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Finding the Gold Standard Intervention for Social Skills Deficits in Autism Spectrum Disorders

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FINDING THE GOLD STANDARD INTERVENTION FOR SOCIAL SKILLS

DEFICITS IN AUTISM SPECTRUM DISORDERS

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Abstract

This literature review focuses on finding research supported techniques to teach social skills to students with autism and to compare each curriculum in terms of generalization of skills, acquisition of new skills, ease of parent use, and student enjoyment. The goal of this review is to discover whether there really is a "gold standard" for social skill curriculum for students with autism or if there are many different curricula that are "gold standards" in specific skill areas.

This literature review answers many questions about the way social skills are taught to students with ASD. The results lead one to ask if using ABA still the best practice. This thesis reviews the many interventions (video modeling, ABA, high interest activities, or social stories) that the increases generalization of skills for students with autism. This literature review evaluates programs that can lead the students to find joy in social interactions, programs that work better in small groups or large groups, and programs that are better for different age groups. Lastly, this thesis examines how teachers can evaluate the effectiveness and level of learning from each of these programs. This information should help in understanding of how to teach social skills and determine if ABA is still the best program for teaching social skills to students with ASD.

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CHAPTER I: INTRODUCTION

History of Autism

Autism is described in the fifth edition of the diagnostic and statistical Manual of Mental Disorders as "persistent deficits in social communication and social interaction across multiple contexts"(American Psychiatric Association, 2000) This includes deficits in social-emotional reciprocity, nonverbal communicative behaviors used for social interactions, and deficits in developing, maintaining, and understanding relationships. The characteristics of autism affect students' socially in the school environment and can reduce their quality of life. It is because of the impact on students' lives that it is so important for teacher to provide a place for students to practice social skills where staff can monitor and use meaningful curriculum in a natural setting.

Leo Kanner, a child psychiatrist first recognized autism in 1943. Kanner noticed three characteristics about autism that separated it from other psychiatric disorders: "the children were unable to relate to people; their use of language was peculiar; and the children showed an obsessive desire for the maintenance of sameness associated with a limitation in the variety of spontaneous activity" (Bailey & Rutter, 389). Kanner recognized autism as having biological influences, which he thought were caused by a lack of affection from the parents (Bailiy &Rutter, 2014).

The theory that autism was caused by lack of parental warmth was labeled with the term "refrigerator mother", based on Kanner's observations of mothers in his 1943 study of 11 children (Whitehouse, 2013). It was not until the late 1960s that autism as a neurobiological disorder became widely accepted (Bailey & Rutter, 2014). Kanner

actually believed that the mothers had a "genuine lack of maternal warmth" and "just happened to defrost enough to produce a child" (Whitehouse, 2013). This theory remained widely accepted until the 1980s when it was discovered that autism had a strong genetic basis (Whitehouse, 2013).

In the 1990s, autism was defined a spectrum disorder that ranged in severity from mild to severe. This discovery led to the diagnostic criteria for Asperger's Syndrome and Pervasive Developmental Disorder-Not Otherwise Specified (Whitehouse, 2013). The definitions provided physicians with a set of criteria to use to identify children who displayed autism as infants (Whitehouse, 2013).

In 1998, Andrew Wakefield claimed to have discovered the cause of autism. The British doctor and 12 of his colleagues published an article in the medical journal *The Lancet* claiming a link between autism and the Measles, Mumps, and Rubella (MMR) vaccine. In his article, Wakefield claimed to have studied 12 children who had developed "normally" and then demonstrated regression after receiving the MMR vaccine (Kolodziejski, 2014). The published article influenced families into not wanting to vaccinate their children, for common preventable childhood diseases. Multiple subsequent epidemiological studies concluded that there is no causal link between the MMR vaccine and autism. It happened that the age of developmental regression noted in individuals with autism coincided with the vaccine schedule for children (Kolodziejski, 2014). The *Lancent* released information about Wakefield having financial interest in providing evidence that supported a connection between the MMR vaccine and autism. In 2010, the Lancet retracted the paper written by Wakefield, stating that Wakefield and his colleagues were guilty of ethical violations and scientific misrepresentation

(Kolodziejski, 2014). The impact of Wakefield's paper continues to influences many families in making a choices of whether to vaccinate their children.

The most recent change in the definition occurred in 2013 when the DSM-V changed the criteria for autism from the previous edition. The DSM-V no longer considered Pervasive Developmental Disorder- Not Other Specified and Asperger's separate diagnosis, but instead part of the spectrum that is under one umbrella term, Autism. The DSM-V also condensed the groups of symptoms required for diagnosis from two to three and removed the restrictions on age recommendations for the onset (Yaylaci &Miral, 2016). There have since been many studies about the causes of autism but none have been conclusive.

Applied Behavioral Analysis

Wolf, Risley, and Mees first studied Applied Behavioral Analysis (ABA) in autism, in the article "Application of Operant Conditioning Procedures to the Behavior Problems of an Autistic Child" in 1964. This study looked at how Discrete Trial Training (DTT) and operant methods effectively treated common behavioral issues associated with autism. Since then, ABA has become one of the most well known methods for teaching social and functional skills to students with Autism Spectrum Disorder (ASD). ABA was popularized in 1980 by Dr. Lovaas and is currently being used as treatment in schools and in private clinics. ABA has been shown to increase skills for students with ASD, but many interventionists feel that the training process dehumanizes children; and that students lack enjoyment in social interactions. There have also been questions raised about the efficiency of the ABA programs in promoting generalization of skills to

multiple environments. The other main concern is that ABA research is biased due to many of the researchers being proponents of ABA and its positive effects. There is also overrepresentation of positive results in ABA studies and negative results are underrepresented (Sham & Smith, 2014).

Providing large amounts of ABA therapy in schools impacts teachers and Individualized Education Plan (IEP) teams by limiting the variety of instruction in natural environments and may encourage parents to request that districts provide hours of ABA services based on the quantity of research that supports ABA interventions (Simpson, 2001). Some advocates of ABA are insistent that it is the only treatment for ASD, leading many to not consider the variety of other practices that have shown to have positive effects on behaviors (Simpson, 2001). The financial concern for districts and families centers around the number of personnel needed to plan and implement ABA interventions (Simpson, 2001). Many families are unable to afford the cost of the in-home service from a private company and schools struggle to find staff trained in ABA therapy and rely on non-trained special education staff to implement ABA techniques (Simpson, 2001).

Overview and Thesis questions

This literature review considered currently available research focusing on social skill instruction using high interest activities, video modeling, social stories, and other lesser-known programs. This literature review focused on finding new techniques to teach social skills to students with ASD including how skills are generalized and maintained compared with ABA therapy the current "gold standard."

This literature review answers many questions about the way social skill instruction is being taught to students with ASD: What was found as the best practice for considered the best practice? What program (video modeling, ABA, high interest activities, or social stories) increased generalization skills for students? Which program helped students find joy in social interactions? Were the programs better when implemented in small groups or large groups? Were certain programs better for different age groups? Lastly, how did teachers evaluate the effectiveness and level of learning from each of these programs? This information will help special education teachers understand how to teach social skills and select social skill programming based on research for students with ASD.

CHAPTER II: LITERATURE REVIEW

Applied Behavior Analysis vs. Other Options

Fereshteh Mohammadzaheri, Koegel, Rezaee and Rafiee examined the differences in Pivotal Response Treatments with Applied Behavioral Analysis in the study: "A Randomized Clinical Trial Comparison Between Pivotal Responses Treatment (PRT) and Structured Applied Behavioral Analysis (ABA) Intervention for Children with Autism". This study sought to compare what is a naturalistic approach (PRT) with a structured approach (ABA). For the purpose of the study, ABA was described as being an approach that has defined discrete intervention targets developed through antecedent-behavior-consequence sequences. The intervention used materials presented repeatedly, with consequences given for non-desired behaviors and tokens and verbal praise given for correct responses. PRT was defined as a treatment that used operant teaching principles in a child-led naturalistic way. PRT included praise and consequences, with natural consequences instead of punitive (Mohammadzaheri, Rezaee, & Rafiee, 2014).

Mohammadzaheri study included thirty participants with ASD ranging from six to eleven years old. A psychiatrist diagnosed all participants and then screened by the author before being admitted to the study. The study was completed during the summer, consisting of two, eight-hour sessions a week. Fifteen of the participants were assigned to the ABA treatment group and fifteen received the PRT intervention. All of the sessions focused on improving the participant's expressive verbal communication. The ABA group materials included picture cards for target responses and favorite foods and toys as

rewards. For the PRT intervention children chose toys, activities and foods for rewards (Mohammadzaheri et al., 2014).

Having each participant describe six picture cards, completed baseline assessments and used to collect language samples. Once the baseline assessments were completed, the 60-minute intervention phases began lasting three months. The ABA interventions worked on the target behaviors exclusively with food or toys paired with verbal reinforcement as rewards. In the PRT group, rewards were provided for natural attempts, all activities were child led and the target behaviors were combined with previously mastered skills. Data was collected before and after the interventions using the Children Communication Checklist (CCC) completed by the participant's parents and teachers (Mohammadzaheri et al., 2014).

The results demonstrated that the participants in the PRT group showed more gains during and after the interventions than the participants in the ABA group. The PRT participants displayed greater gains on the targeted individual skills and the overall pragmatics of social communication. The authors concluded that using a child led naturalistic approach generated positive results in gaining and maintaining of social communication skills (Mohammadzaheri et al., 2014).

LEGOs as Curriculum

LeGoff theorized that children with autism who engaged in a preferred activity readily learned the indirect social skills taught, much like the Mohammadzaheri study. Daniel LeGoff wrote about this method in his 2004 article: "Use of LEGO as a Therapeutic Medium for Improving Social Competence." LeGoff sought a new treatment

to improve social skills in students with autism after exploring available social curriculum available: "…they (children) could learn from social skills drills and exercises, and when prompted could produce the right behavior in the classroom, but they were not initiating or playing on the playground and they were not making friends" LeGoff questioned the lack of empirical evidence published that supported published social skill treatments. He created a study with the following parameters: engaging to children, provided data that assessed the therapeutic effectiveness of the approach, created a conversation about the nature of social competence in children with autism, and what strategies worked to improve it. LeGoff based his theory on the idea of "constructive application" from Attwood in 1998, "using the child's natural interests to motivate learning and change behavior," LeGoff observed that two of his patients with Aspergers, who had never been interested in each other before began cooperative play with the LEGOS without adult prompting or modeling. One child was given the LEGO pieces to put together while the other child had the visual instructions. This ensured that the children worked collectively to build the desired object. The children's roles were eventually given names of the "Builder" and "Engineer". The Engineer gave the instructions and the Builder's job was to put the pieces together. He used the small group time to help reinforce individual goals and skills from his 1:1 sessions with the children. The original group expanded to include seven children and continued to target the same goals. When the group increased, the children collaborated to create a list of rules as a team and developed a point system for completing work and following the rules (LeGoff, 2004).

As the group continued, the children with ASD were allowed to have their non-ASD siblings join as helpers. LeGoff noted that the non-ASD siblings were the ideal helpers as they were already used to the unexpected social behaviors and understood the awkward social skills that their siblings need to improve (LeGoff, 2004).

 LeGoff learned that it was not effective to have children with other social disorders in the group, or children with ASD who did not receive the individual therapy, along with the LEGO group therapy. LeGoff also concluded that parents, even when just observing the group, tended to change the behavior of the children of the group. Later, LeGoff added a check-in time at the beginning of every group. For the younger groups, the check in lasted about 15 minutes, while the older children had check-in time for around 30 minutes each session (LeGoff, 2004).

