TEACHING CHILDREN WITH AUTISM INCLUSION READINESS SKILLS USING VIDEO SELF-MODELING WITH AN iPAD

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ABSTRACT

Video self-modeling has been used in the past to teach many skills to children with autism. Children with Autism Spectrum Disorders have a lack of language processing, expressive communication, and social skills. These deficits may impact the ability to function in the general education classroom. The current investigation examined the effects of using video self-modeling with an iPad device to teach inclusion readiness skills to children with autism. The specific group directions that were taught were cleaning up, lining up, and sitting down. Three young children with autism participated in this study. A multiple baseline design across behavior and subjects was used. All three participants reached mastery criteria in all three behaviors. Experimental control was shown with the multiple baseline across subjects. Moreover, experimental control was established with the multiple baseline across behaviors with one of the participants. Due to generalization across behaviors, experimental control was shown with two of the behaviors with a second subject. When video models were discontinued and maintenance probes were conducted, all three children maintained group direction skills. Results showed that the prerequisite classroom skills were effectively taught to children with autism using video self-modeling. The results are discussed in terms of implications for the general education classroom and future research directions.

Keyword: autism, inclusion, video modeling

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CHAPTER 1

INTRODUCTION

Purpose of the Study

Neurotypical children (i.e., those without autism) transitioning from preschool to kindergarten may have a difficult time due to all the changes that occur. Kindergarten may have more structured rules than a preschool classroom (Wildenger & McIntyre, 2011). Children need to develop school readiness skills for the transition to be successful. Children who don't attend preschool may have more difficulties with both emotional regulation and social interaction while adapting to the new environment (Barnett 2008). Teachers find that children who do attend preschool are more ready for kindergarten (Ladd, Herald, & Kochel, 2006). School readiness skills would include social and emotional competence, motor development, pre-academic skills, and approaches to learning (Janus, 2011). While preschool classes focus more on social skills, kindergarten classes typically focus more on academics. Teachers report that the largest problem among kindergarten students is difficulty with following directions (Wildenger & McIntyre, 2011). Since neurotypical children are known to have difficulties in this area, children with disabilities, and especially those with autism spectrum disorders, might have even more difficulty with following directions, due to their difficulties with attending and initiating responding (Dawson & Faja, 2008).

Children with a diagnosis of autism face many challenges in the inclusive setting. Inclusion is defined as educating children with special needs together and alongside their neurotypical peers (Eldar, Talmor, & Wolf-Zukerman, 2010). Children with autism have both social and language deficits. These deficits can make it difficult for them to

participate in regular classroom activities such as turn-taking, following directions, socializing with peers, and participating in classroom activities. Children with autism may not understand the classroom rules or be able to engage in the same socially appropriate behavior as their neurotypical peers, and some may engage in maladaptive behavior such as aggression, tantrum behavior, and noncompliance (Buggey, 2005; Cihak, Fahrenkrog, Ayres, & Smith, 2010). They also may not be able to participate and follow directions independently. Even though children with autism might be put into a class with their neurotypical peers, they might not be able to benefit from interacting with their peers without direct interventions (Maione & Mirenda, 2006; Hall & Smith, 1996). Interventions in the classroom should be conducted to teach social skills and independent skills. Due to children with autism not being able to imitate readily, there should be opportunities to practice these skills (Odom & Strain, 1984). These difficulties may necessitate extensive support and/or interventions in order for them to be able to succeed independently in the inclusive classroom (Hume & Odom, 2007).

Children with autism's individual needs may not be able to be met in the regular education classroom due to the number of students and staff in a classroom. In a general education classroom the average student–teacher ratio is 15-to-1 (U.S. Department of Education, 2012). Many children with autism depend on one-on-one support to function in an inclusive setting (Adamowycz, 2008). Many do not have the necessary skills to function independently in an inclusive setting; therefore, teachers have to provide them with more directive input and support to ensure they are progressing (Adamowycz, 2008). Although they may have the skills in a one-on-one setting, they might not be able to demonstrate the skills independently (Pelios, MacDuff, & Axelrod, 2003). Removal of

one-on-one staffing may lead to a decrease in appropriate responding in the classroom (Hume & Odom, 2007).

General education teachers may not be able to provide the amount of support that is needed. One-on-one support may be offered by a school district to assist the student in classroom activities but can be expensive. Students with autism are more likely to have individual instruction by a person who is not the general education teacher than are children with other disabilities. Students with autism also are more likely to receive assistance from an aide than children with other disabilities (U.S. Department of Education, 2008). Even though research suggests that there are many benefits to their being served in an inclusive setting, they are the least included group of children with special needs (U.S. Department of Education, 2009).

There are different views when it comes to education placement of children with autism. Some educators and parents feel that they are better served in a self-contained classroom. Parents may feel that their children will not get enough services when they are put in a general education classroom. Gallagher (1994) suggests that general education classrooms cannot provide the intensive and individualized services needed to educate children with challenging deficits and behaviors. Educational professionals also may feel that they are not prepared to teach students with a variety of abilities and levels. Even specialists who work with children with special needs, such as speech pathologists, have reported not feeling adequately prepared to serve this population (Wilson, 2013). Teachers may not have the specific training needed to educate children with significant behavioral and communication differences. Neurotypical students might have their education negatively affected due to the attention needed to serve children with special

needs or learning differences. Most general education teachers do not have experience with running classrooms that include students with behavior difficulties. Reganick (1993) states that it may be harmful for regular education students to share the classroom with students with maladaptive behavior.

Even with these concerns, many parents of children with disabilities, including autism, support having their children being educated in general education classrooms (Reynolds, 2008), as do many teachers. There are many benefits to children with special needs participating in the general education class with their neurotypical peers. Students with autism can make significantly more gains academically in a general education class than in a self-contained classroom (Kurth & Mastergeorge, 2010). Children with autism who are fully included also exhibit more social engagement and interaction (Eldar, Talmor, & Wolf-Zukerman, 2010). Students with disabilities, including autism, served in the regular education class are more likely to decrease their behavior problems due to the modeled behavior of their neurotypical peers. Children with disabilities have opportunities similar to their neurotypical peers when put in a regular education classroom, that they don't have when placed in a self-contained classroom. Although some educators feel that regular education students will be harmed from an inclusive environment, others feel that students without disabilities will learn how to be more accepting and appreciative of the differences of others (Sugai & Horner, 1994). With the Individual with Disabilities Education Improvement Act promoting inclusion and research showing the benefits of inclusion, more children with autism will be participating in the general education classroom.

Even though federal mandates have directed state and local educational

departments to address the individualized needs of children with disabilities and ensure that they provide the least restrictive environment available to children with special needs, students with autism are still less likely to attend regular schools than children with other disabilities (U.S. Department of Education, 2004). In 2009, approximately 34.8% of children with autism between the ages of 6 and 21 years spent 60% or more of their full educational day outside of the regular education classroom. Only 14.6% of all children with all disabilities spent 60% or more of their full educational day outside of the regular education classroom. This is a difference of 20.2% of children with autism spending 60% or more of their time outside the regular education classroom. Almost 50% of students with disabilities other than autism spend 80% or more of their time in the regular education classroom, while only 16% of students with autism spend 80% or more of their time in the regular education classroom. Students with other disabilities are twice as likely to receive language arts and math in a regular education class than are children with autism. According to the annual report from the U.S. Department of Education in 2009, an increased number of children with autism are being served in the regular classroom, while the rates are still largely lower than children with other disabilities. In 2009, over half of the students diagnosed with other disabilities (e.g., speech delay, other health impairments, learning disabilities, visual impairments, developmental delay) were served in the regular education classroom 60–85% of the time. This might be due to the behavioral and social difficulties that children with autism may have compared to children with other disabilities, as well as the schools' difficulties in meeting their demands and needs.

Schools face many barriers on how to serve children in the inclusive environment.

Many modifications have to be made to assignments and the environment. Providing one-to-one support in the inclusive environment is not cost efficient and, with the growing number of children diagnosed with autism, it is difficult for school districts to provide the intensive support needed for each child. Often children with special education needs are accommodated based on the availability of resources (Duncan, 2003). Given that children with autism, as indicated above, present a variety of challenges, effective interventions are vital to assist them in becoming successful in inclusive environments (McCabe, 2008).

One problem associated with putting children with autism in the regular education classroom is that many of them cannot follow group directions and/or cannot follow directions without their specific name being called. This causes many difficulties in the classroom when the teacher has to stop and give the direction again to the child. To decrease these difficulties, teachers and school administrators have to find ways to teach children with autism how to be more independent in the classroom setting. They need extra assistance in preparing for an inclusive setting, including interventions that focus on communication, and social and academics skills before and after placement in an inclusive setting (Odluyurt, 2013). Empirically validated strategies should be used to enhance these important skills (Harrower & Dunlap, 2001).

Evidence-based teaching techniques that have shown progress in the past with this population should be used to teach these skills, as well as maintain the skills across settings. One type of therapy that is highly recognized in treating children with autism is Applied Behavior Analysis (ABA) (Green, 1996). ABA is an evidence-based therapy that uses techniques that have been shown to be an effective treatment with children and

adolescents with autism to decrease behavior problems and teach skills. ABA is a scientific approach to understanding behavior. ABA discovers environmental influences and develops technology that enhances socially significant behavior (Cooper, Heron, & Heward, 2007). Extensive research has been conducted and published on a variety of areas in treating children with autism. Teaching methods from ABA include positive reinforcement, prompting, shaping, chaining, and modeling (Nikopoulos & Nikopoulou-Smyrni, 2008). ABA has been used in both individual and group settings. A common method of ABA is called Discrete Trial Training (DTT). This method consists of breaking down complex skills into smaller steps, teaching each step intensively until mastered, providing repetition, prompting the correct response, fading prompts as soon as possible, and providing positive reinforcement (Green, 1996).

Video modeling (an intervention used in the field of ABA) has mostly been used to teach skills such as communication, play, and social skills. In video modeling, skills can be repeated in a similar fashion as discrete trials, and reinforcement can be given (either in vivo and/or viewed on the video). Videos can be played independently from an adult after the child has been taught to use the video device.

There are many research areas on which to focus regarding successful inclusion practices. Successful inclusion is not a one-step process. Inclusion encompasses different aspects of the classroom environment, teachers, and other students. Teacher education and training, classroom modifications, peer-modeling, and accommodations are all areas that continue to need further research. This study will focus on the evidence-based intervention of video self-modeling that can assist in teaching essential classroom readiness skills to children with autism.

Video modeling (VM) and video self-modeling (VSM) have been shown to be an effective intervention to teach many skills to children with autism. Children with autism have been shown to have strength in visual processing. Video modeling may also be effective in teaching skills to young children with autism due to the reduction of language demands while watching the videos (Sherer, Pierce, Paredes, Kisacky, Ingersoll, & Schreibman, 2001). Video modeling may also be more motivating and reinforcing than face-to-face interaction with an adult teacher and, therefore, children with autism may engage in an increase of attending skills to the screen during this intervention (Bellini & Akullian, 2007). Video modeling consists of individuals watching themselves or others on video engage in a targeted skill. Skills that have been taught using the video modeling interventions include purchasing skills (Haring, Kennedy, Adams, & Pitts-Conway, 1987), play skills (Taylor, Levin, & Jasper, 1999), self-help skills (Lasater & Brady, 1995), and conversational skills (Charlop-Christy, Le, & Freeman, 2000; Sherer et al., 2001). Video modeling has also been used to decrease inappropriate behavior. There are three different kinds of video modeling. The first kind involves a video on which a peer or adult is engaging in the desired behavior, and an individual then watches this video in hopes that s/he will imitate the behavior displayed. A second kind is called Video Self-Modeling, in which the individual themselves participate in the video (Dowrick, 1999). The third type is called point-of-view video modeling, where videos are shown from a person's perspective (Hine & Wolery, 2006). Video modeling has been used in a variety of settings to teach many different skills to increase independence in individuals with autism.

Social skills, play skills, and conversational skills are all topics that have been

taught using video modeling in a controlled setting (Nikopoulos & Keenan, 2003). Research has also been conducted on difficulties that children with autism have in the inclusive environment. Little research has been conducted to teach inclusion readiness skills to children with autism before they are placed in the classroom (Cihak et al., 2010). Inclusion readiness skills include hand raising, cleaning up materials when the teacher gives the direction, and many more skills that focus on group direction following. Video self-modeling, although more widely used in the past few years, has not been used as a common intervention to teach these skills. This study will use video self-modeling to teach skills essential for independence in the inclusive classroom. In this study, video self-modeling was chosen as a tool rather than peer video-modeling, based on previous research (Gelbar et al 2012) that emphasizes that individuals learn best from models that resemble themselves and having oneself as the model may optimize the results. Following group directions will be taught.

