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Restricted and Repetitive Behaviors as Strengths, not Weaknesses: Evaluating the Use of Social Stories that Embed Restricted Interests on the Social Skills of Children with Autism Spectrum Disorder

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Restricted and Repetitive Behaviors as Strengths, not Weaknesses: Evaluating the Use of Social Stories that Embed Restricted Interests on the Social Skills of Children with Autism Spectrum Disorder

by

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Table of Contents

List of Tables

List of Figures

Abstract

The purpose of this study was to investigate the extent to which the use of social stories that integrate a child's particular restricted and repetitive behaviors results in differential social outcomes compared to the use of social stories that do not integrate restricted and repetitive behaviors. A non-concurrent multiple baseline experimental design across participants was used to examine the effects of two Social Story interventions on the frequency of appropriate social behaviors made by participants in a school setting. Field notes were also completed during each day of data collection in order to document the social context, events, activities, moods and behaviors of participants associated with each data collection session. Field notes also included the researcher's thoughts, observations, and reflections on these variables. Overall, the intervention that included participants' restricted interests within the Social Story had the effect of increasing participants' appropriate social behaviors in contrast to the intervention that did not employ restricted interests. This research substantiates the principle that the restricted interests of children with ASD should not be viewed as a form of deficiency that needs to be eliminated. Rather, restricted interests should be viewed as reinforcing agents that increase children's motivation to pursue activities that involve social initiations and interactions with their peers.

Chapter I

Introduction

The Beginning

In 1943, Leo Kanner, an Austrian Psychiatrist who immigrated to the United States to become the Director of the Child Psychiatric Clinic at Johns Hopkins University Hospital, published an article entitled “Autistic Disturbances of Affective Contact” in which he provided detailed accounts of 11 children with a rare psychiatric condition and their families. One year later, Kanner coined this rare condition “Early Infantile Autism.” This article was dubbed highly influential in the field of autism, particularly because of Kanner’s portrayal and presentation of autism as a condition that is unique and distinct from other conditions (Blacher & Christensen, 2011). Kanner identified autistic aloneness, speech disturbances, and preservation of sameness as key distinctive features of children who might have autism. Kanner pointed out that the primary concern of this condition is associated with the children's "extreme aloneness." In other words, according to Kanner, these children lack social relatedness, meaning they are incapable of forming appropriate and normal relations with other people. Kanner also documented speech disturbances as a central component of the condition. Specifically, Kanner recognized that a number of the children experienced delayed speech. He also noted that the speech pattern of the children who were verbal was idiosyncratic and peculiar in nature (e.g. echolalic repetition of words or phrases). Kanner further noted that the children's behaviors were driven by the desire for sameness, thus contributing to their lack of spontaneity and to the repetitive nature of their behaviors (Blacher &Christensen, 2011).

Accounts that describe behaviors similar to those described by Kanner were documented prior to the year 1943. These accounts include early descriptions of the Wild Boy of Aveyron and narratives of Brother Juniper of St. Francis of Assisi (Frith, 1991). Only a small number of researchers, however, studied individual cases of children and made attempts at depicting similarities between these cases. Therefore, the identification of common clinical characteristics of the condition was limited, making the categorization of children based on these characteristics difficult. It wasn't until the late 19th and early 20th centuries that similarities in the behavioral manifestations of children with autism began to be identified. These children were previously categorized under the childhood-onset schizophrenia label or childhood psychosis. Unlike his predecessors, Kanner was revered for his efforts at separating the autism condition from childhood psychosis (Blacher & Christensen, 2011).

In 1944, one year after Kanner's breakthrough publication, Hans Asperger, an Austrian pediatrician provided accounts of four children whom he labeled "autistic psychopaths" (Van Krevelen, 1971; Blacher &Christensen, 2011). Asperger's publications were similar to Kanner's, and like Kanner, Asperger emphasized that children who are afflicted with the condition "autistic psychopathy" were far from having childhood schizophrenia. The children that Asperger studied were described as having typical intellectual functioning and speech. These children, however, experienced marked impairments in their social interaction skills and exhibited significant features of stereotyped patterns of interests and behaviors (Blacher & Christensen, 2011). Neither Kanner nor Asperger were then aware of the other's work.

In 1980, autism and other related disorders were combined together on Axis I of the DSM-III as pervasive developmental disorder. This category of disorders consisted of infantile autism, atypical pervasive developmental disorders, and childhood-onset pervasive

developmental disorders. In 1987, the DSM-III-R the term 'autistic disorder' was included to replace the name 'infantile autism.' The label pervasive developmental disorder-not otherwise specified (NOS) was also introduced to the DSM-III-R in 1987. Children who had characteristics of 'autistic disorder' but did not meet the full criteria, were labeled under the pervasive developmental disorder-not otherwise specified (NOS) category (Blacher and Christensen, 2011).

Parents. Kanner acknowledged the influential role that genetic factors play in the development of autism. However, the emerging and widespread popularity that psychoanalytic theories gained during the early 20th century had a negative impact on the way in which causal factors attributed to the development of autism were perceived. During that time, Kanner began to speculate that parenting behaviors and family characteristics might be contributing to the development of autism in children. Specifically, according to Kanner, children with autism are afflicted with this condition because of their parents' cold, rigid, detached, and humorless demeanor. Kanner also observed that in addition to being cold hearted, parents of children with autism were highly intelligent, obsessive, compulsive, and socially withdrawn. Kanner's portrayal of parents as rigid and cold gave rise to the subsequent term 'refrigerator parents,' which then prompted him to describe children with autism as "kept neatly in refrigerators which did not defrost." This conclusion is deeply rooted in psychodynamic methods of thinking which blame deviant parental relationships on the psychopathologic upbringing of children (Blacher and Christensen, 2011; Wing, 1997).

Kanner's conjectures proved strongly devastating to parents. Parents were anguished and overcome with feelings of guilt. Family dynamics were ruined as spouses began to assign blame to one another. Furthermore, parents began to spend large sums of their money for the provision

of psychoanalytical treatments for their children. The children's condition deteriorated since they were not given the types of educational and behavioral services that they needed (Wing, 1997).

The 1960's witnessed drastic changes in the field of autism research. Such changes were primarily the result of the rising number of independent minded parents who renounced and refuted claims blaming them for their children's condition (Wing, 1997). These parents united to form parents' associations whose influences were monumental in refining views on autism and in appropriately addressing the needs of children with autism as well as the needs of their families. Another factor that was responsible for the changes observed in the 1960's was the introduction of rigorous, evidence based scientific studies. These studies expanded on the findings presented by Kanner and studied the parents of children with autism. Researchers examining the effects of parental relationships with their children found no evidence that would suggest that abnormal upbringing causes autism (Wing, 1997).

The Autism Spectrum

Almost all professionals nowadays agree that autism is a spectrum of disorders, meaning, there is a broad degree of variation in the way children are affected. Specifically, no two children with autism will be alike or will have similar symptoms. Every child on the spectrum will demonstrate unique abilities, symptoms and challenges. The notion that autism may have spectrum qualities was initially proposed by Wing (1981; 1997; Wing & Gould, 1979). Through her research, Wing was able to broaden the conception of autism to embody children who presented with distinct social impairments while not necessarily meeting diagnostic criteria for autism (Kugler, 1998). Nowadays, the term autism spectrum disorders (ASD) is generally used to represent the characteristics of the condition which are manifested in a variety of combinations and varying levels of severity, ranging from very mild to very severe. Specifically, children on

the more severe end of the spectrum are those that are diagnosed with classic autism. In other words, these children present with severe cognitive impairments and speech delays. At the less severe end of the spectrum are children who display similar symptoms of classic autism, but who demonstrate cognitive and language skills that children with classic autism do not display. These children commonly fall into the high functioning autism (HFA) or Asperger's Syndrome diagnosis.

In sum, today ASD is recognized as a broad spectrum of disorders manifesting in varying degrees of severity, from mild to severe. Children with an autism spectrum diagnosis have heterogeneous characteristics. This means that children who fall within the autism spectrum are more different than similar to other children classified as children with ASD. Within varying degrees, children with ASD share difficulties in three fundamental areas coined by Wing (1981) as the "triad of impairments." Specifically, children with ASD are characterized by impairments in communication and in their use of language, impairments in their social interaction, and their engagement in restricted repetitive and stereotyped types of behaviors. Indeed, challenges associated with social interactions and social relationships have been recognized as the defining feature of ASD and one of the core deficits for children with ASD.

Social Impairments in Children with ASD

Children with ASD are characterized by significant and diverse social impairments. These children typically present with a range of behaviors that include difficulties with initiating social interactions; failure to establish and sustain social relationships that are appropriate to the children's developmental level; inability to maintain social or emotional reciprocity (or failure to respond to emotions or social interactions elicited from others); lack of interest in seeking and sharing enjoyment, and difficulty in engaging in verbal communication with others (Cotugno,

2009; Mackay, Knott, & Dunlop, 2007; Bellini, Peters, Benners, & Hopf, 2007; Gillis & Butler, 2007). Children with ASD also experience serious deficits in nonverbal communication (Cotugno, 2009). Children with ASD have limited use of eye-to-eye gaze, and difficulty using gestures to regulate social interaction. Impairments in social pragmatics are also evident in children with ASD. Specifically, these children are characterized by their inability to engage in conversational turn-taking and failure to shape the flow of conversation based on the social context or the listener's needs or interests, and having difficulty recognizing facial expression, inferring the interests of others and understanding their perspective (Mackay, Knott, & Dunlop, 2007; Flynn & Healy, 2012; Bellini, Peters, Benners, & Hopf, 2007; Gillis & Butler, 2007). Finally, a significant characteristic feature of children with ASD is their preoccupation with restrictive, repetitive and stereotyped behaviors commonly manifested as an obsession with narrow and rigid patterns of thinking and behaviors (Cotugno, 2009; Banda & Grimmett, 2008).

Social skills impairments will most likely produce significant consequences that are problematic to children with ASD. These deficits commonly result in serious outcomes including mood disorders such as anxiety and depression. Social skill deficits can also impede successful social, emotional, and cognitive development (Bellini, Peters, Benner, & Hopf, 2007; Mackay, Knott, & Dunlop, 2007). Furthermore, research has shown that social skill impairments contribute to poor academic and occupational achievement. Children with ASD have difficulty forming appropriate and spontaneous interactions with other children and lack the ability to establish meaningful social relations (Bellini, Peters, Benner, & Hopf, 2007; Flynn & Healy, 2012). Nowadays, students with ASD are increasingly being included in mainstream and general education classrooms. Including children with ASD in such classrooms with typically developing peers exposes their social skills weaknesses, resulting in increased peer rejection and social

isolation and withdrawal (Stichter, Randolph, Gage, & Schmidt, 2007; White, Keonig, & Scahill, 2007). Social skill impairments and resulting peer rejection can seriously hamper these children's quality of life. Children with ASD tend to have a significantly lower number of friends than their typically developing peers and a higher number of negative social experiences, which include bullying and shunning. Targeted interventions which are designed to address the social deficits of students with ASD are therefore critical for enhancing their quality of life and opportunities to be accepted in integrated social settings.

Restricted and Repetitive Behaviors (RRB)

Children with ASD have restricted and repetitive behaviors that impede the process of their successful development. Such behaviors consist of insistence on sameness, or rigorous adherence to structure, schedules and nonfunctional routines, and compulsive ritualized behaviors. Restricted interests, or ritualistic perseverations and preoccupation with topics or parts of objects, are also a defining feature of children with ASD. Restricted interests are also commonly referred to as circumscribed interests, obsessions, special interests, or narrow interests and are pursued with abnormal intensity and focus. Stereotyped and repetitive body mannerisms and manipulation of objects are also significant characterizes of children with ASD.

Restricted repetitive behaviors almost always bring about significant impairments to children with ASD. Children with ASD tend to be overly consumed with these behaviors for the duration of almost their entire waking hours. As a result of this dysfunctional determination to constantly engage in restricted repetitive behaviors, the development of healthy peer and family relationships becomes jeopardized. Children's ability to effectively participate in daily family activities is also affected. Furthermore, when adults attempt to interrupt or discontinue the

children's restricted and repetitive behaviors, the children will most likely become anxious, agitated, or disruptive.

Despite the seemingly aberrant nature of their obsessions with idiosyncratic ritualistic behaviors, children with ASD demonstrate a high level of preference towards those behaviors. Fortunately, this notable preference will potentially produce an increase in the children's intrinsic motivation to engage in more frequent and more appropriate social interactions with their typically developing peers (Baker, Koegel & Koegel, 1998; Baker, 2000). The Premack Principle which postulates that highly preferred activities could be employed to reinforce activities, responses, or behaviors that are less preferred, sheds light on how the aberrant behaviors of children with ASD could be used as social motivators (Charlop-Christy, & Haymes, 1996). As a result, the inclusion of restricted repetitive behaviors as reinforcers and motivators in intervention and social skills learning programs designed to increase appropriate behaviors has become increasingly common. Restricted and repetitive behaviors can be effectively incorporated within these programs without increasing the time in which children engage in those behaviors (Baker, Koegel & Koegel, 1998; Baker, 2000). In addition to creating a bona fide interest in appropriate social activities, the intrinsic motivation and reinforcement brought about from incorporating the restricted and repetitive interests of children with ASD into social play interactions will result in the generalization and maintenance of positive behaviors (Baker, Koegel, & Koegel, 1998).

In sum, the symptoms of ASD, including restricted and repetitive behaviors, have been most often defined by a deficit model. We tend to perceive children with ASD as lacking characteristics as opposed to possessing strengths (Winter-Messiers, Herr, Wood, Brooks, Gates, Houston, & Tingstad, 2007; Klin, Danovitch, Merz, & Volkmar, 2007). Recognizing children by

their capabilities and interests (regardless of how narrow or rigid these might be) rather than by their deficits helps build a secure foundation that enhances the children's creativity and strengthens their sense of independence. In turn, the process of successfully integrating them in general education classrooms and instilling in them a sense of classroom community is facilitated (Vacca, 2007). Therefore, instead of focusing on ways through which we can eliminate or eradicate the restricted and repetitive behaviors which are perceived as aberrant and dysfunctional, research should instead focus on embracing those behaviors and using them as an advantage to teach children with ASD new and more appropriate adaptive and social responses.

Social Stories

Positive behavior support (PBS) interventions have been recently introduced to teach children with ASD functional skills that create an enhanced and prolonged overall quality of life first, and to alleviate the frequency and intensity of their problem behaviors second. PBS interventions also have the goal of improving children's opportunities to engage in appropriate social interactions, and of fostering their prosocial behaviors that are maintained and generalized across varying settings (Carr, Dunlap, Horner, Koegel, Turnbell, Sailor, Anderson, Albin, Koegel, & Fox, 2002). Consequently, current research specifically aims at employing direct interventions that target the improvement of socialization skills in children with ASD as well as the teaching of perspective taking skills. Researchers believe that children with ASD lack the ability to assume the perspective of other people. The teaching of perspective taking skills, therefore, consists of teaching children with ASD strategies that would enable them to read, interpret, and understand the emotional states of others. A strategy that addresses the two areas of children's functioning, socialization and perspective taking skills, consists of the use of Social Stories (Sansoti, Powell-Smith, & Kincaid, 2004). Social Stories are individualized short

narratives that are designed to describe social situations that are challenging and/or confusing for children with ASD. The stories are typically accompanied by visual supports and picture cues, use simple language, and incorporate practical and concrete descriptions of a social situation and explicit instructions on what to do or what not to do in this situation. Specifically, Social Stories intend to guide children's responses, illustrate expected behavioral outcomes and address the "who, what, when, where and why" of a specific social setting (Gray, 1998).

A large increase in the number of children with ASD who are being educated in inclusive settings has been evident over the past decade. As a result, teachers are now being faced with more and more challenging behavioral concerns, thus prompting them to use a wider range of behavioral interventions in their inclusive classroom environments (Spencer, Simpson, & Lynch 2008). A shift from the use of interventions based on principles of behavior modification and management to a focus on positive behavioral support interventions, which involves the use of Social Story interventions, has taken place (Adams, Gouvousis, VanLue, &Waldron, 2004). The use of Social Story interventions helps ease the transition of children with ASD into inclusive classroom settings, teaches them academic and appropriate social skills, and familiarizes them with changes and new routines occurring within the home and school settings (Adams, Gouvousis, VanLue, &Waldron, 2004).

In contrast to numerous other interventions designed for children with ASD, Social Stories are designed to draw on the strengths of these children. Specifically, due to the fact that children with ASD exhibit a strong tendency to adhere to routines, Social Stories typically set up routines and rules that children are then expected to apply to specific social situations. Social Stories also use the strengths of children with ASD by incorporating visual material, thus making the structure of the story less intrusive and more appealing to children. The written format and

the visual presentation of Social Stories minimizes the amount of verbal interaction with children with ASD and lessens the aversive nature associated with receiving instruction (Scattone, Wilczynski, Edwards, & Rabian, 2002).

The effectiveness of Social Story interventions on ameliorating impairments accompanying children with ASD has been well documented, including teaching appropriate social and play skills (Barry & Burlew, 2004; Crozier & Tincani, 2007; Delano, & Snell, 2006; Norris & Dattilo, 1999; Quirmbach, Lincoln, Feinberg-Gizzo, Ingersoll & Andrews, 2009; Scattone, Tingstrom, &Wilczynski, 2006; Swaggart & Gagnon, 1995), improving communication skills and verbal greeting (Adams, Gouvousis, VanLue, & Waldron, 2004; Reichow & Sabornie, 2009), enhancing social communication (e.g., securing attention, initiating comments, and initiating requests; Thiemann & Goldstein, 2001), decreasing disruptive and tantrum behaviors (Kuttler, Myles, & Carlson, 1998; Lorimer, Simpson, Smith & Ganz, 2002; Ozdemir, 2008; Scattone, Wilczynski, Edwards & Rabian, 2002), improving classroom on-task behaviors (e.g. appropriate sitting, attending to the teacher, and working independently; Chan, O'Reilly, Lang, Boutot, White, Pierce & Baker, 2011; Schneider, & Goldstein, 2010), and decreasing repetitive tapping behavior (Reynhout & Carter, 2007). Despite the popularity and apparent effectiveness of Social Stories when used with children with ASD, it is still important to approach these results with caution. Many of the studies that used a Social Story intervention have been carried with the purpose of decreasing the frequency and/or intensity of inappropriate and challenging behaviors, while fewer studies have attempted to evaluate the effect of Social Stories on enhancing appropriate social interactions (Scattone, Tingstrom & Wilczynski, 2006; Schneider & Goldstein, 2010). Additionally, most of the research conducted on examining the efficacy of Social Stories included interventions and components (such as picture prompts, video

modeling, reinforcement, and music therapy) that were added to the Social Story and fewer studies looked at the effects that Social Stories alone might have on the outcomes of children with ASD. Whether positive changes in behavior have occurred as a result of the Social Story intervention alone or as a result of a combination of a Social Story and another intervention is still in question (Delano & Snell, 2006; Scattone, Wilczynski, Edwards & Rabiab, 2002; Scattone, Tingstrom & Wilczynski, 2006; Schneider & Scattone, 2010). Further research in this area is therefore warranted.

Rationale for Proposed Study

ASD has been shown to be the fastest growing developmental disability in the United States as evident by the dramatic increase in its prevalence rate over the past decade. According to the Autism and Developmental Disabilities Monitoring Network (ADDM) report that was released in 2012, the prevalence of ASD has risen to 1 in every 88 births in the United States. The prevalence rate has increased 23% since 2009 (where the rate was 1 in 110) and 78% since 2007 (where the rate was 1 in 150) (Centers for Disease Control and Prevention, 2012). It costs between $3.5 million to $5 million to care for a child with ASD during their lifetime and the United States almost spends almost $90 billion annually for the care of individuals with ASD (Autism Society of America, 2012). More importantly, the number of 6 to 21 year old children with ASD receiving services in public special education programs has significantly increased from 54,064 in 1998 to 370,011 in 2010 (Centers for Disease Control and Prevention, 2012).

Evidently, ASD has become a national health crisis. The rapid growth in the prevalence rate of ASD in addition to the apparent increase in the number of children referred to special education services demand an immediate response from the nation and from the research

community. It is imperative to develop evidence-based practices for the education of children with ASD, particularly those that center on improving the social skills of these children.

Purpose

The purpose of this study was to investigate the extent to which the use of social stories that integrate a child's particular restricted and repetitive behaviors results in differential social outcomes compared to the use of social stories that do not integrate restricted and repetitive behaviors. Historically, researchers and practitioners have emphasized reducing certain behaviors that they perceive as negatively affecting the quality of everyday functioning of children with ASD, such as restrictive and repetitive behaviors. This is certainly a logical and necessary approach for children when such behaviors prevent them from learning, developing, and achieving life success. However, it is possible that restricted and repetitive behaviors could be utilized to actually improve outcomes for children with ASD. Children with ASD often engage in restricted and repetitive behaviors rather than engaging in academic and social-emotional teaching and learning activities (Klin et al., 2007; Loftin, Odom, & Lantz, 2007). Some contend that children with ASD engage in these behaviors, at least in part, because the experience a sense of comfort or control when engaging in restricted and repetitive behaviors (Baker, Koegel, & Koegel, 1998; Loftin, Odom, & Lantz, 2007). It is plausible to hypothesize that children with ASD might more readily engage in and thereby benefit from interventions/instruction that purposely incorporate a particular child's restricted and repetitive behaviors.

Research Questions

1. What is the impact of a Social Story alone on the social outcomes of children with ASD?

2. What is the impact of a social story intervention, incorporating elements of circumscribed/restricted interests specific to young children with ASD, on the social outcomes children with ASD?

3. Do teachers value Social Stories incorporating the circumscribed/restricted interests of young children with ASD as acceptable interventions?

Chapter II

Literature Review

ASD and Social Skills Impairments

Children with Autism Spectrum Disorders (ASD) experience distinct impairments in three primary areas of functioning which consist of social interactions, communication, and restricted and repetitive behaviors (American Psychiatric Association [DSM-IV], 2000). Impairments in social skills are considered marked features of children with ASD. One of the social behaviors characteristic of children with ASD is their lack of ability to initiate and maintain social interactions. Other social skills impairments include poor eye contact, lack of social reciprocity and sharing enjoyment, odd gestures and body posture, and bizarre speech (Matson & Minishawi, 2006).

If left untreated, symptoms associated with social skills impairments tend to worsen and become more chronic and severe in nature as children with ASD develop into their adulthood (Howlin, Mawhood, & Rutter, 2000). For this reason, detecting the early presence of social skills problems is deemed necessary. Early detection of problematic social behaviors allows researchers to promptly design and implement the necessary intervention and preventative strategies. Early intervention programs in the field of ASD are most commonly developed with the intention of enhancing the preacademic skills of children with ASD. The acquisition of preacademic skills provides children with ASD the academic knowledge necessary for effective mainstreaming into general education classrooms. Even though these early interventions are helpful in narrowing the academic gap, the social gap will most likely widen, particularly if early

intervention strategies addressing social behaviors are not introduced. Social skills are not as easily detectable as academic skills. Due to the elusive nature of these skills, teachers fail to mark them down as significant target social behaviors on the student's Individual Education Plan (IEP). Teaching social skills to children with ASD should be equally important to teaching preacademic skills. More importantly, the teaching of these skills should begin at an early level of the child's development, or preschool years (Scattone, 2007).