For the study, LeGoff originally examined seven groups, with seven children in each for twelve weeks. However, two of the children were unable to complete the full twelve weeks, leaving five groups of seven and two groups of six (LeGoff, 2004) The treatment goal was for the students to improve in their level of social competence. LeGoff characterized social competence as:

> "(1) Initiation of social contact; (2) duration of social interaction, which reflects the development of communication and play skills; and (3) decrease in autistic aloofness and rigidity, with development of age-appropriate social and play behaviors." (LeGoff, 562).

Observations measured the first two descriptions of the children during unstructured play periods at school. The first description measured the frequency count of "self-initiated

social contact" for 30 minutes during a playtime after lunch. "Self-initiated social

contact", was counted if it:

> "(1) It was unprompted and spontaneous; (2) it was not part of a daily routine
> or required activity; it involved either verbal or nonverbal communication or a
> clear attempt to communicate with a peer; (4) the peer had to be approximately
> the same age or developmental level as the subject (i.e., not a much older or
> younger child); and (5) it was not a reciprocal response to another child's
> approach" (LeGoff, 562).

The study also examined the duration of the social interactions with peers during a one-

hour after lunch recreation time. Inter rater reliability was used to ensure that the results

were valid. Aloofness and rigid behavior was the third dependent that the study

examined. It was based on the social interaction subscale on Gilliam Autism Rating Scale

(GARS). All observations and the GARS were completed every three weeks throughout

twelve weeks (LeGoff, 2004).

LeGoff 's research supported using LEGOS as a therapeutic medium for

improving social competence with children that have autism. The research showed gains

in social competence at the twelve-week mark and further improvement sustained after a

24-week period (LeGoff, 2004).

LeGoff still believed that there were many unanswered questions about the true

effectiveness of the LEGO project and in 2006 co-authored a study: "Long-term outcome

of social skills intervention based on interactive LEGO play" with Michael Sherman. In

this study, LeGoff and Sherman expanded on LeGoff's previous study and collected data

on different social skills and behaviors over three years using the same LEGO

intervention. They compared the data to a different social skill curriculum that did not use LEGOS (LeGoff & Sherman, 2006).

The LEGO treatment group consisted of 60 children who participated in the group and had individual LEGO therapy for the last three years. The comparison group consisted of 57 children who received therapy services by other providers, but used comparable assessments to measure progress, including the Gilliam Autism Rating Scale (GARS) and Vineland Adaptive Behavior Scale (VABS). Both groups of children received individual and group therapy weekly. Both groups received similar levels of speech language therapy, occupational therapy, and physiotherapy services during the three-year period (LeGoff & Sherman, 2006).

LeGoff and Sherman predicted that the LEGO group would have more gains in the area of social competence and demonstrate decreased autistic behaviors. It was believed that the LEGO treatment would be equally effective for any IQ or adaptive behavioral levels (LeGoff & Sherman, 2006).

The results revealed that both groups showed significant improvement on both the VABS-SD and the GARS. The pre and post treatment scales on the VABS-SD showed that the LEGO group improved twice as much as the other treatment group. In addition, "a binomial regression analysis determined that positive changes in the outcome measures were strongly related with LEGO therapy versus the comparison group" The results also indicated that the LEGO group showed improvement for all different diagnosis and IQ/adaptive behavior skills. The team noticed that the levels of communication competence strongly correlated with the outcome on the VABD-SD for both groups, which may have contributed to the children's ability to participate in the

other therapy, but had little impact for the LEGO therapy group (LeGoff& Sherman, 2006). The main conclusion of the study showed:

> "The results above substantially support the main hypothesis of the study: that LEGO therapy participants would show relatively greater improvement in a broad range of social skills and reduction in autistic-type social behavior over a three year period compared with matched controls (LeGoff & Sherman, 326).

The results of the study are promising, but both LeGoff and Sherman agreed that more research is needed in the area.

Jeffery WH MacCormack MR, Ian A. Matheson, and Nancy L. Hutchinson from Queen's University in 2015 also used LEGOS in a study entitled: "An Exploration of a Community-Based LEGO Social-Skills Program for Youth with Autism Spectrum Disorder". In this study researchers incorporated Vygotsky's 1978 sociocultural theory to help determine which components of a community-based social-skills program would most benefit developing social skills in students with ASD (MacCormack, Matheson & Hutchinson, 2015). This team took LeGoff's idea and expanded it to a community based setting.

The study included 17 youth, 12 with ASD, and three with a comorbid diagnosis of Attention Deficit Hyperactivity Disorder (ADHD). One subject had cerebral palsy, and four subjects were typically developing siblings of the youth with disabilities. All of the participants were male except for one typically developing female sibling. The participants that had a diagnosis of ASD and were between the ages of three and ten, while the rest were between the ages of seven to twelve (MacCormick et al., 2015).

Data was collected using observations and interviews. Observations were conducted using guidelines that emphasized the importance of: (a) understanding the complex ethical issues in observing participants with disabilities, (b) recognizing that participants are socially competent, and (c) knowing how to interpret subjective meanings (McCormack et al., 18). To conduct the observations, the researchers sat about two meters away from the group and took detailed notes. When each session ended, the researchers met to review the recorded data. Their conversations were audiotaped and transcribed for later review (McCormack et al., 2015).

The interviews were conducted with the staff and parents in a semi-structured manner. The interviews of the staff included: gathering information on rapport building and the youth's emotional states and perspective regarding the process. The parent interview included: sharing personal details about their child's play abilities, social-skill abilities, and their perceptions of the program (McCormick et al., 2015).

When all of the observations and interviews were completed, transcripts were analyzed using Atlas.ti version 7 software, which used a constant comparative method. The team developed thematic codes in four themed areas: instruction, interest-based play, play-based learning, and structure of the program (McCormick et al., 2015).

The 60-minute sessions began with the youth having a free social time that transitioned into a circle time where the rules for the session were reviewed. The youth then transitioned into pre-assigned groups of three and had structured play time using the same roles of builder, engineer and supplier that LeGoff used in his research. During the final 25 minutes, youth played with any LEGO kit, either alone or with peers (MacCormack et al., 2015).

McCormack altered the minimum number of sessions from LeGoff's research to one-hour per week for four-weeks to eight week sessions spanning one year. McCormack's study had several differences than the LeGoff study including: breaks between sessions, allowing parents to be in the room and included youth that had other diagnoses than ASD (McCormack et al., 2015).

The study found four components that seemingly supported change in social behavior of the youth who participated. The four components included: instruction, interest-based play, play-based learning, and the structure of the implementation of the program. Instruction referred to the use of direct and indirect instruction to teach social skills. This included, not only the staff leading the sessions, but the youth without disabilities who provided indirect instruction by modeling desired social behaviors (McCormack et al., 2015).

In the area of interest-based play, the researchers found that when youth with ASD engaged in activities based on their interests, they were more likely to sustain participation longer and receive greater benefits. The researchers also found that interest-based playing with other youth increased the participant's ability to participate.

The research showed that during Play-Based Learning having the structured playtime first helped the students better cooperates with peers. The team also discovered that after the youth became comfortable with the rules during the structured play, they transferred the rules to unstructured playtime (MacCormack et al., 2015). They noted that the structured play set-up provided a "sequence of social initiations and responses". The researchers found that assigning roles (builder, supplier, engineer) required the youth to practice the social sequences and practice social skills such as initiating and responding.

This study found play skills taught during structured play translated into understanding of social norms such as rule following, negotiations, taking turns, and collaboration (MacCormack et al., 2015).

The interviews and observations demonstrated that programs should incorporate objects and activities of interests to the participant, as well as elements of play as much as possible. Programs should also include these types of scenarios: structured play followed by free play, interactions that require the initiation of social bids, and the development of self-regulation through peer modeling and instruction that includes gradual release of responsibility (MacCormack et al., 2015).

The limitations of this study are that only interviews were completed while the comparison studies included observations and interviews. This study replicates LeGoff's methods and expands the research to see the value of implementation in a public program (MacCormack et al., 2015).

Interest-based learning

Robert Koegel, Rosy Fredeen, Sunny Kim, John Danial, Derek Rubinstein and Lynn Koefel studied the idea of using perseverative interests to benefit interactions between students with autism and their typical peers in the 2012 article: "Using Perseverative Interests to Improve Interactions Between Adolescents With Autism and Their Typical Peers in School Settings". This study researched the perseverative interests common for children with autism, and how the interests were used to engage in conversations (Robert, et al., 2012).

This study included three participants between the ages of eleven and fourteen. All of the participants were given a DSM-IV diagnosis of Autism. All the participants were verbal but not social with their peers. All research was conducted at the participant's individual schools. While at the schools, the researchers created structured socialization opportunities in the form of clubs during the lunch period for the participants (Robert, et al., 2012).

The team looked at two dependent variables' during the group activity, the percentage of intervals where the student with autism engaged with peers, and the number of times the student with autism initiated contact with peers. The team recorded a plus or minus which indicated whether the behavior was present during one-minute intervals. The team considered engagement when pragmatic behavior was displayed in relation to the club's activity. The participant was expected to show engagement by demonstrating at least one of the following appropriate behaviors: eye contact, gestures, asking or answering a question, smiling, nodding, facing peers, sharing materials or engaged in the activities with peers. The interval was marked an absence if the participant did not face their peers, make eye contact, respond to peers, or verbalize. The team marked the frequency of initiations when the participant made spontaneous, independent verbal social communication towards a peer without prompting (Robert, et al., 2012).

Initially, the participants followed the lunchroom routines. During the intervention phases, a club was designed around the participant's perseverative interest. The team created the club in the same structured as the other clubs at school were structured. They sent information home, made posters, chose partners during meetings or

teams. The other participants were unaware of the peer's autism or that the club was created to include the subjects special interests' (Robert, et al., 2012).

The initial results showed that all three participants were not engaged with peers or enrolled in any of the social clubs provided by the school prior to the intervention, but when the participants joined a club based on perseverative interests the participants improved in their social skills. Improvements in communication were noted for all of the participants. In the baseline phase, participants did not initiate interaction, but after interventions, all began to make spontaneous initiations with their peers (Robert, et al., 2012).

The researchers noted this supported the current literature that stated that students with autism interacted with their non-disabled peers, and related better, when they were provided with materials and activities that aligned with their preferred interests. The authors noted that this was a very small sample size and that a larger scale study would have been better. The researchers also concluded that next steps should be to conduct a similar study with older students as the current research was completed mostly with elementary students (Robert, et al., 2012).

In 2013, the researchers (Robert Koegel, Sunny Kim, Lynn Koegel and Ben Schwartzman) did that just that in their article: " Improving Socialization for High School Students with ASD by using their Preferred Interests". The main purpose of this study was to develop interventions that incorporated preferred interests of adolescents with ASD to help improve engagement and initiate conversations with typical peers, and improve social activities. The study also investigated whether the new skills generalized

or maintained after the interventions were completed (Koegel, Kim, Koegel & Schwartzman, 2013).

The study included seven high school students, ages fourteen to sixteen identified with Autism Spectrum Disorder on their Individual Education Plans (IEP). The students were selected after being referred by the school psychologist who noticed that these students had greater difficulty than their peers did in socializing appropriately. Next, students were broken into two cohorts where the social interventions began at the different times of the school year and included seven to twenty-four typically developing peers between the two cohorts. The spring cohort consisted of four students and began in the spring semester when majority of peer relationships had already formed. The other cohort was made of three students and began during the fall semester when majority of relationships were still developing (Koegel et al., 2013).

Baseline data was collected for all participants in order to determine the level of social competence and areas in need of improvement. After the baseline observations and data were collected, each participant was interviewed to find what interest they wanted their club to be focused on. Each student created a club based on their individual preferred interests and then made flyers that invited all students to join in the club (Koegel et al., 2013).

Members of the clubs did not know the participant's diagnoses. There were nine club meetings over the course of nine weeks for each of the participants. The club sessions were videotaped, monitored, and the data was collected. If the school continued the club without the research facilitator, the study collected generalization data. If the school discontinued the club, maintenance data was collected (Koegel et al., 2013).