Significance of Study

This study will represent the beginning of a line of research designed to assist children with autism to prepare for an inclusive setting using video self-modeling. There are many difficulties that teachers have when including a child with autism in the general education classroom. Since children with autism have difficulties in communication and social skills, participation in regular classroom routines remain difficult. Maladaptive behavior in the classroom can be a reason why school officials offer an autistic support class instead of participation either part-day or full-day in a regular education classroom. Children with autism might not pay as much attention to their surroundings and cannot

always read social cues from peers and adults (Nikopoulos & Keenan, 2007). Children should receive the supports needed to succeed. Supports that have been used in the regular education classroom include one-on-one aides, prompting strategies, priming (practice or preview of activities that a child might have difficulty with during the school day), and picture schedules (Harrower & Dunlap, 2001). Other interventions include self-monitoring, management, and peer-tutoring (Harrower & Dunlap, 2001). Modifications and interventions need to be implemented consistently for the child to benefit from the inclusive environment. Since video modeling has been a successful intervention in teaching many skills and decreasing maladaptive behavior, this intervention may be applied to a different skill area to increase independence. If video self-modeling can be refined to teach inclusion readiness skills, schools may be inclined to use the intervention to assist in preparation and to decrease one-on-one support in the classroom (Shipley-Benamou, Lutzker, & Taubman, 2002). Schools might be more likely to offer an increase in the amount of time in an inclusive classroom if the children are able to learn classroom skills quietly and quickly. School officials are also looking for interventions to decrease the large financial commitment that is needed for a child to be successful in a general education classroom. An increase in IQ scores and fewer autism symptoms being exhibited are two of the benefits of children with autism being included in the general education classroom (Eldar et al., 2010). School officials, as well as parents, may be more inclined to prepare a child for the complex general education classroom by using interventions that have been shown to teach skills, as well as use the interventions in the classroom on an as-needed basis.

This study used video self-modeling to teach three group direction skills (e.g.,

"Everyone put their materials away" "Everybody sit down" and "Line up"). Children were taped following the teacher's instructions from a distance with prompts. If group direction skills can be taught before a child enters an inclusive environment using the video self-modeling, then less one-on-one support may be needed for the child to be included in the environment. Using video modeling may promote learning and reduce the need for one-on-one attention by an adult (Shipley-Benamou et al., 2002).

Research Questions

Can inclusion readiness skills (following the direction to line up, sit down, and clean up) using "everybody direction" be taught using video self-modeling?

Can an iPad be used as a video modeling tool to teach these skills?

CHAPTER 2

LITERATURE REVIEW

Children diagnosed with autism have difficulties with verbal and nonverbal communication, and social skills (American Psychiatric Association, 2013). There has been a rise in the percentage of children diagnosed with autism (Centers for Disease Control and Prevention, 2012). Providers, school personnel, and parents are discovering ways to ensure that children with autism are receiving the necessary treatment to learn skills to become as independent as they can be in homes, communities, and schools (Hume & Odom, 2007; Odom, Brown, & Frey, 2003). With the push toward inclusion and less segregated approaches for children with disabilities in the classroom, evidence-based interventions are needed (Harrower & Dunlap, 2001). Video modeling and video self-modeling have been used to teach a variety of skills to individuals with autism (Charlop-Christy et al., 2000).

Within this review, we will first discuss autism and Applied Behavior Analysis (evidenced based treatment for autism). Then an overview of issues relevant to inclusion research with individual with autism will be reviewed. This literature review then explores video modeling and video self-modeling with regards to teaching skills and decreasing inappropriate behavior with children with autism, following by a review that focuses on the literature that discusses advanced technology in the natural setting. With advanced technology, teachers can use the video self-modeling intervention with a decreased amount of time and effort than in the past. Video self-modeling has not yet been used to teach school readiness skills (following group directions) which may assist in a child becoming more independent in the classroom.

Autism

According to the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition, Text Revision (5th ed.; DSM-5; American Psychiatric Association, 2013), children with a diagnosis of autism have deficits in the areas of communication, social interactions, play skills, repetition, and stereotyped patterns of behavior. Impairments of communication in children diagnosed with autism include lack or delay of expressive speech, noticeable impairment of initiating conversation, and deficits in pretend play appropriate to developmental level. Children diagnosed with autism may have marked impairments in eye contact, facial expressions, body postures, lack of social interest in others or lack of emotional reciprocity, and difficulties regulating social interaction with others (American Psychiatric Association, 2000).

According to the Centers for Disease Control and Prevention (2014), the incidence of autism is one in every 68 children. There was a 30% increase in the number of children diagnosed with autism from 2012–2014 (Centers for Disease Control and Prevention, 2014). Due to deficits in nonverbal and verbal communication, imitation, and difficulties with regulating social interaction, children with autism present particular challenges in the inclusive setting (Adamowycz, 2008). As the population grows and more children face the challenges that accompany the diagnosis of autism, schools and parents will be responsible for providing ongoing support for these children.

Inclusion

The Individual with Disabilities Education Improvement Act of 2004 (IDEA) governs how states provide services to children with recognized disabilities. This requires that schools educate children with disabilities in the least restrictive environment possible (Loiacono & Valenti, 2010). This can be a constant struggle for school districts to balance the need for individualized instruction to ensure progress. No Child Left Behind (2002) has consistently directed state education departments to address instructional needs and modifications with children with special needs in inclusive environments. IDEA governs how states provide services for children with special needs, and mandates that children with special needs receive Free Appropriate Public Education (FAPE). Special education services through the development of an Individualized Educational Program (IEP) are designed to meet the specific learning needs of children who are eligible. These students should also be prepared for future education as well as employment and functional independent living.

Inclusion research has mostly focused on the benefits of including children with special needs; however, a few studies have begun to examine teachers' views regarding inclusion and difficulties with having children with differences in their classroom. Kurth and Mastergeorge (2010) conducted a study to examine academic and cognitive profiles of students with autism with a focus on determining if an inclusive placement is beneficial academically for these. Fifteen students diagnosed with autism participated in this study. These students attended seventh, eighth, and ninth grade in either a special education classroom or an inclusive education classroom with their neurotypical peers. Students in both the regular and self-contained classes showed comparable intelligence

and adaptive behavior. Results demonstrated that students who were included in the general education classroom scored higher on achievement and academic tests than students in self-contained classrooms.

Many children with autism are included during noncore curriculum (e.g., art, music, gym, technology). Obrusnikova & Dillon (2011) conducted a study with physical education teachers to determine challenging situations when children with autism are included in their regular physical education class. Results showed that the most challenges were related to their hyperactive and inattentive behaviors, difficulty or inability to comprehend and perform the tasks in the class, lack of interest, inflexible routines, and impairment with emotional regulation. These results suggest that intervention may be needed to teach children with autism essential skills.

Just because students with autism are being placed in an inclusive setting, doesn't mean that they are actually part of the classroom or being taught the general education curriculum. Wehmeyer, Lattin, Lapp-Rinker, and Agran (2003) analyzed multiple studies, which included observation of students in self-contained classrooms and inclusive settings. Results showed that students in self-contained classes worked more on their IEP goals than their counterparts in the general education classroom, but students with autism placed in the general education classroom were 40% more likely to work on general education curriculum than students in the self-contained classrooms. This suggests that students in self-contained classrooms don't get the same opportunities to access the general curriculum.

Play skills can be taught in the regular education classroom with children with disabilities. Dicarlo and Reid studied three toddlers who participated in an inclusive

preschool program. All three children had limited pretend play skills. In this study, a responsive teaching program was used which consisted of three parts. First, a choice was given on which center the child would like to go to. Then the child was prompted to play with a toy if the child did not pick up the toy within 10 seconds of entering the center. The third component consisted of the child being prompted to engage in a pretend play action, and then praise was given. All children who participated in this study increased their independent pretend play skills in the classroom (Dicarlo & Reid, 2004).

Eldar et al. (2010) examined inclusion successes and failures in the regular classroom. Twenty-seven inclusion coordinators participated and discussed their views and experiences regarding inclusion of children with autism disorder in the regular education classroom. The students' functioning level and environment seemed to be the biggest factors in determining whether a child can be successful in the general education classroom. Reviews were conducted with regard to problem instances, focus interviews, and regular bi-monthly progress reports. Recommendations were made that included choosing the right school and principal, training inclusion coordinators, clearly defined expectations and goals for all parties, and data collection methods to ensure individualized evaluation for each child's progress. Data collection methods are important because they will show if the child is making progress or needs more interventions to be successful. Evidence-based interventions are needed to meet these goals.

Strain, Wilson, and Dunlap (2011) conducted a study using the Prevent-Teach-Reinforce (PTR) model to decrease behavior problems and increase task engagement with three children with autism in a regular education classroom. Three children ages 5 to 9 participated in this study. There were five parts to this intervention: teaming, goal

setting, functional behavior assessment (FBA), intervention, and evaluation. During the team meeting, teachers and providers met to go over who would be responsible for implementation of the plan, to discuss the process of the PTR, and to set up future coaching and meetings to ensure ongoing fidelity. Goal setting consisted of defining specific objectives and defining behaviors to decrease and increase. The FBA included each teacher/team member filling out a questionnaire and the team coming to a consensus on the antecedent (what come before) and the consequence (what comes after) that maintains the problem behavior. When the assessment was finished, the team created a behavior plan. The PTR manual had suggestions of intervention strategies that the team chose from. A schedule of training was created for the staff. In the last stage, the data were analyzed. If there were not a favorable outcome from the intervention, the team met again. Children had individualized acquisition skills targeted that were taught and measured. Some of these skills included self-management techniques, social phrases, and using nice tones when talking to friends. Videos were used to record the sessions. This is different than previous studies using this intervention because this intervention was conducted in a general education classroom, in contrast to previous studies which were conducted in special education classrooms. Results indicated that there was a reduction in identified problem behavior.

Applied Behavior Analysis

Although there are many interventions used to treat children with autism, many programs have similar components. They consist of intervening as early as possible, providing an intense intervention, actively involving families, training staff, assessing

children's progress, using a systematic and clearly planned curriculum, establishing a highly supportive environment, providing individualized intervention, and supporting transition to kindergarten (Odom et al., 2003). The most widely recognized treatment for children with autism is Applied Behavior Analysis (ABA) (Green, 1996). ABA is an evidence- and data-based treatment for children with autism (McEachin, Smith, & Lovaas, 1997). This treatment has been developed and become widely recognized (Green, 1996). In ABA, socially significant behavior is taught. Data are analyzed and individual programs are changed based on the data (Baer, Woolf, & Risley, 1987). ABA is mostly known for early intervention with young children with autism (McEachin, Smith, & Lovaas, 1997). ABA is used to decrease maladaptive behavior by analyzing the function of behavior. ABA addresses both antecedents (what comes before the behavior) and consequences (what happens after the behavior) and manipulates these variables in order to improve the learning and behavioral function of children. The goal is to increase appropriate skills, such as communication and social skills, and decrease maladaptive behavior (Green, 1996). Tasks are broken down into smaller parts and presented repeatedly with an instruction, an expected behavior (unprompted or prompted), and a reinforcer for engaging that behavior. This is known as discrete trials (Prizant & Wetherby, 1998). Repeated trials and practicing the target skills have been successful in teaching children with autism (Green, 1996). In the current study, following group direction skills will be taught using discrete trials (repeated instruction, expected behavior, and reinforcement), but instead of live instructors providing the direct instruction, the children will view the discrete trials on an iPAD using video self-modeling.

Modeling

Children with autism have significant deficits in imitation skills (Ingersoll & Schreibman, 2006). Imitation skills are necessary to learn many other skills, such as communication, play, and social competence. Modeling is a useful way to teach children with autism to imitate these skills (Bandura, 1977). One way for children with autism to improve in both their nonverbal and verbal communication is to teach them to imitate appropriate behavior. This is called observational learning or modeling (Bandura, 1977). Modeling is accomplished by having a person engage in a behavior to be learned, followed by an adult prompting the child to engage in that behavior to learn to imitate the model. Many skills can be taught using modeling such as functional life skills, appropriate behavior versus inappropriate behavior, social skills, play skills, and academic skills. Research has shown that modeling has been useful in teaching both younger and older children. Modeling can be taught in vivo, which is when there is a person in front of the child engaging in the behavior to be learned, or through videos, where the child is watching the target behavior on a TV, computer, phone, or iPad.

Imitative skills may generalize to different settings and skills (Dequinzio, Townsend, Sturmey, & Poulson, 2007). Although generalized imitation across skills and settings is the goal, many times skills with different response classes need to be taught directly and intensely for mastery (DeQuinzio, Townsend, Sturmey, & Poulson, 2007). Baer and Sherman (1964) found that 64% of their subjects would imitate responses that were never directly taught as long as other similar responses were reinforced. Other interventions are needed to ensure that skills can be taught using modeling when adults or peers are not available to teach and practice the skills. Using a variety of technologies

may assist in teaching skills when adults and others are not present. Video modeling is a tool that can be used to teach these imitation skills, which might decrease the need for one-on-one support (Dowrick, 1999).