Social Skills Interventions for Children with ASD

A number of reviews and meta-analyses have been conducted on social skills interventions involving children with ASD.

Meta-analyses*. Stichter, Randolph, Gage, and Schmidt (2007).* Stichter, Randolph, Gage, and Schmidt (2007) examined key evidence based interventions highlighted in the literature. One of the intervention components was individualized goals and plans. This intervention focused primarily on designing an educational program based on the identified individual needs of the students. The second component deals with acquisition versus performance goals, meaning, some intervention programs are designed to address skills that are not yet in the student's repertoire, while other programs are designed to address performance weaknesses. In other words, some interventions aim at enhancing pre-existing skills that individuals with ASD have difficulties using in typical environments.

Improving interactions with adults was another component emphasized by Stichter et al. (2007). Such interventions consisted of both student-teacher and student-parental interactions to improve social interactions, play skills and eye contact of children with ASD.

Goals for improving interactions with peers were also identified as a crucial component of social development. Interactions with peers consisted of programs using peer-mediated

intervention with students with ASD. These programs aim at enhancing social interactions between students with ASD and typical peers. Stichter et al. (2007) make note of the fact that typical peers lack the natural motivation necessary to form appropriate social interactions with students with ASD. The concern regarding the peers' lack of motivations was addressed by indicating that peers mediated interventions most often included supports for typical peers which consisted of training and reinforcement. Stichter et al. (2007) concluded that gaining awareness of a disability will most likely foster a higher level of acceptance among typically developing peers.

Goals towards increasing social interactions within the community were also addressed. It is important for children with ASD to make initiations, responses, engagements, and other social interactions with other members in the community that are in accordance with standard societal practices. Interventions should therefore focus on improving the skills that are necessary for appropriate social interactions with others to get their needs met in multiple public settings.

Stichter et al. (2007) identified maintenance, which refers to the extent to which a student is able to demonstrate continued use of the learned skills following the implementation of the intervention. Generalization, which refers to the extent to which the student is able to extend positive behavioral changes attained during a particular intervention setting to other settings was identified as well. Interventions which target behaviors within the natural environment were also identified. Interventions occurring within the child's natural environment are characterized as embedding instruction within the usual and familiar environment in which the child's daily routines and behaviors typically occur. Such interventions make use of naturally occurring contextual cues, thus making the learned skills more meaningful and relevant.

Another important component that was identified consisted of teaching self-regulation and addressing self-regulatory challenges. This component emphasized the importance of teaching children with ASD self-management skills. The significance of self-regulation is evident in the ability of such interventions to create opportunities in which children with ASD are allowed to be more actively engaged in the intervention process. Active engagement, in turn, improves independence and provides students with opportunities to engage in social interactions without direct supervision.

Finally, Stichter et al. (2007) identified family support as a component of effective social interventions. Families of children with ASD undergo a significant amount of stress associated with financial issues, and decreased level of support. It is therefore important to address the concerns that families face when it comes to caring for their children with ASD by providing them with the necessary amount of support. Such support consists of educating families about their child's disability, helping them find services which directly address their emotional struggles, and teaching them techniques through which families are able to become effective advocates for their children (Stichter et al., 2007).

Wang and Spillane (2009). Wang and Spillane (2009) developed a meta-analysis of studies based on interventions that targeted increasing social skills for children and adolescents with ASD. Upon examining the outcomes of the studies, the meta-analysis sought to evaluate the level to which evidence based practices were implemented within each intervention. The majority of the studies used single subject designs to evaluate intervention effects. Five categories of intervention techniques were extracted from the studies. These categories included Social Stories, Peer Mediated, Video Modeling, Cognitive Behavior Training, and Others. The 'Others' category included interventions such as pivotal response training, Theory of Mind,

scripts and cue cards, Keys to Play, incidental teaching, PECS training, tactile prompting device and social skills training with scripts and reinforcement.

A high PND (percentage of non-overlapping data points) was a crucial criterion in the identification of single subject evidence based practices in this study. Based on low PND scores, Wang and Spillane (2009) concluded that the effectiveness of Social Stories as an intervention for enhancing social skills remains questionable, even though Horner, Carr, Halle, McGee, Odom, &Wolery (2005) have already established that Social Stories meet the criteria for evidence based practices. Furthermore, upon examining PND scores, Wang and Spillane (2009) concluded that Peer Mediated interventions were not highly effective in improving social skills, while Video Modeling and Cognitive Behavioral Training were highly effective. Even though some interventions in the 'Others' category, including Theory of Mind, have shown promising results, more research is needed to further evaluate their effectiveness as strong evidence based interventions (Wang & Spillane 2009).

Reichow and Volkmar (2010). Reichow and Volkmar (2009) conducted a review to study the empirical evidence of social skills intervention techniques that fall within the realm of best evidence based practices. Only studies with strong methodological rigor were included for the purpose of eliminating bias that typically results from poor quality studies. Evidence based interventions highlighted in this study consisted of the methods and techniques of Applied Behavior Analysis (ABA); Naturalistic techniques; Parent Training which consists of parental and family involvement; Peer Training which involves the use of peers to assist children with ASD; Social Skills Groups; Visual Supports such as Social Stories, scripts, and visual activity schedules; and Video Modeling.

ABA was often used to improve and build on other intervention techniques including video modeling, visual supports, and peer training. Overall, research has provided sufficient support for the use of interventions which incorporate ABA strategies. Even though there is sufficient evidence to suggest that naturalistic techniques are effective for improving social behaviors for young children with ASD, the evidence for older individuals with ASD is not high enough to draw conclusions about their efficacy. The review has provided support for the use of training parents of young children with ASD. The review, however, does not recommend parent training as an effective technique for improving the social skills of older individuals with ASD. The review has also concluded that enough evidence exists to support the use of peer training methods in enhancing the social skills of all individuals with ASD. Even though social skills groups were examined as the sole intervention in some studies, the majority of studies utilized this technique in conjunction with other techniques. In other words, the social skills group technique was evaluated as a component of a treatment package as opposed to being assessed individually. As a result, the effects of the social skills group method alone remain inconclusive and warrant further evaluation.

The studies using visual supports as intervention have yielded positive findings as they pertain to preschool and school-aged children with ASD, thus suggesting that such methods are effective in increasing desired social skills for this population. More research investigating the use of visual methods for older individuals with ASD is necessary. Finally, the review has indicated that video modeling seems to be effective in teaching social skills to individuals with ASD. However, the use of this technique alone might not be as effective in eliciting desired changes in behavior as its use with other components of intervention (Reichow & Volkmar, 2010).

Flynn and Healy (2012). Flynn and Healy (2012) carried out a synthesis of studies investigating treatment interventions for impairments in social and self-help skills in individuals with ASD. Intervention themes that were derived from the synthesis included peer-mediated intervention; social skills groups; script fading procedures; pivotal response training; video modeling; and reinforcement based procedures.

Flynn and Healy (2012) concluded that all studies reviewed in the peer-mediated intervention category yielded promising results in increasing social skills. The efficacy of the peer-mediated intervention method is largely attributed to its naturalistic character. In other words, the interventions in the reviewed studies were carried out in the children's natural rather than clinical environment (Flynn & Healy, 2012).

Two of the three articles that were reviewed in the social skills groups category reported positive outcomes. The social skills groups intervention, however, was not implemented in natural settings. Specifically, interventions were conducted in clinical or private settings, thus jeopardizing generalization and maintenance outcomes. The reviewed studies have also suggested that social skills interventions are typically more effective for children who are higher functioning on the autism spectrum.

All studies in the script fading procedure, and pivotal response training showed significant outcomes. Unfortunately, interventions on script fading procedures were predominately carried out in school settings. Examining the efficacy of such intervention in various other settings will prove helpful. Even though research on script fading procedures has demonstrated positive findings, more research is needed to replicate and possibly validate these findings. Pivotal response training interventions, on the other hand, seem to be implemented in

natural settings, therefore increasing generalization and maintenance results (Flynn & Healy, 2010).

Two of the three studies on video modeling have demonstrated positive results in improving social skills in children with ASD. One of the strengths associated with the video modeling procedure consists of the fact that it can be employed with children on various ends of the autism spectrum. Specifically, the video modeling procedure may be effective with children whose autism diagnosis ranges from mild to severe, and with children with Asperger's syndrome. Finally, all treatment procedures which incorporated reinforcement procedure were effective in teaching students target social skills (Flynn & Healy, 2012).

Koegel, Matos-Freden, Lang, and Koegle (2011). Koegel, Matos-Freden, Lang, and Koegle (2011) conducted a summary of research highlighting research-based interventions for students with ASD in inclusive school settings. This summary targeted a variety of skill areas including socialization skills. Some of the intervention strategies that Koegel et al. (2011) found to be most effective in targeting the social skills of students with ASD in inclusive classroom environments were priming, self-management, script-fading, and peer-mediated interventions. Developing social skills games and activities based on the perseverative interests of students with ASD were also useful in improving the social skills of students with ASD. Embedding students' interests in classroom games and activities reduces their motivation to escape social situations and increases their motivation to participate in these games and activities. It is necessary that students with ASD are made aware of the fact that their perseverative interests should not be utilized as a tool to engage in stereotypy. Rather, these students should learn more about the nature of their preservative interests and should be taught how to use them in a socially effective and appropriate manner. When students with ASD utilize the knowledge and

information that they have acquired pertaining to their in a socially appropriate manner, they are more likely to be perceived as valued members of a community and/or a peer group. Additionally, incorporating activities that are specifically tailored towards the students' interests into the playground will result in improved socialization and will promote healthy peer relationships (Koegel et al., 2011).

Based on a meta-analysis of 55 peer-reviewed single subject research studies, Bellini, Peters, Benner and Hopf (2007) identified several school-based social skills interventions for children with ASD. Intervention categories included child-specific interventions, collateral skills interventions, peer mediated interventions, and comprehensive interventions.

Bellini et al. (2007). Bellini et al. (2007) used the definitions provided by McConnell (2002) to define the above interventions. Interventions that are child specific involve direct one-on-one instruction of social behaviors, and emphasize specific skill deficits of each child. Contrary to child-specific interventions, collateral skills interventions do not focus on teaching specific social skills directly. Rather, these interventions focus on related skills, such as play behavior and language development, that in turn promote social development and interactions. Peer mediated interventions consist of training (via teaching, modeling, and reinforcement) nondisabled peers to effectively respond to the social behaviors of students with ASD. Finally, comprehensive interventions involve social skills interventions that integrate multiple intervention approaches simultaneously (Bellini et al., 2007).

Findings garnered from this meta-analysis have lead to the conclusion that school-based social skills interventions are not highly effective for children with ASD. In other words, social skills interventions analyzed in this meta-analysis brought about minimal treatment and generalization effects across participants, settings, and play stimuli. Decent maintenance effects

were detected, meaning that increases in social behaviors made during intervention were maintained followed the withdrawal of intervention (Bellini et al., 2007).

In their meta-analysis, Bellini et al., 2007 made note of the important observation that statistically significant differences were detected between interventions conducted in the child's classroom and those that were conducted in pull-out and/or resource settings. Specifically, interventions that were implemented in the child's classroom resulted in notably higher and more significant intervention, generalization and maintenance effects than interventions that required the removal of the child from the classroom. The fact that these interventions most often take place in artificial and restricted settings accounts for the weak findings of social skills interventions (Bellini et al., 2007).

Summary. In sum, several intervention procedures were most salient across the studies examined in the above reviews/syntheses/meta-analyses. These interventions consisted of ABA methods (which included video modeling, PRT, Picture Exchange Communication System (PECS), and script fading procedures), peer mediated training, and social skills groups. Each of these interventions are individually discussed in the following section.

Applied behavior analysis (ABA). "Applied Behavior Analysis is the process of systematically applying interventions based upon the principles of learning theory to improve socially significant behaviors to a meaningful degree, and to demonstrate that the interventions employed are responsible for the improvement in behavior" (Baer, Wolf, & Risley, 1968). Specifically, ABA involves the principles of operant learning and learning theory. In other words, ABA employs reinforcement principles and other important procedures that are associated with well established principles of behavioral science. These procedures are employed for the purpose of enhancing appropriate behaviors, mitigating undesirable behaviors, or

generalizing learned behaviors. In addition to utilizing behavior principles to improve specific behaviors, ABA determines the extent to which observed changes in behavior are indeed a result of the treatment employed at the time of intervention (Baer, Wolf, & Risley, 1968).

The most important objective of ABA is the improvement of "socially significant behaviors to a meaningful degree." Specifically, ABA seeks to examine behaviors which are socially relevant to the individual, as opposed to behaviors that are most convenient for the study. It is essential that intervention programs focus on altering the targeted behavior and on producing outcomes that are meaningful and socially significant to the learner. Most importantly, proponents of ABA strictly focus on the idea that behaviors should be examined and analyzed in their usual social settings, rather than in a "laboratory" or controlled environment (Baer, Wolf, & Risley, 1968).

Over the past 40 years, interventions derived from the science of ABA have been highly successful in reducing some of the challenging social behaviors of children with developmental disabilities, particularly children who are diagnosed with ASD (Dillenburger, Keenan, Doherty, Byrne & Gallagher, 2012). Despite the existence of numerous research studies focusing on interventions based on the principles of ABA, and despite the high efficacy rates of these interventions, misconceptions and misunderstandings about what constitutes ABA-based procedures remain evident. Specifically, it is important to understand that ABA is not merely a standardized treatment method of intervention that is used for a specific type of problem behavior and with individuals with a specific diagnosis. Rather, there are numerous and different intervention strategies that are implemented under the umbrella of ABA (Dillengurger et al., 2012; Matson, Turygin, Beighley, Rieske, Tureck, & Matson, 2012). Some of these strategies that were most evident in the treatment of social skills deficits in children with ASD include

video modeling, PRT, reinforcement, PECS, and script fading. A description of each of these procedures is provided below.

Video modeling. *Definition and subtypes*. Video instruction generally consists of a variety of techniques including video modeling (VM), video self-modeling (VSM), and point-of-view video modeling (PVM) (Shukla-Mehta, Miller, & Callahan, 2010). VM is a procedure which involves the use of video representation and images to demonstrate desired behaviors and skills. A VM intervention typically involves a student with ASD watching a video that demonstrates targeted behaviors and then asking the student to imitate these behaviors. In the VM strategy, target skills are modeled by an adult or peer within the context of the activity (Bellini, Akullian, & Hopf, 2007; Bellini & Akullian, 2007).

VSM is similar to the VM procedure, but it involves the use of the student being instructed as the model in the videotape rather than an adult or peer. Specifically, VSM allows the student to imitate target skills by observing him/herself engaging in appropriate target behaviors (Bellini, Akullian, & Hopf, 2007; Bellini & Akullian, 2007).

Contrary to VM and VSM methods which use adults, peers, or the students themselves to model appropriate and desired behavior, PVM involves videotaping aspects of the environment or the context of the activity from the vantage point of the student. Specifically, recording takes place from the visual perspective of the student and steps for the successful completion of the activity are recorded at the eye level of the student (Shukla-Mehta, Miller, & Callahan, 2010).

Why video modeling strategies are effective for individuals with ASD. Attention is a crucial factor for effective modeling. In other words, an individual cannot imitate the behaviors of a model if that individual is incapable of attending to the behaviors of the model. One of the characteristics of children with ASD is over -elective attention. Meaning, some children with

ASD tend to focus on and take in too much irrelevant details of the environment without being able to filter out unnecessary information. In these cases, children with ASD tend to focus on irrelevant aspects of the environment while ignoring or overlooking other aspects that might be more relevant or meaningful. Video modeling has proven to be valuable in facilitating the learning of children with ASD by reducing stimulus over-selectivity. When irrelevant stimuli are removed, children with ASD are better able to attend to important components of the target behaviors or skills (Bellini, & Akullan, 2007). Through video modeling strategies, the focus area is reduced and limited to just the TV or computer screen that the child is watching, as opposed to the much larger, and more detailed live surrounding environment. This minimization of the focus area increases the ability of the child to attend to the relevant information (Ogilvie, 2011).

Since children with ASD typically become anxious and/or distressed when faced with opportunities to engage in social interactions, their ability to appropriately attend to a learning task becomes significantly jeopardized. Video modeling strategies are more efficacious because they could be implemented with minimal interactions with other individuals, thus reducing the amount of anxiety and distress that are likely to be exhibited by students with ASD (Bellini, & Akullian, 2007).

Furthermore, motivation could be another element contributing to the effectiveness of video modeling strategies. Evidence has shown that watching videos is a highly favored activity for students with ASD, resulting in increased motivation and attention (Bellini, & Akullian, 2007; Ogilvie, 2011). It has also been shown that in the case of VSM, watching themselves engage in positive and successful behaviors as opposed to negative or unsuccessful behaviors significantly increases students' attention and motivation to attend to the behaviors being modeled (Bellini, Akullian, & Hopf, 2007; Bellini & Akullian, 2007).

Children with ASD show preference for visual and observational learning, including video viewing and visual support strategies, thus making video modeling an effective learning technique for students with ASD (Bellini, & Akullian, 2007; Ogilvie, 2011). Temple Grandin, a doctor and professor of animal science, and author diagnosed with ASD explained the differences between being told what a behavior is and what that behavior really looks like. For example, if her mother told her to be nice, Grandin found difficulty visualizing the meaning of that behavior, unless her mother provided explicit examples that provide a step by step illustration of someone engaging in 'nice' behaviors. Grandin was then able to imitate the behaviors illustrated in the example (Ogilvie, 2011).

How video modeling strategies are effective. Bellini and Akullian (2007) conducted a meta-analyses of existing research studies on video modeling and VSM interventions for children and adolescents with ASD. Twenty three studies were analyzed and 73 participants were included. Results of the meta-analysis demonstrated the efficacy of video modeling and VSM interventions in enhancing social-communication skills, behavioral functioning, and functional skills in children and adolescents with ASD. Results also showed that skills attained through video modeling and VSM strategies are maintained over time and are generalized across different persons and settings (Bellini & Akullian, 2007; Bellini, Akullian, & Hopf, 2007).

Bellini, Akullian, and Hopf (2007) conducted a research study to investigate the effects of a VSM intervention on the social engagement of two pre-school aged students diagnosed with ASD. Authors of this study emphasized the importance of studying the social interactions of participants in a natural rather than a controlled clinical environment. Appropriate social interactions with their peers were facilitated by the use of teacher prompts, then captured on video. Data were recorded using a 1-min partial interval recording system. The two participants'

mean percentage of social engagement increased from 3% to 43% and 6% to 24%, respectively. Similar to previous research studies, a strong maintenance effect was evident following the withdrawal of treatment (Bellini, Akullian, & Hopf, 2007).

Pivotal response training. "Pivotal behaviors are defined as behaviors that are central to wide areas of functioning such that a change in the pivotal behavior will produce improvement across a number of behaviors" (Koegel, Koegel, & Carter, 1999). Specifically, the primary focus of PRT is the provision of intervention in pivotal areas of functioning. These core areas in turn create a significant and positive impact on a large number of target behaviors. For example, intervening in pivotal areas such as increasing motivation to initiate and respond to social and academic interactions will most likely result in improved areas of functioning such as language, self help, and academics (Koegel, Koegel, Harrower, & Carter, 1999). PRT is based on ABA procedures that are family centered and that focus on the child's natural context and the provision of early services. PRT strongly emphasizes the need to provide individuals with ASD with opportunities to take part in a meaningful and enhanced quality of life by means of delivering services in inclusive environments. A number of pivotal areas have been identified, including multiple cues, motivation, self-management, and self-initiations (Koegel, Koegel, Harrower, & Carter, 1999; Koegel, Koegel, & Carter, 1999).

Multiple cues. Since children with ASD most often display stimulus over-selectivity, teaching them to respond to multiple cues will likely reduce the display of this attention deficit. The use of multiple cues consists of asking a child to select an object with multiple components or "cues" instead of just one. For instance, the child might be asked to select 'blue crayon' (as opposed to a 'crayon') in a situation where a variety of additional stimuli with the same cues

(such as a blue pencil, a red crayon, a blue crayon, etc.) are present (Koegel, Koegel, Harrower, & Carter, 1999; Koegel, Koegel, & Carter, 1999).

Motivation. Another pivotal area that often proves to be a challenge for children with ASD during teaching and social interactions is motivation. Lack of motivation in children with ASD can be so severe to the extent that their ability to respond to social and environmental stimuli can be profoundly impacted. Improving children's responsiveness can be accomplished by incorporating certain variables within the school environment. Such variables include child choice, natural reinforcers, interspersing maintenance trials, and reinforcing attempts (Koegel, Koegel, Harrower, & Carter, 1999; Koegel, Koegel, & Carter, 1999).

Child choice refers to embedding child-preferred or child-selected items, topics, and toys into everyday teaching and interactions. Focus is also placed on following the child's lead to establish and maintain attention and interest. The use of natural and direct reinforcers rather than arbitrary reinforcers during teaching results in a significant increase in motivation. A natural reinforcer is directly and functionally related to the learning task. When the child successfully produces the desired behavior, the reinforcer will naturally present itself. On the other hand, an arbitrary reinforcer is not intrinsically related to the learning task. When the child successfully produces the desired behavior, he/she will receive an external reward that was not part of the chain of events leading to the target behavior. For example, when teaching a child to open the lid of a jar, a natural reinforcer would consist of a reward placed inside the jar and is accessed as soon as the child is able to successfully engage in the target behavior of opening the jar. In contrast, an arbitrary reinforcer would consist of teaching a child to open the lid of an empty container, then receiving a reward that was not inside the jar (Koegel, Koegel, Harrower, & Carter, 1999; Koegel, Koegel, & Carter, 1999).

Lack of motivation in children with ASD is most likely brought about as a result of repeated failure at tasks or learned helplessness. When previously learned or acquired tasks (or maintenance trials) are incorporated with difficult acquisition tasks, an increase in motivation will most likely occur. Specifically, children with ASD will more effectively respond to new and difficult tasks when they have experienced repeated success in a previously presented task (a task that he child now masters). Research has also shown that when all attempts at responding to a learning task are reinforced, even when the elicited response is not the right one, the child's learning will dramatically improve. Reinforcing attempts will particularly provide children with the necessary confidence they need to avoid giving up following their experiences with repeated failures (Koegel, Koegel, Harrower, & Carter, 1999; Koegel, Koegel, & Carter, 1999).

Self-management. Self-management techniques are valuable and effective in promoting and fostering independence particularly due to the role that they play in shifting responsibility from the service provider to the individual with ASD. Self-management procedures allow children to independently choose, monitor, record, and reinforce their target behavior. Doing so empowers them and provides them with the opportunity to become active agents within the intervention process as well as active participants in their home, school, and community environments (Koegel, Koegel, Harrower, & Carter, 1999; Koegel, Koegel, & Carter, 1999).