The first observation found no significant difference in the results from the spring or fall cohorts. This demonstrated that the time of year a club was formed had little to no impact on the development of social skills. All of the participants improved their level of engagement with typically developing peers in both cohorts (Koegel et al., 2013).

Koegel and others noted that only two out of the seven participants maintained the skills learned once the club ended. All of the participants increased the number of initiations with peers during the nine sessions. At the end of the study about half of the participants reported that they made friends. All of the participants reported that clubs were enjoyable and almost all reported that the clubs made them feel happy (Koegel et al., 2013).

Koegel and others concluded that high school students with ASD could socialize appropriately with typically developing peers if activities were created around preferred activities. The author noted that there were many variables in this study, since the participants were at different locations. The authors suggested that further research should be conducted to see what could be done to facilitate generalization of social skills across settings and increase the level of preferred student activities (Koegel et al., 2013).

In 2011 Carl Dunst, Carol M Trivett and Tracy Masiello wrote an article for *the Journal: Autism: The International Journal of Research and Practice*: entitled "Exploratory Investigation of the Effects of Interest-Based Learning on the Development of Young Children". This article continued the trend of exploring the idea of using preferred interests in teaching children with autism. They began their research by looking at other studies that found that children with and without disabilities demonstrate improvements when interest-based learning is used to teach social skills. The goal of the

study was to " determine if the developmental progress of young children with autism was influenced by interest-based child participation in everyday learning activities (Dunst, Trivett & Masiello, 2011).

The participants in the study were 17 preschool age children with a diagnosis of autism. The group included 13 males, 4 females, and their mothers. All of the participants were diagnosed at clinics known for serving children with autism, and most were diagnosed using the Childhood Autism Rating Scale (CARS). All of the participants were already receiving clinical or classroom interventions before the study (Dunst et al., 2011).

The study began by interviewing all the mothers to find out what their child was interested in using an "investigator-developed protocol." The protocol focused on finding descriptions of the people, toys, and or events that increased the child's excitement, laugh, or that held their interest or prolonged their interaction time. Once the child's interests were identified, the mothers described the opportunities they provided so their children engaged in the different activities. Lastly, the mothers selected eight to ten activities that occurred multiple times a week that involved the child's high interest activity. The mothers and the researchers planned for the mothers to engage their child in the high interest activity daily. The researches then followed up with the mothers every two weeks for 14 to 16 weeks and adjusted the plan as needed (Dunst et al., 2011).

The mothers were given a five-point scale that ranged from not at all to always. They rated "extent to which participation in each activity provided their children with opportunities to use their interests" (Dunst et al., 298). Then the numbers of activities that the mothers rated a five were divided by the total number of activities multiplied by 100

to equal each participant's percent of interest-based learning activities. This method was used to combat the mother's bias.

The researchers also examined the participant's development. In order to do this they used a parent-completed scale called the Developmental Observation Checklist System (DOCS). DOCS include a review of the child's language, cognitive, social, and motor quotients. The mothers completed this three times during the study.

The team compared the children's participation in their interest based activity and the child's development. The "procedure calculates a linear growth curve estimate (regression parameter) for each child using their repeated measure data and then evaluates the influence of interest-based learning on differences in the outcomes" (Dunst, et al., 298). This information helped to divide the students into groups, one was the high interest group, and the other was the low interest group. Because the researchers divided the groups in this matter instead of randomly selecting groups, they had to first perform between group analyses to determine if the groups were different or similar in terms of family background. What they found was that there were no differences between the groups in developmental or chronological ages, mothers' age or years of formal education, and in their marital status or work status (Dunst et al., 2011).

The researchers found that: " …the more interest-based the learning opportunities for young children with autism, the more progress the children demonstrated over a relatively short period of time" (Dunst et al., 302). The article mentioned that though the results were promising, but there were several limitations in the study. The first was that the children were not randomly assigned to groups. That could have influenced the validity of the study. Another limitation was the way in which the children's level of

interest was assessed, as much of it was completed from the parent's perspective. As an improvement, the study suggested using observations instead of the parent retrospective rating system. Lastly, the study recommended that a different investigator-administered scale used in place of the DOCS to measure the child's development (Dunst et al., 2011).

In 2016, a comparative study was completed in didactic skills based intervention and activity-based groups entitled: "Children with Autism Spectrum Disorder and Social Skills Groups at School: A Randomized Trial Comparing Intervention Approach and Peer Composition" by Connie Kasari, Dean, Krtzmann, Shih, Orlich, Whitney, and King. This study included a *skills group* that used a didactic approach that included some modeling and practice within the group and was more structured than the ABA approach. The other group was the *engage group* that used a more naturalistic approach that included shared interests and activities between typically developing children and children with ASD. The study itself was large in scale and took 2 years to find all 148 participants from 120 different classrooms. All of the participants had a diagnosis of ASD, and IQ greater or equal to 65, educated in the general education classroom for at least 80% of the day and was between the ages of 6 and 11 years old. Eighty-two of the participants were randomly assigned to the *Engage Group* and the other 66 were assigned to the *Skills Group*. All sessions occurred at the participant's school during lunchtime/recess or morning, twice a week for eight weeks. Each session lasted 30-45 minutes in length (Connie et al., 2016).

The *Skills Group* intervention focused on specific skills and had directed lessons that included homework. During the lessons, the group leaders facilitated group rapport, used verbal praise and offered a weekly reward system. Each session also included time

for guided practice and role-playing. The *Engage Group* focused on peer engagement, acceptance, and used shared interests to build interactions between group members. Activities in this group included, structured games, free play, music, and improvised storytelling (Connie et al., 2016).

Observations were conducted to assess progress using the Playground Observation of Peer Engagement System (POPE). This study also used the Student Teacher Relationship Scale (STRS) to measure the teacher's perception of the relationship with the participant. The study found that during the recess time, students in the *Skills Group* increased the amount of time engaged with peers more than in the *Engaged Group*. Similarly, the *Skills Group* had decreased rates of isolation when compared with the *Engaged Group*. In terms of behavior, changes were more noticeable in the *Skill Group* than in the *Engaged Group*. The engagement skills were not maintained at the follow up in either group. However, almost half of the sample group did not participate in the follow up. The study predicted that the *Engage Group* would have better results, however the data showed that the adult-led didactic group had greater improvements on the participants social skills (Connie et al., 2016).

The main concern about using interest based learning was that sometimes using a preferred activity or tangible item as a reinforce lead too more stereotyped behavior. This issue was examined in the article "Effects of tangible and social reinforces on skill acquisition, stereotyped behavior, and task engagement in three children with autism spectrum disorder" by Soyeon Kang et al. (2012). As noted in the title this study included three children, ages three, four and eight, all diagnosed with autism. The preferred items selected included a toy car, crayons, and a string of beads. The preferred

social interactions included a game where the participant woke the teacher up from sleep, tickling, and hand clapping. The study sought to find how the tangibles and social interactions influenced skill acquisition, stereotyped behaviors, and levels of task engagement. The study selected target skills for each participant based on classroom education goals. The teaching sessions included 10 teaching trials of the target skill per session initiated by the participant's teacher during one teaching session per day. The procedure consisted of presenting the task materials, giving verbal instruction, delivering the predetermined prompt, and giving the randomly pre-determined reinforce. These sessions continued until the participant completed the skill with 80% mastery across three consecutive sessions (Soyeon et al., 2012).

The study began with an assessment that identified the preferred tangible item, reinforcement item and preferred social interaction. Once the items and interaction were selected, the level of understanding of the targeted tasks were assessed by presenting the targeted materials, giving verbal instruction and waiting for up to three seconds to see how the participant's interacted with the materials (Soyeon et al., 2012).

The results demonstrated that one out of three subjects approached the tangibles and social interactions with the same frequency, and the other two consistently picked the tangible items. The type of reinforcement yielded no difference in accuracy for any of the participants in the teaching sessions. The levels of task engagement between the social interaction and tangible items demonstrated the same results. Considerably high levels of stereotypical behaviors were demonstrated with the tangible items compared with the social interactions. Overall, the study found that both reinforces similarly affected skill acquisition and task engagement, but the tangible item led to more stereotyped behaviors

than the social reinforcement. This study demonstrated that preferred social interactions

could be used to teach skills without the negative impact of stereotyped behaviors, which

was a concern when preferred tangible items were used (Soyeon et al., 2012).

Prelinguistic Milieu Teaching

J.H Fanco and B.L Davis considered another approach that used child-led

activities to increase social skills with nonverbal students with autism in their article:

"Increasing Social Interactions Using Prelinguistic Milieu Teaching with Nonverbal

School-age Children with Autism" found in the *American Journal of Speech-Language

Pathology*. In the study the researchers sought to determine, whether using prelinguistic

milieu-teaching methods in play routines developed social interaction between students

with autism. They also considered whether new interaction and communication skills

could be sustained over time. Though this study did not specifically look at using

restricted interest to teach social skills, prelinguistic milieu teaching also uses the

technique of having the child guide the teaching. The article defined prelinguistic milieu

teaching as "Procedures that are embedded in play routines within a child's natural

environment. Adults used natural prompts and responses to encourage the child to make

requests and comments through nonverbal means (e.g. vocalizations, eye gaze, and

gestures) (Franco et al., 2013).

The participants in this study were six nonverbal five to 8-year-old students with

autism. The participants had varying degrees of communication skills but all were

considered primarily non-verbal. All passed hearing and vision screenings and had

developed receptive and expressive language to at least the level of an 18 month old (Franco et al., 2013).

The study was completed in the participant's homes where the participants interacted in a play session in their natural environment. Play routines were created based on the participants' individual preferences. After baseline assessments were completed, each participant had 14 treatment sessions. The intervention sessions focused on teaching vocalizations, eye gaze, and gestures using Prelinguistic Milieu Teaching protocols (PMT). This means that the researchers arranged the environment and used the established play routines to create opportunities for the participants to initiate communication with the facilitator. The interventions were completed during child's play and the researcher followed the child's interest and attempted to join with the child. If the child was not responding, prompts such as gestures or verbal cues were used to aid the child's engagement (Franco et al., 2013).

The researchers used "A multiple baseline design". This referred to pre and post assessments of the student's communication skills. The sessions were 25-30 minutes long and the number of sessions was randomly assigned. All sessions were videotaped to be reviewed by the research team. After watching the video, the researchers counted how many times each participant initiated communication by a process they defined as coding. The participants were evaluated again after 4 to 6 weeks to see if they maintained their newly learned skills (Franco et al., 2013).

All of the participants demonstrated an increased number of communication acts, even though the level of increase varied among the participants. The ability to maintain the skills after the 4-6 week period also varied with at least a slight improvement shown

by all participants. The researchers found that the use of PMT increased communication skills and initiation of contact for all participants and seemed to work better with older participants. Though future research is needed, this study demonstrated that using PMT had a positive effect on children with autism in their ability to initiate contact with others.

Problems with this study include the small sample size and too many variables. Each of the participants had different levels of interaction skills at the beginning of the study, which made it difficult to determine how much the use of PMT increased the participant's skills. Each session was also performed in the participant's home, which added unexpected unaccounted variables. Additional variables included the behavioral issues of the individual participants. The study noted that one of the participants had self-injurious behaviors that needed to be resolved during the session. This took valuable time from implementing the PMT techniques (Franco et al., 2013).

Video/ In-Vivo modeling

In 2015, Sunhwa Jung and Diane Sainato investigated how to use restricted interests with video modeling to help teach children game playing skills in the article "Teaching Games to Young Children with Autism Spectrum Disorder Using Special Interest and Video Modeling." The purpose of the study was to determine effectiveness of embedding children's restricted interests within a video modeling intervention to measure the child's level of engagement. The study also wanted to find what impact this type of intervention had on the participant's social engagement with typically developing peers and if the intervention decreased inappropriate behaviors. Lastly, the study

considered the teacher's feelings about this type of intervention and whether they thought, it was beneficial in an inclusive setting (Jung & Sainato, 2015).