Video Modeling

Video modeling is another useful tool to teach children a variety of skills. This tool can be used to teach a skill to neurotypical individuals or to those with developmental disabilities. Video modeling is defined as watching the target skill exhibited by a person such as a peer or the subject himself/herself. In video modeling, a target behavior is chosen, individuals are selected to act or engage in the target behavior, training or practicing is conducted, videos are filmed, prompts are edited out, and then the individual who is learning the skill repeatedly watches the video (Charlop-Christy et al., 2000).

Video modeling can be a beneficial tool when teaching skills to children with autism (Dowrick, 1999). Video modeling may be advantageous when compared to in vivo or live modeling. A video can be taken anywhere and played at any time there is technology available that can play videos. The cost of making the videos may be less than the cost of a therapist conducting Applied Behavior Analysis therapy. Schools are more likely to provide USB video cameras due to the cost being half as much (in terms of materials, training, and implementation) as a live model teaching the skills (Charlop-Christy, Le, & Freeman, 2000). With class sizes growing, using video modeling may also reduce the demands on teachers and specialists regarding the amount of time it takes to teach an individualized skill (Wilson, 2013). Only minimal adult prompting has to be

used when teaching using video modeling (Hume et al., 2009). A video can be played over and over again, giving the child the opportunity to watch the video closely and practice the correct skill frequently. With videos, the correct skill is shown, which decreases teaching errors that may occur when a child has multiple therapists teaching the same skill. Finally, videos can be used in naturalistic settings (Charlop-Christy et al., 2000). Videos can be used in a variety of settings and amongst different professionals and team members. Using video models may have little to no disruptive features compared to having a one-on-one aide or the student being pulled from a classroom to be taught the skill. Family members may also be able to use the videos to practice the skills that the students learned in school. Since the family members will be able to see how the skills were taught, consistency and generalization across settings may be more likely than with numerous individuals teaching the skills (Wilson, 2013). Results from previous video modeling studies showed that video modeling is effective in both maintaining skills (skills learned from videos are maintained even after video is removed) and generalizing to other examples, settings, and people (Bellini & Akullian, 2007). Some children can even generalize the skills after viewing the videos as little as three times (Nikopoulos & Keenan, 2004). There are very few teaching methods that can claim ongoing strength of both maintenance and generalization without the provision of ongoing direct instruction (Buggey & Ogle, 2012). Even if a participant has emerging skills and cannot imitate or role play, cameras or other video equipment can be set up for a long period of time to catch part of the behavior and then edited so that the targeted behavior can be captured (Buggey & Ogle 2012)

Video modeling may also be a preference for certain children with autism due to

their over-selectivity behavior (when focusing on a non-relevant part of an item or area) (Charlop-Christy et al., 2000; Nikopoulos and Keenan, 2003). Not only may it be a preference, but children with autism may be able to attend more to videos due to this over-selectivity (Charlop-Christy et al., 2000; Buggey et al., 2009). Children with autism are sometimes partial to visual stimuli. Pictures, choice boards, and picture schedules are used in many interventions targeted for this population (Hume, Loftin, & Lantz, 2009). Some children with autism may also be more distractible by the nature of live modeling (Wilson, 2013). Some individuals with autism may relate better to objects rather than human interaction, which may also be a reinforcing value to using videos instead of live models (Buggey, Hoombs, Gardener, & Cervetti, 1999). Videos are also short, usually between 2 and 4 minutes long, which doesn't require a long attention span from a child with autism. Many individuals with autism remember information more visually than verbally (Hume et al., 2009). They may also have excellent memories and, if they are watching the correct behavior or skill repeatedly, they may be more likely to engage in the skill. Some children with autism also avoid eye contact, which may make it more difficult to teach certain skills using in vivo models. Another benefit to video modeling can be that, once a behavior is modeled, a video model can be changed and expanded to teach more complex behavior (Wilson, 2013). Video modeling can also have narration or captions.

Children with autism prefer video modeling to in vivo modeling (Charlop-Christy et al., 2000). Charlop-Christy et al. (2000) compared video modeling with in vivo modeling for teaching a variety of tasks. Five children, ages 7 to 11, were assessed on their rates of acquisition in a variety of tasks. The tasks were different for each child and

based on the child's needs. The target behaviors for acquisition were expressive labeling of emotions, independent play, spontaneous greetings, conversational speech, oral comprehension, cooperative play, self-help skills, and social play. Familiar adults were used as models. Four out of five of the acquisition tasks were acquired more quickly using video modeling than in vivo modeling (Charlop-Christy et al., 2000).

Many researchers have been conducting studies using video modeling as an intervention to teach specific skills to individuals. Some of the skills that have been taught using video modeling include play skills (D'Ateno, Mangiapanello, & Taylor, 2003), basic first-aid skills (Ergenekon, 2012), purchasing skills (Haring et al.,1987), social skills (Wert & Neisworth, 2003), and treating maladaptive behavior in schools (Coyle & Cole, 2004). Research has shown that video modeling has been successful in teaching social (Wert & Neisworth, 2003), play (D'Ateno et al., 2003), and functional life skills (Shipley-Benamou et al., 2002) to children with developmental disabilities.

Pretend play skills have been successfully taught to children with autism using video modeling. Reagon, Higbee, and Endicott (2006) demonstrated using video modeling with a sibling as a model and play partner to increase pretend play scenarios with a 4-year-old boy with autism. The child with autism watched the video with the sibling and then was told to go play with the toy materials that were displayed in the video. Data were collected on scripted and spontaneous comments with the materials and sibling. Scripted statements increased in four different play scenarios. This study further reinforces previous research that video modeling and siblings can be used to teach play skills.

Another study (MacDonald, Sacramone, Mansfield, Wiltz, & Ahearn, 2009), with

results consistent with the study above, showed that video modeling increased verbalization and play actions quickly with children with autism in a preschool setting. During the intervention phase, two pairs of children between the ages of 5 and 7 – one child with autism in each pair – were prompted to sit on the floor in front of three play sets, one play set at a time and one pair of children at a time. For each pair, there was little appropriate play between the children, even though the neurotypical child in each pair had extensive play skills in their classroom with other neurotypical children. The children then watched twice videos of adults acting out a sequence of pretend play. They were again prompted to sit on the floor and encouraged to play. Both pairs of children exhibited rapid acquisition of interactive play skills, with relatively short exposure to training and in the absence of response prompting and reinforcement. This research showed video modeling could be useful in teaching neurotypical children how to play with children with autism, which can be important with the rise of inclusionary classrooms.

Odluyurt (2013) conducted a study comparing peer direct modeling and peer video modeling to teach games to children with autism in an inclusive setting. Two games were chosen by the teachers. One game was taught using direct modeling and the other was taught using video modeling. Peers were taught to implement the direct modeling and the video modeling. Twenty-one students participated (three children with autism and 18 neurotypical peers). Both video modeling and peer direct modeling were shown to be efficient in teaching children with autism to play games in an inclusive setting. This included participation and rule following.

Video modeling has been used to teach social skills to children with autism.

Nikopoulos and Keenan (2007) examined the effects of video modeling to teach complex social sequences to children with autism. This study was conducted in a special education school. A 10-year-old child and an adult experimenter acted in the movie. Three children participated in this study. After watching the videos numerous times, social initiation was enhanced for all of the children who participated, and all three children's latency of social initiation decreased.

Video modeling has been combined with other interventions with promising results. Higher-level social skills were also taught by using video modeling as an intervention. Gena, Couloura, and Kymissis (2005) conducted a study using in vivo modeling, video modeling, and reinforcement to modify the affective behavior of preschoolers with autism. Three categories of affective behavior were assessed: sympathy, disapproval, and appreciation. Various responses were required in order to have been considered correct: the child must have emitted a verbal response within 5 seconds following the scenarios presented, have made eye contact with the therapist, and have made both of the appropriate verbal and facial responses that went along with the scenarios. Videos were taped of peers engaging in appropriate reactions. Therapists then told the children to look at their peer and do what they do. If the child did not engage in the correct behavior, the therapist prompted the correct behavior. Error correction was used during both the in vivo and the video modeling phases. All three students' appropriate affective responses increased and were generalized to untrained scenarios.

Charlop, Dennis, Carpenter, and Greenburg (2010) conducted a study to teach socially expressive behaviors to children with autism. Video modeling was used to teach appropriate gestures, facial expressions, verbal comments, and intonations to three

children. The videos had two adults engaging in a scenario. After the child watched the video twice, the experimenter took the child into the playroom, where the same toy that was in the video was presented to the child. The experimenter used the initiated action or verbal statement that was presented in the video. All of the children reached the mastery level in each of the four categories by only watching the videos a handful of times.

Yakubova and Taber-Doughty (2013) examined the effects of using video modeling and verbal prompting on teaching specific social skills while purchasing items. Three students ages 12 to 15 diagnosed with autism participated. All three students were at different levels of functioning (one student could request verbally and had some social skills, the second student was nonverbal and used a Dynovax to interact, and the third student was verbal but did not engage in social interaction with familiar or unfamiliar adults regularly). The study took place in a self-contained classroom and two different grocery stores. The independent variables that were used were both video modeling and verbal prompts. In the videos, an adult demonstrated proper purchasing and social skills. The dependent variable included standing in line, greeting the cashier, smiling, paying the cashier, thanking the cashier, and retrieving the paid grocery items. The researchers used event recording to determine the percentages of independence within each skill. During all phases (baseline, intervention, and generalization) investigators gave the directions and the prompts when needed. Intervention consisted of the participants watching a video of an adult modeling the purchasing and social skills targeted. The students were taken to the grocery store and then told to do what they watched in the video. One student reached 100% mastery with the purchasing and social skills as well as generalized the skills to a different grocery store. The second and third student made

significant gains in the purchasing and social skills but their data varied during the generalization phase. These results demonstrated that using video modeling and verbal prompts as an intervention to incorporate social skills when teaching other behaviors can be effective.

Other essential life skills can also be taught using video modeling. Ergenekon (2012) conducted a study to teach basic first-aid skills to three children with autism. Children with autism need to learn safety skills to avoid dangerous situations and function more independently. A sibling model participated in the video. Children were all aware of what a dangerous situation looked like and that first aid would need to be applied but lacked the knowledge of how to implement the first aid. Sessions were conducted in the children's home. The dependent variable was learning which treatment to use and how to apply the first-aid skills after accidents such as cuts, abrasions, and minor burns. The independent variable consisted of a first-aid training packet. First the child would read a short story created by the experimenter regarding a specific situation where first aid would have to be applied. Then the child would watch a simulated video on the specific situation and how to respond (the sibling model was in the video acting out the correct sequence). Correct responses consisted of the target behavior being implemented within 4 seconds. Verbal praise was given. If the child gave the incorrect response, the trainer gave feedback to the child and then repeated the skill direction. Children had to perform the skills 100% correct over three sessions for it to be considered mastered. Generalization probes were taken. This consisted of multiple examples given and the child implementing the targeted first-aid skills on themselves and the experimenter. The training package was effective in teaching the proper first-aid skills.

All three children generalized the skills learned in the training sections to themselves, to researchers body parts, and with different materials.

Point-of-view modeling has been shown to be a successful intervention in teaching play to preschoolers with autism. In a point-of-view modeling, individuals are watching the targeted behavior through their perspective or vantage point. Hine and Wolery (2006) examined the effects of point-of-view modeling. Two preschool-aged girls diagnosed with autism watched videos of adult hands playing with toy gardening tools and toy cooking materials. The dependent measure was the different types of modeled actions performed during each probe. Sessions were run each day. The children would watch the play action being modeled, view the video, and have daily practice with the toys. These videos were displayed on a laptop computer. Both children acquired play skills using the same materials that were viewed in these videos. This study supports the research using video modeling as a useful tool to teach children with autism.

Point-of-view video modeling can be used to teach vocational skills as well. Shipley-Benamou et al. (2002) used instructional video modeling to teach daily living skills to children with autism. The videos were made by positioning the camera over the adult's shoulder to view the hands of the model engaging in the skills. Making orange juice, preparing a letter to mail, pet care, setting a table, cleaning a fish bowl, and putting a letter in the mailbox were videotaped. There was a rapid skills acquisition in two of the three children. Video instruction increased the performance of these tasks after the viewings.

Almost all of the studies showed positive results in using video modeling as an intervention. This could be due to the reinforcement value of watching videos. The theory behind why video modeling seems to work so well with children with autism is that watching

videos can function as a reinforcer when made available contingent on behavior (Lasater & Brady, 1995). In many of the studies, videos appear to be motivating when watching the videos (Lasater & Brady, 1995; Boudreau & Harvey, 2013; Charlop-Christy et al., 2000).