Self-initiations. Some characteristic features of children with ASD include diminished language skills, hence the absence of question asking, and reduced curiosity and interest levels. Children with ASD resort to the use of language predominantly in instances in which access to a desired object is needed. In other words, these children do not use language to initiate socially driven conversations. While typically developing children invest a large portion of their time actively pursuing opportunities for social interactions, children with ASD seek to avoid such

'unpleasant' situations. For this reason, self-initiations are pivotal to the child's learning. One viable method that helps elicit spontaneous verbal interactions includes cultivating some of the motivational techniques explained above (Koegel, Koegel, Harrower, & Carter, 1999; Koegel, Koegel, & Carter, 1999).

Picture exchange communication system (PECS). PECS is a training system that was developed to teach functional communication to young children with ASD and with social communication deficits. PECS focuses on teaching children to initiate requests despite deficits in engaging in appropriate eye contact and/or imitation skills. PECS requires children to give a picture of a desired item to a communication partner in exchange for the actual item (Bondy and Frost, 2001; Bondy, 2001; Bondy & Frost, 1994). PECS emphasizes teaching requesting skills in view of the fact that concrete and tangible reinforcers are typically more motivating to children with ASD than social rewards (Bondy & Frost, 2001). The training system is comprised of six phases through which the child progressively learns to communicate by means of using a picture, then by using a sentence which incorporates multiple pictures across different settings and communicative partners (Bondy & Frost, 2001).

Phase 1. Phase 1 primarily consists of determining the child's preferred items, or the item that she persistently requests (Bondy & Frost, 1994). Once preferences are determined, the child learns to pick up a picture of a preferred item by means of physical guidance and/or gestural prompts from the trainer (who is positioned in front or immediately next to the child) and to place the picture in to the trainer's hand. The trainer, in turn, promptly hands the child the preferred item. No verbal prompts such as "What do you want," or "give me the picture" are provided during that phase. The child will most likely become prompt dependent if such prompts are provided. An essential component of this phase is making sure that the child is provided with

the preferred item each time that item is requested. Denying the child access to that item undermines the efficacy of the picture exchange process particularly during this early stage of learning (Bondy & Frost, 2001; Bondy, 2001; Bondy & Frost, 1994).

Phase 2. Phase 2 consists of teaching the child to get the picture and approach the communicative partner each time he or she needs to communicate. This involves the communicative partner gradually moving away from the child and increasing the distance between the child and the communication board so that the child can find the picture on his or her own. Various communicative partners are involved in this phase for the purpose of teaching the child to initiate an exchange with different partners. Furthermore, this phase focuses on gradually eliminating subtle gestural prompts until almost all exchanges are made unassisted. Pictures of additional desired item are introduced during phase 2. Specifically, the child is taught to request a variety of significantly different preferred items one at a time. For example, if the child has learned to request an edible in phase 1, other preferred items such as toys, books, or balls will be introduced in phase 2. At this point, a communication binder is created such that the picture that is in use is placed on the front and additional pictures are placed inside the binder on a cardboard using adhesive material. This way, the child is able to easily remove the picture from the communication board and hand it to the communicative partner (Bondy and Frost, 2001; Bondy, 2001; Bondy & Frost, 1994).

Phase 3. Discrimination training, during which the child learns to discriminate between at least two pictures on the communication board, occurs in phase 3. The process of accurately determining what the child really wants is achieved by conducting correspondence checks. Correspondence checks refer to the extent to which correspondence between the selected picture and the selected item exists (Bondy and Frost, 2001; Bondy, 2001; Bondy & Frost, 1994).

Through correspondence checks, pictures of two desired items, e.g. toy cars and blocks, are placed on the front of the communication binder. When the child hands the trainer the toy cars pictures, the trainer proceeds to present the child with both desired items and says "Take it." The child is given permission to play with the toy cars after he or she makes an attempt at reaching for them (the child is provided with his or her reward in view of the correspondence evident between the picture that the child selected and the item that he or she selected). If the child selects the blocks after selecting the toy cars picture, an error correction takes place. The number of pictures on the binder cover increases as the discrimination training process continues (Bondy & Frost, 2001; Bondy, 2001).

Phase 4. Phase 4 involves teaching the child to arrange pictures into a sentence. This phase is important since it helps the listener know the function of the child's request, i.e. whether the child is requesting an item or merely making a comment. Typically developing children who are at the very early stages of acquiring language rely on voice inflection and intonation to express the function of a word. Because of their inability to use expressive language effectively, children who use the PECS system are incapable of providing the listener with tone-of-voice cues. Therefore, children using PECS are taught to indicate how the pictures are being used by incorporating sentence starters at the beginning of each sentence. For instance, if the child wants to request an item he or she is taught to construct a two-picture sentence, the first picture depicting the word "I want," and the second picture depicting the requested item. Other sentence starters such as "I see," "I hear" etc. are used to make various comments (Bondy and Frost, 2001; Bondy, 2001; Bondy & Frost, 1994).

Phase 5. Phase 5 focuses on teaching the child to respond to verbal prompts including "What do you want?" By placing a desired item and the "I want" card on the communication

board, the trainer points to the "I want" card and at the same time asks "What do you want?" Following this interaction, the child is expected to complete a sentence beginning with the "I want" picture and followed by the picture of the desired item. This phase essentially focuses on having the child respond to "What do you want" prompts irrespective of whether the object is present or not (Bondy and Frost, 2001; Bondy, 2001; Bondy & Frost, 1994).

Phase 6. Finally, phase 6 consists of teaching the child to make comments by responding to questions such as "What do you see?" and "What do you hear?" (Bondy and Frost, 2001; Bondy, 2001; Bondy & Frost, 1994).

Efficacy of PECS. Charlop-Christy, Carpenter, Le, LeBlanc, and Kellet, 2002 investigated the efficacy of using PECS with three young children with ASD. This study showed significant increase in all three children's spontaneous and imitative speech. An improvement in the children's social communicative behaviors, including initiations and requests, was also documented. Finally, the results demonstrated an inverse relationship between communication skills and problem behaviors. In other words, decreases in problem behaviors were observed in conjunction with increases in communication skills.

Script fading. Scripts consist of verbal statements constructed in either a written or an audio format for children with limited reading skills including children with ASD. Through the script-fading procedure, the child learns to read a script in specific social situations such as making initiations, asking questions, and making comments. As the child learns to read and repeat the scripts, they become faded and eliminated one word at a time from end to beginning (Krantz, & McClannahan, 1993, 1998).

Efficacy of script-fading. Krantz and McClannahan, 1993 investigated the effects of a script-fading procedure on peer initiations and responses of 4 children with ASD. In this study,

10 different scripted sentences and questions pertaining to different activities and objects within the school environment were provided. After manual prompts and guidance were faded, fading of the script from end to beginning began. A significant increase in participants' unscripted interactions was evident throughout the script-fading procedure. Results also reflected participants' ability to exhibit spontaneous language and to combine certain components of the learned scripts with segments of their existing verbal repertoires.

Social skills groups. School age children with high functioning autism (HFA) and Asperger syndrome (AS) face numerous social challenges as they are integrated into the regular education classroom. Social skills groups can be an essential source of support for these children. Social skills groups training consists of bringing together a group of school-age children with HFA or AS and asking them to participate in activities (including hanging out together, engaging in conversations, or playing games) that typically developing children enjoy. Such activities are most often frustrating for children with HFA or AS and could therefore lead to rejection, a diminished sense of self-esteem, and/or increased anxiety. Consequently, social skills group programs should be designed to teach skills that are essential for appropriate and successful social interactions (Freedman & Silverman, 2008).

Social skills groups usually take place either in a clinic or a school setting and are facilitated by a psychologist, trained teacher, or a speech-language pathologist. The goals that are set during sessions include aspects of social engagement and problem solving. Social engagement goals focus on creating social awareness and enhancing communication skills. Specifically, social engagement goals address children's ability to appropriately initiate and maintain a conversation, understand social cues as well as perspective taking. Problem solving

goals primarily focus on helping children with HFA or AS come up with alternative solutions to problems that they may encounter (Freedman & Silverman, 2008).

Mackay, Knott and Dunlop (2007) conducted a comprehensive study that examines the effects of social group intervention on the social interaction and understanding of 46 participants with high functioning ASD. Participants were divided into six groups each group consisting of approximately eight participants. The study was carried out for a period of around 16 weeks. Three major themes were emphasized throughout the intervention process. The themes were social and emotional perspective-taking, conversation skills, and friendship skills. Results of this study showed significant gains on all social skills measures. In comparison with the normative population, significant improvements were evident for social skills and social competence.

Peer mediated training. In peer-mediated interventions, peers without disabilities provide academic and social support to students with ASD. In other words, a peer mediated approach involves students without disabilities sharing, prompting and helping students with ASD in their classroom activities for the purpose of promoting their academic skills and enhancing their social interactions (Ogilvie, 2011; Wang, Cui, & Parrila, 2011).

A meta-analysis conducted by Wang, Cui, and Parilla (2011) examining the effects of peer-mediated interventions on the social behavior of students with ASD documented significant increases in the display of these behaviors. Furthermore, Laushey and Heflin (2000) implemented a peer-mediated approach to promote social interaction skills of two male kindergarten students with ASD. An ABAB reversal design was used to evaluate the effects of a peer-mediated approach on non-adult-directed interactions. No intervention was implemented during the first baseline phase. Data were collected as target students interacted with their nondisabled peers (who were also their models) in their integrated kindergarten classes. A peer

tutor training program was implemented during the first treatment phase. The peer-tutoring system was withdrawn during the return to baseline phase, then reinstated during the second treatment phase. The treatment system consisted of assigning a daily buddy for each student in the classroom. All students, including student with ASD, were trained to stay with, play with, and talk to a buddy. Target skills that were examined included asking for an object and responding according to the answer given, appropriately getting the attention of another, waiting turns, and looking at or in the direction of another person who is speaking. Due to the peer buddy intervention, results of this study demonstrated significant improvements in the social interaction of the two students with ASD. A significant strength associated with this study consisted of the training of all students, without singling out a child with a disability and just focusing on peers without disabilities. This approach is more likely to produce better long-term effects. Furthermore, the randomization of peer buddies, or the use of all peers as possible social partners provided children with ASD with the opportunity to respond to multiple peers and to generalize their social behaviors across classroom settings (Laushey & Heflin, 2000).

Social stories. ***Definition.*** A Social Story is an individualized short story which adheres to a particular format and guidelines and is written by parents or professionals to describe a person, skills, event, concept, or social situations that are challenging, confusing, or upsetting for children with autism. The Social Story is usually presented in the form of a personalized "mini-book" describing a target social situation. The story, however, is not limited to words on paper; a range of instructional techniques and materials can be utilized to render it easily understandable by the student (Gray, 1995). Social Stories serve a broad variety of purposes. They seem to be particularly useful in facilitating the inclusion of students with autism in general education classes (Gray & Garand, 1993). Social Stories are useful for identifying relevant social cues,

introducing new routines, and identifying desired social skills and responses. Specifically, Social Stories are designed to help the child gain a precise understanding of target social situations and appropriate methods of responding to these situations in various social contexts. In school settings, Social Stories can help students get ready for unfamiliar and unpredicted situations such as fire drills, school closings, or substitute teachers. For instance, when a change in routine, such as introducing a substitute teacher, becomes upsetting for a student with autism, presenting a Social Story which provides a detailed explanation of the role of the substitute teacher will most likely eliminate the student's negative response. In the home setting, Social Stories may be developed by the parents to help their child prepare for upcoming events or situations which include a visit to a relative or a family vacation. Social Stories can also be developed to introduce a new daily routine in the home. In a community setting, Social Stories identify and provide structure to naturally occurring cues events, and situations that the child finds overwhelming and/or difficult. For instance, when a child with autism becomes frustrated when a traffic light changes color, introducing a Social Story which describes how traffic lights work will most likely eliminate the child's negative feelings. Providing structure to a social situation (by presenting the Social Story) allows the child to easily carry out community outings and activities with his/her parents and/or teachers (Gray, 1998, 1995).

The goal of a Social Story is to share information pertinent to where and when a situation takes place, who is involved, what is happening, and why. In some cases, the Social Stories share information about situations or events that are 'obvious' to most children, but overwhelming to children with autism (see traffic light example above). In other cases, the information shared is relevant to concepts (such as the concept of 'fair') that are abstract and more difficult to understand (Gray, 1998).

Overall, social Stories also describe what other people know, feel, or believe Gray, 1998). More importantly, professionals strongly recommend sharing information through Social Stories by taking into consideration the student's perspective, abilities, and interests. Through accurate observation, writers of a Social Story should focus on what a student may see, hear, and feel in the target situation (Gray, 1998, 1995; Gray& Garand,1993). Additionally, Social Stories are more likely to show positive outcomes with students with higher intellectual and language skills (Gray & Garand, 1993).

Rationale behind social stories. The rationale behind Social Stories is based on the increasing agreement that children with autism suffer from cognitive impairments (independent of IQ) that hamper their ability to "read" and understand social events, and to construct appropriate responses to these events (Baron-Cohen, Leslie, & Frith, 1985; Gray & Garand, 1993). Specifically, children with autism lack a theory of mind, or the ability to mind-read and understand that other people know, feel, want, or believe things. In other words, these children have a significant deficiency in their ability to recognize that other people have thoughts, feelings, and perspectives that are unique and distinctive from our own (Baron-Cohen, Leslie, & Frith, 1985; Ozonoff & Miller, 1995). Furthermore, researchers have managed to link social and behavioral characteristics of children with autism to a cognitive style termed weak central coherence (WCC). WCC indicates that children with autism lack a drive for meaning and have a diminished capability to form coherence and make generalizations over a broad range of contexts and stimuli. As a result of their inability to formulate contexts and stimuli into a gestalt and to perceive them as whole, children with autism become characterized by detachment especially as they become overly focused on details (Frith, 1989).

If children with autism are unable to infer the mental states of other people, and/or extract overall meaning from various details, they will be thought of as rude, inconsiderate, or irrational. This lack of social understanding can make these children look as if they belong to a foreign social culture. Social Stories are therefore created to guide and introduce the children to the social expectations and conventions (and their rationale) that are acceptable by our social culture (Attwood, 2000). Social Stories seek to translate the "secret code," to which people who have a theory of mind are privy, into information which is practical, tangible, and obvious (Gray, 1998). Deciphering the code requires Social Stories to identify the relevant stimuli and their meaning, and to provide explanations and corrections to false assumptions. Social Stories should also enable the child to recognize the global pattern or the whole Gestalt of a given social situation (Attwood, 2000).

Traditional teaching methods most commonly consist of direct face-to-face interactions between the teacher and the student. Consequently, relying on traditional teaching approaches to teach social behavior poses a significant challenge for students with autism, particularly since it has been established that these students struggle with social interactions. In addition to the challenge associated with understanding the lesson, students with autism are presented with the challenge of being able to form accurate interpretations of the social cues used in its presentation. In contrast to traditional teaching, Social Stories have been shown to be a more powerful and useful teaching approach. Social Stories aim to provide students with autism direct access to social information and more detailed descriptions of social situations, and to reduce potential confusion brought about as a result of face-to-face instructional interactions (Gray & Garand, 1993). More importantly, Social Stories are constructed with the intention of providing

predictability to a situation that the child perceives as confusing, frightening, and/or hard to decipher (Gray, 1998).

Developing a social story intervention. Gray (1995) outlined several steps in the development of Social Stories. According to Gray, Effective writing of Social Stories primarily includes targeting a specific social situation which triggers the occurrence of a problematic social behavior. In other words, a topic (which consists of the identified target social situation and the target social skill) for the Social Story needs to be determined first. The problem behavior caused by the social situation is usually one that presents continuous difficulty despite the administration of various social skills interventions and academic accommodations. In other cases, the social situation is one that is new for the child and includes changes in the routine.

Another step outlined by Gray (1995) involves gathering information relevant to the child's interests, abilities, and impairments. Information gathering requires careful observation and objective documentation of factors (related to the target situation) that the observer can and cannot see. Objective recording of what can be seen involves identifying when and where a situation takes place, who is involved, routines and rules, social cues, among other observable information. Most often, an observer is not present during the occurrence of the target situation. The observer is, therefore, required to make recordings of the factors that cannot be seen by means of posing a number of questions to caregivers, teachers, and other people who play an active role in the child's social adjustment. Information gathering further necessitates taking the child's perspective with respect to the target situation into account. Understanding the child's perceptions provides accurate information essential for determining which aspects of a situation should be the focus of the Social Story. Information regarding the child's perspective is gathered through observations in addition to talking directly to the child (in cases where the child is able

to communicate). If the child finds it difficult to effectively communicate his perspective of the situation, information is gathered from the parents, teachers, or peers (Gray, 1995).

Following the gathering of information, a third step in developing a Social Story involves the sharing of observations with the child. The sharing of information should consider the fact that children with autism need help understanding social situations, the perspectives of others, and appropriate response methods. Consequently, Social Stories consist of at least three basic types of sentences: descriptive, directive, and perspective (discussed in detail in the following section).

In addition to creating a Social Story and reading it to the child, a fourth step in effectively developing a Social Story includes the support of new social skills which entails the administration of supplementary steps that aid the child in learning a new social skill. The Social Story should be consistently and frequently read to the child, and it should be ensured that the people affected by the child's success are knowledgeable of the appropriate administration methods and techniques. In addition to the involvement of these people, the child's involvement must be maximized. Such involvement consists of carrying the Social Story, approaching others with it, and listening to contents of the Social Story as it is read aloud. During the period in which the Social Story is implemented, people can provide the child with further assistance in practicing and retaining targeted social skills. For instance, they may administer "cues" in reference to particular content presented in the Social Story. Reciting key phrases from the story, when appropriate, reading the story with the child immediately after the target situation, and providing the child "story notes" presented on a card with key phrases from the story are additional steps in supporting the learning of new social skills. Finally, gradual fading of the use of the Social Story by rewriting, revising the review schedule, and/or decreasing verbal cues to

the story is essential in helping the child learn new social skills. Through fading by rewriting the story, the child could be taught how to generalize the newly acquired social skill to other environments and/or social situations. Generalization is best accomplished by writing new Social Stories such that other social situations, in which the social skill is applicable, are described. Directive sentences should still be emphasized in the new Social Stories, while reducing them in the original. Fading by revising the review schedule consists of increasing the amount of time between the reading of the Social Story and the occurrence of the target situation. Finally, decreasing verbal cues to the Social Story involves increasing the amount of wait time before a verbal cue is introduced.

Swaggart and Gagnon (1995) elaborated on the work of Gray (1995) and Gray and Garand (1993) by presenting a 10-step process for creating and implementing effective Social Stories. Their process included the original aspects involved in the development of a Social Story (Identifying a target behavior and problem situation, defining target behaviors, and writing the Social Story using the four sentence types). However, Swaggart and Gagnon (1995) proposed additional methods (e.g. collecting baseline data, incorporating pictorial icons) of writing a successful Social Story. Each of the ten methods are described in the following section.

1. *Identify a target behavior or problem situation.* This step involves selecting a social behavior for change. Upon improvement, this behavior should result in enhanced and positive social interactions, a secure environment, and greater social learning opportunities.

2. *Define target behaviors for data collection.* This step mandates a clear and precise description of target behaviors by all those involved in the developing and implementing processes of the Social Story intervention. Specifically, in order to ensure that reliability

in measuring change is attained, data collectors should be able to achieve a common understanding of all aspects of the target behaviors. Additionally, the target behavior should be clear enough for the participant to understand appropriate means of engaging in that behavior.

3. *Collect baseline data on the target social behavior.* Collecting data over a period of time helps researchers identify a trend. Baseline data collection occurs over a period of 3 to 5 days. Baseline data are collected by tallying the frequency of the behavior and allow for a comparison between the participant's behaviors during and following a Social Story intervention.

4. *Write a social story using descriptive, directive, perspective, and control sentences.* Social Stories should be developed in accordance with the child's comprehension skills. Specifically, vocabulary and print size should be individualized to meet the child's comprehension needs. Additionally, the Social Stories should be written in the first person in either the present or the future tense.

5. *Place one to three sentences on each page.* The Social Story format should take into account the specific skills and abilities of each child. Depending on the child's functioning level, one sentence pages might be sufficient, while more than one sentence pages might result in an overload of information.

6. *Use photographs, hand-drawn pictures, or pictorial icons.* Illustrations can improve the child's understanding of appropriate behaviors, particularly with children with reading impairments. According to Gray (1994), however, target situations will most likely be

narrowly defined as a result of pictorial representations thus limiting the generalizability of the Social Story.

7. *Read the social story to the student and model the desired behavior.* Reading a Social Story and selecting appropriate behaviors to be modeled for the child is perhaps the most essential step in the Social Story process. This step should be practiced frequently and consistently, ideally, just prior to the occurrence of the target situation.

8. *Collect intervention data.* The same procedures used for collecting baseline data are also used for collecting intervention data. Intervention data are collected during the Social Story intervention process.

9. *Review the findings and related social story procedures.* Reviewing the Social Story and its implementation procedures are critical if no positive behavioral changes were observed 2 weeks following intervention. It is imperative, however, that revisions be made to only one facet of the Social Story. Alterations made on more than one aspect of the story will most likely create confusions as to which aspect was responsible for any observed behavioral changes.

10. *Plan for maintenance and generalization.* One a behavior change has been determined, fading (which could be achieved either by extending the time periods between readings, or placing further responsibility on the child to read the Social Story) should take place. Additionally, it should be ensured that Social Stories allow for making appropriate generalizations across different settings and behaviors.

Guidelines for writing Social Stories. Prior to writing a Social Story, it is important to select the perspective from which to share the information. Due to its directive tone, writing from

a second person perspective is not a recommended approach. The perspective that is most recommended in Social Story research is the first-person perspective. A large number of Social Stories are written from a first-person point of view as though the child is describing events and social situations as he/she sees them. Social Stories can also be written from a third-person perspective. These stories resemble newspaper articles and are therefore referred to as Social Articles. Specifically, they feature columns, advanced vocabulary, and/or Times New Roman font giving the text a more 'adult-like' appearance. For these reasons, Social Stories written from a third-person perspective are a better fir for older and more advanced children, while Social Stories written from a first-person perspective are a better fit for younger children who are severely challenged (Gray, 2004).

Social Stories should also be written using positive language. Including written descriptions of negative behaviors places additional (unwanted) emphasis on these behaviors. For instance, the phrase "I will try not to yell in the library" (which highlights the negative behavior 'yell'), would be replaced by "I will try to talk quietly in the library" (a phrase which positively describes a desirable behavior: 'quiet'). When references to negative behaviors are made, they are usually written in from a third-person rather than a first person perspective. Keeping positive statements helps build and maintain the child's positive self esteem (Gray, 2004).

Social Stories should consist of three central parts: an introduction, body, and conclusion. The introduction focuses on identifying and clearly stating the topic. Introducing the topic may often times be accomplished by composing as little as one statement. The body, which comes right after the introduction, adds further descriptions and explanations of the topic of interest. The conclusion makes references to the concepts, situations, and achievements stated at

the beginning of the story. Specifically, the conclusion rephrases the original purpose and summarizes the overall meaning of the story. In order to gather information and provide details supporting the Social Story topic, Social Story developers recommend posing the five "wh" questions. These questions help identify where and when the situation takes place, who is involved, how events progress, and what happens (Gray, 2004).