Three children with ASD participated in this study along with six typically developing children who served as collaborates during game play. The children were nominated by their by classroom teachers because they had difficulty engaging with play materials, following directions, and struggled to engage in game playing with peers. All three students had been diagnosed with autism and had current IEPS that addressed social and communication goals. The six typically developing students were in the same classroom and were selected because they consistently followed directions, attended school regularly, and demonstrated appropriate social skills with peers. The typically developing students rotated from one participant to another in pairs (Jung & Sainato, 2015).

The games used for the intervention were selected with participant input and teacher interviews. The video modeling consisted of two adults playing the same games that participants would play during the intervention. During the videos, the models described each action and provided commentary and complements, and modeled taking turns. The videos were filmed from a child's point of view to help the participants replicate the play after watching the videos (Jung & Sainato, 2015).

Observations assessed the targeted behaviors during the baseline, maintenance and follow up sessions, which included 10 seconds of observations and five seconds of recording. The target behavior engagement was recorded if the participant demonstrated behaviors that were appropriate to the game, stated what they needed, or narrated the game. If the student was using self-talk or repeating a script, it was not considered verbal

engagement. The observers also recorded nonverbal engagement when the student picked up game pieces, looked at the game, or used any physical motion needed to complete the game play. The participants' teachers were provided information about the intervention and given pre ad post social validity surveys (Jung & Sainato, 2015).

Intervention sessions began with video modeling followed by the participants replicating the game. Prompts were used if the participant completed the steps incorrectly or if they were not engaged in the video. The maintenance phase was introduced once the participant was able to complete 90% of the steps independently. The participants played the same games during the maintenance phases, but without the support of the video modeling. Participants again played the same game in a one month follow up session (Jung & Sainato, 2015).

Based on the baseline phase results all of the participants demonstrated low levels of verbal engagement. Following the video modeling using high interest stimuli, both verbal and non-verbal engagements increased. In the follow up phases, all of the participants continued to demonstrate increased levels of verbal and non-verbal engagement. In the generalization phases, all of the participants applied the skills to new games. The study also examined the level of inappropriate social behavior and reported that in the baseline phases, all participants demonstrated a high level of inappropriate social behavior but following the intervention, all showed dramatic decreases in inappropriate behavior. This trend continued for additional follow up sessions with continued decreases in inappropriate behaviors. The classroom teacher reported that the intervention was appropriate, provided improvements in behaviors and was not very difficult to maintain (Jung & Sainato, 2015).

In the article: "Teaching Social-Communication Skills to Preschoolers with Autism: Efficacy of Video Versus in Vivo Modeling the Classroom" from *the Journal of Autism and Developmental Disorders* the effectiveness of video modeling vs. vivo modeling written was examined by Kaitlyn Wilson.

Five preschool students with ASD participated in the study; however, one was removed due to interfering behaviors. The students met the following criteria: diagnosed with ASD, normal vision and hearing screenings, received ASD services school, able to attend to a video, and demonstrated basic imitation skills (Wilson, 2012).

The Autism Diagnostic Observation Schedule (ADOS) along with the Vineland Adaptive Behavior Scale 2nd edition, the Mullen Scales of Early Learning, and the Preschool Language Scale 4th edition were used to develop the participants' initial profiles. The students were selected from two different preschools with similar schedules. The data was collected in the respective classrooms. In each classroom, two lead teachers and three teaching assistants modeled the behaviors and acted as interaction partners (Wilson, 2012).

The researchers collected baseline and replication data for all participants to determine the comparative effects of video modeling and in vivo modeling. For each student a target social communication behavior was chosen and clearly defined. This process involved one 30-minute classroom observation of the child in small group activity and one session of adult-led one-on-one play. The team completed multiple-stimulus preference assessments to find each child's preferences (Wilson, 2012).

The author recorded 3-minute videos of each child's teacher and an assistant modeling the behavior. This video was compared to the child's teacher and an assistant

modeling the desired behavior in front of the child (In-Vivo). The effectiveness of each model was based on assessment results, observations, and interviews with the child's teacher and parents (Wilson, 2012).

The results of the study found that children demonstrated varied results on preferred treatment methods. One child favored video modeling; one in vivo modeling and the third case had favorable results from both treatments. The study found that more visual attention was maintained during the video modeling (Wilson, 2012).

The study provided a lot of background information on the difference between the in vivo and video teaching methods. This study was based on individual student needs making it difficult to determine any long-term results. The study found changes for individual students but each video was made specifically for that one student so it would be hard to replicate to a general audience.

 Mohammed Alzyoudi, AbedAlziz Sartawi and Osha Almuhiri of U.A.E.U looked at the efficacy of using video modeling in their article: "The Impact of Video Modeling on Improving Social Skills in Children with Autism". In this article, the researchers evaluated the impact of video modeling on social skill development in children with autism (Alzoudi, Sartawi & Almuhiri, 54). For the study, the participants were selected from a center-based program that served children with autism. All participants were male, five to seven years old and chosen due to deficits in socially expressive behaviors (Alzoudi et al., 2014).

The research was completed at the participants' school to help the participants feel more comfortable. Baseline assessment data was collected on participant's social skills before video modeling. After the baseline data was collected, each participant was

shown the video model and then worked with their teacher to imitate the model. During the intervention period the researchers looked for imitation of the social behaviors modeled in the video with at least 80% accuracy in four different response types: non-verbal communication, asking and answering questions, social initiation, and conversational skills. The researchers deemed a task incorrect if the participant completed it differently than in the video model. Mastery was achieved when the participants completed 80% of tasks correctly over three separate sessions. The researchers completed a follow up study one month after the final assessment to evaluate whether the skills had been maintained (Alzoudi et al., 2014).

Video modeling proved to be as an effective tool to improve social skills in children with autism (Alzoudi et al., 60). The main issue with this study was that it only included five participants. The researchers believed that the positive results could be explained by the fact that most children enjoy watching videos and thus it was more engaging for the children (Alzoudi et al., 64). The researchers also considered that the positive results were due to the enjoyable activities embedded into the lesson, which made the lesson more motivating. This corroborates the other articles examined from many countries that demonstrated that methods that focus on the students' interests and enjoyable activities appear to teach social skills and maintain the skills over time (Alzoudi et al., 2014).

In the article " A Comparison of Least-to-Most Prompting and Video Modeling for Teaching Pretend play Skills to Children with Autism Spectrum Disorder" Burcu Ulke-Kurkcuoglu sought to find if there was a measured difference in effectiveness and efficiency in teaching pretend play skills to children with autism using video modeling

and least-to most prompting. The study compared the number of correct versus incorrect responses, the number of sessions, number of trials, the amount of time teaching, and the number and percentage of incorrect responses needed until mastery of the skill. Though pretend play is not a social skill for older children, in younger children, pretend play helps them interact with their peers by being able to play in similar ways. Least-to most prompting means that the intervention started with the least invasive prompt and the prompts gradually increased if the skill was not demonstrated. Once the participant responded correctly, reinforcement was given. For this study the least-to-most hierarchy was as follows: independent from prompt, gestural prompt plus verbal prompt and lastly, physical prompt plus verbal prompts (Ukle-Kuruogle, 2015).

      For video modeling Ukle-Kurkcuoglu used Bandura's observational learning theory, in which a video of a skill was recorded. Next, the participant watched the video and demonstrated the skill. For the purpose of this study, peer modeling was used in the videos. During the video modeling sessions, the researcher sat next to the participant and started the video once the student was engaged. Following the video of a certain play skill; the participant was invited to a play area to replicate the skill from the video. If the participant was able to complete the skill, they were rewarded with verbal praise or edibles for every correct step. An incorrect response was ignored and the session continued as planned (Ukle-Kuruogle, 2015).

      The participants included two boys and one girl between the ages of five and six. The participants were observed prior to the study to ensure that that they were able to engage in an activity for at least five consecutive minutes, imitate verbal expressions, demonstrate fine and gross motor skills, complete two or more sentences verbally,

perform simple instructions, and maintain attention to a video for at least two minutes. All of the sessions occurred at Anadolu University. Each participant had a list of learning skills developed by the researchers with teacher and parent input (Ukle-Kuruogle, 2015).

Sessions were held once a week for three weeks with the participant's teacher. For each session, the participants worked on play skills using either least-to most or video modeling. Verbal reinforcement and social reinforcement were used in all sessions to help maintain engagement. Sessions were observed and correct responses were recorded (Ukle-Kuruogle, 2015).

The study used two forms of social validity to collect data sets. One was to determine the level of intervention difficulty from the mother's viewpoint and the other was from a graduate students of Applied Behavior Analysis and considered how effective the interventions were in teaching play skills. Data was collected from having the graduate students and the participants' mothers watch videos of the sessions and then completing questionnaires separately (Ukle-Kuruogle, 2015).

At the end of the study student "A" demonstrated the target skill correctly when both least-to-most and video modeling were used. Student "A" also maintained the skills after one, two and four week sessions demonstrating generalization of the skill. Student "B" was at 3.2% correct at the baseline data of least-to most, and 2.1% correct with video modeling. With both interventions student "B" gave correct responses 100% and maintained that level at the one, two and four week generalization sessions. Student "C" was at 3.2 % for least-to-most and 0% for video modeling at the baseline. After the intervention, student "C" gave 100% correct responses. Student "C" decreased his correct responses by 35.4% with least-to most and to 83.3% with video modeling after the 10th

intervention. During the maintenance phases, Student "C" was back to 100% accuracy after one, two and four weeks with both interventions (Ukle-Kuruogle, 2015).

Regarding social validity, the mothers all agreed that they saw positive results and were happy with their child's participation in the study. They also all agreed that they observed the play skills taught in the study in different environments and use of both interventions appeared effective. The graduate students all noted positive result from both interventions. The students did not all agree about the level of difficulty in setting up and planning for the lessons, as some found it difficult to recreate while others thought it would be easy. The graduate students mostly agreed that the interventions could easily formatted for a group (Ukle-Kuruogle, 2015).

The researcher concluded there was no difference in terms of effectiveness in teaching video modeling versus least-to-most in teaching pretend-play skills. The findings demonstrated that using both methods for maintenance of the pretend-play skills was effective. Using least-to most was more efficient with two of three students compared to video modeling. For the other student no difference was noted. Ukle-Kurogle noted that the limitations of the study included the small sample size and that subjects were given only one opportunity (Ukle-Kuruogle, 2015).

In the article: "Teaching Generalized Imitation Skills to a Preschooler with Autism Using Video Modeling" by Vickie Kleeberger and Pat Mirenda, examined the effectiveness of video modeling to instruct preschoolers to imitate previously mastered skills that had not applied during toy play and singing activities. As the other studies examined, this study defined video modeling as providing a videotape of a target behavior followed by an imitation of the same behavior after viewing. This study used

video modeling to teach skills that the participant had not mastered. It considered how video modeling impacts the acquisition and generalization of the new skills and skills that considered mastered by the participant (Kleeberger & Mirenda, 2008).