Even children with autism who have a difficult time attending to videos may be able to be taught to attend and imitate a video model. Plavnick (2012) conducted a study to teach a 4-year-old with autism to attend to a video on an iPhone. The video was taken using peer models. The goal of the first part of the study was to increase the duration of the child attending to a portable video by using prompting and reinforcement. During the intervention phase, the experimenter said, "Watch the video." Then the experimenter showed the child a preferred edible and moved the edible behind the iPod as the video clip started so the child's focus would be on the iPod. In the video, the peer would verbally request a preferred item or comment on an item in the room. If the child attended to the video for the targeted duration, the edible was given. The second part of the study consisted of the child imitating what was shown in the video. The video depicted a peer picking up a picture of a preferred activity and handing the picture to the experimenter. During the intervention, the child watched the video, then the experimenter placed a picture on the table in front of the child. When the child attended the video, the child did imitate the picture exchange. Since many picture exchange programs require two instructors using a video to teach this skill to a child, video modeling may be more practical, as it reduces costs and eliminates the necessity of having two instructors available. This study shows that children who do not initially attend to videos and smaller mobile devices can be taught to attend to the video and then may be able to imitate the models in the video.

Video Self-Modeling

Video self–modeling is relatively new compared to other types of video modeling using peers and adults (Buggey & Ogle, 2012). In video self-modeling, individuals observe themselves engaging in a skill or behavior. When watching oneself, the individual pays more attention to the model (Bandura, 1986). Peer video modeling might be more difficult to create than self-videos due to consent from parents, time constraints, anonymity, and participation of the child. Also, filming the videos could be timely, and the child peer model might lose interest or not be available to finish the tape (Dowrick, 1999).

Creer and Miklich (1970) were the first to conduct a study using video self-modeling to decrease inappropriate behavior, with a child who engaged in aggressive behavior. A 10-year-old boy participated. During a role-playing session, the child was videotaped demonstrating appropriate and inappropriate behavior (aggression, etc.). During intervention the child was asked to watch the video of himself engaging in only the positive behavior for 5 minutes every day for 2 weeks. There was a significant decrease in his problem behavior. For the next 2 weeks, the boy watched himself daily on a video engaged in the problem behavior. His inappropriate behavior increased back to baseline levels. The appropriate behavior was shown again to him for the following 2 weeks, and marked improvement was shown and maintained for over 6 months.

There have been studies using video self-modeling in the classroom to decrease inappropriate behavior. Coyle and Cole (2004) used video self-modeling and a self-monitoring treatment program to decrease off-task classroom behavior with three male children with autism. Frequency, event, and time sampling of off-task behavior was measured. The children were taken into a separate room and watched a video of

themselves working appropriately, with all off-task behavior edited out. For the self-monitoring part of the intervention, the children were to make a mark after a timer beeped for either “working” or “not working.” Off-task behavior largely decreased in all three children. The combination of video self-modeling and self-monitoring increased the on-task behavior in a classroom setting.

Other studies have shown video self-modeling as a useful tool to decrease inappropriate behavior in the classroom. Buggey (2005) conducted a study in a small, private school for children with autism. Participants’ ages ranged from 5 to 11. Children were chosen to participate in one of three experiments. In the first experiment, peers and the participants were shown in the video increasing social initiated conversation among their peers. This video was shown for 10 days in the morning. Both participants in the first experiment increased their frequency in social initiations after watching the video self-modeling. The second experiment was conducted to decrease tantrum behavior in two students with autism. In this experiment, common classroom scenarios where the children have engaged in problem behavior in the class were acted out. The children had scripts and were prompted to act in the videos with appropriate behavior and reactions. Children memorized the scripts. After the children watched the video, the rate and duration of tantrum behavior decreased substantially. In the third experiment, the participant was videotaped engaging in a variety of appropriate activities such as hugging a classmate, sharing a toy, complying with teacher’s directions, and quietly attending to task. The goal of this study was to increase the child’s one-word responses to three-word responses and to decrease instances where the student was pushing other students. The video was edited to show the child engaging in appropriate behavior with no pushing, and

answering questions in three-word responses. The instances of pushing decreased. For the language to increase, the videos had to add more of the child in the videos. This could be due to the child attending more if he was the focus of the video.

Marcus and Wilder (2009) conducted a study comparing peer video modeling and self-video modeling in teaching novel letters to three children with autism. Two tapes were developed. Familiar peers were taped in the videos labeling Greek or Arabic letters on index cards with a teacher prompting their responses. In the self-videos, the children were prompted to say the letters without seeing the cards. Prompts were edited out of the videos. In the final videos, the teacher asked, "What letter is it?" and an index card of the letter was shown. The child would answer with the correct response and praise was given in the videos. Results showed that all three children reached mastery criterion in the self-modeling condition, while only one child reached the mastery level in the peer modeling condition.

Cihak and Shrader (2008) focused their study on determining if the model matters in the acquisition and maintenance of vocational and prevocational skills. Four young adults between the ages of 16 and 21 participated. Two of the participants had the tasks of using a fax machine correctly and making copies. The other two participants had tasks that included preparing a family pack and preparing a first-aid kit. Each participant viewed a video with an adult model engaging in the task, or a video self-model (the participant engaging in the task with the prompts edited out of the video). Maintenance probes were collected. One of the participants indicated a preference for the video self-modeling. Two of the participants acquired the tasks more efficiently in the self-video modeling, although the difference was slight. The fourth participant showed no difference

with preference or rate of acquisition. The participants acquired the skills in both videos. All four participants stated that they preferred to watch themselves in the videos than to watch the other adults. Although this preference didn't make a significant difference in the rate of errors, the reinforcing factor of watching themselves may be an advantage of improving self-efficacy.

Boudreau and Harvey (2013) examined the effects of using video self-modeling to teach more complex social skills to children with autism. Three students ages 4 to7 participated. All three students had similar social skills and low frequencies of social initiations amongst peers. The study was run in the students' school. Social initiation was defined as a vocal statement directed toward peers with the participant's head facing the peer, or an independent vocal statement with a manipulation of a toy (e.g., asking a peer to play with a ball). Videos were taken of the children initiating play with peers. The prompts were edited out of the videos. The children viewed videos 10 minutes before recess. Observations and data collections were conducted the first 10 minutes of recess. Maintenance probes for all the children were conducted 2 weeks after the final intervention. Videos were not shown during the maintenance probes. All three participants showed an increase in independent social initiations with peers. The first participant's average increased from 36% of initiations during observation to 72% after the intervention. The second participant's average initiations went from 2% to 26%. The third participant's initiations rose from an average of 10% before the intervention to 58% after the intervention. The first two participants' maintenance probes dropped (compared to the average during intervention) but were still significantly higher than baseline. The third participant's probe data was higher than the average intervention data at 78%. The

increase of initiations was immediate for two of the participants once intervention began, and increased within 1 week for the third participant. This study adds to the research that video self-modeling can assist in teaching children with autism more complex social skills such as initiations. It also adds to the research that the skills learned from the videos were maintained even after the videos were removed.

Children who do not have imitating in their repertoire can still be successful in making videos to increase skills. Responding-to-questions skills were targeted in a study with three elementary children with autism (Buggey et al., 1999). These students did not readily imitate. Videos were taped for 3 to 4 hours over time to be able to prompt the responses since they were very inconsistent. Videos were cut down to 2 minutes and 30 seconds. After viewing the videos, responses to several simple questions that were asked to the students increased from 0% to 100%.

Another study used video self-modeling as an intervention to teach skills to young children with autism. Bellini, Akullian, and Hopf (2007) examined using video self-modeling as an intervention to increase social engagement in a natural setting, such as preschool. Two preschool students participated in this study. The dependent variable was unprompted social engagement with peers. Social engagement included skills such as complimenting, sharing, showing toys, joining in play with another child, requesting assistance, giving a toy to another child, responding to questions following a request, and accepting toys when offered. Children watched the videos for 17 days (videos were alternated). Then the child was sent into the classroom to participate in a free-play activity. Prompting and reinforcement from the teacher were not given during the intervention phase. Both children's social engagement increased dramatically during the

intervention phase and were maintained after the children stopped watching the videos. This study was different than others previously because this study had no other intervention that was combined with the video self-modeling intervention. The study did not include any reinforcement or prompting from teachers during the intervention phase. This study expanded the research on video self-modeling as an intervention to increase skills with children with autism.

Video Self-Modeling and New Technology

There is new technology that can be used to make watching video modeling more easily accessible. Videos do not have to be watched with a large TV and a VCR, which can make it difficult for a child to watch immediately before an event or immediately before they are to engage in a targeted behavior. With small technology such as cellphones, iPods, and iPads, a child can watch them anytime and in a variety of settings.

Smaller technological equipment can be used in community settings with little disruption. Laarhoven, Laarhoven-Myers, and Zurita (2007) evaluated the effectiveness of using a Pocket PC to teach vocational skills in community-based setting to two adolescents with cognitive impairments. Both adolescents were taught these skills in chain restaurants. Tasks that were taught included portioning salads or veggies, clocking in and out, cleaning and sanitizing the area, rolling silverware, and sorting and sanitizing silverware. Participants viewed the video sequence before they engaged in the vocational task. For every fifth error that the participants made, they would be told to watch the video again. Positive feedback was given for the correct response and constructive feedback was given for errors. Results showed that an increase of independent responding in this task, and a

decrease in prompting from others, occurred when using this intervention.

Cihak et al. (2010) conducted a study using video self-modeling, point-of-view modeling, and least-to-most prompts to improve transitional behaviors for students with autism who are included fully in the general education classes. Four students participated, with each of the four children engaged in behavior problems during transition from one location to the other (e.g., bus to classroom, classroom to music room, music room to bathroom). Each video showed the child transitioning appropriately and independently to the next location. If the child engaged in inappropriate behavior, then the teacher prompted the child to watch the video again. If the problem behavior continued, least-to-most prompting was used until the child engaged in the correct response independently. With all the children, video modeling using the iPods resulted in independent transitions. The children's inappropriate behavior decreased to 0%. This study showed that students can benefit from the use of video self-modeling to become more independent in a regular education classroom.

Schools do not use this intervention even with the research Bellini and McConnell (2010) discussed, which proposes lack of implementation is due to the complexity or the perceived complexity of editing videos. With the new technology and all the availability of easy-to-use editing programs, video self-modeling takes less and less time to create and use as an effective intervention for children with autism. Boudreau and Harvey (2013) used Movie Maker to edit videos with self-models quickly and efficiently. Using smaller video equipment such as smartphones make it easier to use in the general classroom than a video screen or computer screen (Plavnick, 2012). Video editing equipment has become more available to the general public. It has now become more cost

effective and user friendly (Buggey & Ogle, 2011).

IPADS are a helpful tool that facilitates learning. Children with autism have greater opportunities to improve their communication and social skills with an iPad. This tool is more portable then a computer and can be carried around to different environments by a young child. Tapping and sliding motions on an iPad can be easier to use than a keyboard (Vanderbilt University, 2013). There are many applications that can be tailored to enhance the needs of a child with autism. Children may prefer iPads to learning from a person due to decrease language demands. Children with autism may prefer the visual aspects of an iPad. Since iPads are not as distractible, this tool may be able to be used in the classroom to teach a variety of skills (Plavnick 2012).

This study will begin a line of research to teach classroom readiness skills to children with autism using an iPad. If this technology can be used to successfully teach these skills, then research should continue to determine if this intervention can be used more widely in a general education classroom. This study will add to the research in achieving more independence for children with autism.

CHAPTER 3

METHODOLOGY

Participants

Participants for this study were selected by putting up flyers in a center-based Applied Behavior Analysis program for children with developmental disabilities. Three male children participated in this study, ranging in ages from 3 to 4. All three children were diagnosed with autism by a developmental pediatrician, and were currently enrolled in an Applied Behavior Analysis program. All three had some expressive verbal skills. Children were able to request their wants and needs, and were able to follow simple directions. All of the children had simple imitation skills. All of the children could repeat 3-to-4-word phrases. They all have a history of requesting the iPad to play games or watch movies. All of the children currently receive Applied Behavior Analysis therapy 12 to 20 hours per week. All of the children had delays in both social and communication skills. These characteristics were determined based of their current assessments (VB-MAPP and/or developmental pediatrician report). Participants for this study had to have demonstrated specific skills in their individual Applied Behavior Analysis programs. These skills included motor and verbal imitation, the ability to follow one-step directions, and some expressive communication skills in their individual sessions. All three current participants were assessed using the ABLLS- R assessment to confirm that the prerequisite skills were mastered. Participants in the current study received praise as their reinforcer for performing the inclusion tasks. It should be noted that during the study, numerous snowstorms occurred which decreased the amount of consecutive days per week the child participated in the study. Participants attended the program on average 2–

3 days per week during the duration of the study.

Brian was a verbal boy aged 3 years and 6 months with autism. Brian was diagnosed with moderate autism using the Autism Diagnostic Observation Schedule (ADOS) by the developmental pediatrician. He imitated all single-step motor actions. Brian used words to communicate. He spoke in 2-to-3-word sentences and could repeat up to 4-word sentences. Brian followed a minimum of 10 one-step directions. Brian needed prompts or assistance for any two-step directions. Brian would engage in tantrum behavior (e.g., dropping to floor, refusal) when asked to transition from a preferred to a nonpreferred activity.