Social Stories generally consist of three basic types of sentences: descriptive, directive, and perspective (Gray, 1995; Gray & Garand, 1993). Gray (2004) has suggested additional sentence types that may be incorporated in a Social Story. These sentence types are affirmative, control, cooperative and partial. A Social Story should always contain descriptive sentences, with the option of including one or more of the remaining sentence types (Gray, 2004).

Descriptive sentences. Descriptive sentences draw attention to the most relevant features of a social situation. They are factual statements free of opinions and assumptions. Descriptive sentences are the only required type of sentences in a Social Story- using too few of these sentences is considered a mistake. Descriptive sentences are often used at the beginning of the Social Story and provide answers to the "wh" questions. An example of a descriptive sentence would be "many children play on the playground during outdoor recess" (Gray, 1995, 1998, 2004; Gray & Garand, 1993).

Directive sentences. Directive sentences usually follow descriptive sentences, explaining to the child what is expected in a given social situation (Gray, 1995; Gray & Garand, 1993). Specifically, these sentences guide the behavior of the child by pointing out appropriate responses or behaviors (Gray, 2004). Additionally, these sentences are crafted with careful consideration of the possibility of literal interpretation. In other words, beginning the sentence with "I can…" or "I will…" might mislead the child into assuming that there is no room for

error. The statement might also mislead the child into interpreting the statement as a demand insisting pure compliance rather than a statement intended to promote the child's learning and practicing new responses. For this reason, beginning directive sentences with "I will try to…" or "I will work on…" is recommended. Finally, authors should recognize the importance of formatting directive sentences using positive language (e.g "I will try to walk" vs. "I will not run") (Gray, 1998, 2004).

Perspective sentences. Perspective sentences describe the internal state, thoughts, feelings, knowledge, motivation, opinions, and beliefs of other people as well as their reactions to a situation (Gray, 1995, 2004; Gray & Garand, 1993). We are likely to err when trying to make assumptions about the child's internal state. This is why Social Story experts advise not using these types of sentences unless the child's own references to positive thoughts or feelings are used (e.g. "I really love to swim with Jake"), or the content of the sentence is one which is typically experienced by most people (e.g. "sleeping helps me feel rested") (Gray, 1998, 2004).

Affirmative sentences. Affirmative sentences immediately follow a descriptive, perspective, or directive sentence and enhance the meaning of these sentences. Affirmative sentences also express a commonly shared value or opinion within a given culture. Specifically, the purpose of an affirmative statement is to stress an important point, refer to a law or rule, or reassure. For instance, a Social Story explaining the importance of using a seatbelt in a moving vehicle might include "I will try to keep my seatbelt fastened" as a directive statement followed by "This is very important" (an affirmative statement referencing a law), or "This is a safe thing to do" (an affirmative statement referencing a rule") (Gray, 2004).

Control sentences. Control sentences are statements written by the child to identify strategies that would enable him/her to recall and use information included within the context of

the Social Story. Unlike directive statements, control statements provide the child with the opportunity to control his/her response by identifying individual and meaningful strategies that could be used to deal with challenging situations. Control statements intend to reflect the child's specific interests and personal writing style. These statements are added after the Social Story is read and reviewed with the child. For instance, a child who has an interest in insects and poetry may write the following control sentence about delays in the lunch line at school: "Lunch lines and turtles are both very slow. Sometimes they stop, sometimes they go" (Gray, 1998, 2004).

Cooperative sentences. Cooperative sentences identify what other people will do help the child. For example, in a toileting story, a cooperative sentence may read: "My mom, dad, and teachers will help me as I learn to use the toilet." In this manner, cooperative sentences remind parents, peers, and/or professionals of the role that they play in the success of the child to whom the Social Story is written (Gray, 2004).

Partial sentences. Partial sentences are statements that use the fill-in-the-blank format for the purpose of assessing the child's comprehension of the Social Story, or to encourage the child to come up with guesses regarding what might come up next in a situation. All sentence types: descriptive, directive, perspective, affirmative, control, and cooperative can be formatted into a partial statement within a Social Story. A blank space is usually employed to replace a selected component of the sentence. Filling in the blank promotes that child's ability in retrieving critical concepts. Consequently, the child is provided with the opportunity to actively participate in the review of the Social Story while taking ownership of its contents. Additional support in the effect use of partial sentences is required for younger children and/or those who present with more severe challenges (Gray, 2004).

Guidelines for successful implementation of Social Stories. Gray and Garand (1993) proposed three approaches that are necessary for the successful implementation of Social Stories on students who are diagnosed with autism. Selecting the most appropriate approach is highly dependent on the unique abilities and needs of the students (Gray & Garand, 1993). The first approach is applicable to students who are independent readers. This approach consists of the adult introducing the Social Story by reading it twice with the student. Gray and Garand (1993) recommend that the adult read the story by sitting back and on the side of the student. The student will then read the story after the adult has finished reading. The student will begin independently reading the story once a day as soon as familiarity with the story is achieved.

The second approach towards successful implementation of a Social Story involves reading the story to a student who has reading difficulties. Through this technique, the Social Story is first recorded on a tape recorder followed by the usage of a bell the sound of which indicates that the student should turn the page. Once the student learns how to use the tape recorder and to turn the pages upon hearing the cue, the student "reads" the Social Story no more than once per day (Gray & Garand, 1993).

The third approach towards successful implementation of a Social Story consists of videotaped Social Stories. This approach is used either with students who are independent readers or with those who need help reading (Gray& Garand, 1993). In the videotaped technique, Social Stories are read aloud on a videotape with one page appearing on the screen at a time. Through the videotape technique, the Social Story could be read to the student (when the volume is on), or the student could read the story himself or herself (when the volume is off) (Gray & Garand, 1993).

Regardless of the technique used to introduce the Social Story, a student's understanding of the story should be checked. Checking comprehension could be achieved by means of having the student complete a checklist, or by having the student answer questions in writing at the end of the story. Comprehension could also be checked by role playing. In role playing, the student will be asked to demonstrate what he or she will do the next time the situation occurs (Gray & Garand, 1993).

Often times, it becomes evident that the student is literally interpreting certain portion of the story, or that he student is finding other parts of the story confusing. Discovering these problems at an early stage of the Social Story intervention and rewriting the story accordingly, enhances chances for successful outcomes. Revising a Social Story might also occur in response to a student's progress. Revisions, in this case, could include eliminating directive sentences, thus increasing student independence (Gray, 1998).

Effectiveness of social stories. Two databases, PsycINFO and ERIC, were accessed in order to obtain articles that focus on Social Story Interventions for children with ASD. Manual searches in three peer reviewed journals, Focus on Autism and Other Developmental Disabilities, Journal of Autism and Developmental Disorders, and Journal of Positive Behavior Interventions, were carried out for the purpose of retrieving additional articles. The term "Social Stories" was used for the retrieval of articles from the above journals. The entire search generated sixteen studies which addressed a number of different skills and behaviors including (a) verbal greeting initiations, (b) appropriate social interactions, (c) choice and play skills, (d) on-task behaviors, (e) appropriate social behaviors, (f) communication skills, (g) disruptive or challenging behaviors, and (h) appropriate classroom behaviors.

Only correlational, as opposed to functional, relationships between the Social Story intervention and target behaviors was inferred in three (Norris & Dattilo, 1999; Swaggart, et al, 1995) of the sixteen studies. A correlational relationship was observed due to the lack of experimental rigor associated with AB and ABC designs employed in two studies and one study respectively. On the other hand, through their reliance on withdrawal designs and multiple baseline designs, the remaining thirteen studies provided a sufficient level of experimental control that allows them to contribute evidence for the effectiveness of social on various target behaviors. Experimental control has minimized threats to internal validity of these studies, therefore confirming that a functional or causal relationship between the implementation of a Social Story intervention and the target behavior indeed exists (Horner, et al, 2005; Kazdin & Kopel (1975).

One of the studies that used an AB design sought to evaluate the effectiveness of a Social Story intervention on the social interactions of an 8-year-old girl diagnosed with mild to moderate autism (Norris & Dattilo, 1999). The participant was reported to be functioning within the average range of general mental abilities and was fully included in a general education second-grade classroom. Even though she demonstrated strengths in reading recognition, spelling, verbal communication, and daily living skills, weaknesses in math, knowledge of general information, and socialization skills were observed.

Three different Social Stories were constructed according to Gray's (1997) guidelines, and designed to address the participant's social interactions during lunchtime. One of the three social stories was read each day, immediately before the participant's lunchtime. Introducing a Social Story intervention immediately prior to lunch, known as "priming" strategy, is intended to produce a decrease in inappropriate social behaviors typically exhibited by the participant while

she ate her lunch with her peers. Participant's inappropriate social interactions, appropriate social interactions, and the absence of social interactions were videotaped during lunchtime. Videotape recordings lasted for eight to ten minutes and were used to monitor the participant's target behaviors during baseline as well as intervention. Videotaping also took place in the participant's second grade class prior to the baseline phase for the purpose of helping the participant and her classmates get used to being taped.

Dependent measures consisted of the participant's estimated frequency of appropriate, inappropriate, and absence of social interactions with her peers at lunchtime. Appropriate social interactions consisted of initiating or responding to other students verbally, physically, or gesturally. Inappropriate social interactions consisted of verbalizations with bizarre content, singing, and making noises. Absence of social interactions consisted of no evidence of verbal, physical, or gestural initiations or responses. The primary observer was the participant's special education teacher and the secondary observer was a graduate student. Prior to the beginning of the study, both observers received training on sample tapes by recording frequencies on all targeted behaviors. Training continued until at least 80% agreement was achieved by both observers. The primary observer recorded estimated frequency of targeted behaviors during baseline and intervention. Videotaping took place daily during the participant's lunch periods and lasted 8 to 10 minutes. Reliability checks were later conducted by the secondary observer during 20% of baseline sessions and 25% of intervention sessions. Inter-rater agreement during baseline and intervention ranged from 88% to 100%.

Results of the study showed a 48% delayed decrease in inappropriate social interactions. Although this decrease in the participant's inappropriate social interactions was delayed, it was still attributed to the effects of the Social Story intervention. Results also showed that levels of

appropriate behaviors remained intact during baseline and intervention, therefore demonstrating a lack of significant effect of Social Stories on these behaviors. In sum, even though Social Stories seemed to be effective in reducing inappropriate social behaviors, yet they have not proven valuable in increasing appropriate social behaviors. Most likely, the intervention was effective in decreasing inappropriate social interactions because it was carried out before, as opposed to during, the participant's lunch. The intervention was therefore strong enough to create a decrease in inappropriate behaviors, but not robust enough to create new patterns of behaviors (appropriate social behaviors to be more specific). Future research should therefore seek to examine the effects of Social Story interventions directly conducted during the actual observation period (i.e. during lunch).

The other study that used an AB design used an intervention which combined Social Story methodology with a behavioral social-skills training procedure (Swaggart & Gagnon, 1995). The combined intervention was designed to teach appropriate social behavior to 3 children who fell within the spectrum of having moderate to severe autism and pervasive developmental disabilities. All participants demonstrated a significant level of aggressive behaviors as well as impairments in their expressive language skills. Due to their aggressive behaviors, participants were placed in a restrictive self-contained educational environment. The first participant's target behaviors were identified through an environmental analysis. The analysis revealed that inappropriate social responses consisting of inappropriate greeting skills should be targeted for intervention. Target social behaviors for the remaining two participants consisted of appropriate sharing of materials.

Intervention strategies consisted of the implementation of a Social Story designed to address the individual social behavioral needs of each participants. All Social Stories were

designed according to Gray's (1994) guidelines. The Social Story was then read each morning to each participant by his/her classroom teacher and/or paraprofessional. Another social story combined with a response-cost system were also designed to address aggressive behaviors of the first participant. Unfortunately, this study failed to record percentages associates with the level of inter-observer reliability.

Results showed that appropriate greetings made by the first participant increased from 7% (during baseline) to 74% (following intervention). Results following the combined Social Story and response-cost intervention demonstrated a decrease in the first participant's aggressive behaviors. Specifically, the participant's episodes of aggressive behaviors per day decreased from a range of 0-19 (during baseline) to a range of 0-14 (following combined intervention). The remaining two participants also showed an increase in their target behavior following the Social Story intervention. Both participants' sharing behaviors increased from no instances of sharing during baseline to 22% and 35% respectively.

This study supports the use of Social Stories as an effective technique in enhancing social behaviors of children with autism. Additionally, this study provides support for the use of Social Stories in combination with a more traditional behavioral social-skills technique (response-cost) to decrease the frequency of inappropriate social behaviors and increase the frequency of more socially appropriate behaviors. However, due to the lack of experimental control associated with this design, results should be interpreted with caution. Furthermore, Gray (1994) has maintained that Social Stories are typically most effective when read to children who are considered higher functioning. Yet, this study has included children with moderate to severe intellectual levels and has shown promising results regarding the effects of a Social Story intervention on the social outcomes of these children. Evidently, more research aiming at investigating the efficacy level of

Social Stories when used with children with a higher versus a lower level of intellectual functioning is needed. More importantly, because this study has measured the effectiveness of Social Stories in conjunction with another social behavior strategy, it has failed to isolate the contribution made by the Social Story intervention alone.

The third study that used an ABC single subject design aimed at investigating the efficacy of a Social Story intervention for an 8 year child with autism functioning in the mild-to-moderate range. The participant had impaired conversation skills and his speech was limited to two-to-three word utterances. Furthermore, he was competent in following basic instructions, but lacked adequate independent self-care skills. The participant would also engage in disruptive behaviors which most commonly consisted of intense and frequent tapping of his hand on a variety of surfaces including his own body. His disruptive behaviors were labeled by his teachers and peers as being annoying and distracting. These behaviors were most evident during reading and were identified as behaviors targeted for decrease.

Following the identification of target behaviors, an individualized Social Story was developed for the participant in adherence with the recommendations provided by Gray (1994). Upon Gray's suggestions, more than one person (the researcher and the participant's teachers) were involved in reading the Social Story. Social Story reading was conducted in a small room adjacent to the participant's classroom. Observations of behaviors were also recorded in the participant's classroom. Social Story intervention sessions and classroom observations were both recorded by means of videotaping procedures. The video camera was placed in the participant's classroom 2 weeks before the initiation of the study to help students become acclimated to its presence. A 10-second partial interval recording procedure was used for data collection. Interval recordings were timed by audible beeps emitted by a CD player every 10 seconds.

Social Story reading took place immediately prior to the lesson in which data were collected. Following reading, the researcher or the teacher asked the participant comprehension questions assessing his understanding of the content of the readings. Teacher prompting was introduced if the participant struggled with the answers to the questions. The study consisted of three phases: Phase A, Phase B, and Phase C. Phase A (or baseline) referred to no Social Story intervention. Phase B was the first intervention phase in which a Social Story was read to a participant, but following intervention, the Social Story was left for the participant to access independently. However, in the second intervention phase (Phase C), in addition to leaving the Social Story for the participant to access independently following intervention, it was reviewed again by the teacher during the lesson as deemed appropriate. Interobserver reliability for the target behavior, teacher prompting, and number of comprehension questions answered correctly was 97%, 100%, and 90% respectively.

Results showed that, following Phase B intervention, the participant failed to access the Social Story on his own, therefore proving Phase B intervention ineffective. Observed positive changes, however, were evident following the introduction of Phase C intervention. Specifically, the mean percentage of tapping following Phase C significantly decreased from 63% (during baseline) to 41%.

This study provided a decent level of support for the use of a Social Story intervention to decrease disruptive behavior in a child with autism. However, the observed decrease in disruptive behavior was not significant enough to provide a clear manifestation of experimental control. Further, the use of an ABC design ruled out any evidence of a functional relationship between Social Story reading and disruptive behavior. Finally, existing studies have attempted to investigate the efficacy of a Social Story intervention in combination with other intervention

strategies. Unlike these studies, an advantage associated with this study lies in its attempt to assess the usefulness of a Social Story by implementing a Social Story intervention in isolation from other evidence based interventions.

Five additional studies that investigated the efficacy of Social Stories by using an ABAB/withdrawal design were reviewed. Taking into account the necessity of effective early intervention for children with ASD, one of these studies used Social Stories to enhance prosocial behaviors of three preschool children diagnosed with autism (Crozier, & Tincani, 2006). The first participant demonstrated impairments in general cognitive ability, communication skills, socialization, and adaptive behavior. The second participant also showed weaknesses in communication, socialization, and adaptive skills (cognitive skills measures were not included for that participant). The third participant, on the other hand, was diagnosed with "high functioning" autism. Specifically, he showed strong expressive language skills in the classroom and highly advanced vocabulary.

Following teacher interviews and classroom observations for each participant, the primary author was able to identify behaviors that should be targeted for intervention. The first participant would typically wander around the classroom and would not sit still during circle time. The target behavior for the first participant, therefore, consisted of sitting appropriately for the first 10 minutes during morning circle time. The second participant was observed to engage in social initiations with staff members but not with his peers during snack period. Furthermore, the participant would fail to respond social gestures made by his peers towards him during snack time. Target behaviors for the second participant, therefore, included chatting and interacting with peers during snack time. The third participant was uncooperative and failed to share toys

with his peers in block center. Intervention, therefore, targeted replacing his inappropriate play behaviors with his peers with ones that are appropriate in block center.

All three participants attended an inclusive early childhood education preschool. Participants' classrooms consisted of students with disabilities as well as typical students, and special education services were provided in these inclusive classrooms. An ABAB reversal design was used for the first and third participant. When the use of the Social Story intervention alone for the second participant proved unsuccessful, an ABCACBC multicomponent design was used instead. During baseline (A), participants were observed in their individual classrooms with the intention of examining the occurrence of target behaviors. Classroom teachers and staff were instructed to carry out their lessons and classroom management techniques as they typically do. No observer/participant interactions took place during baseline. During intervention (B), an individualized Social Story was read to each participant respectively on an empty table in his classroom immediately prior to the target activity. The Social Story was constructed in accordance with Gray's (1995) recommendations and designed to address target behaviors of each participant. During the second intervention phase (C) for the second participant, a Social Story was read prior to the target activity (snack time), followed by the administration of prompts by the observer during the observation session.

Two maintenance sessions were conducted 2 and 3 weeks following the final intervention phase. Maintenance sessions were performed according to baseline procedures and no direct participant interactions occurred. Observers then followed up with teachers on the location and the frequency of the use of the Social Story. In addition to maintenance sessions, treatment integrity during each intervention was assessed. Treatment integrity was assessed by means of a checklist highlighting all the steps required for the completion of the intervention. Treatment

integrity was 99% for the participant, and 100% for the remaining two participants. Inter-observer agreement scores were also calculated for each of the target behaviors. The mean for inter-observer agreement was 97%, 94%, and 91% for participants 1, 2, and 3 respectively.

Results indicated that the implementation of a Social Story was effective in decreasing inappropriate social behaviors and increasing appropriate social behaviors of children with ASD. Target behavior (sitting during circle time) for participant 1 increased from 16.4% during baseline to 78% during the first intervention. Target behavior decreased to 37.4% upon withdrawal during the second baseline, then increased again to 80.4% when the Social Story intervention was reintroduced. Social Story intervention alone was insufficient for participant 2. However, upon introducing intervention C (Social Story plus verbal prompts), an increase of 5.8 unprompted verbal interactions per session from the first baseline to the final intervention phase was observed. For participant 3, an overall decrease of 3.9 in inappropriate behavior and an overall increase of 15.86 in appropriate behavior occurred from the initial baseline to the final intervention. Results also showed that increases in appropriate behaviors were maintained for participants 1 and 2, but were not maintained for participant 3.

The use of a reversal design in this study allowed for the demonstration of a functional relationship between Social Stories and prosocial behavior. Despite this advantage, upon withdrawal of intervention, participants are not provided with exposure sufficient enough to produce long lasting results. For this reason, a multiple baseline design is deemed more effective. Additionally, most, if not all, the credit has been attributed to the effects of the Social Story in increasing prosocial behaviors exhibited by participant 2. The effects of the Social Story is unclear, particularly since this study failed to assess the effectiveness of verbal prompts alone in creating positive changes in the participant's behaviors.

Lorimer, Simpson, Myles, and Ganz (2002) also used an ABAB design to study the efficacy of using a Social Story to reduce precursors to tantrum behavior. Unlike other studies that focused on implementing the Social Story in the participant's classroom, this study sought to assess the efficacy of the intervention in the home environment of a 5 year old boy diagnosed with mild to moderate autism. The participant's cognitive abilities appear to fall within the average to above-average range, and his communication skills are similar to those typically exhibited by other students his age. Some of the participant's challenging behaviors that were commonly observed in the home included tantrum behaviors characterized by screaming, hitting, kicking, and throwing objects. A functional assessment of these behaviors revealed that they were stimulated by attention and attempts to gain access to a tangible reinforcer. The participant's challenging behaviors are usually preceded by attempts to try to verbally communicate his needs and wants. The communication methods used by the participant, however, were ineffective and were presented in the form of loud and perseverative commands (e.g., "Stop talking!" and "Listen to me!"). These precursors to the participant's challenging behaviors were referred to as "interrupting vocalizations." If these interruptions are ignored or reprimanded, the participant engaged in intense episodes of tantrum and aggressive behaviors. The precursors to tantrum behaviors occurred at least five times per day and lasted from 45 minutes to 1½ hours.

Using an ABAB design, the first and third phases (A) consisted of the baseline phase and the second and fourth phases (B) consisted of the intervention phase. Two Social Stories were designed for the participant. The first Social Story was created to address the participant's need for attention, while the second Social Story was created to make waiting easier for the participant. The two Social Stories were read once or twice a day, particularly when an adult

(parent or therapist) was to engage in a conversation with another adult in the participant's presence, and when the participant was required to wait. An event recording was used to record the frequency of the participant's precursors to tantrum behaviors. Data were collected by the parents and in the home environment of the participant. Reliability checks occurred during 33% of the observation sessions, and the average reliability averaged 96.10% across the intervention.

Results showed that, during the initial baseline period, tantrums occurred on 5 of the 7 days. The participant's tantrum behaviors significantly decreased to zero tantrums on 6 of the 7 days following the introduction of the two Social Stories. The participant began to exhibit tantrum behaviors again on 2 of 3 days after withdrawal, but was again reduced to no tantrums on 6 of the 7 days. Changes in the participant's precursor behaviors were also observed and were similar to the pattern seen in his tantrum behaviors. Occurrences of the precursor behaviors were noted several times a day during the 7-day baseline period, but began to decrease following the implementation of the Social Story intervention. The precursor behaviors significantly increased during the second baseline, but managed to decrease again after the Social Stories were reintroduced.