This study had one participant, a four-year-old male diagnosed with autism at age two. The subject participated in an in-home Applied Behavioral Analysis service before the intervention. During this intervention, the participant imitated fine and gross motor skills when given specific prompts, but had significantly less success without prompting. All of the sessions occurred in the participant's home with one or both parents present. The researchers collected information from parents, pre-school teachers and the behaviorist in order to find familiar songs that used gross motor and fine motor skills to teach the participant during the intervention. The gross motor songs were: "Head and Shoulders", "Slippery Fish", and "Wheels on the Bus". For the fine motor or finger play songs: "Open Them, Shut Them", "Five Green Speckled Frogs", and "Itsy Bitsy Spider". The researchers interviewed staff at four different preschools in the area to find out what types of toys students played with and based on that information chose caring for a doll, playing with a carnival playset and playing with a construction play set to teach during the interventions. The researchers also selected songs and play activities for the generalization probes that were similar to the ones from the target probes. The target probes were made into videos that included one adult modeling the behavior and two other adults acting as children imitating the behavior. During the baseline and intervention sessions, probes were completed one to three times a week. Each session began with the participant's mother and the researcher engaging in the song or toy activity. When the activity was completed, the participant was instructed to move to the

next activity. A video camera was placed in the corner of the room to help with scoring the performance of the target behaviors. The video models were viewed once between 30 and 60 minutes before the probe sessions (Kleeberger & Mirenda, 2008).

During the intervention phases, it was noted that after three video modeling sessions of the gross motor songs the participant showed no improvement. Because of this, the researchers highlighted critical features of the video models with prompts to draw the participant's attention to certain aspects of the videos (Kleeberger & Mirenda, 2008).

The results demonstrated that video modeling by itself did had no effect on the child's ability to complete the target behaviors, but when prompts and reinforcement were included in the intervention positive results were seen and the participant was able to master previously not mastered skills. Results of the toy, showed an increase in mastered imitations. Overall, this study demonstrated that video modeling was helpful when teaching or reinforcing play skills in preschools. Results of this study should be used with caution due to the limited sample size and changes made during the baseline phase (Kleeberger & Mirenda, 2008).

Video self-modeling is an adaptation of video modeling used as an intervention in targeting social skills in students with ASD. In the article: "Increasing Recreational Initiation for Children's who have ASD Using Video Self Modeling" by Jordan Boudreau and Mark T. Harvey, the researchers explored the concept of video self-modeling. In Video Self-Modeling (VSM), children are videotaped demonstrating correct behaviors and then view the videos as a model of the correct behavior. The theory behind the intervention is that the child will have better understanding of the correct way to use the

behavior if they see themselves modeling the correct behavior. For the purpose of this study social initiations were defined as: "making a verbal statement while holding the corresponding item independently and verbal statements made while facing the peers" (Boudreau & Harvey, 2013).

The study consisted of three participants between the ages of four and seven. Each participant had similar areas of concern including limited spontaneous social initiations and limited social skills. The sessions for creating and watching the videos took place in the student's school. Each session was videotaped and scored by a trained observer using a 15-second interval recording system. The videos were made with the participant interacting with a peer and all prompts by the researcher were edited for the final video. The participants viewed the videos 10 minutes before their recess time with verbal prompts given for attending. Following the video the participant was taken to a playroom, where the child with ASD and one typically developing peer were observed and data was recorded for the first 10 minutes of the play session. Maintenance session occurred two weeks after the last intervention and did not include a video viewing (Boudreau & Harvey, 2013).

Teachers and parents completed a follow-up survey to assess social validity. All raters said the intervention was favorable and they were able to see changes in behaviors after the intervention. The study also found that all participants demonstrated increased spontaneous social initiation after viewing their videos. The results showed that the participant's teacher and parents found the intervention easy to complete. They noted positive results with improvement documented for all participants (Boudreau &Harvey, 2013).

Social Stories are an intervention like Video Self Modeling that involves creating an intervention from the student's point of view. Like video modeling, the intervention is completed multiple times to explain the expected behavior. Cimen Acar, Elif Tekin-Iftar and Ahmet Yikmis compared video modeling to Social Stories in the article: " Effects of mother-delivered social stories and video modeling in teaching social skills to children with Autism Spectrum Disorder". For the purpose of this study Social Stories were defined as: "Short stories used to help individuals with ASD understand complex social situations. They are individualized narratives, in which the expectations from the child are indicated, the appropriate behavior in a certain social situation is described, and the information about the child is shared." (Acar, Tekin-Iftar & Yikmis, 2016).

Researchers compared Video Modeling with mother-delivered Social Stories to teach social skills considering the effectiveness of the intervention and the mother's opinions on the interventions. The study consisted of three mothers and their children with documented ASD. In order to be considered for the study the children were required to follow simple directions, listen to others, attend visual and/ or audio stimulation for a minimum of five minutes, and comprehend and verbal directions. All three mothers received training in both Social Stories and in Video Modeling. Sessions occurred in the child's home and each child had different target behaviors for both the social story intervention and video modeling. The interventions were delivered in an unpredictable order for no more than three sessions in a row. Sessions were completed in rapid alternation with one-hour breaks between sessions. Consistent scheduled reinforcements were used in all interventions. The dependent variables included the percentage of

occurrence of the target behaviors, with different target behaviors for each participant based on current functioning (Acar et al., 2016).

Before the interventions, three baseline sessions were completed in the participants' home. The sessions consisted of the mother gaining the child's attention with specific prompts followed by verbal reinforcement of correct verbal or non-verbal responses. The mothers used cues that provided the child an opportunity to help with a task, and followed with a five second wait for a response. Correct responses were validated with verbal reinforcement and no response or incorrect responses were ignored. Once the baseline data was collected, the intervention sessions began. Intervention sessions consisted of five training trials per day over a five-day period. Daily interventions were randomly assigned to the mother (Acaret al., 2016).

The Social Story interventions started with the mothers facing the child with a set of cues used to gain the child's attention. Next, the mother read the Social Story to the child followed by comprehension questions (who, what, where, when, why, and how). If the child provided an incorrect response, the mother read that part of the story again and repeated the questions. If the child did not demonstrate the target behavior, the mother provided the correct response and moved the child to the area where the target behavior should occur. A three-step fading hierarchy was used to achieve the target behavior following the story. The hierarchy consisted of reading the story without the directive sentences, reading the title and then the first and last sentence, and finally only showing the cover of the book before expecting the target behavior (Acar et al., 2016).

For the Video Modeling sessions, the mother gained the child attention to the video with specific cues, and then the video was played. Verbal reinforcement was used

if the child continued attention for the entire video. Following the video, the mother and child went to an area were the target behavior was expected to be completed. Once in the setting a friend of the mother prompted the task direction of the target behavior. Incorrect responses were ignored and correct responses were reinforced with verbal praise. (Acar et al. 2016).

Maintenance sessions were completed with two of the mother/ child duals in the same way as the baseline sessions. The maintenance sessions were used to see if the skills learned could be maintained and generalized to different settings. Sessions were conducted starting at week five and ending at week 14 and assessed using pre-post tests (Acaret al., 2016).

The mother's ability to write social stories based on the selected target behaviors was assessed. Results showed that the mothers could write the stories with 11%, 22%, and 22% accuracy during the pretest and all could write with 100% accuracy after the interventions and trainings. For the Video Modeling it was seen that one mother was not able to complete a video, one had 22% accuracy, and one had 33% accuracy in the pre-test, but all were at 100% accurate by the post-test. All of the mothers developed target behaviors and completed inventions for both the Social Stories and Video Modeling in the generalization sessions with 100% accuracy. (Acar et al., 220).

During the baseline assessment, two of the children had zero correct responses and one had 20% correct responses. After the Video Modeling intervention, all met the criteria with 100% accuracy. For the Social Story intervention, after the fading hierarchy, each child obtained the target behavior with 1000% accuracy. The study found that for

two of the children, the Video Modeling appeared more efficient, while one child responded more efficiently to Social Stories (Acar et al., 2016).

Social validation for this study was completed by interviews with the mothers. The mothers were asked about the goals and the interventions done in the study with semi-structured interviews developed by the researchers. The results showed that the mothers responded positively to the interventions and felt that the interventions had a positive impact on their lives and were easy to set up with no impact on their budgets. All of the mothers agreed that the interventions helped their child become more independent and helped them communicate better with their children. The mothers also all reported that the children were able to demonstrate the generalize and maintain the skills learned during the interventions (Acar et al., 2016).

Point of View video modeling was examined in the article "Teaching Social Skills to Children with Autism using Point-of-View Video Modeling" by Allison Serra Tetreault and Dorothea C. Lerman. This study included three participants between ages three to five diagnosed with ASD and attending the same treatment center. The study used videos filmed in the first person, including having the camera on a tripod and moving from side to side to simulate head movements. A female narrator read the participant's scripts, but was not seen in the videos. The videos included three scripts: "Get Attention" was used to gain a person's attention, "Request Assistance" was designed to request assistance in opening something, and "Share a Toy" was designed to offer a toy to a partner and then ask for it back. The study also included two sets of generalization materials per script that allowed more materials to be introduced to the

participant. Each video began with introduction slides with three repetitions of the target scripts (Tetreault &Lerman, 2010).

Sessions were video taped for data collection. Data consisted of the behavior in the target script and the participant's vocal behaviors. The scripts contained five conversational exchanges including participant eye contact and vocal behaviors. A sentence was considered correct if it had fewer than two errors. Eye contact was scored correctly if the participant looked at the conversant before, during or after the target vocalization for any length of time. All data was collected using pen and paper data sheets that listed the target behaviors. A multiple baseline across scripts design was used with participants moving out of the baseline phases once the participants achieved mastery of the first script (Tetreault &Lerman, 2010).

The treatment phase involved one adult acting as the conversational partner and a second adult acting as the trainer for both the viewing of the video and the practice sessions. Reinforcements helped the participants remain engaged in the videos and during the practice sessions. After the participant viewed the video, the trainer invited them to practice the skills. If the participant responds incorrectly, the conversant cued following 10 seconds of no response. Maintenance was conducted the same way as the other phases except the participants did not watch the video prior to the practice session and the trainer was not in the room (Tetreault &Lerman, 2010).

The study found that eye contact generalized across the baseline phase and mostly maintained. In terms of the effectiveness of the POVM to teach social exchanges, it was only effective for one of the three participants. The study found that reinforcement and prompts were needed to increase the amount of social initiations. The study noted that the

participants mastered the majority of the scripts but were unable to replicate the scripts with new materials (Tetreault &Lerman, 2010).

Social Stories

Carol Gray's Social Stories have become a more common method of teaching social skills to children with autism. In the article "Social Stories: Mechanisms of Effectiveness in Increasing game play Skills in Children Diagnosed with Autism Spectrum Disorder Using a Pretest Posttest Repeated Measure Randomized Control Group Design" from the *Journal of Autism & Development Disorders*, the authors considered which ratio of different sentence types was most effective in the use of Social Stories. The Social Stories written by Gray and Garrand contain three different types of sentences: descriptive, perspective and directive sentences. This study queried whether there was a difference in the teaching and generalization of play skills in stories composed of directive sentences versus the standard format for Social Stories. This study reproduced work completed in 2001 by Feinberg. Feinberg's study found that a single Social Story helped to develop specific game playing skills for a large group of children diagnosed with ASD. This study recreated Feinberg's study but also wanted to determine which parts of the Social Stories were most effective in teaching the play skills, to see if the skills could be generalized and maintained, and to determine the prerequisite skills needed for a child to benefit from Social Story interventions (Quirmbach, Lincoln, Feinberg-Gizzo, Ingersoll & Andrews, 2008).

The study used 45 children diagnosed with ASD, ages seven to fourteen, all had prior game experience and at least a first grade reading level on the Reading Recognition

and Reading Comprehension subtests of the Peabody Individual Achievement Test-Revised. Participants were assigned to either the standard, directive, or control group for the story conditions. The study used the same stories as Feinberg in his directive version. Each participant completed five trials on each of the two intervention days, starting with baseline trials and ending with a generalization trial. During the generalization trial, the game changed to a different game. The study used a variety of games varying the length of play, levels of interaction, and verbal requirements. Participants in the experimental and control groups returned for another training session one week after the initial session in order to assess whether the participants in the experimental group maintained their learned social skills (Quirmbach et al., 2008).