Garrett was a verbal boy aged 3 years and 7 months with autism. Garrett was diagnosed with Autism by a developmental pediatrician using the MCHAT, CARS, and STAT assessment tools. When diagnosed, he met the criteria according to the DSM-IV in all three areas (social, communication, and behavioral). Garrett spoke in 4-to-5-word sentences. He followed a minimum of 10 one step directions independently. He could follow two-step directions with one verbal prompt. He engaged in some tantrumming behavior when preferred items were removed.

Jack was a verbal boy aged 4 years and 1 month with autism. Jack was diagnosed with Autism Spectrum Disorder by a developmental pediatrician. He was diagnosed using the ADOS tool. At the time of the study, Jack spoke in 3-to-4-word sentences. Jack engaged in echolalia behavior (repeating what others said without function) at times. Jack could follow a minimum of 10 one-step directions. Jack needed multiple prompts to follow two-step directions.

Setting

All data were collected at the center-based program. The center-based program is set up to look like preschool and kindergarten classrooms to mirror what a school would look like. The rooms where the study took place were equipped with tables and chairs; educational toys such as puzzles and puppets; pretend play equipment (kitchen set, tool bench); and a circle time rug.

All data collection was conducted at a therapy center by the researcher or trained therapists. Trained ABA therapists and researchers also collected data for purposes of establishing reliability. The study was conducted in an Applied Behavior Analysis center-based program where the child receives therapy regularly. The center has rooms with desks, tables, toys, chalkboards, and other classroom materials that resemble preschool/kindergarten classrooms. Highly preferred toys or activities are put out of sight to decrease distractions when the videos are played. The participants sat in a chair or on the carpeted floor while watching the iPad videos.

Materials

Informed Consent Form

This form was provided to all parents of the participants prior to data collection. The form provided a brief description of the study, an assurance of confidentiality, contact information for the experimenter's supervisor, and a statement that the participant may withdraw at any time without penalty. The therapists who implemented the program for the children they were teaching collected data on the targeted inclusion skills in the same manner that they collected data on all other acquisition skills. All data were recorded in their program books. All therapists had training on independent-versus-

nonindependent responses before the study began. A researcher role-played the different responses and then had the therapists practice collecting the data on these skills. The researcher then gave feedback and modeled the correct response if necessary. All therapists collected the mock data, which was reviewed by the researcher. Therapist's demonstrated 100% accuracy for correct data collection before the implementation of the study began. All therapists have been trained in Applied Behavior Analysis and have worked in the field for a minimum of 1 year.

Videotapes

Three videotapes were made for each child: All videos depicted the teacher saying the direction "Line up," "Everyone clean up," or "Everybody sit down." Then in the video the child followed the direction (line up, sit down, or clean up) immediately. The video showed the therapist/teacher giving the direction and then depicted the child following the directions, with any prompts edited out, to depict the child following the direction within 10 seconds of the teacher telling the class the direction. All nonverbal and verbal prompts were edited out of all three videos. Familiar teachers/therapists gave both the directions and prompted the participants in the creation of the videos.

Experimental Design

A multiple baseline design across behaviors and subjects with three participants was used. The dependent variable is defined as how many times the child responded independently to the three group directions (clean up, sit down, and line up) within 30 seconds of the direction given. Interventions of each behavior were counterbalanced

across participants. Table 1 below describes the order of video interventions.

Table 1: Order of Interventions Implemented for Each Participant

Order of Interventions	Brian	Garrett	Jack
Line up Video	1	Intervention not implemented due to mastery in baseline	2
Sit Down Video	2	1	Intervention not implemented due to mastery in baseline
Clean up Video	3	Intervention not implemented due to mastery in baseline	1

Data Collection

Baseline

During baseline, a teacher stood 10 feet away from the participant and gave the directions “Line up,” “Everyone clean up,“ and “Everybody sit down.” The teacher gave the direction five times throughout the child’s sessions throughout their daily routine (before and after playtime, circle time, transition to table work, etc.). No feedback or prompting was given to the child during this phase. For the clean up direction, toys were on the table or floor and an empty bucket was put next to the toys. Baseline was taken in the classrooms (all classrooms looked similar). All videos were recorded in one of the classrooms. Intervention was conducted throughout the child’s day in different

classrooms/therapy rooms.

Video Preparation

In each of the videos, the familiar therapist/teacher was shown giving the direction from a distance of 10 feet. The video was recorded until the direction from the teacher was clear. The children were not present during the video recording of the direction from the teacher.

Clean Up Video

In this video, the therapist prompted the child to clean up by saying "[Child's name], do this." "Do this" direction was used instead of giving the specific direction (everyone clean up etc.) to prevent learning from the creation of the videos. Then the child would put the toys or other materials in a bucket. The child was recorded in this video cleaning up the toys for a minimum of 30 seconds. Praise from the teacher from a distance was given. In the final video, the teacher was shown giving the direction from 10 feet away, then the child in the video followed the direction with all the prompts edited out, then praise from the teacher was shown. The video depicted the child engaging in the clean up behavior five times after the teacher gave the instruction. The video depicted the same loop five times.

Line Up Video

To create the line up video, the teacher was recorded saying, "Line up." For the recording, a therapist told the child "Do this" while lining up against a wall. The therapist

was edited out of the video. The final video depicted the teacher saying, “Line up” and the child following the direction to line up without any prompts from teachers or therapists. Praise was shown in the video from a distance. The video depicted the teacher giving the direction to “Line up” five times. Every time the teacher gave the instruction, the child followed the direction and received praise. The video depicted the same loop five times.

Sit Down Video

To create the sit down video, the teacher was recorded saying “Everybody sit down.” For the recording, a therapist told the child “Do this” while sitting down in a chair. The therapist giving the prompts was edited out of the video. The final video depicted the teacher saying “Everybody sit down” and the child following the direction to sit down without any prompts from teachers or therapists. Praise was given in the video from a distance. The video depicted the teacher giving the direction to sit down five times. Every time the teacher gave the instruction, the child followed the direction and received praise. The video depicted the same loop five times.

Probe

Once the videos were created, a single probe was conducted to determine if the child learned the direction from the creation of the video. The teacher gave each direction the same way they delivered the direction in baseline and intervention, and data were collected on the child’s response. A minimum of 5 data points (probes) for each behavior was conducted during the child’s regular session.

Video Self-Modeling Intervention

Therapists were given instructions to show the videos five times during their 3-hour sessions with the child before the direction was given. A checklist was given to the therapists with times to deliver the videos (before transition to other activities for clean up and line up and after transitioning for the sit down video). The last viewing was to be shown towards the end of the child's session. Since the videos were only 30 seconds to 1 minute and 30 seconds long, the therapist was asked to remain next to the child. The therapist told the child to look at the iPad. The therapist was present during the intervention. The only other people in the room were the data collectors.

Throughout the child's session (during natural transitions) a teacher walked in and gave the direction from 10 feet away from the child. The teacher was told to look out into the room and not make direct eye contact with the child when given the directions. If the child did not follow the direction within 10 seconds during the first trial, the therapist said, "Let's watch the video again." Then the teacher gave the direction again. Five trials per session were conducted of the task. If the child did not follow the direction but the videos were shown five times, the video was not shown again. For the correct response to be counted, the child had to independently follow the teacher's directions from a 10-foot distance within 30 seconds of the direction being given. Any prompted response was not considered independent. Verbal praise was given to the student after the correct response was made. The dependent variable being measured was the number of times the child engaged in the independent skill after the direction was given (sit down, line up, or clean up). To be considered an independent response, the child would have to have lined up within 30 seconds of the teacher's direction. Lining up was operationally defined as the

child walking with one foot in front of the other (not running, jumping, or skipping) to the predefined location upon the direction of the teacher and then stopping at the location. To be considered an independent response for the cleaning up direction, the child must have begun cleaning up within 30 seconds of the direction and must have cleaned up a minimum of two toys. Cleaning up was operationally defined as the child picking up the toy or materials and placing the items in a container. Specific directions that were also given to the staff regarding the cleaning up target included that, if the child took the toy out of the bin once it was placed in, that did not count as independently cleaning up. To be considered an independent response for the sit down direction, the child must have sat down within 30 seconds of the direction being given. This was operationally defined as the child walking over to the chair or rug and sitting down. Criterion for mastery was 80% across two sessions. Once mastery was achieved, videos were shown only three times per five opportunities (instead of five times) and were shown throughout the time the child attended the program each day. Videos were only allowed to be viewed during sessions. Opportunities for directions given were varied according to classroom setting and coincided with natural events (e.g., time for gym, play time over, coloring time ending, time to sit down for lunch, etc.) throughout the child's day. Each child had 15 opportunities (5 of each direction) throughout their session to emit the independent response.

Fading Videos

Once mastery criterion was achieved (80% across two sessions with only three viewings of the videos), videos were removed to determine if subjects could

independently follow the directions.

Interobserver Agreement

Interobserver agreement was calculated across all four conditions (baseline, 5 times viewing, 3 times viewing, maintenance probe) for each participant for each condition for 33% of the trials. Agreements between the two observers were calculated by dividing the smaller frequency count by the larger frequency and multiplying by 100% for each trial. The second observer was initially trained using modeling and role playing. Feedback was given. The second observer had a bachelor's degree and over 3 years of Applied Behavior Analysis experience regarding data collection and implementation of therapy. Interobserver agreement was 100% across all participants.

Independent Variable Integrity

Data on independent variable integrity was collected. A checklist was given to the observers (trained ABA therapists) to ensure interventions were being implemented as similarly as possible across children. The investigator trained the observers on the correct procedures. Examples of correct and incorrect procedures were given. Independent variable integrity data was 100% across all checklists for each participant.

Social Validity

Following intervention, therapists/teachers and parents completed a short validity survey. Questions asked on the teacher survey included a four-question checklist, with each question being measured on a 5-point Likert scale. This was administered to the

teachers to determine their approval of the interventions that were used. Data were analyzed using descriptive statistics.

CHAPTER 4

RESULTS

Participant 1 (Brian)

Line Up Direction

The data for the first participant is shown in Figure 1. During baseline for Brian, the mean for his following the group direction of “Line up” was 0%. The range score for baseline was 0%. A probe was conducted after the creation of the videos. The after-creation-of-video probe was 0% in the line up direction. Baseline was stable, therefore intervention was implemented after six sessions. An immediate increase was noted after the introduction of the videos, with the initial intervention data point increasing to 80%. The intervention mean was 90% higher than the baseline mean. Brian met the mastery criteria (80% or more across two consecutive sessions) within the first two sessions during the intervention phase. Once the criterion was met, the fading out of the video procedure was started. In the next intervention phase, the videos were only shown three times (15 views of the participant engaging in the line up following direction behavior) throughout the session. Brian continued to maintain a high percentage with the first data point in the three times viewing phase at 100%. This phase was mastered in two sessions and all line up videos were faded out of the sessions for maintenance. During the maintenance probes, Brian averaged 100%. Maintenance was 100% higher than baseline.

Sit Down Direction

Brian’s following the group direction for, “Sit down” was at a mean level in

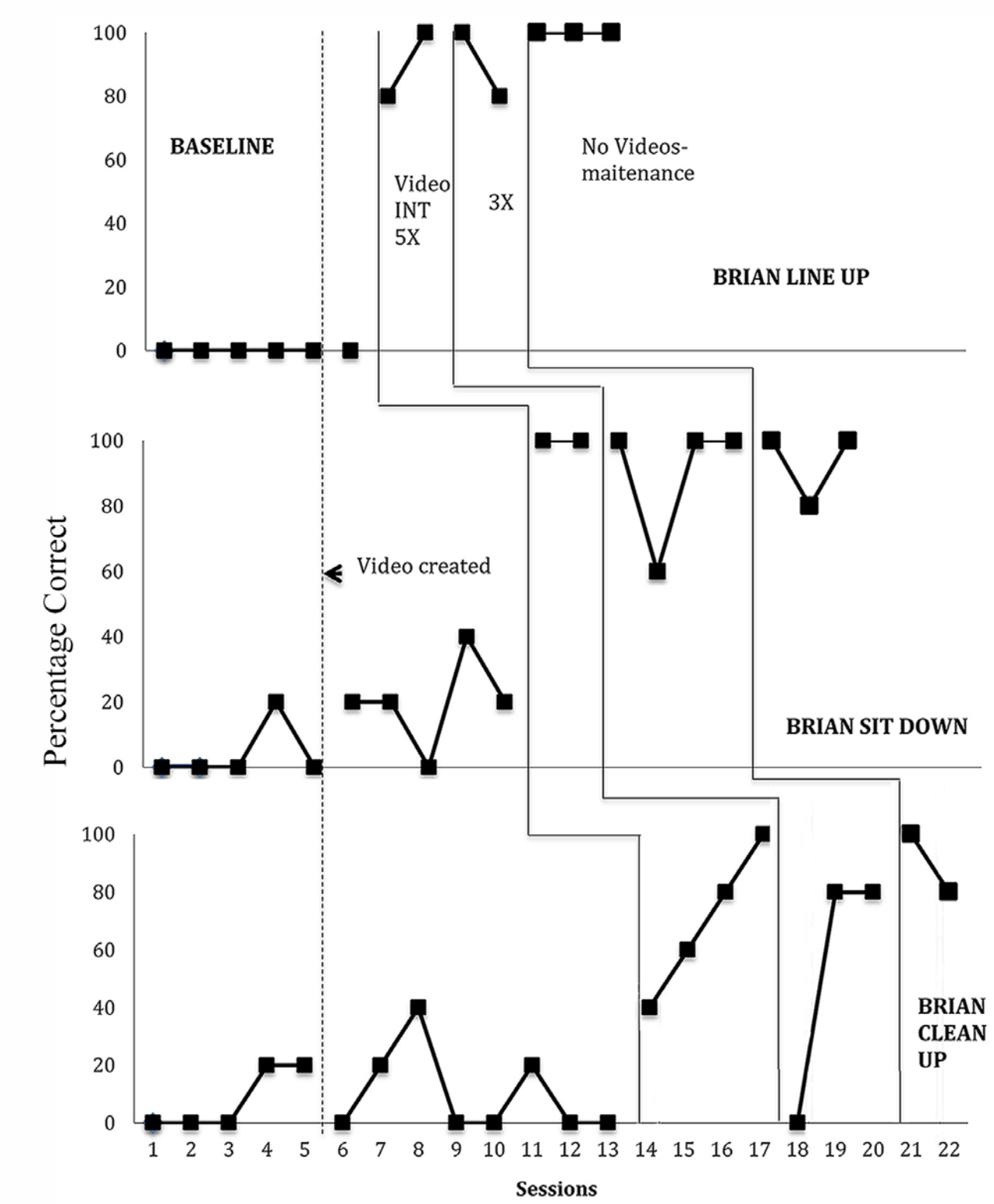

Figure 1. Percentages of correct responses following group directions before and after implementation of video self-modeling for Participant 1.