This study provides further research support for the usefulness of Social Stories in reducing the frequency of tantrum behaviors in a participant with ASD. One of the strengths linked to this study is its reliance on Social Stories alone, rather than including other interventions, to decrease tantrum behaviors. Additionally, this study has examined the effects of a Social Story in the home environment of the participant, and the intervention was implemented with the collaboration of parents and professionals, thus adding to the social validity of the results for a home setting program. Results of this study, however, should be interpreted with caution, particularly when trying to generalize the results of this study to other students with

autism. Even though this study provides a measure of control through its use of an ABAB/reversal design, it lacks the experimental rigor of other designs that include more than one participant (e.g., multiple baseline design across participants). Furthermore, information gathered from teachers of the participant following intervention might have provided some insight regarding carry over effects of appropriate behaviors from the home to the school setting.

Adams, Gouvousis, VanLue, & Waldron, 2004 also used an ABAB design to examine the effects of a Social Story on inappropriate and undesirable behaviors in the home environment of a 7 year old boy diagnosed with ASD. Target behaviors that were most frequent and distracting were identified through videotaping procedures conducted by the participant's parents in his home. These behaviors included crying, falling, hitting, and screaming. Through a functional analysis, the authors were able to identify the function of the participant's frustration behaviors. Specifically, the functional analysis revealed that the participant would cry, fall, hit, or scream in response to his homework. The participant's frustration behaviors occurred most frequently when he was facing difficulties with his homework and was unable to appropriately and verbally communicate his need for help. Following the identification of target behaviors, a Social Story was developed addressing all four target behaviors. The social story followed Gray's (1994) recommendations, except for the suggestion which involves creating one Social Story for each target behavior, rather than simultaneously addressing multiple target behaviors in a single Social Story. The Social Story was designed to address the completion of homework, by including a description of the homework situation as well as the disruptive behaviors that accompany homework sessions. More importantly, the Social Story emphasized how the participant could replace the undesired behaviors with behaviors that are more socially appropriate by means of quiet verbal communication (e.g., "I will try to use my quiet voice to tell

Mom and Dad I don't understand"). Baseline and intervention sessions were videotaped. The videotapes were observed and coded by two investigators. Interobserver reliability was 90%.

Twelve homework sessions were recorded in each phase of the ABAB design. Baseline phases, A1 and A2 consisted of the observation and recording of the frequency of distracting behaviors during homework sessions, and the withdrawal of treatment respectively. Treatment phases B1 and B2 consisted of the reading and re-reading of the Social Story respectively. Following the completion of the final phase of intervention, qualitative information was obtained from the parents and teachers of the participant. Parental questioning provides information relative to the impact that the Social Story might have on the participant during homework and other contexts. Additionally, qualitative information gathered from parents allows for a better understanding of how the implementation of a Social Story might have impacted the family as a whole. Qualitative information obtained from teachers helps us determine whether carry over effects of the intervention could occur from the home to the school environment.

Results showed an overall decrease in socially inappropriate behaviors. Specifically, a 48%, 61%, 74%, and 60% decrease in crying, screaming, falling, and hitting was observed respectively. Qualitative findings obtained from parents confirmed that, after the intervention, the participant was able to find the proper words and to appropriately communicate that he needs assistance. Qualitative findings obtained from teachers revealed that prior to the intervention, the participant would engage in inappropriate behaviors similar to those that were targeted for intervention. Following the introduction and implementation of the Social Story at home, teachers reported an observed decease in the participant's inappropriate behaviors in the classroom. In other words, the participant was able to generalize his use of effective communication skills from his home to his classroom setting.

This study provided additional support for the use of Social Stories in alleviating inappropriate social behaviors. The success of this study not only lies in its ability to decrease the frequency of the inappropriate behaviors, it also provided the participant and his parents a way to deal with his frustration. More specifically, instead of screaming, crying, falling, or hitting when he needed assistance and felt incapable of independently completing his homework, the participant was able to learn the more appropriate alternative behavior of using language to communicate his frustration. Another strength associated with this study is the inclusion of the parents in the intervention procedure. The involvement of parents and their awareness of their child's target behaviors might further contribute to carry over effects across different contexts and settings. Even though carry effects were observed from the participant's home to his classroom, the study failed to evaluate whether the Social Story could generalize to other behaviors.

Seven studies used a multiple baseline design to measure the efficacy of Social Story interventions. The first of these studies aimed at using Social Stories for the purpose of increasing appropriate social interactions as opposed to decreasing inappropriate behaviors (Scattone & Tingstrom, & Wilczynski, 2006). Three boys whose ages ranged between 8 and 13 years and who were diagnosed with ASD were asked to participate in the study. All participants were chosen because of their difficulties with initiating and maintaining conversations, their inappropriate social interactions with their peers during unstructured activities, and their inability to appropriately respond to communications initiated by their peers. An individualized Social Story which adheres to Gray's (1998) guidelines and which aimed at enhancing the level of appropriate social interactions was developed for each participant. Specifically, each Social

Story included explanations of appropriate initiations and responses that are exhibited by their typical peers.

The first session of the intervention consisted of the teacher reading the Social Story to each participant. The teacher then evaluated the participant's understanding of the Social Story by administering a list of predetermined comprehension questions. The Social Story was re-read and the comprehension questions were explained until a100% accuracy was achieved. If the participant was able to read, subsequent intervention sessions consisted of having the participant read the Social Story. The Social Story was read one time per day, 5 days per week, right before the unstructured activity. A 10 second partial interval recording was used to record behavioral observations.

Results did not show an increase in appropriate behaviors for the first participant following the introduction of the Social Story. The second participant, however, demonstrated a significant increase in appropriate social interactions. The third participant showed a moderate improvement in appropriate social interactions from baseline to intervention. This study has added to the literature demonstrating that Social Stories may be effective in increasing appropriate social interactions in some children who are diagnosed with ASD. This study, however, did not achieve the same level of positive behavior change that previous studies examining the efficacy of a Social Story intervention have managed to achieve. The modest potency of this study could be explained, as highlighted by its authors, by the possibility that Social Stories tend to be more effective in alleviating inappropriate social behaviors, as opposed to improving these behaviors. Finally, the fact that the study solely used a Social Story without the inclusion of prompts, reward systems, and most importantly the participants' specific and restricted interests, might have contributed to the weakness of the intervention.

Research has primarily focused on using Social Stories as teaching techniques in creating positive social outcomes in children who are diagnosed with mild or moderate autism, or with Asperger's syndrome. Consequently, Barry and Burlew (2004) added to the literature by investigating the effects of Social Stories on the social outcomes on children who are diagnosed on the severe end of the autism spectrum. The study used an ABCD multiple baseline design across two participants to investigate the effects of Social Stories on the choice-making and play behavior skills of the participants. Two dependent variables were measured throughout the study: prompting needed for choice making, and appropriate play. During the measurement of the first dependent variable, a 5-point scale designed to rate the amount of prompting needed to elicit a choice from the participant was used. For example, a rating of 4 would be given if the child failed to respond to all prompting and/or engaged in self-stimulatory behavior instead of making a choice. A rating of 0 would be given if the participant showed evidence of independent choice making skills and of the participant carried out his choice without prompts provided by the teacher. Appropriate play consisted of interactions with materials and/or peers that are similar to those typically displayed by same-age peers in a general education environment.

Phase A of the study consisted of student observations and the recording of the level of prompting required for the participant to make a choice. Phase A also consisted of the recording of the duration of appropriate play exhibited by the participants. Two Social Stories that focused on choice making and appropriate play with materials were read to each participant during phase B. Actual photographs of the participants, their classrooms, and their peers were used to illustrate the written content of the Social Stories. The stories were read on a daily basis. Repetition and corrective feedback were used to ensure the understanding of the stories. Following the reading of the stories and emphasizing the relevance of the illustrations to the words, opportunities to

practice the behavioral skills highlighted in the stories were created. Recordings of the level of prompting needed to make a choice, and recordings of appropriate play with materials were made. A third Social Story describing appropriate interactions with peers was introduced during Phase C of the study. The same procedures for practicing the Social Story carried out in Phase B, were also practiced in Phase C. The level of prompting required to make a choice and the duration of appropriate play with peers were recorded. The Social Stories were read in the morning and were still made available for the participants during Phase D. Teacher intervention, however, was withdrawn followed by the collection of data pertaining to the level of prompting and the duration of appropriate social play.

Results showed an increase in the ability of both participants to make independent choices and to engage in appropriate social play. This study, therefore, provides further evidence that Social Stories could serve as effective interventions for children with autism. More importantly, this study has contributed to the research base by drawing attention to the efficacy of Social Stories when applied to students who are diagnosed with severe autism and who exhibit little to no language and communication skills.

Thiemann and Goldstein (2001) used a multiple baseline design across social behaviors to examine the effects of Social Stories supplemented with pictorial and text-based cues, and videotaped feedback on the social communication skills of five students with autism. For comparison purposes, each of the five target students was paired with two other students without disabilities. During baseline, each triad participated in two 10-minute sessions every week. In these sessions, students engaged in social activities which included pretend play, board games, and art or science projects without any adult interaction. Treatment sessions took place in the media room and consisted of two 30-minute sessions every week. Each treatment session was

divided into three 10 minute sub-sessions: (a) 10 minutes of instruction using Social Stories, text cues, and pictures of social skills, (b) 10 minutes of social interactions, and (c) 10 minutes of self-evaluation by means of video feedback. Four Social Stories targeting four dependent measures were constructed according to Gray's (1995) recommendations. Parents were also provided with a copy of each Social Story to be read on a daily basis with their child in at home. The dependent measures were (a) securing attention, (b) initiating comments, (c) initiating requests, and (d) contingent responses.

Results of this study showed significant improvements in the social communication skills for the five participants as they interacted with peers without disabilities. Following treatment, all participants demonstrated increased rates of the four dependent measures. Two of the participant's improvements generalized across untrained targeted social behaviors, while another participant was able to generalize his improved social skills to his classroom. Overall, the findings of this study validate the importance of Social Stories in improving the social communication of children who are diagnosed with autism. A limitation associated with the use of this study is its use of multiple visual strategies, including written cues, pictures of social skills, and video feedback, in addition to the use of Social Stories. All these strategies were implemented under the same intervention without the examination of the efficacy of each of these strategies when implemented alone. It is therefore unclear whether improvements occurred as a result of the unique combination of the different strategies, or just the Social Story. Future research should carry out separate investigations of the usefulness of each of these strategies.

Even though Thiemann and Goldstein (2001) have succeeded in establishing that the use of Social Stories in combination with visual supports is effective, the specific outcomes of using Social Stories alone are still unclear. As a result, Delano and Snell (2006) sought to evaluate the

effectiveness of Social Stories in increasing the same target social behaviors identified by Thiemann and Goldstein (2001) but without the combination of supplemental treatment strategies. The study also sought to assess the generalization of the intervention across different people and settings. Participants included three students with autism and six nondisabled peers. Each target student with autism was paired with two nondisabled peers; one for the intervention session and the other for generalization probes.

A multiple-probe-across participant design was used to assess the effects of Social Stories on the duration of appropriate social engagement of the three target students. A coding method was developed to produce the following dependent measures: (a) appropriate social engagement with a peer, (b) inappropriate social engagement, and (c) the absence of engagement with a peer. Duration data were collected for these dependent measures. Frequency data was also collected on four other variables: seeking attention, initiating comments, initiating requests, and making contingent responses. A digital camcorder was used to videotape observation sessions.

A set of Social Stories which follow Gray's (2000) format and recommendations was developed for each of the target students. Six peers without developmental disabilities were observed before baseline procedures were carried out. Observation data were collected on the duration of each of the three dependent measures and were used for comparison purposes. Three components made up baseline sessions. These components were (a) story reading, (b) comprehension check, and (c) play session. Specifically, the target student was paired with his training peer and was read a generic story in a resource classroom. Following the reading of the story, the target student was asked a number of comprehension questions assessing his understanding of the story. The authors continued to ask the questions until 75% of the questions were answered correctly. The target student then took part in a 10 minute play session during

which the experimenter did not engage in any form of interaction with the student. Intervention sessions consisted of the same three components applied during baseline. The generic story read during baseline, however, was replaced with a Social Story which was specific to the events of the play session. When the target student demonstrated improvements in his social engagement skills, generalization probes were conducted by observing the target student in a general education situation. The target student was also observed with the novel peer in the intervention setting (resource classroom). No instructions were provided and no Social Stories were read during generalization probes.

Results showed an increase in the duration of appropriate social engagement in all three participants following the introduction of the Social Story intervention. This increase was evident in the three students' engagement with the training as well as novel peers in the intervention setting. Two of the three participants, however, showed gains in their general education setting. Even though the third student demonstrated generalized treatment effects during his interaction with a novel peer, he did not show any improvements in the general education setting. Furthermore, all three students demonstrated an increase in the frequency of the four target skills: seeking attention, initiating comments, initiating requests, and contingent responses. The increase, however, was mostly evident in two of these target skills which were: initiating comments and contingent responses. Again, all students demonstrated an increased frequency in the social target skills with the training and novel peer. The first two students demonstrated generalized treatment effects in the general education classroom, while the third student showed improvement in the intervention setting only.

Overall, the findings of this study support the idea that the use of Social Story interventions may increase the social engagement of children with autism with peers. One of the

contributions that this study made to the literature on the topic of Social Stories consists of its use of a Social Story as the main intervention. Also, unlike other studies which have focused on investigating the role of Social Stories in alleviating challenging behaviors, this study has succeeded in showing that Social Stories are effective in enhancing positive behaviors. Finally, a limitation associated with this study consists of the fact that, throughout the course of the study, two of the three students were participating in a discrete trial program targeting the students' language and academic skills. It is, therefore, difficult to make accurate assumptions regarding the efficacy of a Social Story as the sole intervention in enhancing the social skills of children who are diagnosed with autism.

Schneider and Goldstein (2010) also addressed the concern regarding the efficacy of Social Stories when combined with other forms of treatments by examining the outcomes of Social Stories alone. A multiple baseline design across three participants was used. Participants' grade level ranged from kindergarten to fifth-grade. Inclusion criteria for participation in the study included a diagnosis of autism, the demonstration of off-task problem behaviors, verbal and/or social communication impairments, and not being recipients of any sorts of services or interventions targeting their off-task behaviors.

A Social Story targeting the social behaviors of each child was written according to Gray's (1998) recommendations. During baseline, participants engaged in the regular classroom routine and activities with no interactions with the research investigators taking place. Treatment consisted of the reading of the Social Story to the participant on a daily basis immediately prior to the targeted routine. Targeted behaviors were coded every 10 s for 2.5 min for one of the participants, and every 15 s for 5 min for the remaining two participants

Results of the study demonstrated that Social Stories could be effective in improving classroom on-task behavior. More specifically, the mean percentage of intervals of on-task behavior for the first participant increased from 29% during baseline to 50% during Social Story intervention. An increase from 56% to 76% and 60% to 73% from baseline to Social Story intervention was evident for the second and third participant respectively. Observing that there was room for improvement, a follow up analysis was conducted for the first participant. The follow up consisted of replacing the Social Story with a visual schedule using the Social Story pictures to enhance the effects of the intervention. After the story was transformed from an audio presentation into a visual presentation, the first participant showed an additional increase of 22% in on-task behavior.

Even though this study provided further evidence supporting the usefulness of Social Stories in enhancing on-task behavior, it failed to address the ability of the participants to generalize their targeted behaviors from one context to the other. Furthermore, the study showed that on-task behavior was augmented with the introduction of a supplemental visual schedule. It is remains uncertain, however, whether the increase in the target behavior was a result of the administration of the visual schedule alone.

Restricted and Repetitive Behaviors (RRB)

Overview of RRB. Repetitive and restricted interests and behaviors are amongst the core features exhibited by individuals identified as having Autism Spectrum Disorders (ASD) (Lam, Bodfish, & Piven, 2008). Significant focus on the study of restricted, repetitive behaviors (RRB) has been observed in numerous researches for the purpose of identifying causes of RRB and understanding the progression of such behaviors in individuals with ASD. More importantly, research on RRB has been developed in order to gain an understanding of the impact that RRB

have on the features of ASD, including social skills (Boyd, Conroy, Mancil, Nakao, & Alter, 2006).

According to the DSM-IV (American Psychiatric Association, 2000) meeting one of the following RRB criteria is necessary for ASD diagnosis: '(a) encompassing preoccupation with one or more stereotyped and restricted patterns of interest that is abnormal either in intensity or focus; (b) apparently inflexible adherence to specific, nonfunctional routines or rituals; (c) stereotyped and repetitive motor mannerisms (e.g., hand or finger flapping or twisting, or complex whole-body movements); or (d) preoccupation with parts of objects.' It is important to highlight that ASD is a heterogeneous condition: there is a whole spectrum of individuals who are diagnosed with ASD but whose symptoms significantly differ from each other. The above DSM IV definition targets ASD in general; it does not target specific individuals with ASD. The fact that the criteria that are used for placing individuals under the ASD spectrum, including RRB criteria, are broad criteria characterized by a wide-ranging variability, poses a great challenge to researchers in the field of autism (Lam, Bodfish, & Piven, 2008; Klin, Danovitch, Merz, & Volkmar, 2007). The broad scope and wide range of ASD and RRB criteria make research which aims at conducting a more in depth and thorough examination of the vast variety of symptoms of ASD, particularly those that pertain to RRB, necessary.

Various studies (Cuccaro et al., 2003; Shao et al., 2003; Bishop, Richler, & Lord, 2006; Szatmari et al., 2006) have looked at the nature and variations of RRB by means of evaluating scores obtained from the Autism Diagnostic Interview-Revised (ADI-R, Rutter, Le Couteur, & Lord, 2003). These studies have indicated that RRB are classified into two different factors; a 'lower-order' category referred to as 'Repetitive Sensory and Motor Behaviors' (RSMB) and a 'higher-order' category referred to as 'Insistence on Sameness' (IS). Upon further examination

of the different factors of RRB's as measured by the ADI, Lam, Bodfish, &Piven (2008) were able to identify an additional factor; Circumscribed interests. Turner (1999) also classified RRB into two factors; higher and lower order. Lower order behaviors in this case are associated with simple, repetitive and stereotypical actions, as well as decreased developmental levels and cognitive functioning. Higher order behaviors, on the other hand, consist of more advanced RRB, or circumscribed interests, and are associated with higher developmental levels and advanced cognitive thinking. Circumscribed interests was not grouped in a separate category, rather, it was perceived as a set of complex repetitive behaviors commonly observed in individuals who are identified on the higher end of ASD (Bodfish, Symons, Parker, & Lewis, 2000). Similarly, Klin, Danovitch, Merz, & Volkmar (2007) indicated that criterion 'a' of the DSM definition, also referred to as circumscribed interests, is more commonly associated with individuals with ASD whose symptoms fall on the higher end of the spectrum. The remaining criteria, however, (i.e. those that include ritualistic, stereotypical, and repetitive behaviors) are characteristic of lower functioning individuals with ASD.

Current research (Fecteau, Mottron, Berthiaume, & Burack, 2003; Seltzer et al., 2004; Shattuck et al., 2007) has shown that core features of autism tend to fade away as children with ASD reach adolescence than young adulthood. Even though research suggests that improvements are most commonly evident in areas of reciprocal social interaction and communication, improvements are not as apparent in the area of RRB. Researchers have therefore concluded that RRB constitutes the primary symptom of ASD, while symptoms in the social and communication domain are secondary (Chowdhury, Benson, & Hillier, 2010). Unlike circumscribed interests, the prevalence and severity of which increase with age, areas of RRB that are related to ritualistic, stereotypical, and repetitive behaviors, and rigid routines are more

pronounced during the early stages of development, but less apparent during the later stages of development. Researchers have attributed the increase in the severity of circumscribed interests overtime to improvements in social and communication skills. In other words, the more communication skills individuals with ASD acquire, the more likely they are to engage in conversations that center around their circumscribed interests (Mancil, & Pearl, 2008).

Development of RRB. Factors contributing to the development of RRB have been explained by means of at least one or more of several different approaches. One of those approaches explains autism from a homeostatic perspective, while other approaches include behavioral/operant, cognitive, and biological/neuro -physiological explanations.

Homeostatic perspective. One of the prevailing hypotheses explaining the origin of autism revolves around the idea that individuals with autism engage in repetitive behaviors for reasons associated with homeostatic mechanisms. Repetitive behaviors tend to surface in conditions that increase arousal levels – situations that induce higher anxiety levels lead to more intense repetitive behaviors, while lower anxiety conditions tend to lower the intensity and frequency of restricted behaviors. Proponents of the homeostatic principle explain that engaging in repetitive behaviors helps reduce the intensity and unfamiliarity of highly arousing situations. Moreover, because "nonspecific activity of the ascending reticular activating system is at a chronically high level in autism," individuals with autism attempt to reduce this activity by engaging in stereotyped repetitive behaviors. Repetitive behaviors in this case act as suppressors to additional sensory input stemming from high arousing conditions (Turner,1999).

Behavioral/operant perspective. Researchers have also speculated that reinforcement seems to play a role in the strengthening of repetitive behaviors. For this reason, repetitive behaviors are referred to as operant behaviors- behaviors that are maintained by, or are more

likely to occur again in the future due to the consequence/s they produce. In this case, repetitive behaviors are strengthened by the sensory consequences that are generated by engaging in such behaviors. Repetitive behaviors could present themselves in the form of perceptual, auditory, or tactile stimulation. Alleviating the frequency and intensity of repetitive behavior is evident in conditions where these behaviors are replaced with more appropriate behaviors that serve the same stimulatory function (Turner, 1999).

One of the signature characteristics of individuals with autism is that they have an impaired theory of mind. Individuals with autism lack the ability to understand and make sense of the beliefs, intentions, and mental states of other individuals. As a means of coping with such impairment, individuals with autism strive to alleviate high anxiety levels, resulting from their struggle to make interpretations of the intentions of others, by engaging in repetitive behaviors. Repetitive behaviors therefore provide individuals with autism a safe venue from a world that often might seem unpredictable and fear provoking. Repetitive behaviors are most intense and most frequent when individuals with autism are exposed to novel and unpredictable situations. Additionally, due to their lack of social knowledge and skills, individuals with autism are likely to develop circumscribed interests- interests that most commonly center around nonsocial and mundane topics (Turner, 1999).

Cognitive aspects of RRB. Weak *central coherence.* Some individuals with autism are known for their unusual tendency to focus on the details of objects and incidences, while their gestalt perception (their ability to focus on the larger context of things) is almost completely impaired (Chen, Rodgers, & McConachie, 2009). The focus on detail and the neglect of 'perceptual whole' presented by individuals with autism is measured by various instruments. One of these instruments is the Embedded Figures Test (EFT) which examines the individual's

ability to identify a figure, shape, or letter embedded within a wider context or pattern (Chen, Rodgers, & McConachie, 2008). Various studies (Jolliffe & Baron-Cohen 1997; Shah & Frith 1983) have indicated that individuals with autism show higher performance on the EFT than their control group that consists of typically developing individuals. Specifically, Mottron, Burack, Iarocci, Belleville, & Enns (2003) presented 12 children and adolescents with high functioning autism and 12 children and adolescents who are typically developing with two target stimuli: letters H or S. The letters were displayed either individually or were grouped together, several H's or S's, forming a pattern which represents the digit 8. Results of this study indicated that individuals with autism ignored the irrelevant global representation of the digit 8 that was configured by the assembly of the target stimuli (H's or S's). Instead they managed to focus only on, and identify the target stimuli that are embedded within the digit 8. Typically developing participants, on the other hand, displayed an enhanced performance in identifying target stimuli (H's or S's) as they were presented individually, as opposed to being represented within the framework of a larger and much broader pattern composed of multiple versions of the target stimulus (digit 8) (Mottron, Burack, Iarocci, Belleville, & Enns, 2003).

