool classroom. The baseline data demonstrated that all four students were only engaging in functional play for a limited amount of time. Next, a discrete trial training program was created for each individual student focusing on functional play skills. The teacher implemented discrete trial training as an intervention method for seven weeks. During these seven weeks, the four students continued to be

observed once a week during the thirty minute group playtime to monitor how often each student was engaging in functional play.

The results over the seven weeks for all four participants demonstrated an increase in the amount of time the students engaged in functional play. Participant 1 was observed to engage in functional play for an average of eight more minutes when compared to his baseline data. Participant 2 had an average increase of 14 minutes from his baseline data. Participant 3 had an average increase of ten minutes and Participant 4 had an average increase of 11.5 minutes. Furthermore, when the data was analyzed as a group it was found that the amount of time that the whole group spent engaged in functional play increased an average of 2.8 minutes for every two discrete trial training sessions they received. These results suggest that discrete trial training can increase the amount of time preschoolers spend engaged in functional play skills during group playtimes.

These findings are not entirely unexpected based on previous research that has been conducted. Discrete trial is considered to be one of the most effective intervention strategies for young learners with autism (Ghezzi, 2007). A review article of research on discrete trial training also found that discrete trial training is effective in teaching procedural knowledge (Ghezzi, 2007). Procedural knowledge focuses on how to do things or complete certain tasks, which can include washing hands or getting dressed. Functional play can also be considered procedural knowledge as the students are learning how to use toys appropriately, further supporting the use of discrete trial to teach functional play skills.

Another study that examined the effectiveness of discrete trial training had similar results to this current study (Din & McLaughlin, 2000). Din and McLaughlin implemented discrete trial training to four male students between the ages of three and four with autism, which is very similar to the population of this study. Din and McLaghlin found that all four students with autism were able to learn new functional and academic skills within two months of implementing discrete trial training. Similar to these findings, this current study also was able to teach all four male students a new skill, functional play, within two months.

Further research on discrete trial was also conducted by Smith, Groen, and Wynn (2000). For their study, Smith, Groen, and Wynn studied 15 children, 7 diagnosed with autism and 8 diagnosed with pervasive development disorder, ranging in age between 18 and 42 months. The children received discrete trial training in their homes and in school. The discrete trials focused on a variety of skills that would help increase independence and prepare the children for school. Their results revealed that children who received discrete trial training made more improvements in their IQ score, visual spatial skills, and language development (Smith, Groen, & Wynn 2000). The results of this previous research are similar to the current study in that both demonstrate discrete trial training as being effective in teaching preschool age children with autism new skills. However, the current study differs from the previous research in that it only focuses on functional play skills, whereas the previous research focused on academic skills and language development.

Even though this current study can be seen as similar to previous research on discrete trial training, this current research study adds to previous research by focusing specifically on functional play, a skill area that has not been researched extensively to date. When examining previous research along with this current research, discrete trial can be considered as a possible intervention to teach students with autism a variety of academic and functional living skills, including functional play skills.

Limitations

The sample size of this study was limited to only four preschool males with autism. The sample size did not include older students, females, or students with other disabilities. During this study, all four students were taught functional play skills through discrete trial training. However, all four students had already been enrolled in a preschool classroom for at least six months, where the primary modality of teaching is discrete trial. Before this study, all four students were being taught academic, daily living, and language skills through discrete trial training. For this reason, all four students were already familiar with the components of discrete trial and the setting. They understood the expectations of teachers and knew they would receive preferred positive reinforcers for completing the task. If the students were completely new to discrete trial training, it may take a longer time for them to acclimate to new expectations and procedures.

The data collection sheet used during observations of play time was categorized into functional play and other, so that the observer could check off when functional play occurred and write what occurred when it was something else (other). Most of the time the category titled other was filled with self-stimulatory behaviors such as jumping,

lining up objects, spinning objects, or putting toys in mouth that the students engaged in. However, there were a few occasions when the students demonstrated other types of play besides functional play. In these instances, pretend play and parallel play were recorded in the section categorized other. The results do not demonstrate an increase for these types of play even though the students were engaged in appropriate play.