baseline at 12%. The after-creation-of-the-sit-down-video probe was 20% correct. The range score for baseline was 40%. Once the videos were introduced, Brian made significant improvement, with the intervention data averaging 100%. This is an average of an 88% difference than the baseline condition. Brian reached mastery criteria in two sessions, and then the videos were faded to three times per session. The first session when the video was viewed three times reached 100% of following the group directions, but dropped to 60% for the next session. After four sessions, Brian met mastery criteria in the three viewings of the videos and moved on to the maintenance probes. Brian maintained following-the-group-direction skill with an average of 93% across three sessions. The mean level with maintenance probes was 81% difference from the average baseline scores.

Clean Up Direction

Brian's baseline for following the clean up direction had a mean of 9%. The range score for baseline was 40%. The after-video-creation probe was at 20% for the clean up direction. Although there was improvement when the intervention was introduced at 40%, the improvements were not as immediate or as high as in the first two targets. Brian reached the criteria in the clean up target after four trials with an average of 70%. This is a 61% difference from the baseline data. Once the videos were faded to only three viewings, Brian's first data point dropped to 0%. After three sessions, the mastery criteria for the three viewings were met and the maintenance probes (no videos shown) were taken. Percentage correct averaged 90% across two sessions in the maintenance probe, which was an 81% increase from baseline.

Participant 2 (Garrett)

Sit Down Direction

Data for Participant 2 is represented in Figure 2. Garrett's mean baseline level for the group direction "Sit down" was at 3%. Range scores were 20% in baseline. The probe data point after video creation was 0%. When the intervention was implemented, there was an immediate increase of the sit down behavior to 40%. At the third intervention session, Garrett's data increased to 100%. After four intervention sessions, the criterion was mastered. Garrett averaged 70% in the first intervention phase, which is a 67% increase from baseline levels. The videos were then shown three times during the sessions. The mastery criterion was reached after two sessions at 80%. Videos were faded out. Maintenance probes were conducted that averaged 90%. Maintenance levels were 87% higher than baseline levels.

Clean Up Direction

The mean baseline level was 9% for Garrett in the clean up direction before an intervention was started for the sit down target. After the video was created, the probe was 0%. Intervention was never implemented due to the data exhibiting an increasing trend. Baseline remained low for nine sessions. The increasing trend did not appear until a marked increase in independent responding occurred during the sit down intervention. The group direction skill appeared to have generalized to the clean up direction target from the first intervention on the sit down skill. Since the skill is the same (following group directions) but the targets are different, then, due to the previous behavior being reinforced, generalized imitation may have occurred (Baer & Sherman, 1964), and this

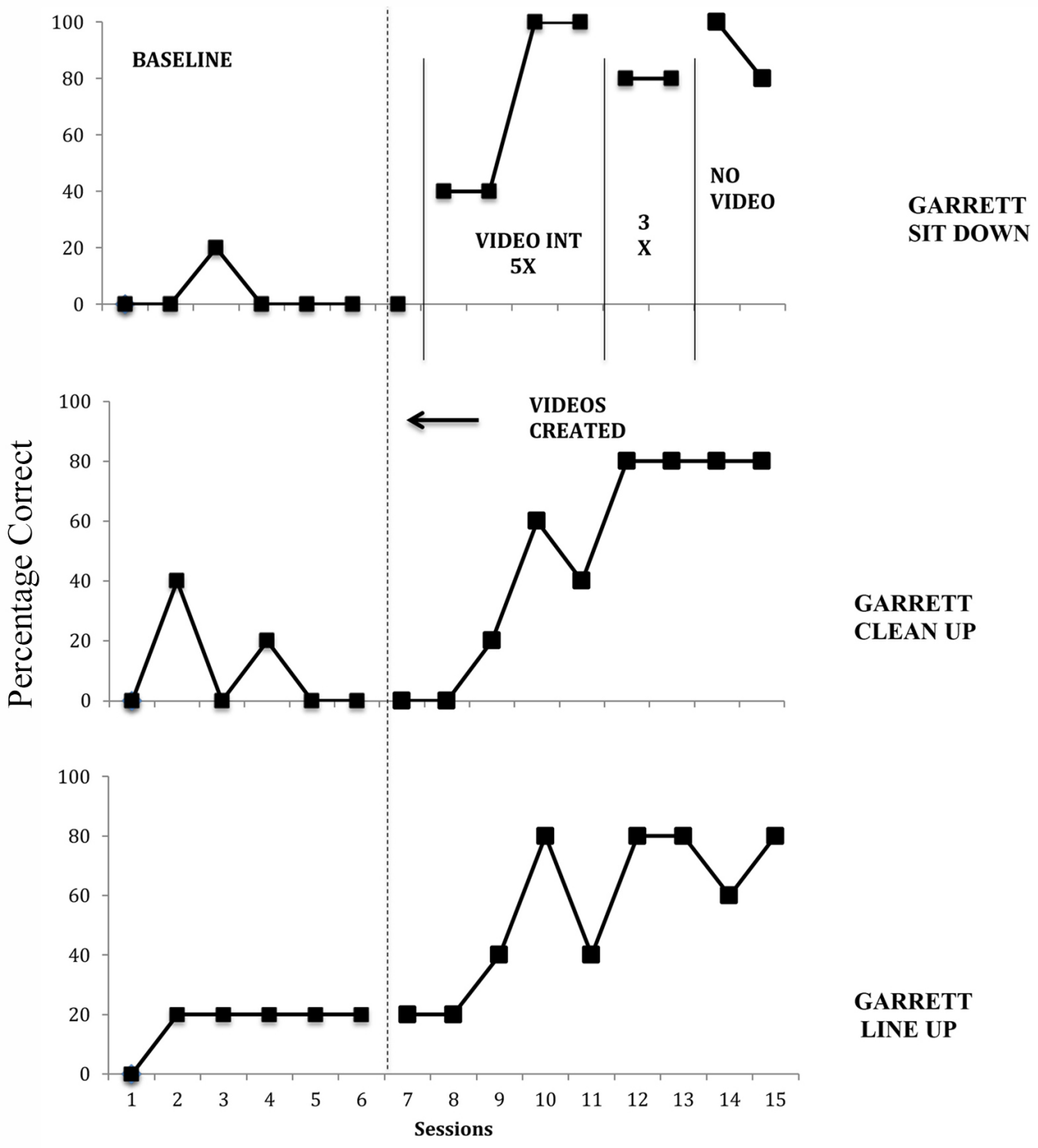

Figure 2. Percentages of correct responses following group directions before and after implementation of video self-modeling for Participant 2.

can be a reason why additional intervention was not needed.

Line Up Direction

Garrett's mean baseline level was 17% before the sit down intervention was initiated. Probe after video creation was 20%. Intervention was never implemented due to an increasing trend in the baseline data. Baseline remained low for the first nine sessions. Increasing in percentage scores did not occur until an increase in the sit down intervention occurred. The possibility that the skills may have generalized amongst targets is likely. Due to the generalization, the likelihood that the behaviors represent a response class is probable.

Participant 3 (Jack)

Clean Up Direction

Data for Participant 3 is shown in Figure 3. Jack's mean baseline level for clean up was 4%. Range scores for the clean up behavior were 20% in baseline condition. His probe after video creation was 0%. Jack averaged 68% during the first experimental condition. This was an increase of 64% from baseline levels. Jack met criterion level after five sessions and then moved to the next experimental condition of viewing the clean up video only three times throughout the session. He received 100% across two sessions. All videos were faded out. Maintenance probes were conducted. Jack received 100% across two sessions. This was a 96% average increase compared to original baseline levels.

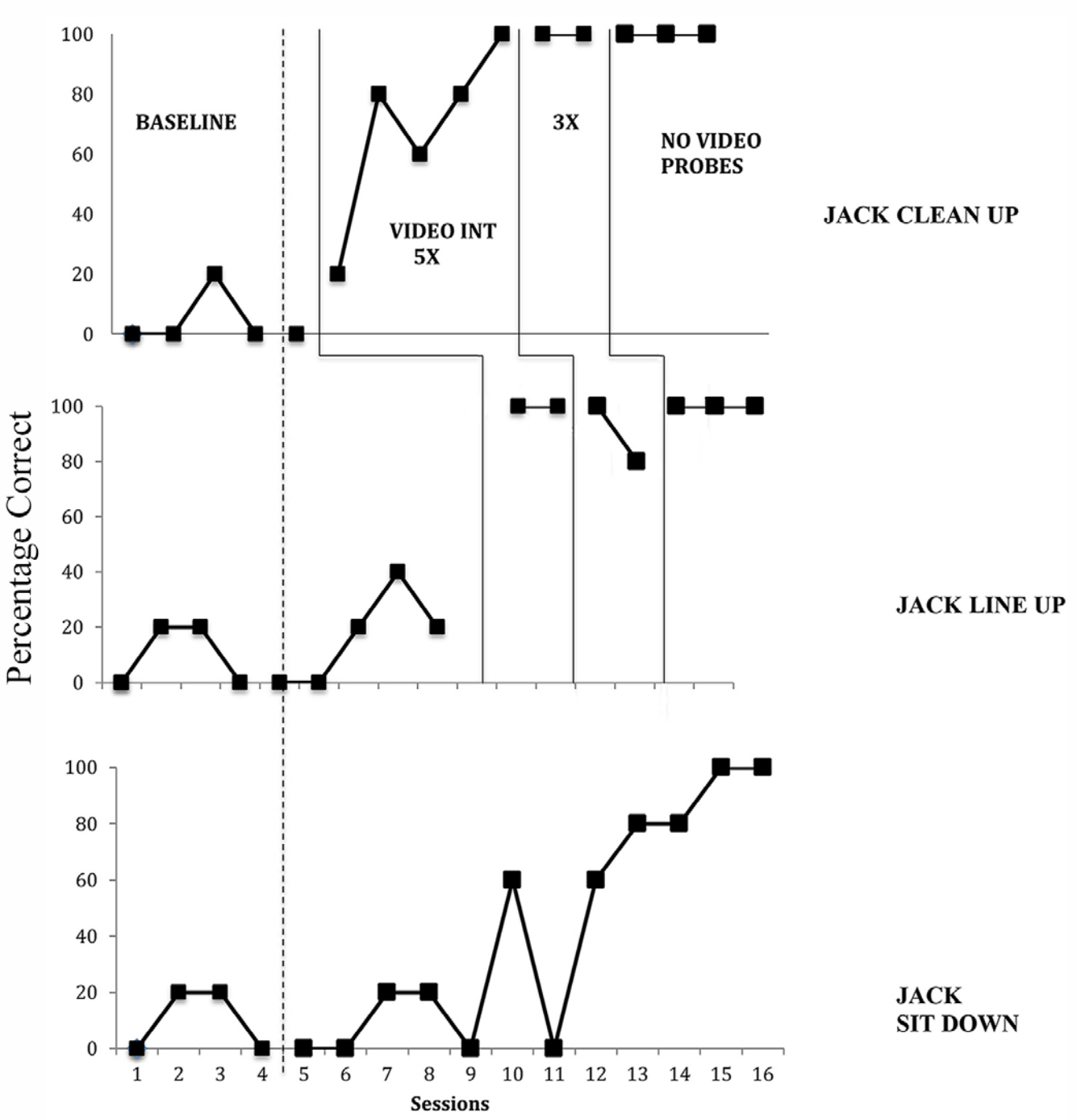

Figure 3. Percentages of correct responses following group directions before and after implementation of video self-modeling for Participant 3.