Some researchers (Chen, Rodgers, & McConachie, 2008) studying weak central coherence have proposed that a correlation between this cognitive style and restricted and repetitive behaviors exists. More specifically, findings have shown that an increased level of restricted and repetitive behaviors is highly linked to improved performance on the EFT. In their study, Chen, Rodgers, and McConachie (2008) have also established that a significant association between sensory abnormalities and restricted and repetitive behaviors is present. Researchers have justified the presence of this association by explaining that individuals with

autism are more likely to engage in restricted and repetitive behaviors in order to gain better control of their atypical sensory processing (Chen, Rodgers, and McConachie, 2008).

Moreover, research has shown that the neural causes associated with the formation of abnormal sensory processing are the same for those responsible for weak central coherence. This means that in addition to being overly sensitive to specific sensory information- such as noise, light or taste- many individuals with autism lack the ability to look at the gestalt or 'the big picture' and focus on the detailed features of the environment instead. As a result, by engaging in restricted and repetitive behaviors, individuals with autism are able to gain better control over their environment and create one which is safe and predictable (South, Ozonoff, and McMahon, 2005).

Executive dysfunction. Another cognitive theory explaining the presence of restricted and repetitive behavior in autism is the executive dysfunction hypothesis. It has been shown that individuals with autism engage in such behaviors due to the manifestation of executive dysfunction which causes individuals with autism to lose their ability to execute and control their behavior in a socially appropriate and acceptable manner (Turner, 1999). The hypothesis provides a suitable explanation of the fixed, perseverative and stereotypical nature of repetitive behaviors. When individuals with autism are unable to effectively adjust and control their behaviors, they are left with the option of repeatedly engaging in the same behaviors (Turner, 1999).

The executive dysfunction hypothesis postulates that individuals with this dysfunction struggle to shift from one form of thinking to another; even though instructions that the other form of thinking is incorrect or inaccurate (South, Ozonoff, & McMahon, 2007; Yerys, Wallace, Harrison, Celano, Giedd, & Kenworthy, 2009). One of the measures which examine executive

dysfunction is the Wisconsin Card Sorting Task (WCST). Through the WCST, individuals are presented with 4 stimulus cards and 128 response cards. Each card is illustrated by different geometric shapes which vary in color, design, or quantity. Participants are expected to match the response cards with the stimulus cards in response to feedback provided by the person administering the test. Participants are not provided with explicit instructions; rather they are expected to infer matching procedures (i.e whether the cards should be matched by color, design, or number) by means of trial and error. After participants have mastered a particular classification rule, and once they have achieved 10 correct matches, a different rule is introduced with no prior warning. Participants are expected to make a shift from the previously acquired classification rule to the new one. The time that participants took to acquire the new rule, and the mistakes made during matching procedures are examined and analyzed by test administrators (Nyhus & Barceló, 2009).

South, Ozonoff, and McMahon, 2007 examined executive dysfunction in a group of participants with autism by means of the WCST. After using the Repetitive Behavior Interview (RBI) and the Yale Special Interests Interview (YSII), to measure participants' repetitive behaviors and circumscribed interests respectively, they reported a significant correlation between executive dysfunction and restricted and repetitive behavior in participants with autism. In other words, participants with preservative responses on the WCST also had higher scores on the RBI and YSII measures.

In another study, Yerys, Wallace, Harrison, Celano, Giedd, and Kenworthy, 2009 used the Intradimentional/Extradimentional Shift Test (ID/ED) to measure executive dysfunction in individuals with autism. The ID/ED test is composed of nine stages that are grouped according to three different tasks. Participants are presented with four empty rectangular boxes on a computer

screen. In each trial, two stimuli appear in separate boxes- stimuli are pink abstract shapes or random white line drawings. Task one, which requires simple object discrimination, consists of stages 1-5. Through this task participants are expected to distinguish between one of two pink shapes. As in the WCST, correct discrimination and rule acquisition occur through trial and error procedures conducted by the examiner. Task one requires participants to make correct discrimination while also ignoring distracting shapes (white line drawings). Task two, which consists of stages 6-7, brings in ID shift procedures. Participants are expected to apply the same rule of task one to the new stimuli presented in task two (stimuli are still pink but shaped differently). Task three, which consists of stages 8-9, introduces ED shift procedures. Participants are presented with new pink shapes and white lines. However, they are now required to shift their focus from the pink shapes (an older feature) to the white line drawings (a new and previously irrelevant feature). Results in this study were twofold; participants with autism exhibited ID/ED deficits, and a significant correlation between ID/ED deficits and restricted and repetitive behaviors (as measured by the ADI/ADI-R) was evident (Yerys, Wallace, Harrison, Celano, Giedd, & Kenworthy, 2009).

Despite the fact that such perseverations were evident in response to experimental manipulations, they can be similarly apparent in response to real life conditions. In other words, individuals who perseverate on executive dysfunction measures are likely to develop a series of activities or speech patterns that are difficult to break off. These include stereotypical movements, circumscribed interests, and rigid practices (South, Ozonoff, & McMahon, 2007).

Biological perspective. Lewis and Bodfish (1998) proposed that repetitive behavior is brought about as a result of neural circuit impairments linked to the basal ganglia. The basal ganglia are located at the lower end of the brain and are linked with major areas such as the

cerebral cortex and the thalamus. Examples of some of the functions related to the basal ganglia include voluntary motor control, and procedural learning, which pertain to the acquisition of new skills following repeated practice and execution. The regulation of eye movements, cognitive and emotional functions are also associated with the basal ganglia. Most importantly, it is reported that behavioral switching and decision making processes are associated with the basal ganglia. The basal ganglia seem to be responsible for helping the individual determine which action or behavior to execute at a particular time.

Conversely Grossman and Verobyev (1998) maintained that, as observed in animals who exhibit atypical stereotyped movements and behaviors, these movements and behaviors are caused by abnormal levels of dopamine and serotonin.

Restricted and Circumscribed Interests

Restricted and circumscribed interests are topics or objects in which individuals with ASD engage with unusual intensity and focus. These interests tend to become more intense as individuals progress into their adult years (Nadig, Lee, Singh, Bosshart, & Ozonoff, 2010; Mancil, & Pearl, 2008). The content of these interests also appears to change across the life span of individuals with ASD (Nadig, Lee, Singh, Bosshart, & Ozonoff, 2010; Mercier, Mottron, & Belleville, 2000). After obtaining subjective viewpoints through interviews from six participants diagnosed with high functioning ASD, Mercier, Mottron, and Belleville, 2000 concluded that participants' restricted interests changed and evolved through time. According to the participants, such changes were primarily brought about as a result of strategies that they developed in the hope of overcoming their restricted interests (which they perceive as invasive, and socially destructive). One of the strategies consisted of maintaining the restricted interests, and adjusting them to fit cultural and social expectations. Participants have indicated that

adapting their interests to the environment required them to hide their interests, carry them out in private rather than public settings, or alter their interests rendering them socially appropriate. Another strategy that the participants suggested included reducing or diminishing their restricted interests. One participant took pride in his ability to give up his restricted interest. He admitted that as a result of developing alternate interests, his restricted interest gradually became extinct. More importantly, family members who played a key role in the social growth of the participant acknowledged that it was only through the process of 'maturation,' or the participant's ability to replace his restricted interests with social integration and appropriate social etiquette, that 'normalization' could be achieved. Finally, some participants explained that they learned to change their restricted interests by means of diversification. In other words, some participants stated that instead of solely focusing on one interest, they have learned to develop their interests and broaden them to other pursuits and activities (Mercier, Mottron, and Belleville, 2000).

In addition to changing and evolving through time, the content of restricted and circumscribed interests are sometimes similar to those acquired by typically developing children; such interests would include video games, or books. At other times, the content seems to be odd or unusual in nature (Nadig, Lee, Singh, Bosshart, and Ozonoff, 2010). For instance, individuals with autism are often interested in esoteric things such as 18th century history, train schedules, sewer systems, or garage doors (Nadig, Lee, Singh, Bosshart, and Ozonoff, 2010; Lam, Bodfish, and Piven, 2008).

Negative aspects of restricted and circumscribed interests. Restricted interests tend to impede the ability of individuals with ASD to develop proper peer relationships due to the fact that these individuals are mostly concerned about engaging in conversations directed towards their interests rather than the interests of others (Attwood, 1998). Boyd et al. (2007) highlighted

a number of attributes of restricted and circumscribed interests common to individuals with ASD. These individuals are described as relentlessly accumulating considerable amounts of information pertaining to their restricted interest- topics that they find uninteresting are usually discarded or overlooked. Often, it proves difficult to redirect individuals with ASD from physically interacting with or chattering about their interests; the level of focus on, and fascination with the interest continues to be intense and prolonged. Consequently, as individuals with ASD persist in talking about their interests, one-sided and monologue-style conversations will be maintained with minimal eye contact with their conversation partner.

Nadig et al. (2010) confirmed the validity of these patterns of behavior attributed to individuals with ASD in a study they conducted on 20 children with high-functioning autism and 17 typically developing children. Participants in this study were required to engage in a conversation with an adult about a circumscribed interest and a generic topic. Participant utterances were coded depending on whether they were contingent, self-contingent or non-contingent upon the topic of discourse initiated by the adult partner (contingent utterance were defined as those that kept in tune with and maintained the conversation topic). Results of the study supported previous claims about the adverse nature of restricted and circumscribed interests. More specifically, this study showed that, in relation to generic topics, participants with high functioning autism gave fewer elaborations and responses that were contingent on the topic of discourse. Additionally, these participants produced significantly more elaborations and responses that are self-contingent. That is to say, these elaborations were not entirely novel, rather, they were contingent upon a topic that they themselves introduced, and repeatedly talked about. The conversational styles of the comparison group, consisting of typically developing children, were not significantly impacted by the variation of conversational topics. On the other

hand, it was obvious that participants with high functioning autism, due to their enthusiasm and fascination with their circumscribed interest, appeared to be engaging in one sided conversations. A monologue feel to the conversation was therefore created at the expense of being more engaged and attentive to their conversation partner. This provides further support to the notion that circumscribed interests are harmful to the individual's ability to effectively participate in reciprocal and two-sided conversations.

In their study, Mercier, Mottron, and Belleville (2000) elaborated on the invasive nature of restricted and circumscribed interests. They did so by not just emphasizing the damage that these interests could have on the social and personal lives of individuals with ASD, but by also emphasizing the damage they could have on the families of these individuals and the people around them. Participants acknowledged the suffering and frustration experienced by their families. One participant in particular indicated that his mother is having a 'hard time' dealing with his restricted and circumscribed interests and that these interests are causing other people to 'get tired of' him. Family members themselves indicated that conversations of their relatives with ASD are significantly focused on their restricted and circumscribed interests, and that they continuously talk about them to the extent that they get on the nerves of other people. Consequently, individuals with ASD are singled out and ostracized. They are also prone to develop relationship and marital conflicts with their partners (assuming they had the capacity and the social means to establish a relationship to begin with).

Restricted interests as social instruction (and as a strength) and effects on social behaviors. Boyd et al. (2006) worked with a seven-year-old boy diagnosed with autism for the purpose of identifying then using the child's restricted interests to increase his social behaviors. Target social behaviors included social initiations and continued social exchanges with typical

peers. The child's restricted interest was identified by means of a teacher interview, using a structured interview questionnaire, and a parent phone interview. Both the teacher and parents independently noted that balloons were the child's object of primary interest. Interview responses based on teacher and parent interviews were validated through direct assessment. Specifically, several items with which the child enjoys playing (including balloons) were introduced to the child. After demonstrating how the items can be played with, the child was given 5 minutes to play with the items during which the amount of time the child physically engaged in each item was observed and recorded. The direct assessment results corroborated those garnered by teacher and parent interviews. In order to determine whether balloons, the child's restricted interest, played a role in improving his social behavior, the following steps were conducted. One of the child's peers was instructed to hold a balloon making sure no social initiations to the child are made. Another balloon was placed on the other side of the room, and the child was given the choice of either playing alone or with the peer. The same procedure was repeated by using coloring supplies (a neutral item) instead of balloons. Results showed that the child was more likely to make initiations with his peer in the presence of balloons rather than the neutral item. This study, therefore, confirms that a child's interest could be identified and utilized to improve his social initiations and interactions.

Using a multiple baseline across participant design, Baker et al. (1998) sought to increase the amount of time that children with autism engaged in social interactive play by incorporating their obsessive behaviors (idiosyncratic objects, topics, and themes on which the children perseverate) in a social game. The study also aimed at examining the occurrence of generalizations and maintenance to other social games that did not include the child's obsessive behaviors, and an increased positive affect exhibited as the child engaged in interactive play with

typical peers. Participants' ages ranged from 5 to 8 years. Obsessive behaviors of the first participant consisted of persistent repetitive speech about particular topics, specifically those that relate to U.S states. The second participant was primarily distinguished by her engagement in relentless obsessive behaviors involving Disney characters and paraphernalia, while the third participant exhibited obsessions with movies.

The baseline phase consisted of the recording of observations made as all three participants engaged in routine activities during recess and lunch settings. Participants were also prompted to participate in the same game used in intervention, but with the exclusion of the obsession theme. During the intervention phase, participants were prompted to participate in a game that is typically played at school and which incorporates the participant's obsessive behaviors. Results of this study demonstrated that obsessive behaviors (behaviors that are commonly perceived as challenging and disruptive) can play an effective role in creating positive social interactions between children with autism and their typical peers. Results further showed that increases in appropriate social play are maintained even when adult prompting is withdrawn. Positive social play was also shown to generalize to other non-obsession theme games. A positive increase in the participants' affect was also evident, highlighting the role that the intervention played in enhancing the participants' interests, motivation and happiness.

In another study, a multiple baseline design across participants was used to examine the extent to which an intervention which incorporated the thematic ritualistic behaviors of three children with autism into an appropriate social game would result in increased social interactions with their siblings (Baker, 2000). Baseline conditions consisted of observations of the participants' social play behaviors with their siblings under naturally occurring conditions. A selection of age appropriate toys and games were provided in each playroom setting. Intervention

conditions were similar to those during baseline with the exception of teaching participants to play a modified version of the game bingo incorporating their thematic ritualistic interests.

Koegel et al. (2012) also demonstrated the effectiveness of the use of perseverative interests in promoting positive socialization behaviors between three adolescents with autism and their typically developing peers. The dependent measures targeted in this study consisted of the percentage of intervals that participants engaged with their typically developing peers in addition to the frequency of initiations that participants made towards their peers. All students were provided with opportunities to join a large variety of social clubs during the school's lunch hour. A repeated measures multiple-baseline across participants was used to evaluate the effects of the intervention. Intervention involved the creation of a social club designed around the perseverative interests of each of the participants. Results of the study showed that all three participants were socially isolated at lunch during baseline, even though a number of social clubs were provided for them to join. However, marked improvements in all participants' level of social engagement and initiations with typically developing peers were evident once social clubs that targeted their individual perseverative interests were made available.

Repetitive Behaviors

Repetitive behaviors as difficulties. Repetitive and stereotypic motor behaviors which include body rocking, object tapping hand flapping, finger flapping, etc., cause numerous challenges for children with ASD (Loftin, Odom, & Lantz, 2007). These behaviors have been considered abnormal or pathological, and lowering the occurrence of these behaviors has been the target for many years. As a result of their bizarre, and in some instances noisy nature, repetitive motor behaviors could create social stigma for students with ASD, therefore preventing them from being included in general education settings, decreasing their ability to

engage in positive social interactions with other individuals in the natural environment. Stereotypic motor behaviors are also likely to interfere with the students' ability to learn new adaptive skills and behaviors, and to attend to academic instruction and engage in appropriate to play (Loftin, Odom, & Lantz, 2007; Wolery, Kirk, & Gast, 1985). Engaging in stereotypic motor behaviors also threatens students' accurate performances of previously learned tasks (Loftin, Odom, & Lantz, 2007).

Chapter III

Research Methods

For purposes of the dissertation proposal, this chapter will include a description of both the methods for the dissertation study and the results of the pilot study conducted by the researcher and how the pilot study informed the dissertation study. Therefore, the chapter will begin with a description of the pilot study and how the results of the pilot study informed the research about the design of the dissertation study. Following, research methods for the dissertation will be described.

Description of and Rationale for Pilot Study

A pilot study was conducted during the Summer of 2012 in preparation for the current dissertation study. According to Teijlingen and Hundley (2001), pilot studies are an essential component of a good study design. The pilot for this study was conducted for several reasons. Primarily, this pilot study was conducted for the purpose of assisting the researcher to develop and test research instruments, design a research methodology, assess and refine the research methodology, and collect preliminary data (Teijlingen & Hundley, 2001). Furthermore, the pilot study contributed to the development of more focused research questions and an appropriate research plan.

Specifically, the pilot study was completed to pre-test the effects of a Social Story intervention on the social skills behaviors of an elementary school student diagnosed with ASD. The study took place during the summer of 2012 in a fifth grade classroom in a public charter school committed to the teaching of students with identified learning and learning related

disabilities. A single case A-B design was used to examine the effects of a Social Story intervention, incorporating the participant's restricted interests, on the frequency of appropriate social behaviors made by the participant during recess, in a school setting. The participant's restricted interests were identified by means of the Social Skills Interview (SSI), a structured interview questionnaire developed by Asmus, Conroy, Ladwig, Boyd, & Sellers, 2004. The interview questionnaire was administered to the participant's mother and one of the participant's former teachers. Based on information gathered from the parent and teacher interview questionnaire, a direct free-operant preference assessment procedure (Boyd, Alter, & Conroy, 2005) was utilized to more systematically identify the participant's restricted interests. Following the consent process, the participant's specific target behaviors were identified by means of interviewing the participant's mother and her former teacher using a semi-structured interview adapted from O'Neill et al.'s (1997) Functional Assessment Interview Form. Target behaviors consisted of appropriate social play and behaviors. Social Stories each of which incorporated one of the participant's restricted interests were then developed to address the participant's target behaviors. All Social Stories targeted the same dependent measure, increasing appropriate social behavior, and adhered to the recommendations suggested by Gray (1994, 1998, 2002) and Gray and Garand (1993).

Each of the Social Stories incorporated a different object of interest, as identified by the free-operant assessment. Prior to each intervention session, the items of interests were placed in front of the participant. The participant was then prompted to choose the item she wanted to play with for that session. The Social Story which reflected the participant's interest for the session was selected and read to her for about 15 to 20 minutes prior to recess. The primary investigator sat facing the participant at a small table in the hallway right outside her classroom. During the

first intervention session, the Social Story was placed directly facing the participant, then was read to her by the investigator. The participant was then given the opportunity to read the story on her own, out loud. Necessary guidance was provided throughout the participant's independent reading of the story. The remaining Social Story reading sessions consisted of providing the participant with the story to read out loud on her own. During a 20-minute time frame at recess, the researcher gathered data on the participant's use of targeted behaviors using a 30-second partial interval recording procedure and recorded on an observational data form.

The effectiveness of the Social Story intervention was analyzed by measuring the percentage of intervals when the participant engaged in appropriate social interactions during the 20-minute observations across the baseline and the intervention phases. Data were then plotted in a line graph as a percentage of intervals per session across the baseline and the intervention phases (see Figure 1). These data points were inspected visually for changes in level, trend, and variability. Finally, the amount of overlap between phases, or percent of nonoverlapping data (PND), was calculated. During baseline, the participant demonstrated relatively consistent low rates of appropriate social interactions (see Figure 1). Upon introduction of the Social Story intervention, an increase in the participant's target behavior was evident. Specifically, from the last three data points in the baseline period (2.5% mean target behavior) to the first three data points in the intervention phase (10.4% mean target behavior) there was a 7.9% increase in rates of appropriate social interaction. This increase demonstrates a relatively rapid change in social behavior following the implementation of a Social Story intervention.

The overall mean percentage of the target behavior exhibited by the participant during baseline was 1.9%. The participant's mean percentage of target behavior exhibited during intervention was 15.2%. The participant's engagement in appropriate social behaviors ranged

from 0% to 5% during baseline and from 0% to 30% during intervention. Descriptive statistics highlighting changes in mean are presented in Table 1.

Table 1. Descriptive Statistics for Appropriate Social Behavior- Pilot.

	M	*SD*	*Min.*	*Max.*	*Slope*	*PND*
Baseline	1.9%	2.4	0	5	0.25	
Intervention	15.2%	12.2	0	30	4.3	83.3%

A comparison of the lines drawn according to the Nugent method demonstrated a stable trend in appropriate social interactions (slope = 0.25) prior to the implementation of the Social Story intervention. Following the Social Story intervention an increase in trend (slope = 4.3), suggesting increased levels of appropriate social interactions, was evident. Finally, from baseline to intervention the PND was 83.3% indicating a moderate effect.

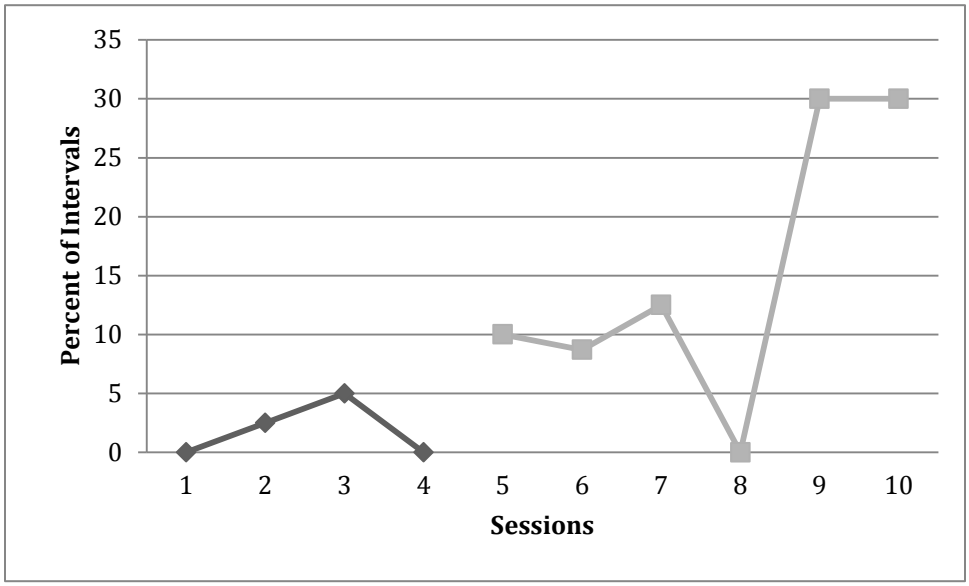

Figure 1. Display of Target Behaviors- Pilot.