The dependent variable was scored on a zero to eight scale, rated by three independent trained raters, unfamiliar with the predicted hypothesis of the study. The scored skills consisted of: greetings, requesting to play a game, asking what the other person wanted to play, and accepting the game choice of another person. Skills then rated zero to two, zero if the participant showed no effort to complete the skills, one if the participant made a non-verbal attempt, and two if they completed the behavior correctly (Quirmbach et al., 2008).

The participants in the standard group were given the story in the standard format both intervention days. The directive group received the story with the directive sentences. The control group received the control story on the first day and then randomly assigned with the directive or standard for the second day. All groups had two rooms; a reading room, where the participants read the story and a separate playroom. In the game room, the research assistant sat across from the participant with all six game

options in reach of the participant. The research assistant waited one minute for the participant to initiate contact. If contact was not initiated, the research assistant initiated the contact. Following no response, the participant went back to the reading room. If the participant selected a game, the research assistant played the game. After the game was over, the research assistant waited another minute to see if the participant selected another game to play, this was completed up to three time in each session. The same process continued a week later to determine whether the skills were maintained (Quirmbach et al., 2008).

The study found that students with low verbal comprehension skills did not benefit from the Social Stories as an intervention in the directive or standard format and needed visuals to help learn a new skill. The study found that students with comprehension skills falling in the borderline range or above demonstrated improvement in their game play skills from either the directive or standard story intervention. All students who received the standard or directive Social Story improved their play skills, whereas the students in the control group showed no improvement following intervention. The students who received either the directive or the standard demonstrated improved generalization and maintenance skills intervention. Students in the directive story group did not improve their game playing skills faster then those who received the standard story intervention (Quirmbach et al., 2008).

Justin B. Leaf compared Social Stories with the social skill curriculum called *cool versus not cool* in the article from *Education and Treatment of Children*: "Comparing Social Stories to Cool Versus Not Cool". In the *cool versus not cool* (CNC) intervention. The teacher demonstrates a targeted skill correctly and incorrectly or the *cool way* and the

not cool way. Following the demonstrations, the students have to explain whether the demonstration was the *cool* way or *not cool* way and give reasons. Lastly, the students role-play the *cool* way (Justin et al., 2016).

One seven-year-old male was chosen to participate in this study. Nathan was diagnosed with high functioning autism and attended a typical first grade with staff support. Nathan had an above average IQ and used spontaneous language; answered open ended questions, and could carry a conversation with peers (Justin et al., 2016).

The authors' pre-selected six social skills to be taught during the study. The skills were taught in pairs, one with CNC and one with Social Stories. The skills were selected after the authors watched Nathan in a natural environment and observed how his deficits affected his social interactions and used tat information to create target skills. The study used naturalistic probes to assess Nathan's accuracy in engaging in the different steps of the skills and thus eliminating reinforces or prompts to Nathan. Naturalistic prompts determined Nathan's skill mastery in the natural environment. Mastery was achieved once Nathan completed all steps with 100% accuracy over three consecutive sessions. A second dependent variable included the percentage of correct responses for three comprehension questions about the Social Stories used for intervention. The last dependent variable was the percentage of correct answers for whether the model was *cool* or *not cool* using the CNC intervention (Justin et al., 2016).

The study utilized three conditions including baseline, intervention and maintenance completed three times a week for up to 20 minutes. During the baseline and maintenance sessions, researchers implemented the natural procedures for skill assigned

to the CNC condition or the Social Stories followed by a 5-minute break for Nathan (Justin et al., 2016).

During the intervention stage, Nathan was shown two *cool* and two *not cool* models and than an opportunity to role-play the skill. Nathan role-played until he completed all steps correctly on either two consecutive or six total trials. Researchers developed three Social Stories as outlined by Gray. The researchers read stories to Nathan and provided the control sentence. Followed by three comprehension questions, that included what the story was about, when to use the skill, and why he should use the targeted social skill (Justin et al., 2016).

Nathan demonstrated low but stable response levels during the baseline phases for CNC and Social Stories. Nathan reached mastery in the CNC after seven sessions but not mastery on any of the skills using Social Stories. During the intervention phases, Nathan differentiated the *cool* and *not cool* model with 79.2% accuracy across three trials, and respond correctly 84.8% to all Social Story comprehension trials. The researchers inferred that Nathan learned parts of the skill using Social Stores but not the gestalt social behavior (Justin et al., 2016).

In March 2014, an article compared Social Stories with a teacher interaction procedure in "Comparing the Teaching Interaction Procedures A Replication Study" from the *Journal of Autism Developmental Disorders*. In this study, researchers used a teaching interaction procedure, which consisted of didactic questions, role-play and teacher modeling. The study compared the effectiveness of this teaching style to traditional Social Stories from Gray that included four sentence types (descriptive,

perspective, affirmative, and directive) and written in the first person. This study also replicated a study completed in 2012 by Justine leaf and his colleagues. Six participants learned three social skills following a teaching interaction procedure and Social Stories. All participants met 100% mastery using the teaching interaction procedure but only 22% of the skills met mastery using Social Stories. Limitations included lack of peer interaction and group vs. individual teaching (Alyne et al., 2014).

Three children with Autism from a summer program participated in this study. The study used a familiar developing five-year-old peer to practice the skills. The sessions took place as part of a social skills group for people with autism; this included the participants, other children with ASD, and typically developing children. The 45-minute sessions were three days a week. Each session included a performance probe, Social Story procedure, and the teaching interaction procedure. Three social skills broke into five steps were selected from the group leader and randomly assigned to either a treatment or control condition (Alyne et al., 2014).

The teaching interaction procedure consisted of a model followed by expressive identification and labeling. Once completed, the researcher explained the reason for the new skill and asked the participants to identify the meaning. The researcher then stated five skill steps and students repeated the steps in random order. Once participants met mastery, the researcher correctly demonstrated the skill for the entire group depending on participants' level of mastery. Lastly, members role-played the skill with a typically developing peer. Participants had three attempts to get 100% accuracy. The group provided verbal feedback following each trial while the researcher provided continual feedback (Alyne et al., 2014).

All members sat in a semi-circle as the researcher read each Social Story page. Praise and a ticket system helped the participants remain engaged. Once completed, four comprehension "WH" questions were asked. Correct responses resulted in tickets and praise; and a model of the correct response provided, followed by a flexible prompt fading for incorrect responses (Alyne et al., 2014).

All three participants reached mastery of all skills taught with the teaching interaction procedure and maintained the skills for up to 100 days after the teaching was completed. The study found little to no improvement in the skills taught using Social Stories. The researchers noted with only having three participants made it difficult to get a broad understanding of the results. The researchers also mentioned that Social Stories were created based on the writing guidelines available at the time, but Gray has since updated her guidelines, this may have influenced the efficacy of the Social Stories (Alyne et al., 2014).

The use of Social Stories to address self-regulation was studied in the article: "Use of Social Stories to Improve Self-Regulation in Children with Autism Spectrum Disorder" by Robyn M. Thompson and Susan Johnston. Though self-regulation is not listed as a social skill, students need it to monitor themselves during conversations. Researchers evaluated how the use of Social Stories impacts engagement in functional behaviors of three to five year olds. Sensory integrative-based therapy, as described in this study, addressed sensory modulation deficits. When a child modulates his sensory responses, social participation and self-regulation skills increased. This skill is important for students with autism as many suffer sensory deregulation that affects their social abilities. The hypothesis stated that by combining the Social Stories with sensory

integrative-based strategies, participants would increase self-regulation during specific activities (Thompson & Johnston, 2013).

All participants had normal hearing and vision, a diagnosis of ASD, difficulty with sensory modulation, an interest in reading, and engaged in at least one behavior that interfered with their education. The study used a multiple baseline across participants design, which collected data on the presence of desired self-regulation behaviors during all three phases (baseline, intervention, and maintained). Teachers completed the Sensory Profile School Companion that generated the participant's goals for the study. Sessions were all completed in the self contained preschool classroom for two hours per day, four days a week. The study occurred over a nine-week period that began following a three-week break. Each student had a personal Social Story was written with the criteria from "Social Stories 10.0" and included information about strategies with sensory integrative-based approaches. Materials were also available in the classroom to provide sensory support that included materials like brushes and weighted blankets (Thompson & Johnston, 2013).

Social Stories were read during one-to-one sessions followed by discussion and practice. The teacher completed a survey following the intervention. Data to determine the effectiveness of the interventions was collected by the interventionist using momentary time sampling of the frequency of the incorrect behaviors, use or non-use of the self-regulation strategies, and the use of the new desired behaviors. Baseline data was collected without the use of the stories in a routine classroom interaction. Generalization probes were conducted during classroom activities provided opportunities for the participants to engage in new behaviors (Thompson & Johnston, 2013).

The study found that all three of the participants increased the number of desired behaviors during and after the intervention. The classroom teacher mentioned that each student increased his or her level of classroom independence. The results demonstrated that teaching the use of self-regulation using Social Stories improved the functional behaviors of preschoolers. The limitations of this study include having only three participants (Thompson & Johnston, 2013)

Combining video modeling and Social Stories to teach social skills is another area being examined to teach social skills to children with autism. Cihak et al. studied this concept in the article: "Using Video Social Stories to Increase Ask Engagement for Middle School Students with Autism Spectrum Disorders". For this study, the researchers combined the principles of Social Stories by Gray with Video Self-Modeling. The study used Functional Assessments to determine target off-task behaviors to be addressed during the study (Cihak, Kildare, Smith, McMahon &Quinn-Brown, 2012).

The study included four male participants diagnosed with autism, four general education math teachers and three special education teachers. Two of the four participants attended the same school and all phases took place in the students general education math class. All materials were created by the participant's special education teacher and included a video of the student reading the Social Story. Each student made two videos, one directed at the targeted attention-seeking behaviors while the other targeted the task avoidance behaviors identified by the functional assessment before interventions. All 15-minute sessions had data collected by another special education teacher and used a 10-second partial interval recording procedure to record the number of intervals of off-task behavior and task engagement (Cihak et al., 2012).

The study found that when stories addressed the specific function of the behaviors, the participants' behavior improved. When the story did not aligned to the function of the behavior, no improvements were noted in the target behaviors. This study demonstrated that Social Stories in a video self-modeling format, targeting specific behaviors improved student's behaviors. In terms of the social validity, both the general education and special education teachers reported that the interventions helped and suggested the interventions to other teachers (Cihak et al., 2012).

The effects of computer-presented Social Stories and Video Models targeting the social communication skills of children with autism were examined in the article: "Using Computer-Presented Social Stories and Video Models to Increase the Social Communication Skills of Children With High-Functioning Autism Spectrum Disorder" by Frank Sansosti and Kelly A. Powell-Smith. For this study, the researchers used Gray's Social Stories and focused on stories that offered suggestions of what to do given a situation. The study sought to determine how Social Stories used with Video Modeling to teach social skills in a packaged intervention, would benefit behaviors and to determine the effectiveness of multimedia intervention in unstructured environment (Sansoti& Powell-Smith, 2008).

Three public school boys' ages six to ten diagnosed with high-functioning ASD, or Pervasive Developmental Disorder-Not Otherwise Specified (PDD-NOS) participated in this study. Observations of the participants occurred during their school recess time and individually selected Social Stories based on Carol Gray's model were presented using PowerPoint. The PowerPoint had a *Show me how* button that introduced the Video Modeling. The number of times the participant engaged in the target behavior was

recorded. Observations lasted for 15 to 20 minute twice per week. Peer comparison data assessed the median level of social interactions for typically developing peers. Four follow-up sessions were completed two weeks after the interventions. Generalization probes were completed weekly throughout the study in unstructured environments (Sansoti & Powell-Smith, 2008).