Line Up Direction

Jack's mean baseline level for the line up data was 13%. Range scores for baseline were 40% in the baseline condition. The probe after video creation was 0%. There was an immediate increase in the line up behavior when exposed to the intervention, with an increase to 100%. There was an 87% difference in correct response from the baseline level. Criteria for viewing the video five times during a session were met after two sessions. During the three-time viewings, high percentages remained throughout and mastery was achieved after only two sessions. During maintenance (where no videos were shown), Jack received 100% during maintenance probes across two sessions. This was an 87% increase from baseline.

Sit Down Direction

Baseline was low at 8% before the intervention was implemented for the clean up target. Jack scored a 0% in the sit down baseline after the video was created. Jack met mastery criteria within 14 sessions. Intervention was not implemented due to the increasing trend in data. The possibility that this skill was generalized amongst this target was likely. When Jack reached 100% for the first intervention (viewing the line up video five times), Jack's sit down data increased to 60%. After five more sessions, the mastery criterion was met in the baseline condition. For Jack to master the criterion in the baseline condition, both other targets and interventions had to be conducted. Due to the generalization across targets, the likelihood that the behaviors represent a response class is a possibility.

Social Validity Results

Following intervention and maintenance probes, parents and teachers completed a short validity survey. The results for the 5-point anchored Likert scale (i.e., 1-low to 5-high) are represented in the tables below. Questions asked on the therapist survey were: (1) Do you feel this study has helped you teach the school readiness skills? (2) Do you feel that more school readiness skills can be taught using video self-modeling? (3) Do you feel that this technology can be effectively used in the classroom setting? and (4) Would you use this intervention throughout your teaching day with your students? Table 2 depicts the social validity scores from the therapist survey. Parents were given a three-question checklist with each question being measured on a 5-point Likert scale. Questions on the parent survey included: (1) Do you feel this study has been beneficial to your child? (2) Would you request this intervention to teach your child other skills? and (3) Would you want your child to participate in more studies using the video modeling intervention? Table 3 depicts the social validity scores from the parent survey.

Table 2: Social Validity Scores from Teachers of Participants

Question topics	Teacher 1	Teacher 2	Mean
Study benefits with teaching school readiness skills	5	5	5
Opinion on using this tool to teach more school readiness skills	5	5	5
Opinion on effectiveness used in the classroom setting	4	4	4
Using this intervention throughout the day	5	5	5

Table 3: Social Validity Scores from Parents of Participants

Questions	Parent of participant 1 (Brian)	Parent of participant 2 (Garrett)	Parent of participant 3 (Jack)	Average
Benefits of Study	5	5	5	5
Requesting of this intervention to teach other skills	5	5	4	4.7
Having child participate in more studies with this intervention	5	5	4	4.7

CHAPTER 5

DISCUSSION

The purpose of this study was to examine the effects of video self-modeling when teaching children with autism to follow group directions. After viewing each video depicting the child following the specific direction (i.e., “Everyone sit down”, “Everybody line up” or “Let’s clean up”), participants were instructed to engage in the target behaviors. The results of the current investigation indicated that all children met mastery criteria for all three target behaviors. It should be noted that two of the participants did not need to view the videos for every trial due to mastering criteria at baseline which substantially compromises the experimental control in the multiple baseline across behavior design. All three children had low percentages at baseline before any of the interventions were implemented. Data were recorded to reflect the child’s engagement in the target behavior when opportunities were given throughout their day. Results indicated that these participants were able to learn to follow the above-mentioned directions through exposure to the videos. Maintenance data were gathered when the videos were removed. The data revealed that participants continued to follow the specified directions even with the removal of the videos.

A functional relationship between the independent variable and dependent variable was demonstrated in two ways. First, experimental control was shown by way of the multiple baseline across subjects. The start of treatment was staggered amongst participants, with interventions starting at different times. Intervention was counterbalanced across the three individuals. Second, experimental control was shown by

the multiple baseline across behavior for one participant. Due to generalization across behaviors, experimental control was shown with two of the behaviors with a second subject,

The introduction of the intervention resulted in a rapid increase of the "line up" target for participant, Brian. During the intervention phase, Brian received only prompts to "look at the video" and then praise if he engaged in the target behavior. If he did not engage in the target behavior, he was shown the video again, although no other consequences such as physical guidance or modeling prompting were given. A functional relationship was established using the video modeling intervention for the "Line up" target as well as the other two targets for following directions. For Brian, an increase occurred immediately for the first two targets. For the third target, "Clean up," the increase was not as dramatic as the first two targets and took more viewings to reach mastery criteria. During the "Clean up" intervention, there were times when the child stated, "No, I don't want to clean up." Cleaning up is not a preferred activity for this participant and has resulted in tantrums in the past, which could be a factor impacting the lack of a rapid increase in his performance. His comment suggested that he understood the direction given to him but was engaging in noncompliant behavior during this session. In the phase where videos were shown three times, Brian dropped to 0%. He stated that he wanted to watch a video of himself not cleaning up. Both preferred and non-preferred items were used throughout the session for cleaning up (toys, work activities, etc.) since trials were run throughout the total session. This may have been a factor that helps to explain why data varied for Brian with this target behavior. When Brian viewed the initial "line up" video, he made many comments. He smiled, labeling

himself and the teacher in the video. After watching the video a few times, he repeated the instruction given in the video and repeated the praise received. During the last intervention of the "Clean up" target behavior, he did not appear to be watching the video as intently and did not repeat the instruction or the praise. Numerous verbal prompts to watch the video were given.

For participant Garrett, with the first target, there was an immediate increase when the intervention was implemented. After watching the videos four times, Garrett met the mastery criteria for that target. Although the intervention was never implemented for the last two targets, baseline did not increase until the participant's data increased in the first target skill after the video self-modeling was implemented. Although all the target skills were acquired, the last two targets did not show a functional relationship between the intervention and the mastery of the skills. Once the video was removed, the skills learned were maintained. Even though this data did not show experimental control for the last two targets, these results did provide insight into the possible learning differences amongst children with autism.

For participant, Jack, two of the targets were taught with the intervention, therefore a functional relationship existed. Jack's average increased significantly during the intervention phase for the first target behavior. For the second target skill, there was an immediate increase in percentage correct for the "Line up" direction. The third target, "Sit down," reached mastery criteria without the child watching the video of himself depicting the target behavior. Baseline data for the third target was low until the data increased in the first two targets. All of the target skills were acquired. Jack continued to maintain the skills at 100% accuracy once the videos were removed.

While only participant Brian needed the intervention implemented for all three targets, participant Garrett needed only one video intervention of one of the target behaviors to generalize across the targets. Jack required two interventions before the third target behavior generalized. There are several possible explanations for the varying responses of generalization. Although children with autism usually have a history of difficulty with generalizing skills and generalized imitation, these children may exhibit individual differences, which were seen amongst these three participants. Each participant may have a unique history of reinforcement. Another possible difference in acquiring the skills could be due to the amount of time the individuals have been treated using ABA therapy and their learning histories. Brian began Applied Behavior Analysis 6 months prior to the study beginning, whereas Garrett and Jack had been receiving treatment for almost 2 years.

Response generalization occurs when a child demonstrates an untrained target. Usually with children with autism, generalization does not occur spontaneously or without direct training. DTT (direct trial training) is usually used to teach the targets. The videos that were created emulate DTT. A direction is given, the child engages in the target behavior, and the behavior is reinforced via praise. This is repeated five times in the video (which is a common length of time when using DTT). Children may say comments, label, or imitate actions that were shown in the videos which may be self-reinforcing (Charlop-Christy & Daneshvar, 2003). Another possible reason for two of the participants to generalize across targets is that video modeling is not as structured as DTT.

Although generalization across the response targets was not an initial question,

this adds to previous research regarding the generalization effects of video modeling with children with autism. Once the stimulus control was established for two of the participants the skill appeared to be generalized. Of interest in this study is the presence of the video modeling intervention influencing the participants' variation of generalized responding across target behaviors. These results show that it may not be necessary to expose the children to a video for every target for each skill. It would be beneficial to test or probe other targets before multiple videos for the same general skills are filmed and edited.

Although literature on video modeling has demonstrated effectiveness with teaching a variety of skills, this study examined the effectiveness of using video self-models without the combination of other interventions to teach the following-direction skills to young children. In many of the video modeling interventions, multi-element components are required for children to make progress (Delano, 2007). Many studies used modeling, physical guidance, verbal prompting, or other instructional packages to assist in teaching the skills (Yakubova & Taber-Doughty, 2013; Ergenekon, 2012). Children with autism might be able to master the skills at a more rapid pace if corrective feedback is given or if a combination intervention package is used with the video self-modeling intervention to teach the classroom readiness skills.

The increase in the following-direction skills revealed the effectiveness of the video self-modeling intervention. This contributes to the literature base, which confirms that there are positive outcomes when video modeling is used (Cihak et al., 2007; Haring et al., 1987; Yakubova & Taber-Doughty, 2013). The National Research Council (2001) recommended that the focus for children with autism should be positive and proactive

interventions that increase independent functioning. In the mainstream classroom, frequent demands are placed on children with autism to engage in skills that they have not yet learned (Buggey, Toombs, Gardener, & Cervetti, 1999). Using video self-modeling to teach the prerequisite classroom skills may assist the child in the future classroom setting. Video self-modeling is an intervention that removes the stimulus control (teacher or support) and moves to an alternative individual controlled stimulus (Hume, Loftin, & Lantz, 2009). Since many children with autism depend on the one-on-one support (Adamowycz, 2008), this intervention may reduce the amount of staff needed and still allow the children to participate in the general education classroom. Since children with special needs are often accommodated based on the availability of resources (Duncan, 2003), video modeling may be a way to increase inclusion time without putting a strain on the school districts' and teachers' limited resources. With the ease of delivery of this intervention and the fact that the children were able to press the play button themselves, this intervention continues to suggest high hopes for increasing independence for children with autism.

For video modeling to be a successful intervention in the classroom, the intervention has to be simple and efficient, due to the lack of extra time teachers have during their classroom day. The ease of creating the videos, rapid filming, and quick-to-edit video programs, all contribute to making this intervention a less complex project than in the past. The entire videotaping and editing process of each video was completed within 10 minutes from start to finish. Videos were taken on an iPad, edited on a laptop, and uploaded under the picture section on an iPad. The video interventions were easy to deliver on the iPads with little training required for staff. Since using smaller

technological equipment can be used in schools and other settings without causing as much disruption as the larger video systems, video modeling can now be used as an efficient intervention for the classroom (Laarhoven, Laarhoven-Myers, and Zurita, 2007).

All of the participants maintained the following-direction skills after the videos were removed. Although this was not part of the intervention, it should be noted that other group-direction-following skills were observed during sessions after the study was complete. All three children followed the directions with no additional prompts needed. This study adds to previous research regarding video modeling as an effective modality for promoting generalization for children with autism (Apple, Billingsley &,Schwartz, 2005; Charlop-Christy et al., 2000; Shipley-Benamou et al., 2002).

The potential generalized responding gain across the targets might be able to be explained if the video self-modeling intervention were viewed as more of an antecedent strategy. This may exert stimulus control over the participants' behavior. Nikopoulos, Canavan, & Nikopoulou-Smyrni (2009) conducted a study to determine if video modeling can be used to establish instructional stimulus control over a behavior (i.e., cleaning up a toy). The results demonstrated that the procedure could be effective if the children exhibited low levels of inappropriate behavior and had higher-level imitation skills. In this study, responses were generalized across stimuli and subjects and were maintained at follow-up assessments. In the current study, the generalization occurred with different targeted group instructions given to the children.

The social validity results of this study were very positive with both parents and therapists. Questions were given regarding the effectiveness of the intervention, the ease of implementation, and the likelihood that parents and teachers would request or use this

video self-modeling intervention to teach other skills. The parents strongly agreed with all of the above. The therapists indicated that they really enjoyed using the video self-modeling to teach the skills. When discussing the videos with the therapists, they reported that the videos that were 30 seconds and shorter were easier to implement, and they believe that those would be the most efficient for use in a classroom setting. The teachers strongly agreed that the videos were an effective intervention that can be utilized in the classroom to teach these skills. Furthermore, both therapists stated that they would use this intervention to teach other classroom readiness skills. Since video modeling is a permanent product that can be shown multiple times, and videos can be recorded in a variety of real-world environments, this can be a successful tool to use in the classroom.

The initial aim of the study was to determine if video self-modeling could be used to teach children with autism the prerequisite following-group-direction skills on an iPad. Although it was determined that video self-modeling can effectively teach these skills, many other questions arose. Future research should explore the variability of progress and generalization responses amongst children with autism through the use of this video self-modeling intervention and possibly look at the different skill sets that the children must have in their repertoire to generalize without direct instruction. These results suggest that it may not be necessary to expose each video target to the child due to the possibility that watching one or two different targets may generalize to other targets if they are in a similar skill set (i.e. following group directions).