Lessons Learned from Pilot Study

This pilot study provided the researcher with the opportunity to pre-test the research methodology and the research instruments under authentic conditions. Doing so helped the researcher to better understand various elements of the research process in preparation for the dissertation study and helped her discover the varying ways in which a participant might react and respond to both the intervention and the research process. Additionally, the pilot has brought to the researcher's attention certain challenges and concerns that were not anticipated prior to the initiation of the study. One of the challenges involved the use of the free operant preference assessment procedure. Even though the results of this procedure corroborated those that were obtained from the structured interview questionnaire administered to the participant's mother and teacher, the preference assessment did not allow the researcher to identify a hierarchy of preferences for the participant. For the dissertation study, the researcher supplemented the use of the free operant preference assessment with the paired preference assessment, which provided a hierarchy of the participant's preferences. The use of prompting throughout the reading of the Social Story and during data collection raised another concern in the study. The evaluation of the Social Story intervention was, therefore, confounded by the use of an additional intervention component. Furthermore, the ability of the participant to generalize her targeted behaviors across different settings and situations, other children with autism, and other behaviors was not assessed in the pilot study. The generalization of target behavior from one setting to another should be addressed in future research by conducting generalizability probes.

Additionally, the participant in this study had functional communication skills, and at least beginning reading skills. It is, therefore, unclear whether the intervention would have yielded similar results if the participant exhibited lower functional communication and reading

skills. This issue was addressed in the dissertation study as it included multiple participants who represent different levels of reading and functional communication skills. Furthermore, inter-rater agreement for observations assessing for reliability of the data was not conducted during the pilot study. To ensure data reliability, a trained secondary observer aided with the recording of data during the three phases of the dissertation study and an inter-rater agreement score was calculated. Finally, one of the primary challenges that the researcher encountered in both the pilot and the dissertation study was the appropriate involvement of parents within the intervention process. How to effectively involve parents in the Social Story interventions should be more carefully examined in future research.

Research Methods for Dissertation Study

Research design. A non-concurrent multiple baseline experimental design across participants was used to examine the effects of two Social Story interventions on the frequency of appropriate social behaviors made by participants in a school setting. The design was composed of three phases. The first phase (A) consisted of baseline where the observer recorded the frequency of the target behavior. The second phase (B) consisted of intervention 1, which involved the administration of the Social Story alone. The third phase (C) consisted of intervention 2, which involved the administration of the Social Story incorporating the restricted interests of the participants.

Participants. The participants in this study were selected from a public charter school committed to the teaching of students with identified learning and learning related disabilities. Participants were selected based on the following criteria (1) diagnoses of ASD or Pervasive Developmental Disorder-Not Otherwise Specified (PDD-NOS), (2) demonstration of social skills impairments which impede their ability to interact with other people and to successfully develop

friendships with their peers, and (3) demonstration of at least pre-reading or beginning reading skills as evidenced by testing documentation. Participants who were diagnosed with ASD but who did not show evidence of restricted and repetitive behaviors and/or social skills impairments did not qualify to take part in this study.

Taking into account the possibility of participant attrition, four participants were purposively selected at the beginning of the study. The four participants were selected following discussions conducted with the school director and school principal, consideration of the inclusion criteria and careful examination of their school records. One of the participants was later excluded from the study due to her lack of participation in the aftercare school program. An unstructured environment was required for the observation of students and for the collection of data. Aftercare was the only school program that provided students with opportunities to freely interact with one another.

Once potential participants were identified, their parents were contacted and briefed about the study by the primary investigator. When parents expressed interest in the study, the primary investigator contacted the parents again to provide more details about the study, to obtain parental consent for their children to take part in the study, and to answer questions and address concerns they may have.

Ean. Ean was eleven years old at the beginning of the study. Ean is Kevin's fraternal twin brother and also attended fifth grade in a classroom of students with various learning disabilities. The Gilliam Autism Rating Scale- Second Edition (GARS-2) was administered by Ean's teacher and the primary research investigator during the period of intervention. Ean received an Autism Index score of 109, which translates to a *Very Likely* case of autism. It was noted in Ean's educational files that the administration of an individual IQ test and accurate

measurements of his true abilities were deemed impossible due to Ean's diminished attention span and inability to understand verbal directions. Ean's perceptual skills were measured using Bender Visual Motor Gestalt Test (VMI-5). Results yielded developmental Age Equivalent Score of <2 years 7 months. Results obtained from the Bracken-3 Receptive and Expressive measures yielded a score of 63 on Receptive School Readiness Concepts (SRC), which is in the very delayed range. The Expressive SRC score was 84, which is in the delayed range.

Even though Ean uses signs, gestures and 'yes' and 'no' language to communicate, his communication skills are severely lacking and he almost never asks for things he wants. He talks louder, engages in crying spells and/or increases the intensity and frequency of his clapping each time he gets upset. Ean also engages in immediate and delayed echolalia. Specifically, Ean repeats words and phrases he has just heard or that he has heard at an earlier time in the day and that are unrelated to the current context. In most cases, the echoed words and phrases are lyrics to a favorite song. Ean also engages in inappropriate laughter from time to time. Specifically, he engages in brief laughter episodes in situations that do not necessarily call for a display of such reaction. Ean shows no interest in academic tasks, including solving math problems and reading. He inappropriately answers questions about a statement or a brief story.

As a result of his social skills impairment, Ean does not seem to have friends. He does not participate in appropriate social play, does not initiate conversations with his peers or adults and tends to avoid looking at, or looks away from the person speaking to him. Ean engages in frequent clapping, hand flapping and body rocking behaviors. He also makes high-pitched sounds for self-stimulation, and makes rapid and abrupt lunges and movements as he moves from one place to the other. Based on the structured interview questionnaire related to the

identification of restricted interests (Adams, 1998), Ean has a particular fascination with Music and Legos.

Kevin. Kevin was eleven years old at the beginning of the study. Kevin also attended fifth grade in a classroom of students with various learning disabilities. The Gilliam Autism Rating Scale- Second Edition (GARS-2) was administered by Kevin's teacher and the primary research investigator during the period of intervention. Kevin received an Autism Index score of 91, which translates to a *Very Likely* case of autism. Results of the Differential Abilities Scale-Second Edition (DAS-II) revealed a Standard Cluster score of 90, a Nonverbal Reasoning Cluster Standard Score of 89, a Spatial Cluster Standard Score of 97, and a General Conceptual Ability Standard Cluster Score of 91. Results of these scores fall within the average range of abilities with the exception of the Nonverbal Reasoning Cluster. Results obtained from the Kaufman Test of Educational Achievement (K-TEA-II) indicated that Kevin's performance on tasks within the written language and reading fell in the below average range as compared to same age peers. His overall performance with math tasks fell within the lower extreme range.

Kevin's communication is marked by verbal repetitions of words that are occasionally uttered out of context. Kevin uses language that is immature for his age and often makes unintelligible sounds and repeats them over an over. According to his teacher, Kevin will call out in class and utter a statement that is off topic and nonsensical.

Although Kevin is able to engage in activities that are enjoyable to him with others, he rarely responds when spoken to by other children and has difficulty playing directly with them. Kevin has difficulty using appropriate verbal and nonverbal communication for purposes of social interaction with other children. Kevin's social initiation efforts are most often directed towards adults rather than other children. He enjoys seeking adult attention and approval. For

instance, each time he is reprimanded by one of his teachers, Kevin worriedly utters 'No, No I'm sorry, please don't be sad!' Additionally, when Kevin finishes a Lego creation, he makes sure he shows it to a teacher not to a nearby classmate.

Kevin is characterized by an occasional obsession with details and talking too much about things that other children do not care about. Kevin prefers routine, structure and predictability and becomes upset when order is disturbed. Based on the structured interview questionnaire related to the identification of restricted interests (Adams, 1998), Kevin has a particular fascination with Legos and with technology, including computers and iPads.

Marvin. Marvin was elven years old at the beginning of the study. Marvin attended fifth grade in a classroom of students with various learning disabilities. Marvin was diagnosed with PDD at the age of 8 years one month. The Gilliam Autism Rating Scale- Second Edition (GARS-2) was administered by Marvin's teacher and the primary research investigator during the period of intervention. Marvin received an Autism Index score of 89, which translates to a *Very Likely* case of autism. Marvin's performance on the Stanford Binet Intelligence Scale, 5th Edition (SB5) yielded a full scale Intelligence Quotient (FSIQ) of 70 (PR2), lying in the low classification as compared to the normative sample. Marvin received a Verbal IQ (VIQ) performance score of 63 (PR1) and a Nonverbal IQ (NVIQ) performance score of 81 (PR10). These scores suggest that Marvin has weaker verbal reasoning skills and a relative strength in nonverbal skills. Marvin's performance on the Woodcock-Johnson Tests of Achievement, 3rh Edition (WJIII) suggests strong basic reading, writing, and math skills (Academic Skills, SS 117). Marvin's fluency in completing academic tasks under timed conditions (Academic Fluency, SS 88) and ability to apply basic skills to comprehension questions (Academic Applications, SS 85) were measured in the low average range. Overall, Marvin demonstrated reading skills consistent with his age and

grade placement. Marvin's comprehension skills were measured as weaker than his basic reading skills.

Marvin speaks with a flat affect and has a monotone voice pattern. He tends to escalate the volume of his voice to a high degree and in most cases appears to be shouting over the person to whom he is talking. Marvin also keeps repeating certain words and phrases over and over as demonstrated in the following example. Marvin shares afterschool hours with Ean, a student with autism who engages in noncompliant behaviors (such as jumping out of his seat and running aimlessly around the classroom) and repetitive behaviors (such as hand flapping). When Ean engages in noncompliant or repetitive behaviors, Marvin often repeats the phrases 'Ean, sit down!', or 'Ean, quiet hands!'

In addition to engaging in repetitive verbal behaviors at a high frequency, Marvin perseverates on specific topics and ideas. One of the methods that was used to identify Marvin's restricted interests were interviews with Marvin's mother and his teacher. A structured interview questionnaire related to the identification of restricted interests (Adams, 1998) was utilized. Specific questions that were used to identify Marvin's restricted interests can be found in Appendix A. The interviews were carried out at the mother's and teacher's convenience. Each interview took approximately 20 minutes to complete. Both, Marvin's mother and teacher identified the iPhone as his restricted interest. They both indicated that Marvin's fascination with iPhones has allowed him to gain knowledge about various iPhone models and features and that he can identify the different iPhone models by sight.

According to Marvin's mother, Marvin does not participate in appropriate social play with typically developing children and does not make any attempts at initiating social play or conversations with them. Marvin, however, demonstrates some interest in initiating social play

with children who are also on the autism spectrum. Despite Marvin's efforts at initiating social play with children on the autism spectrum, his mother is still concerned about the quality and adequacy of such initiations. Based on a report provided by Marvin's teacher, Marvin shows little to no evidence of sharing and initiating eye contact and frequently appears to be withdrawn and aloof in a group setting. Additionally, Marvin reacts inappropriately and engages in temper tantrums when introduced with commands, requests or directions. Marvin has difficulty dealing with frustrations, particularly when technology he's working with slows down and in instances in which one particular classmate, Kevin, says something. Marvin can become very loud and will often engage in banging on items with fists. Marvin's teacher has indicated that Marvin's specific anger and aggression towards Kevin is most probably attention-seeking behavior from which Marvin gains enjoyment and a sense of class belonging.

Setting. Participant observations took place during after school hours, while intervention procedures took place at the participants' school during regular school hours. The setting in which observations took place was dependent on the identified behaviors targeted for the Social Story intervention. Behaviors associated with social play are most commonly identified when opportunities for social interactions are most prevalent. Aftercare, which took place in the cafeteria immediately after school dismissal, was the only environment throughout the entire school hours that was unstructured and that provided students at the school with opportunities to easily and liberally interact with one another. Therefore, observations that were most relevant to the study took place in the cafeteria during participants' aftercare hours.

The cafeteria setting in which aftercare was held consisted of six long tables that seated around six students each. A large flat screen television, which played a different children's movie on a daily basis, was placed facing the tables in the area separating the seated area from

the kitchen area. During aftercare, students from multiple classrooms were present at the same time and in the same cafeteria setting. Appropriate social behaviors most frequently used in the cafeteria by students in general included sharing food or play materials, engaging in conversations, and quietly watching a movie. Intervention sessions occurred at a table in the classroom adjacent to Marvin and Kevin's classroom.

Instruments and materials. ***Preference assessments.*** Three separate preference assessments were conducted in this study. These assessments included a parent interview questionnaire, a free operant preference assessment conducted directly with participants, and a paired-stimulus preference assessment also conducted directly with participants. Identifying accurate preferences for each participant was especially important for this study because these data were used to identify participants' restricted interests. The integration of restricted interests for each participant into the Social Story intervention represents one of the intervention phases for this design. The three preference assessments in this study provided the researcher a stronger base for identifying the restricted interests of each participant.

The *parent and teacher interview questionnaire* consisted of utilizing a portion of the Social Skills Interview (SSI) (Asmus, Conroy, Ladwig, Boyd, & Sellers, 2004), a structured interview questionnaire, was used to identify the participants' restricted interests. The SSI is an informal assessment designed to target peer-related social interaction variables of students with ASD. This tool includes an assessment of seven contextual variables relating to the social skills of students with ASD. Specifically, the SSI includes an assessment of (a) communication strategies, (b) current social behavior, (c) opportunities for social interactions, (d) antecedent events predicting the likelihood of engaging in appropriate or inappropriate social behaviors, (e) identification of consequences or anticipated outcomes of social behaviors, (f) description of

interventions that have been successful in the past and those that should be avoided, and (g) questions related to the student's restricted interests. Section G was completed by parents and teachers for the identification of participants' restricted interests and preferences. The remaining sections were completed by the participants' teachers for the identification of target social behaviors. The entire SSI questionnaire, including section G that was used to identify the participants' restricted interests, can be found in Appendix A. The interviews were carried out at the mothers' and teachers' convenience. Each interview took approximately 20 minutes to complete. Through the SSI, the researcher was able to identify the participants' restricted interest and a list of other interests on a preliminary basis. Even though the indirect approach of the SSI might have enabled the researcher to gather valuable information regarding participants' interests, it may not have been enough to enable the researcher to make valid inferences. Furthermore, due to the lack of accuracy of parent and teacher recollections, the legitimacy of the use of the indirect approach alone was questioned. The identification of the participants' interests was therefore subsequently validated and substantiated by the administration of more direct preference assessments: the free operant preference assessment and the paired preference assessment.

Interviews with Ean's mother and teacher indicated that Ean was fascinated with and loves listening to music. Both Kevin's mother and teacher asserted that Kevin was interested in Legos. Kevin's teacher added that Marvin was also interested in tactile objects such as play dough, in addition to technology, including computers and iPads. Finally, according to both Marvin's mother and teacher, Marvin was particularly interested in iPhones and iPads. Marvin's teacher's further indicated that Marvin specifically enjoys playing the video game 'minecraft.'

A *free operant preference assessment,* based on a direct preference procedure described by Boyd, Alter, & Conroy (2005), was utilized to more systematically identify the participants' restricted interests. Items included in this assessment were based on information gathered from the parent and teacher interview questionnaire. The preference assessment was conducted directly with the participant. It was a 5-minute procedure that included 5 items with which participants liked to play. Based on parent and teacher responses obtained from the SSI indirect assessment, different items were chosen for each of the three participants, and separate preference assessment sessions were conducted for each participant. If less than 5 items were identified during the parent and teacher interview, the researcher identified additional items (by conducting observations and by further consulting with the participant's teacher/s) that the participant enjoys playing with. Supplementary items were identified until a total of 5 items were included during the preference assessment. Music (through the iPhone), drawing material, Legos, stacking cups, and play dough were identified for Ean; Legos, iPad, play dough, drawing materials, and pipe cleaners were identified for Kevin; and iPad (with 'minecraft' video segments from youtube turned on), iPhone, Legos, drawing materials, and stacking cups were identified for Marvin.

During each session, items were arranged in a semi circle on a table in the participant's classroom. Prior to the recording process, the researcher moved around the table with the participant introducing the participant to the items, making sure that the participant made physical contact with each item. Appropriate methods of manipulating the items were demonstrated. Then the researcher withdrew from the assessment area while the participant was provided permission to manipulate any of the available items (adapted from Roane, Vollmer, Ringdahl, & Marcus, 1998). A 10-second partial-interval recording procedure for a total of 5

minutes was utilized to determine the percentage of intervals the participant played with each of the five items. The 5-minute observational session was separated into 10-second intervals with 30 boxes that were used to record the participants' manipulation of the presented items. The preference assessment form included a table consisting of a top row representing the number of intervals and a left column representing the number of preference items. The researcher marked down whether a participant engages in a specific item by placing an 'X' in the box representing the interval number and the item number. These data were used to determine the items the participants are most interested in. The same preference assessment procedure was repeated for each participant during two separate sessions. A sample of the preference assessment form is provided in Appendix B. The purpose of the free operant direct assessment was to provide a more disciplined and controlled approach to the identification of the participants' restricted interests. The researcher wanted to make sure that the interests identified by the participants' teachers and parents were not subject to bias, or based on false recollections. The researcher also wanted to ensure that the interests reported through the indirect assessment did not wane over time. Results from the free-operant preference assessment indicated that Ean, Kevin, and Marvin were interested in music, Legos, and stacking cups respectively.

A *paired stimulus assessment* was administered in order to help with the identification of a hierarchy of preferences for each participant. During the paired-stimulus assessment, the same stimuli that were utilized in the free-operant preference assessment were placed in pairs, one pair at a time, on the table in front of the participant. A stimulus was recorded as 'selected' once the participant engaged in a reaching response towards that stimulus. Participants were provided 5 seconds to make a selection. Once a selection took place, the item was made available to the participant for 20 seconds. In case participants failed to make a choice, the researcher provided a

verbal prompt directing them to make a choice. If participants did not reach for either one of the stimuli after another 5s, then the items were removed, and the researcher recorded 'not selected' (adapted from Roane, Vollmer, Ringdahl, & Marcus, 1998). The researcher continued presenting participants with the paired stimuli until all choices were paired with one another. Each stimulus was paired twice with every other stimulus so that each stimulus of the pair was presented on both the left and right positions. Participants' responses were analyzed for purposes of determining the most preferred and the least preferred items. A 'preference percentage' for each item was then calculated by adding the number of times that participants selected that item, dividing that number by the total number of pairs in which the item appeared multiplied by 100. A sample of the paired preference assessment form is provided in Appendix C. The paired stimulus preference assessment is an essential technique of identifying potential preference items. Conducting the paired preference assessment in addition to the free operant preference assessment enabled the researcher to determine the extent of a participant's preference towards an item. In other words, if the same item was identified as preferred in both assessments, the conclusion that the item is of high interest to the participant and carries a significant level of reinforcement is strengthened. Furthermore, the paired preference assessment provided the researcher with a ranking for the item identified as preferred during the free operant preference assessment. By administering the paired preference assessment (which is intended to help establish a ranking of preferences) the researcher was able to more accurately identify the item that ranked the highest in preference. Preference items are primary independent variables of this study. It was therefore of utmost importance to accurately identify the item which was most preferred, and hence the most reinforcing and motivating to participants. Incorporating three

methods of assessment: the SSI, the free operant preference assessment, and the paired stimulus assessment, enabled the researcher to determine the items most preferred by the participants.

It is important to make note of the fact that both free-operant preference assessments, and paired stimulus preference assessments seek to assess the preferences of individuals, not their restricted interests. Restricted interests are characterized by obsessions and continuous perseverations with particular objects, topics or items, while preferences are not. The researcher has selected the above preference assessment procedures as a tool to validate and assess the restricted interests of participants, not their preferences. Instead of randomly selecting items for inclusion in the preference assessment (since doing so will merely provide the researcher with information regarding the participants' preferences in general), the researcher specifically aimed at obtaining preliminary information regarding the participants' restricted interests through interviews conducted with the teachers and parents of participants and validating those interests by means of the preference assessment procedures.

Results obtained from the paired-stimulus preference assessment indicated that music ranked number one for Ean (preference percentage = 100%), Legos ranked number one for Kevin (preference percentage = 100%), and the iPhone and iPad (with 'minecraft') tied for the number one spot for Marvin (preference percentage = 87.5% for both items). See Table 2.

Table 2. Preference Percentage and Overall Rank of Stimulus Items.

	Stimulus Items	Preference Percentage	Overall Rank
Ean	Music	100%	1
	Drawing material	12.5%	5
	Legos	62.5%	2
	Stacking cups	25%	4
	Play dough	50%	3
Kevin	Legos	100%	1
	iPad	75%	2
	Play dough	12.5%	5
	Drawing material	37.5%	3
	Pipe cleaners	25%	4
Marvin	iPad (with ‘minecraft’)	87.5%	1
	iPhone	87.5%	1
	Legos	37.5%	2
	Drawing material	0%	3
	Stacking cups	37.5%	2

Observational data form. An observational data form was used to record the frequency of the participants' identified target behaviors when they were in the selected social context (aftercare in the cafeteria). Data were gathered using a 30-second partial interval recording procedure where data were recorded based on whether or not the target behavior and/or negative behavior occurred anytime during the 30-second interval. The observational data form was divided into 40 intervals. Data representing 'display of appropriate social interaction,' 'absence of social interaction,' 'display of inappropriate social interaction,' or 'display of appropriate social interaction and inappropriate social interaction' were recorded for each sequence at the end of each 30-second interval. Each observation period lasted approximately 20 minutes. A sample of the observational data form is provided in Appendix D. The number of total intervals in which the behaviors occurred (separately or together) and did not occur were summed and divided by the total number of observation intervals. Percentage scores specifying the extent to which participants engaged or did not engage in target behaviors, engaged in negative behaviors, and engaged in both target and negative behaviors were then calculated.

Observation of appropriate social interaction skills (OASIS). The OASIS, a social skills checklist designed by Sansosti (2003), was utilized to gather further information regarding the frequency of appropriate social interactions of participants (see Appendix E). For purposes of this study, the OASIS was also used to document observed differences in participants' social engagement between intervention 1 and intervention 2. Comparing participants' social engagement levels across interventions allowed the researcher to determine what intervention was likely to be more effective in enhancing the social interaction skills of children with ASD. The OASIS consists of 15 items, each of which describes appropriate social behaviors. The checklist was completed by each participant's teacher by placing a check or tally mark adjacent

to each item indicating whether or not the behavior specified in that item was observed. The intention is to establish whether a difference in the efficacy between intervention 1 and intervention 2 is present. Therefore, the OASIS was administered twice for each participant, once following the completion of intervention 1 and another time following the completion of intervention 2. The totals and ratios of yes/no responses were calculated for each observation in order to document any change in frequency for each participant's use of appropriate social interaction skills. There was no variation in scores from intervention 1 to intervention 2 for all three participants. Specifically, Ean's percentage of appropriate skills following intervention 1 was 26.7% and remained 26.7% following intervention 2. Similarly, Kevin's and Marvin's percentages of appropriate skills following intervention 1 were 50% and 73.3% respectively and did not vary following intervention 2.