Using computer-presented Social Stories along with video models had a positive effect on the social communication skills for all of the participants. After the interventions, the rates of behavior were near the same level as that of their peers. The study found that the peers' behavior directly affected the participants' behavior, if the peers' behavior decreased so did the participants, the inverse was also true. All teachers interviewed reported that the intervention worked well and recommended the intervention. Though the study provided positive results, it addressed that a sample size of three was a small sample size and the impact that had on the results (Sansoti &Powell-Smith, 2008).

Other Social Skills Curriculum

In 2011, William Jenson developed a new social skill curriculum using superheroes to help children with autism engage in lessons. The multimedia social skill curriculum used peers to encourage generalization of skills via video modeling, behavioral practice with peers, and comic books. In the article "Effects of a Social Skills Intervention on Children with Autism Spectrum Disorder and Peers with Shared Deficits" from *the Education and Treatment of Children*, a team of researchers developed a multiple probe design to determine the efficacy of the Superhero Curriculum for

preschool students with autism or other social cognitive disorders. The researcher

inquired whether the Superheroes Social Skill program improved accuracy of target

social skills in pre-school children with probes presented by parents, whether the parents

find the program stressful, and would marked improvements be observed in children's

social skills (Keith et al., 2017).

The study included five pre-school children; three diagnosed with autism and two

with no diagnosis but referred from head start programs for social deficiencies. The social

skills training and probes were conducted in a clinic-based treatment room while the

generalization occurred in one of the clinical treatment rooms or in the hallways.

Graduate students gave the participants cues to demonstrate the social skills using dialog,

toys, and games. If the participant correctly demonstrated the skill, it was recorded using

an adapted task analyses from the Superheroes Social Skill Program. The researchers

used between two and six probes per intervention session that varied based on the

participants' responses. Generalization probes assessed generalization across different

people by having the parents administer the cues. The task analysis used was consistent

with the training skills scoring (Keith et al., 2017).

Parents completed pre and post social function evaluation using the Autism Social

Skills Profile. Results were compared to determine the efficacy. The study also examined

the stress levels of the parents who completed the Superheroes Program by completing

The Parenting Stress Index Short Form before and after the intervention. The scores were

used to see if the parents stress level changed after completing the Superheroes Program

(Keith et al., 2017).

Three phases (baseline, intervention and maintenance) introduced a new skill once 80% of the participants performed at least three consecutive probes 100% during the training setting. The targeted skills were chosen based on the parent input from the ASSP and PSI and matched with skills covered in the Superheroes Program. During the baseline probes, multiple toys were presented paired cues for targeted social skills to engage the participant. This same model was used in the generalization probes but completed by the parents'. Participants were allowed five seconds to complete the social skill or all steps were marked as incomplete. If the steps were completed praise was given but no feedback on skill performance (Keith et al., 2017).

Five weeks of interventions were completed in one and a half, to two-hour sessions. Each child completed two social skill-training sessions per week with four target skills taught. Sessions began with Superheroes videos, followed by skill review. The researchers modeled both the correct and incorrect skills and the participants identified whether the steps were completed correctly. Next, the participants completed three to five role-play sessions with the researchers and the other children. The researchers provided feedback and gave specific praise if the participant successfully completed the skill. Next, the participants watched a comic style video that reviewed the target skill and had free play with access to all of the toys. After the free play, probes about the new skill were used in the same way during the baseline procedures. In the generalization session, parents were given the cues for the targeted skills to show to their child. Parents did not give performance feedback during the generalization session. Previously mastered skills were assessed over the 5-week intervention period for the maintenance session (Keith et al., 2017).

The results of the study demonstrated that all of the participants improved their skill accuracy with scores ranging from moderate to strong levels. Four out of five participants achieved mastery of the targeted social skills, but accuracy varied among the participants in the maintenance sessions. The study also found improved generalization of communicative skills with parents. Four out of five parents rated minimal change in social functioning while one rated noticeable improvements in the area of social reciprocity and avoidance. Total social functioning was rated as improved by all parents. All parents reported a decrease in stress levels except for one parent who rated minimal change in stress level. The researchers found overall improvements, and noted that an individualized approach may be more effective for some children. The authors noted that the research demonstrated that programs like Superheroes Social Skills help preschool children learn new social skills and reduce the stress levels of parents (Keith et al., 2017).

In 2015, Keith Radley and others further investigated the Superhero Program by looking at the social skills in a natural setting because they felt that the previous research was tainted with researchers' performance feedback. In the article "Brief Report: Use of Superheroes Social Skills to Promote Accurate Social Skill Use in Children with Autism Spectrum Disorder" Radley et al., evaluated the effectiveness of the intervention on skill correctness in the training environment (Keith et al., 2015).

Two males with autism diagnoses ages 11 and 12 participated in this study. All sessions were held at the university in a conference room with a table, chairs, and a television for the videos. In order to replicate the previous study, sessions occurred in a hallway, treatment room, or office. The dependent variable was skill accuracy in the training setting. One graduate student used cues to elicit a specific targeted social skill,

while another graduate student coded the child's performance. Generalization data was gathered across settings and people, such as a non-researcher, parent or a familiar clinic employee affiliated with the study. The procedure remained consistent with multiple probes used across skills with changes made when mastery was reached in three consecutive probes of 100% (Keith et al., 2015).

As in the previous study by Radley et al., the Autism Social Skill Profile was given to parents before interventions to determine the level of social functioning. The ASSP identified the target skills chosen from the Superheroes curriculum. Once skills were identified, baseline data was collected. During this phase, no feedback was provided to the participants (Radley et al., 2015).

Intervention phase sessions lasted 1.5 hours and included training and probing. This phase lasted five weeks with twice weekly sessions presented in a group format where both participants received the same training for the same target skills. For the first session each week, participants received instruction in the steps of the target skills using the animated DVD from the Superheroes Curriculum followed by two to three video models of unfamiliar peers performing the target skill in multiple contexts. Once the videos were completed, the researcher reviewed the steps and modeled the correct and incorrect way to complete the skill. Participants role-played with each other and the trainers using self-monitoring cards and feedback from the trainers. Once a participant completed the skill with 100% accuracy, they played a social game that required the target skill. Sessions concluded with an animated video that reviewed the target skill. The second session during the week was similar without the social game (Keith et al., 2015).

Immediate improvements were seen for both participants following the Superheroes Curriculum in the ability to complete and generalize the skill. Both participants showed improved results on the ASSP total score and Reciprocity Subscale and moderate improvements on the Participation/ Avoidance Subscale. One of the participants showed moderate improvement on the Detrimental Social Behaviors sub score while the other demonstrated only minimal improvement after the interventions. This study concluded that participation in the Superheroes Curriculum resulted in improved social skills for both participants even when performance feedback was not provided. Both sets of parents noticed improvements in social skills in home and community settings. The study noted the limitations of the small sample size and relatively short generalization and maintenance periods (Keith et al., 2015).

The University of California, Los Angeles developed PEERS, a program to teach social skills to students with autism. This program was researched in the study: "A Randomized Controlled Trial to Improve Social Skills in Young Adults with Autism Spectrum Disorder: The UCLA PEERS Program" by Elizabeth A. Laugeson et al. PEERS stands for Program for the Education and Enrichment of Relational Skills and was developed as a social skills program for high-functioning adolescents with autism. The program focuses on dealing with rejection, making and keeping friends, and managing peer conflict (Elizabeth et al., 2015).

For this study, 22 young adults participated from The Help Group (A UCLA Autism Research Alliance) and UCLA PEERS Clinic ranging in age from 18 to 24 years. The PEERS program used caregivers to help deliver interventions, so the participants care team (job coaches, family members, parents, etc.) was included in the study. The

treatment group attended 16, 90-minute weekly social skills sessions. The groups focused on friendships, developing romantic relationships, and managing peer conflicts. The skills were taught using didactic lessons, behavioral rehearsal exercises, role-play demonstrations and in vivo homework assignments. The delayed treatment group waited to receive the treatment for 16 weeks. Participants were assigned to a group based on a coin toss. The participants in the treatment group were assessed for a second time during the last session with the delayed group assessed again after the 16-week wait time. Follow-up assessments were conducted with the treatment group 16 weeks after the last sessions and immediately after the last session for the delayed group followed again in 16 weeks. During the treatment times, the caregivers were given homework with instructions on ways to provide assistance in social coaching (Elizabeth et al., 2015).

Pre and post treatment group results showed significant improvement with social skills, frequency of social engagement and knowledge of social skills, compared to the delayed treatment group. The study noted decreased in repetitive and restricted behaviors. The majority of the improvements made in the treatment period were maintained at the 16-week follow up. Improvements in the delayed treatment group were similar to that of the treatment group (Elizabeth et al., 2015).

Cognitive Behavioral Therapy has been used in the past for different treatments but an article by Jeffrey J. Wood, Cori Fujii, Patricia Renno and Marilyn Van Dyke examined how Cognitive Behavioral Therapy practices could be applied during recess in their article: "Impact of Cognitive Behavioral Therapy on Observed Autism Symptom Severity During School Recess: A Preliminary Randomized, Controlled Trial." In this study, they sought to find if Cognitive Behavioral Therapy (CBT) influenced social

communication, skills for children with autism compared to the children's standard treatment (Woods, Fujii, Renno &Dyke, 2014).

The study included thirteen children in the Los Angeles area between the ages of seven and eleven and their parents. The eligibility to be included in this research required a clinical diagnosis of ASD confirmed by the researchers own evaluation, an IQ above 70, with no concurrent psychotic episodes or physical disabilities. Participants were also required to have maintained a stable dosage of medication for one month before the study and throughout the entire trial. Children in the CBT group were not to receive any concurrent psychotherapies. The participants continued with any school services such as teacher aids, school counseling, speech therapy, occupational therapy, social skills, and regular schoolwork. The participants in the treatment as usual group continued their treatments or find other interventions, including medication adjustments. The groups consisted of seven children in the CBT group and six in the randomized treatment as usual group (Woods, et al., 2014).

Six graduate students and one postdoctoral clinical psychology student performed the CBT interventions. The families in this group received 32 weekly sessions of CBT, mostly taking place in the university clinic. In this ASD modified CBT, the participants and their parents learned social skills such as giving compliments or hosting peer gatherings. Coaching was provided on-site for the participants directly before they engaged in a social situation and in sessions during the school day. Correct behavior was rewarded with daily privileges and longer-term incentives. Teachers and teachers' aides received training to help provide coaching and act as a peer "buddy" to the participants'. Unlike the other treatment using the student's interest to help facilitate social growth, this

study used a "suppression" approach in the later weeks. The suppression approach decreased the amount of time per day the participant discussed or engaged in their high interest activity. They taught that the behavior is acceptable in private but not in public (Woods, et al., 2014).

In the treatment-as-usual group, were provided with community mental health clinic information and encouraged to complete an evaluation and treatment for their child from one of the resources provided. The researchers provided psychosocial interventions in the community during the 16 weeks. After the 16 weeks, the participants had 16 weeks of the CBT treatments (Woods, et al., 2014).

Observations were completed during their recess time and the behaviors were coded in 30 one-minute intervals. The codes were divided into four social communication types based on the participants' actions: solitary, interaction, initiations, and response. When the participant engaged in the social behavior with a peer it was noted whether the peer's response was positive, neutral or negative. The interactions were divided into two categories, either social or functional. Functional meant to obtain something or fulfill a purpose, whereas social was just for enjoyment (Woods, et al., 2014).

The researchers found that the participants in the CBT group nearly doubled their rate of social interactions and decreased their rate of solitary behavior by more than half. The treatment as-usual group using the same variables showed slightly worse post treatment performance compared to pretreatment. The researchers attributed some of the dramatic changes in the CBT group to the length of the intervention (90 minutes, 16 weeks) and the continued coaching approach (Woods, et al., 2014).