Limitations

There were several limitations within this study that should be considered. The videos that were created varied in duration. All videos were between 30 seconds and 90 seconds, with the "Clean up" video being the longest in duration. As the study went on, the children began to repeat what they said in the video while the video was running, such as "Good job with the teacher," but they needed frequent reminders to continue to watch the videos. Variability in duration of videos may affect acquisition rates and implementation in the classroom.

In the current study, all children had previously demonstrated an interest in iPads and were familiar with using these devices to plays games or watch videos. Not all children with autism show an interest in iPads or demonstrate the ability to use and attend to this device. Although one previous study (Plavnick, 2012) demonstrated that a child could learn to attend to a small video device, other forms of teaching methods and interventions might be more effective. Future research might involve conducting a preference assessment of learning tools to determine if there are more effective learning tools based off of individual preference and the current skill repertoire of each child.

Replicating this study with a larger number of participants might provide further insights into teaching group directions and other inclusion readiness skills. Children with a variety of skills and abilities may respond differently to the intervention. In this current investigation, all children have been in a current ABA program with intensive services. Children who have not had as much direct instruction might not respond in the same way.

A final limitation of the current investigation is that no maintenance data were taken in the child's typical school setting. All children were at least a year away from

attending a kindergarten program, so data were not collected in the regular education classroom. Follow-up studies may yield important information in determining if the children maintain the skills in a regular education preschool and/or regular education kindergarten program. It would also be important to determine if using these video modeling interventions does actually decrease the amount of staff and support that the student will need to function in the general education classroom.

Future Research

From these results there are several avenues for future research. From the current data set, it appears that some children might be able to generalize targets when one skill is taught, while other children might need to be directly taught each target even if the skill is similar. Future research can also examine if video self-modeling teaching group directions can also be used to teach children who do not exhibit expressive skills. Effects for both skill acquisition and generalization may be different if children have a variety of skill levels and different abilities.

Although this study used self-models, peer or adult models might be just as effective to teach these skills. Consents for peers or self-models can be difficult to obtain, and privacy/confidentiality has to be maintained. If participants can learn the skills from adult video models, then this intervention might be easier to implement. Further research should determine if adult video models could teach the inclusionary skills.

An additional avenue of research could be an extension of video modeling with the creative use of animation using a variety of characters to teach the skills. Another idea is to have the children participate in more interactive games to teach these skills with the

possibility of the children starring in their own video games. Again, with the use of easy editing programs, this can be an option. In the current study, participants requested to play games on the iPads such as Angry Birds or racecars during the time when sessions were running. This could be a future issue during video self-modeling interventions, since iPads are used now as a reinforcer and for teaching a variety of developmental skills using different games for children with autism. Research can be conducted to determine if a more interactive game can be developed to teach the children the following-direction skills.

This study was also conducted in a center-based program. Although the study took place at a center-based program set up like a school, it would be helpful to determine if more "natural settings" will have the same results. It would be beneficial to determine if the following-directions skills on the iPad can be taught during school hours in a regular education classroom. Replication of this study in the general education classroom is warranted.

Future research should monitor if the students generalize the group-following-direction skills to a general education class. Studies should also look to determine if the students' independent behavior increased in the general education classroom. It would also be of interest to determine the cost reduction of using this intervention instead of one-to-one staff in the inclusive environment and determine the best equipment to implement the skills (i.e., iPod, iPad, etc.).

In sum, the current study indicated that, among the three participants, all three children did meet mastery criteria in all three targets of following the group directions. Similar to previous investigations, this study supports that using video self-modeling can

teach new skills (i.e., following direction skills). This study was the first to use video self-modeling to teach inclusion readiness skills. This study represents a significant starting point for future research and intervention with children with autism to increase inclusion and independence in the general education classroom.

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APPENDIX A

CONSENT FORM A

Title of the research study: ***Teaching children with autism inclusion readiness skills using video self-modeling***

Name and Department of investigator:

Kenneth Thurman

Education Department

The purpose of the research is to determine if video self-modeling can assist in teaching school readiness skills to children with autism and to see if the videos have to be edited without prompts to teach the skill.

What you should know about a research study:

- Someone will explain this research study to you.
- You volunteer to be in a research study.
- Whether you take part is up to you.
- You can choose not to take part in the research study.
- You can agree to take part now and later change your mind.
- Whatever you decide, it will not be held against you.
- Feel free to ask all the questions you want before and after you decide.
- ***By signing this consent form, you are not waiving any of the legal rights that you otherwise would have as a participant in a research study.***

The estimated duration of your study participation is **4-6 weeks.**

The study procedures consist of

- ***Data will be taken on the child following directions from a teacher from a distance away. The child will then be videotaped with prompts following the direction. During sessions, the child will be watching the video of themselves following the direction. Then the teacher will give the child the direction. Data will be recorded on the child's independence with this skill***
- ***An iPad will be used***
- ***The length and duration of visits and procedures data will be taken in the child's program book similar to other programs***
- ***Children will interact with their regular therapists***
- ***Research will be conducted at the ABA2DAY center***
- ***Children will be taped engaging in the following direction task before or after the child's regular therapy session -- Target goals will be run during one of the child's regular sessions***
- ***Therapy includes Applied Behavior Analysis with the video self-modeling***
- ***Video Self-Modeling is a tool that is already regularly used to teach children with autism***

Data will be gathered as to whether a child will follow directions when the teacher is standing some distance from the child. ***The child will be taped engaging in the following direction tasks (clean up, line up, and sit down,).*** The child will then be videotaped and the teacher will give the child verbal prompts to follow directions. The intervention will consist of the child watching a video on an iPad of themselves following the direction. Then the teacher will give the child the same direction that was observed on the iPad. The specific directions to be followed are sit down, clean up, line up. The teacher will then note whether or not the child follows the direction independently or with assistance. This intervention will be incorporated into the child's daily routine and will not interfere with his/her other therapies or school day activities.

The reasonably foreseeable risks or discomforts are there is a risk that the treatment won't be effective. If this does occur, your child will be able to receive extra free evidence-based therapy time

The benefit you will obtain from the research is knowing that you have contributed to the understanding of this topic and been provided an intervention free of charge. You will be able to keep the videos of your child engaging in the classroom readiness skills.

The alternative to participating is **not to participate**

Please contact the research team with questions, concerns, or complaints about the research and any research-related injuries by calling 610-864-7376 or e-mailing **abayourway@yahoo.com**

This research has been reviewed and approved by the Temple University Institutional Review Board. Please contact them at (215) 707-3390 or e-mail them at: irb@temple.edu for any of the following: questions, concerns, or complaints about the research; questions about your rights; to obtain information; or to offer input.

☐ Check this box if you approve your child to be videotaped for the purpose of this study only

Confidentiality: Efforts will be made to limit the disclosure of your personal information, including research study records, to people who have a need to review this information. However, the study team cannot promise complete secrecy. For example, although the study team has put in safeguards to protect your information, there is always a potential risk of loss of confidentiality. There are several organizations that may inspect and copy your information to make sure that the study team is following the rules and regulations regarding research and the protection of human subjects. These organizations include the IRB, Temple University, its affiliates and agents, Temple University Health System, Inc., its affiliates and agents, and the Office for Human Research Protections.

Signature Block for Children

Your signature documents your permission for the named child to take part in this research.

DO NOT SIGN THIS FORM AFTER THIS DATE →

Printed name of child

Signature of parent or guardian | Date

Printed name of parent or guardian

❑ Parent
❑ Guardian (See note below)

Note on permission by guardians: An individual may provide permission for a child only if that individual can provide a written document indicating that he or she is legally authorized to consent to the child's general medical care. Attach the documentation to the signed document.

Signature of person obtaining consent and assent | **Date**

Printed name of person obtaining consent and assent | **Date**

APPENDIX B
CONSENT FORM B

Title of the research study: **Teaching children with autism inclusion readiness skills using video self-modeling**

Name and Department of investigator:

Kenneth Thurman

Education Department

The purpose of the research is to determine if video self-modeling can assist in teaching school readiness skills to children with autism and to see if the videos have to be edited without prompts to teach the skill.

What you should know about a research study:

- Someone will explain this research study to you.
- You volunteer to be in a research study.
- Whether you take part is up to you.
- You can choose not to take part in the research study.
- You can agree to take part now and later change your mind.
- Whatever you decide, it will not be held against you.
- Feel free to ask all the questions you want before and after you decide.
- By signing this consent form, you are not waiving any of the legal rights that you otherwise would have as a participant in a research study.

The estimated duration of your study participation is 4–6 weeks.

The study procedures consist of

- Data will be taken on the child following directions from a teacher from a distance away. The child will then be videotaped with prompts following the direction. During sessions the child will be watching the video of themselves following the direction. Then the teacher will give the child the direction. Data will be recorded on the child's independence with this skill.
- An IPAD will be used.
- The length and duration of visits and procedures data will be taken in the child's program book similar to other programs.

- Children will interact with their regular therapists.
- Research will be conducted at the ABA2DAY center.
- Children will be taped engaging in the following direction task before or after the child's regular therapy session – Target goals will be run during one of the child's regular sessions.
- Therapy includes Applied Behavior Analysis with the video self-modeling.
- Video Self-Modeling is a tool that is already regularly used to teach children with autism.

Data will be gathered as to whether a child will follow directions when the teacher is standing some distance from the child. The child will be taped engaging in the following direction task ("Clean up," "Line up," and, "Sit down."). The child will then be videotaped and the teacher will give the child verbal prompts to follow directions. The intervention will consist of the child watching a video on an iPad of themselves following the direction. Then the teacher will give the child the same direction that was observed on the iPad. The specific directions to be followed are, "Clean up," "Line up," and, "Sit down." The teacher will then note whether or not the child follows the direction independently or with assistance. This intervention will be incorporated into the child's daily routine and will not interfere with his/her other therapies or school day activities.

The reasonably foreseeable risks or discomforts are: there is a risk that the treatment won't be effective.

A benefit you will obtain from the research is knowing that you have contributed to the understanding of this topic.

The alternative to participating is not to participate.

Please contact the research team with questions, concerns, or complaints about the research and any research-related injuries by calling 610-864-7376 or e-mailing abayourway@yahoo.com

This research has been reviewed and approved by the Temple University Institutional Review Board. Please contact them at (215) 707-3390 or e-mail them at: irb@temple.edu for any of the following: questions, concerns, or complaints about the research; questions about your rights; to obtain information; or to offer input.

☐ Check this box if you approve your child to be videotaped for the purpose of this study only

Confidentiality: Efforts will be made to limit the disclosure of your personal information, including research study records, to people who have a need to review this information. However, the study team cannot promise complete secrecy. For example, although the study team has put in safeguards to protect your information, there is always a potential risk of loss of confidentiality. There are several organizations that may inspect and copy your information to make sure that the study team is following the rules and regulations regarding research and the protection of human subjects. These organizations include the IRB, Temple University, its affiliates and agents, Temple University Health System, Inc., its affiliates and agents, and the Office for Human Research Protections.

Consent Form and Signature Block for Therapists and Teachers

Your signature documents your permission to take part in this research.

DO NOT SIGN THIS FORM AFTER THIS DATE →

Signature of Therapist/Teacher	Date
Printed name of Therapist/Teacher	❑ Therapist ❑ Teacher (See note below)

Note on permission for Teachers/Therapists: Therapists will assist in the recording sessions but will not be asked to perform any activity outside of their routine activities. This study will contain data from the teacher or therapist through interaction or intervention with them, but will not contain any information, which could assist in readily identifying them as a participant in this study. Any identifying information will not contain private information.

.

Signature of person obtaining consent and assent	Date
Printed name of person obtaining consent and assent	Date

APPENDIX C

CHECKLIST FOR INTERVENTION

Checklist for intervention

Child's initials_____

Date_____

Circle which video is being shown – (each video should have a different checklist)

clean up sit down line up

5 times

- Line up and Clean up videos should be shown before transitions
- Sit down video should be shown after transitions
- Videos should be shown throughout the child's session (beginning, middle, end)

Write a check when the video is shown to help keep track!! Write the time you showed the video under the Time.

	Time
1.	Example 9:30AM
2.	
3.	
4.	
5.	

Checklist for intervention

Child's initials_____

Date_____

Circle which video is being shown – (each video should have a different checklist)

clean up sit down line up

3 times

- Line up and Clean up videos should be shown before transitions
- Sit down video should be shown after transitions
- Videos should be shown throughout the child's session (beginning, middle, end)

Write a check next to the number when the video is shown to help keep track!!
Write the time you showed the video under time.

	Time
1.	Example: 9:30
2.	
3.	

APPENDIX D
SAMPLE DATA SHEET

SAMPLE DATA SHEET

Child's initials______

Date	Task		1	2	3	4	5	%	Staff	Comments
			+/-	+/-	+/-	+/-	+/-	%		