Practical Implications

For this study, all four students received discrete trial training focusing on one specific type of functional play (pushing cars, lacing beads, stacking blocks, inserting puzzle pieces). Discrete trial training was always conducted in a one-on-one setting with one student and one teacher and included components of repetition, prompting, and positive reinforcement. After seven weeks, all four students demonstrated an increase in the amount of time they engaged in functional play. Discrete trial training can be a possible intervention to teach preschool age children diagnosed with autism functional play skills and help increase the amount of time students spend engaged in functional play. Also, even though discrete trial occurs in a one-on-one setting these skills can carry over into group playtimes with other students. Since discrete trial training has been effective for preschool students with autism, teachers may also want to consider using the components of discrete trial training (one-on-one individualized instruction, repetition, prompting, and positive reinforcement) during other parts of the school day.

Future Studies

The study of the effectiveness of discrete trial training in regard to functional play skills is a novel topic that can use much further research. Further research could focus on

the effectiveness with females, other age groups, and other disabilities who struggle with functional play skills. Other studies could also include students who are completely new to discrete trial training to determine how long it will take to see progress in functional play skills and how their results differ from the results of students who have previously been taught using discrete trial training. Research could also be conducted to determine if discrete trial training is effective in generalization of functional play skills by carrying over into new settings and with new materials and toys. The effectiveness of discrete trial training could also be compared to the effectiveness of other interventions that address play skills such as video modeling and live modeling. Future research could look at the possible effectiveness of discrete trial training with other types of play including pretend play, parallel play, and cooperative play.

Conclusion

The purpose of this study was to determine if discrete trial training could increase the amount of time preschoolers spend engaged in functional play skills during group playtimes. After receiving discrete trial training focusing on one specific functional play skill for seven weeks, four male preschool students were able to significantly increase the amount of time they spent engaging in functional play. This is an important skill for these children that will now allow them to continue gaining new play skills, and eventually lead to more social interactions. Discrete trial training was a successful intervention method for this group of students diagnosed with autism and could potentially be beneficial for many more children with autism who struggle to engage in play. With the use of discrete trial training, teachers and parents will be able to improve a child's ability

to engage in play, which in turn allows for more opportunities to develop the intellectual, language and communication, social, and emotional skills that are necessary for an independent and successful adult life.

References

Autism and Developmental Disabilities Monitoring (ADDM) Network. (2016, July 29). Retrieved February 1, 2017, from https://www.cdc.gov/ncbddd/autism/addm.html

Din, F. S., & McLaughlin, D. (2000). Teach children with autism with the discrete-trial approach.

Ghezzi, P. M. (2007). Discrete trials teaching. *Psychology In The Schools*, *44*(7), 667-679.

Hine, J. F., & Wolery, M. (2006). Using point-of-view video modeling to teach play to preschoolers with autism. *Topics In Early Childhood Special Education*, *26*(2), 83-93.

Holmes, E., & Willoughby, T. (2005). Play behaviour of children with autism spectrum disorders. *Journal Of Intellectual And Developmental Disability*, *30*(3), 156-164.

Jahr, E., Eldevik, S., & Eikeseth, S. (2000). Teaching children with autism to initiate and sustain cooperative play. *Research in Developmental Disabilities*, *21*(2), 151-69.

Jung, S., & Sainato, D. M. (2013). Teaching play skills to young children with autism. *Journal of Intellectual & Developmental Disability*, *38*(1), 74-90.

Lang, R., O'Reilly, M., Rispoli, M., Shogren, K., Machalicek, W., Sigafoos, J., & Regester, A. (2009). Review of interventions to increase functional and symbolic play in children with autism. *Education & Training in Developmental Disabilities*, *44*(4), 481-492.

Lang, R., O'Reilly, M., Sigafoos, J., Machalicek, W., Rispoli, M., Lancioni, G. E., & ... Fragale, C. (2010). The effects of an abolishing operation intervention component on play skills, challenging behavior, and stereotypy. *Behavior Modification*, *34*(4), 267-289.

Sigafoos, J., Roberts-Pennell, D., & Graves, D. (1999). Longitudinal assessment of play and adaptive behavior in young children with developmental disabilities. *Research in Developmental Disabilities*, *20*(2), 147-161.

Smith, T., Groen, A. D., & Wynn, J. W. (2000). Randomized trial of intensive early intervention for children with pervasive developmental disorder. *American Journal on Mental Retardation*, *105*(4), 269-85.

Williams, E., Reddy, V., & Costall, A. (2001). Taking a closer look at functional play in children with autism. *Journal of Autism & Developmental Disorders, 31*(1), 67-77.