Virtual reality is a new technology that uses computer created 3D environments and allows people to interact with the environments. Peter Mitchell, Sarah Parsons and Anne Leonard studied the possibility of using this simulated environment in the article "Using Virtual Environments for Teaching Social Understanding to 6 Adolescents with Autistic Spectrum Disorders". This study sought to find whether a virtual café helped people with autism better understand social situations and apply the understanding to new situations. The study designed a café to elicit the participants' ability to practice finding a place to sit and ask appropriate questions. The study a included the same objectives, but added a new environment-being on a bus (Parsons, Mitchell, & Leonard, 2006).

Four males and three females between 14 and 15 years with a diagnosis of autism participated in this study. The virtual café was set up with the participants in front of a computer with a joystick while the researcher acted as a facilitator next to them. The virtual café included four levels followed by training activities that allowed the participants to understand different functions of the experience. Each level of the program became increasingly more difficult in terms of social complexity, background noise and number of people. All levels began with the participant at the register with a tray. The first task was to find a place to sit, choosing from one of six tables. Feedback was provided through the computer throughout the session to help the participant learn about different choices they faced during the experience. For the task of finding a table, if the participant did not ask to join the table, the characters at the table responded by saying "Excuse me, that seat is taken" as a reminder that the participant needed to ask before joining a table. Each participant had two virtual environment sessions. The first session included the training activities followed by the levels, and the second just had

three levels. Each session was approximately 40 minutes long and completed on back-to-back days (Parsons et al., 2006).

Video measures assessed the progress of the participants. There were three video measures, two were café scenes: one with an empty table available, and one with no empty tables. The third measure included a video on a bus in which the participant needed to generalize the skills learned. With both measures, participants were asked to find a place to sit and asked what to do and why. The study included 10 raters who viewed the measures and provided a questionnaire about the choices made and explained the choices to the researcher (Parsons et al., 2006).

One participant was excluded from the study because after the first session in the virtual café, he chose to sit down without asking the others at the table if he could eight times in a row and was not responding to the feedback provided. For the other participants, four who made errors (sitting without asking, sitting at a full table when an empty seat was available, or asking inappropriate questions) in the first session did not make the same errors in the second session. The study found that the sessions that included the virtual experience resulted in more significant gains than the sessions that did not. It was also noted that majority of the participants were able to use the skills learned in the café and apply them to the bus scenarios, demonstrating generalization of the skills. Though this is a new and not highly researched area of social skill curriculum, this study shows that it would be beneficial to continue research in this area as there appears to be some positive effects on social learning for students with ASD (Parsons et al., 2006).

An iPad is another technology used more frequently in classrooms. The article "Effectiveness of Siblings-Delivered iPad Game Activities in Teaching Social Interaction Skills to Children with Autism Spectrum Disorders" examines the effectiveness of not only iPads, but also incorporating siblings into teaching social skills. Three children diagnosed with ASD and their typically developing siblings participated. To be included in the study they needed to have: a medical diagnosis, maintain attention on the iPad for two minutes without prior training, able to follow directions, maintain eye contact, pay attention to visual or verbal stimulation for five minutes, and understand how to swipe on a screen with their finger. The typically developing sibling had to be in primary school, willing to participate, play the selected game on the iPad independently, understand the materials used in their siblings training sessions, enjoy playing on the iPad, and have good social skills with both adults and peers (Ozen, 2015).

All sessions took place in their homes in a room without other family members present. After interviewing the participant's parents and teachers, a game that had multiple steps of putting a baby to bed was selected. The game included eight steps for washing the baby and four steps for feeding the baby. The target behaviors taught to the typically developing sibling were: inviting their sibling to play, provide directions on how to play, appropriately taking turns with their sibling, helping in aiding with the learning of two words and three sound effects during the game, how to prompt their sibling to play with the game independently, and reinforce appropriate play behaviors. The sibling was also expected to teach their sibling a set of target skills: to touch an object after the sibling had named, perform a behavior after the sibling had named it (wash the baby's hair), follow directions from the sibling, and perform the set sound

effect and words all with in five seconds of the sibling completing the task. The typically developing sibling had training in six 40 minutes videos sessions. The sessions included instructions on how to help their sibling, how to play the game, and how to provide prompts. Baseline sessions were conducted one-on-one with the trainer for both the typically developing sibling and then with the participant with ASD. During the sessions, the participants sat on the floor together, once attention was gained the typically developing sibling led the participant with ASD through the set of tasks in the game, and provided reinforcement for correct responses. Generalization sessions were conducted at a clinic and where the typically developing sibling used the same skills learned with different children with autism. Maintenance sessions occurred one and two weeks after the interventions were completed (Ozen, 2015).

The results indicated improvement in game playing skills for all the participants with ASD. All of the participants were also able to maintain the skills one and two weeks after the interventions were completed. The participants with ASD learned the new target behaviors with between 75% and 100% accuracy. In terms of social validity the parents were given surveys after the interventions were complete and it was found that the mothers all agreed that they saw positive results from the interventions and they were able to see the participants use the skills learned in other environments (Ozen, 2015).

CHAPTER III: DISCUSSION AND CONCLUSION

Summary

This literature review is just a small section of the relevant research that is continuing to grow in the field of interventions for social skills for children with autism. It demonstrates that there is a growing body of research in using methods other than ABA for the effective treatment of skill deficits in ASD. Promising options demonstrate positive effects on generalization and learning new play skills (Jung, 2015; Kasari, 2015; Dunst, 2011). This literature review provided insight into consideration of the best practice for teaching social skills to students with autism. The literature review revealed that the best practice is as individual as the student with ASD (Ulke, 2015; Mohammadzaheri, 2014; Kleeberger, 2008; Quirmbach, 2008; Sansoti, 2008). What works with one student may not work with another, and some students will learn best with a combination of curricula. The literature review provides insight regarding when ABA is appropriate and that other curricula demonstrate better results with generalization and maintenance of skills (Matson, 2011; Simpson, 2001). The research illustrated that using a student's interest as motivator's demonstrated positive effects on maintenance and generalization of the skills (Jung, 2015; MacCormack, 2015; Koegel, 2012; Dunst, 2011;; LeGoff, 2004). In-vivo and video modeling established similar results as well as social stories (Acar, 2016; Alzyoudi, 2014; Bourdreau, 2013; Kleeberger, 2008). The studies demonstrated that some of the interventions provided better results when used in a larger group such as the LEGO studies and the studies that researched using the participant's interests to develop groups (Leaf, 2016; Koegel, 2013, 2012; Kassardjian,

2014; LeGoff, 2004). While others demonstrated better results when completed on a 1:1 basis, in-video modeling, and student made video modeling. Overall, this literature review demonstrated that there are interventions other than ABA that provide equal, if not better results for teaching students with autism cognitive social, social emotional and social communication skills that will positively impact their lives.

In the McCormack study generalization and retention of the new skills was seen in the participants (McCormack et al, 2015). The Kasari's study revealed that peer engagement increased and isolation decreased after the introduction of social groups based on the participants' interests (Kasari et al., 2015). In the Kang study, similar results were noticed including using tangible items instead of socially based rewards led to more stereotyped behavior being observed (Kang et al., 2013). In the Acar, et al. study results of 100% accuracy of new skill after Social Stories were used with Video Modeling (Acsar et al., 2016). In that same study, the mothers also reported positive results and noticed change in their child's behaviors (Acsar et al., 2016) The Kleeberger and Mirenda study provide insight in how using prompts and reinforcements of desired behaviors and greatly influence how quickly skills were learned (Kleeberger & Mirenda, 2008). Tetreault and Lerman saw similar results in that generalization of skills was acquired after Video Modeling and using reinforcements and prompts increased the participant's skill acquisition (Tetreault & Lerman, 2011). In the Quirmbach study the use of Social Stories had a direct positive effect on teaching social skills to students autism, and the way in which the story was presented did not change the results of the study (Quirmbach et al., 2008).

Professional Applications

This review provides teachers with researched alternative social skill and social communication interventions to consider. It also provides evidence that not all social skill curricula work for every student, and that multiple curricula may need to be tried before one that works for a student is selected. It is also a reminder that data collection and progress monitoring are the best tools to use to ensure that the best curricula are being used. The review also serves to demonstrate that in some scenarios embracing students restrictive interests can be useful in teaching social skills. That restrictive interests do not always need to be "fixed" but can be used to motivate students.

This literature review does not demonstrate that ABA should never be used, but that it is not the only method and can yield positive results. Some of the research indicated that when ABA is used in conjunction with other methods it could yield better results. As Simpson demonstrates in the article: " ABA and Students with Autism Spectrum Disorders: Issues and Considerations for Effective Practice": "The most appropriate and efficacious programs for children with autism and their families seem to be those that employ a variety of practices, including systematic and ongoing evaluation of interventions and treatment" (Simpson, 2001). ABA at this point is still the most researched and widely known intervention for autism, and some of the components can easily be adapted into other curricula. The research showed that motivators, whether food or praise, had positive effects on the students' level of engagement in all of the interventions studied. The research demonstrated that using a combination of play activities with structured activities demonstrated positive results.

One important area that the Kassardjian study highlighted was the importance of using the most up-to-date version of the curriculum. In that study, there were concerns that not using the most up to date version had negative consequences on the study's results. Teachers can modify or change curriculum to meet their needs, but it is extremely important to remember that affects the validity and effectiveness of the curriculum.

Overall, the professional implications of this literature review are that professionals need to continue to try different approaches to reach students with autism. No one approach will work for everyone, and that treating each student as an individual with different needs will help when identifying what approach will have the greatest impact on their individual needs. This does not make the job of the teacher any easier but it does provide teachers with a variety of options to try instead of or in conjunction with widely used ABA.

In terms of implications for my teaching, I have found many different ideas and methods to teach social skills to students and how to blend interventions to a students' specific needs. This information will improve my teaching style and ensure that the interventions my students receive are well rounded and accessible. The review also helped me to better understand ABA intervention, when it is appropriate to use and the benefits that it can have when used correctly.

Limitations of the Research

The main limitation of this research was that majority of the sample sizes were small and thus did not provide definitive results. Some of the studies had less than five

participants making it hard to conclude any real evidence from the study.   There are also a very limited number of studies that compared ABA with other social skill curricula in terms of effectiveness. In terms of the research on ABA, it was difficult to find articles that yielded numeral results when ABA was used. Most of the articles published only demonstrated positive results, which is difficult to believe when all of the other research demonstrates that there is not one way to teach social skills.

Implication for Future Research

Recommendations for future research would include completing more research on other curricula and intervention techniques much like the National Standards Project, but ensure that it is inclusive of all research and not just the studies that continue to support ABA as the gold standard for treatment. This includes more documented research where ABA was not the most effective, or that demonstrates that it is not the best for generalization of skills.

More research is also needed that targets specific age groups and compares the same curricula and its' effectiveness with different age groups. It would be helpful for professionals to be able to narrow their search when trying to decide what program to use with individual students in their classrooms. Research is needed that compares the different curricula with targeted skills, such as how do Social Stories compare with Video Modeling for teaching reciprocal conversations or adjusting to changes in routines?

It would also be interesting to find more research comparing ABA with other interventions in order to compare treatment effectiveness within the same subjects. Overall, the topic of social skill intervention needs to be researched more thoroughly as

many of the studies I reviewed contained small sample sizes and limited scopes of research.

Conclusion:

This literature review gave me an opportunity to explore own biases about ABA therapy, and explore in more depth why ABA is considered the gold standard in teaching social skills in ASD. What I have learned is that ABA alone is not always the best method for teaching social skills, but that there are circumstances where it can be useful in teaching specific skills. This process demonstrated that there is not one gold standard for teaching social skills, but a variety of curricula should be considered the gold standard for individual students.

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