Social validity (intervention acceptability). Wolf (1978) and Kazdin (1980) noted that social validity refers to the need to demonstrate that an intervention is acceptable and useful when implemented within community settings. Social validity also focuses on documenting whether treatment goals and outcomes are socially significant and relevant to the individual receiving intervention and to those who care about the individual. In other words, social validity deals with the extent to which an intervention was able to address at least one meaningful and significant problem experienced by an individual and whether the intervention resulted in important changes or outcomes. Gresham and Lopez (1996) extended Wolf's and Kazdin's ideas and defined three distinct but related components of social validity. These components are (a) goals of treatment, (b) treatment procedures, and (c) outcomes produced by treatment procedures.

Kazdin (1980) stated that social validity research has primarily centered around the appropriateness of treatment procedures (also referred to as treatment acceptability). According to Kadzin (1980) acceptability is determined by judgments about the intervention made by nonprofessionals, clients, lay persons, and others. Acceptability refers to whether a treatment or intervention is fair, reasonable, or intrusive. More importantly, acceptability determines whether a treatment is appropriate for a certain problem or whether it is in line with common notions of what the treatment should be (Kazdin, 1980).

For purposes of this study, intervention acceptability was assessed following the final intervention phase of the study by asking each participant's teacher to complete the Intervention Rating Profile (IRP-15; Martens, Witt, Elliot, & Darveaux, 1985) (See Appendix F). The IRP-15 is a 15-item scale addressing various features of intervention acceptability. Items were rated using a 6-point Likert-type scale ranging from 1 (*strongly disagree*) to 6 (*Strongly agree*). Scores on the IRP can range from 15 to 90. Scores above 52.50 are considered acceptable. Higher scores indicate greater acceptability regarding the level to which the intervention is appropriate and likely to be successful and effective in changing the participant's social skills difficulties. In addition to addressing the efficacy of the intervention, this scale addressed the appropriateness of the intervention if extended to other participants. It also addressed the fairness and practicality of the intervention and the level of satisfaction experienced by teachers regarding the handling of the participant's social skills difficulties. The degree to which teachers believe the intervention is consistent with or similar to interventions implemented in their classrooms, and whether the intervention is likely to cause harm to the participant are also addressed in the scale (Lang, Sigafoos, Rispoli, Chan, Lancioni, O'Reilly, Machalicek, Shogren, Davis, & Hopkins, 2010).

Parent social validity. The researcher attempted to measure and assess the acceptability of the Social Story intervention by conducting a non-structured interview with the parents of participants at the end of the study (see Appendix G). Interview questions focused on examining the perspectives of parents regarding the use of their children's restricted interests within instruction (i.e. Social Stories) prior to the initiation of the study and how their outlook might have changed by the end of the study. The researcher also wanted to examine the extent to which parents thought the intervention has resulted in positive changes in regard to their children's social behaviors. The resulting information was examined and analyzed descriptively.

Procedural fidelity. In order to assess the accuracy and fidelity in which the two interventions were implemented, a daily checklist was used (see Appendix H). On the checklist, the researcher marked whether or not the participants read, or were read the Social Story that day at the specified time, whether comprehension questions were asked, and whether participants were instructed to play in the unstructured target social setting following the reading of the Social Story. The checklist also assessed whether the room was available for the reading and whether the researcher sat at a table across from the student during the reading of the Social Story. Treatment fidelity was computed as a percentage by dividing the number of steps completed by the total number of steps in a session and multiplying by 100. Procedural fidelity scores were 100%, 100%, and 98.6% for Ean, Kevin, and Marvin respectively.

Field notes. Field notes were completed during each day of data collection. Field notes were recorded on a journal kept by the researcher throughout the entire data collection process. The purpose of recording field notes was to document the social context, events, activities, moods and behaviors of participants associated with each data collection session. Field notes also included the researcher's thoughts, observations, and reflections on these variables. The analysis

of the researcher's observations and reflections helped inform her knowledge and beliefs on how the intervention could be strengthened and made more practical. Such analysis also helped the researcher better understand the extent to which the intervention was socially valid and acceptable.

Dependent measures. The primary dependent measure that was recorded and analyzed in this study was the display of appropriate social interaction. A coding system was used to group the dependent measure, appropriate social interaction, into four subcategories (Thiemann & Goldstein, 2001; Delano & Snell, 2006). The subcategories were seeking attention, initiating comments, initiating requests, and contingent responses. An elaborate explanation of what these behaviors consist of is presented in table 2. Other dependent measures were inappropriate social interactions, and absence of social interaction (see Table 1). Data were collected on the frequency of the dependent measures.

Intervention. ***Social stories.*** Two Social Stories were designed and developed for each participant that addressed their target behaviors. The first Social Story focused on enhancing appropriate social behaviors of participants while ignoring their restricted interests as identified by the preference assessment tests described above (See Appendix I for an example of a Social Story that did not incorporate restricted interests). The second Social Story targeted the same dependent measure as the first story and incorporated at least one of the participants' restricted interests (see Appendix J). The two Social Stories for the same participant were comparable in vocabulary, text structure, and content. Furthermore, both stories included similar picture cues, and the context and behaviors identified and described in both stories were identical. The only difference was the removal of the restricted interest content in the first story. For example, in a case where Legos is an identified restricted interest for a participant, the second Social Story

Table 3. Definition of Dependent Measures.

Dependent Measure	Description
1. Appropriate Social Interaction (ASI)	Uttering one or more comprehensible words with body oriented toward the peer and/or Making a gestural initiation or cooperative response toward the peer (e.g. tapping shoulder, handing object to peer, receiving object from peer, or playing a cooperative game). or Engaging in motor or verbal behavior in response to a peer's initiation.
a. Seeking Attention (SA)	Coded if the child (a) requests attention or recognition from peer, (b) calls the peer's name to receive attention, (c) uses gestures or vocalizations to gather attention from peer (e.g. tapping shoulders, sharing something with peer), or joins friend in ongoing activity.
b. Initiating Comments (IC)	Coded if the child makes a comment about an ongoing activity. The comment is not contingent on the peer's prior utterance and not used to request information. The child initiates a comment representing a new idea related to the ongoing activity. The comment may compliment peer, reinforce peer, or express enjoyment regarding the child's interaction with the peer.
c. Initiating Requests (IR)	Coded if the child requests information, objects, or actions. The request is not contingent on the peer's prior utterance and is not a clarification of what the peer said.
d. Contingent Responses (CR)	Coded if the child's response is contingent on the peer's prior utterance. Coded when the child acknowledges the utterance (e.g. "hmm"), partially repeats the utterance, agrees with the utterance, answers peer's question, responds with a related comment about observable objects within the context of the ongoing activity, or confirms or clarifies a question or comment expressed by the peer. Also coded when the child engages in a nonverbal gesture in response to peers' nonverbal gesture or verbal utterance (such as receiving object from peer).
2. Inappropriate Social Interaction (ISI)	The child whines, pulls hair, screams, destroys or inappropriately throws materials.
3. Absence of Social Interaction (ASI)	The child does not engage in any form of social interaction with a peer (e.g. child does not initiate a gesture/movement toward peer, does not converse with peer by saying one or more words, does not share materials with peer).

included a sentence such as “I will try to say, ‘I have Legos, will you play with me?”’ The first Social Story included a more general sentence: “I will try to say: will you play with me?”’ In addition to the inclusion of the restricted interest and a demonstration of its use within a social context, various visual images of the interest were incorporated in the second story.

All Social Stories for each participant targeted the same dependent measures, increasing appropriate social behavior, and adhered to the recommendations suggested by Gray (1994, 1998, 2002) and Gray and Garand (1993). All Social Stories incorporated at least one of the four key sentence types; descriptive, perspective, affirmative, and directive. Each of the Social Stories was printed on 8.5"x11" pinch holed paper with a 20 point Times New Roman font. Each story included a cover page that contained only the title written in a 26 point Times New Roman font in addition to boardmaker illustrations highlighting key elements of the title page. A transparent plastic cover topped the cover page and a black plastic opaque cover was included following the end page. All pages were combined together by a spiral bookbinder.

Each Social Story consisted of a written script that included information specific to the targeted setting and behavior. The Social Story text contained a scenario of the appropriate play behaviors, social initiations, and responses that the participant will be expected to engage in with their peers during the targeted social context. Each page contained one to two sentences, and one colored picture was placed underneath each sentence in order to visually capture the narrative of that sentence. The colored pictures consisted of both real life pictures, and Mayer-Johnson picture communication symbols (Mayer-Johnson, 1994). Real life pictures were captured by the researcher's camera and consisted of images specific to the target situation and desired social behaviors. Camera images included the intervention setting and the participants’ peers engaging in appropriate social play. Camera images in the second Social Story depicted the participant

manipulating the interest items. Real life pictures were included to provide meaning and relevance to the written text as well as to capture the participants' attention throughout the reading of the Social Story. Each Social Story was supplemented by a set of comprehension questions that the researcher used to assess the participant's understanding of the contents of the Social Stories (see Appendix K).

The Mayer-Johnson's Boardmaker program was used to create visual images supporting some of the phrases of the Social Story. The Boardmaker contains a database of over 3000 Picture Communication Symbols that are designed to represent words and short phrases. These symbols were specifically created to provide support to children and adults with communication difficulties, including those diagnosed with ASD. Additionally, their explicit and visually appealing design is meant to enhance learners' motivation and facilitate their learning of new skills.

Procedure. Parents were briefed about the purpose of the study, study procedures, and possible outcomes. Benefits and potential risks to their children were also be highlighted and explained. A consent form containing a description of the study, the benefits and risks of the study, and the rights of the parents and their children were provided and reviewed with the parents. Parents were provided the opportunity to consider and question all options made available in the consent form. The researcher ensured that any questions that parents might have had were addressed.

Identification of target behaviors. Following the consent process, specific target behaviors were identified by means of interviewing the participants' parents and their teacher/s. Both interviews were carried out by the primary researcher using the SSI (Asmus, Conroy, Ladwig, Boyd, & Sellers, 2004). The interview focused primarily on identifying areas of

strengths, weaknesses and behaviors of concern, and the frequency and intensity of these behaviors. Findings obtained from these interviews were substantiated by observations made by the researcher in settings in which the behaviors of concern were most likely to occur. Information garnered from parent and teacher interviews in addition to the researcher observations were used to develop a set of Social Stories that specifically address participants' target behaviors. The researcher then obtained feedback from parents and teachers regarding the accuracy of the identified target behaviors for each participant.

Pre-baseline assessment of target students. As described above, an informal assessment procedure and a direct assessment procedure were administered prior to the experimental session in order to identify participants' restricted interests. The informal assessment consisted of interviewing the mother and a former/current teacher. The informal assessment was then followed by a direct preference assessment approach in which the items that were identified by the parents and teachers, and other play items that the participant had a history of playing were incorporated. The direct preference assessment allowed the researcher to identify participants' items of interest based on a 10-s partial-interval recording procedure for a total of 5 minutes.

Observer training. Prior to the beginning of the study, the researcher trained a secondary observer in reliable data collection procedures on social interactions. The researcher familiarized the secondary observer with the definitions of target behaviors in addition to the observation data collection form and other procedures required for data collection. Both observers then practiced by conducting observations on a nonparticipating student in non-structured play setting, similar to the setting employed during intervention. Training continued until an 80% inter-rater agreement was reached for two consecutive sessions. Inter-rater agreement was calculated by

dividing the number of agreements divided by the total number of agreements plus disagreements multiplied by 100.

Baseline period. The baseline phase consisted of making observations and a recording of all the participants' targeted behaviors in the selected social context prior to the reading of the Social Story. During baseline, participants were observed during the selected social context (aftercare in the cafeteria). No intervention and no direct interactions with the participants took place during the baseline phase. The observational data form was used to measure the frequency of the primary dependent measure for each participant: display of appropriate social interactions. A check mark was recorded if a display of appropriate target behavior was evident during any of the 30-second intervals. The symbols 'X' and '__' were recorded for each occurrence of an appropriate social interaction or inappropriate interaction respectively. The symbol 'B' was recorded if both appropriate and inappropriate social interactions occurred during an interval.

The baseline phase carries out two essential functions, the first of which is the descriptive function. Specifically, data collected during baseline describe the level of performance or the extent to which the participant engages in behaviors that are targeted for intervention. The second is known as the predictive function. In other words, baseline data may enable the researcher to predict the degree or frequency of targeted behaviors for the immediate future if the intervention has not yet been introduced. The only method which provides us with an accurate prediction of the participant's future level of performance would be to continuously observe baseline performance for several days. A prediction is brought about when assuming or projecting that a continuation of the same baseline performance will be carried out in the future (Kazdin, 2011). Since baseline data help researchers make predictions in relation to how the participant's performance might look like in the future, it is important that the data be stable. In

other words, the data should be characterized by the absence of a trend and should exhibit little to no variability in performance (Kazdin, 2011). The researcher therefore conducted baseline observations and plotted baseline data for each participant until stability was established. Stability was achieved when baseline data demonstrated at least three consecutive data points representing little to no occurrence of target behavior. Such stability was expected from all three participants. At least six data points comprised the baseline phase for each participant for the purpose of demonstrating consistency over a reasonable period of time. Baseline was continued for another three days for all three participants even though the same score occurred during the first three baseline sessions. Data points reflecting the last three baseline sessions were the same.

Intervention period. Similar to the baseline phase, the intervention phase describes current performances and predicts future performances. The intervention phase, however, investigates whether performance during the intervention phase significantly varies from the level of performance observed during the baseline phase as well as from the projected level of baseline performance. If data during the intervention phase differs from the baseline phase, then a change in performance is indicated (Kazdin, 2011). For this study, individualized Social Stories were created. Each of the contents relating to the participants' target behaviors were derived from the SSI interview form administered to the participants' mothers and teachers, as well as observations carried out by the principle investigator. Two interventions were then applied to each participant.

Intervention 1. Researcher developed Social Stories that did not incorporate the participants' circumscribed interests were read about 15 to 20 minutes prior to participants' engagement in the target social setting. For each participant, the researcher sat facing the participant at a table in the intervention setting. The Social Story was placed directly facing the

participant. The participant was then given the opportunity to independently read the Social Story out loud. Necessary guidance was provided throughout each participant's independent reading of the story.

The first time the Social Stories were introduced, the researcher assessed participants' understanding of the stories by asking them a set of predetermined comprehension questions. The Social Stories were re-introduced until participants were able to respond to the comprehension questions with 100% accuracy. In cases where participants were unable to verbalize their understanding of the Social Stories, they were required to make a selection of the right response for each question from a printed and laminated list of three possible answers.

Intervention 2. The same procedures (relating to the administration of the Social Story intervention) implemented during intervention 1 were also implemented during the second phase of intervention. For this phase, however, individualized Social Stories that incorporated the participants' restricted interests were read instead.

Sequence of events. Due to the non-concurrent nature of this design, the researcher predetermined the length of each of the baseline phases. In order to guarantee data stability, the baseline phase for each participant totaled 6 days. Participants were randomly selected to participate in one of the three pre-determined baseline phases depending on their availability. Ean was the first to participate, Kevin was the second, and Marvin was the third.

Once baseline for Ean reached a stable rate (or when at least three data points representing low occurrence of target behavior appeared in a row immediately before intervention), intervention 1 was applied. Observations and data recording were continued throughout the intervention 1 phase for a predetermined length of 9 sessions. The researcher wanted to make sure that at least six data points the last three of which stable, was observed and

maintained for Ean during intervention 1. Intervention 2 was then initiated and continued for another nine sessions. Kevin was then selected based on availability to participate in the second series of baseline and intervention procedures. Kevin underwent baseline, intervention 1, and intervention 2 procedures in the same manner described above for Ean. Kevin's baseline sessions totaled 7 days, his intervention 1 sessions totaled 8 days, and his intervention 2 sessions totaled 11 days. Once baseline and intervention phases were completed for Kevin, Marvin was selected to participate in the final series of baseline and intervention procedures. Marvin's baseline and intervention 1 sessions totaled 9 days each, while his intervention 2 sessions totaled 11 days.

Inter-rater reliability. Inter-rater agreement for observations assessing for reliability of the data were conducted. To ensure data reliability, a trained secondary observer coded the data for one session during baseline, and intervention phases of the study for each participant. Inter-rater agreement was also measured by dividing the number of agreements by the total number of agreements plus disagreements then multiplying by 100. Inter-rater agreement was defined as instances in which both observers agreed that that an appropriate social behavior either occurred or did not occur. Disagreements were defined as instances in which one observer noted the occurrence of appropriate social behavior in an interval but the second observer did not validate the occurrence of the behavior. Reliability checks occurred during 20% of the baseline, intervention 1, and intervention 2 phases. Observations were considered reliable if at least 80% inter-rater agreement was achieved during each observation. Inter-rater agreement was consistently above 80% for all participants. Agreement ranged from 80% to 95% for Marvin, 85% to 100% for Kevin, and 95% to 100% for Ean.

Data analysis. The effectiveness of the Social Story intervention was analyzed by means of measuring the percentage of intervals of appropriate social interactions exhibited by the

participant during 20-minute observations across the baseline and intervention sessions. Percentage scores were calculated by dividing the number of intervals when the participant engaged in appropriate social interactions by the total number of intervals multiplied by 100. Data was then plotted in a line graph as a percentage of intervals per session across the baseline and the intervention phase. Data points gleaned during baseline and intervention sessions were inspected visually for changes in level, trend, and variability. Finally, two types of effect size calculations were made. Effect size calculations included calculating the amount of overlap between phases, or percent of nonoverlapping data (PND), and the percentage of data points exceeding the median (PEM).

Level. The level examines whether a change in the target behavior from the baseline to the intervention period has occurred (Engel & Schutt, 2012). Level was inspected by drawing a line at the mean score (a score of the average observations in the baseline or intervention phase). Specifically, the mean of the baseline scores was calculated followed by the drawing of a horizontal line across the baseline passing through the mean score. The mean of the intervention scores was also calculated, and a horizontal line was drawn across the intervention phase passing through the mean score. A change in level is also associated with the immediacy of the effect. In other words, what happens immediately after the intervention is introduced (or withdrawn) is documented as change of level of performance (Kratochwill et al., 2010; Kazdin, 2011). The rapidness of the change in level is directly proportional to the efficacy of the independent variable. The higher the immediacy effect, the more credible the assumption that change in the dependent variable was a result of the introduction of the independent variable. The immediacy of the effect was visually analyzed by examining the level of change between the last three data

points in the baseline phase and the first three data points in the intervention phase (two circles were drawn to highlight each of the point sets) (Kratochwill et al., 2010).

Trend. Visual analysis also consisted of comparing trends in the baseline and intervention phases. A trend or slope refers to the direction in the configuration of the data points. Data direction might be cyclical or curvilinear and might show systematic increases or decreases across time. The extent to which a change in the direction of appropriate behavior has been observed following the application of the intervention was investigated (Engel & Schutt, 2012; Kazdin, 2011). The Nugent method was used to document a trend in a phase. Specifically, a straight line connecting the first and last data points with an arrow specifying the direction of the pattern of behavior was drawn in each of the baseline and intervention phases. The two lines were then compared (Engel & Schutt, 2012). Baseline and intervention data were entered using Microsoft Excel and changes in slope within each phase were calculated.

Variability. Visual interpretation relies on the variability or fluctuation of the data points, or the participant's performance over time. Variability refers to the extent to which the points within the baseline or intervention phase are different or divergent. Wide and extreme variability in data in the baseline and/or intervention phase can complicate drawing conclusions about the effect of the intervention. Stated differently, the larger the variability, the more challenging it is to make valid inferences about the efficacy of the treatment intervention (Kazdin, 2011). Variability was illustrated by drawing range lines. Range lines were sketched by drawing a horizontal line cutting through the lowest data point and another one through the highest data point in both the baseline and the intervention phases. Range lines that are much farther apart in the intervention phase than in the baseline phase might be indicative of a positive treatment effect.

PND. The PND method involved determining the percentage of data points in the intervention phase that go above the most extreme data point in the baseline phase. The PND procedure has been put to the test by several studies, and is straightforward and easy to calculate and understand. For these reasons, this procedure was chosen as an effect size measurement for this study (Riley-Tillan & Burns, 2009).

PND points were calculated by first drawing a straight line from the highest baseline data point through the intervention data. Second, the number of data points above the straight line were counted then divided by the total number of intervention points multiplied by 100. A PND of 90% or more was considered highly effective, 70-90% was considered moderately effective, 50-70% was considered mildly effective, while a PND of 50% or less was considered ineffective (Wright, & McCathren, 2012).

Despite some advantages associated with the calculation and interpretation of PND scores, the PND method has several flaws that have led researchers to question its use. This method has been criticized for ignoring all data points in baseline except for one and for being influenced by one single outlying data point. As a result, the PND method is vulnerable to floor and ceiling effects. If one or more data point in baseline has reached the ceiling or floor level, then the PND score will be calculated at approximately 0%, even though visual inspection of data suggests that a treatment effect might have taken place (Ma, 2006).

PEM. Several new effect size methods have been introduced in order to correct some of the drawbacks present in the PND approach. One of these methods is the PEM, which offers a solution to the floor and ceiling effect by using a median value of the data points in baseline rather than an extreme score (Ma, 2006).

PEM is defined as the percentage of intervention data points that exceed the median of the baseline phase. In order to calculate the PEM for this study, the researcher (1) calculated the median of the baseline phase, (2) drew a horizontal line from the calculated median all the way through the intervention phase, (3) counted the number of data points in the intervention phase that exceed the baseline median, and (4) divided the total count by the total number of intervention points then multiply by 100 (Martella, Nelson, Morgan, & Marchand-Martella, 2013).

PEM scores range from 0 to 100%. A PEM between 90 and 100% was considered highly effective, 70-90% was considered moderately effective, while a PEM of 70% or less was questionable and considered ineffective.

Field notes. Two forms of information, descriptive and reflective, were documented in the researcher's field note journal. Descriptive information consisted of a recording of factual data consisting of setting, social context, actions, events, behaviors and activities observed. At the same time the researcher recorded her descriptive information, she engaged in a reflective process and supplemented the descriptive information with reflective ones. Reflective field notes consisted of personal thoughts relating to her insights, impressions, assumptions or themes emerging during the observation process. Analysis of field notes consisted of the development of codes as a way to discern major themes. Through this method, the researcher constantly read through her notes and reflections to look for recurring themes or topics related to her primary research questions and that might provide insight into issues relating to the social validity of the intervention.

Social validity (intervention acceptability). Information obtained from the IRP-15 was used to answer the last research question: Do teachers value Social Stories that incorporate the

restricted interests of students with ASD as acceptable interventions? Judgments on the acceptability of the intervention based on teacher ratings were measured and evaluated based on the scores obtained. IRP-15 scores range from 15 to 90, with higher scores indicating higher treatment acceptability. Scores higher than 52.50 were considered acceptable. The obtained information was also examined and analyzed descriptively.

Chapter IV

Results

This chapter describes the data relative to each research question. Specifically, visual analyses are presented for research questions one and two, while descriptive data analyses are presented for research question three. The chapter concludes with a summary of the findings.

Research Question One: What is the Impact of a Social Story Alone on the Social Outcomes of Children with ASD?

Results were examined by means of visual analysis of the data. Figure 2 provides a graphic display of the percentage of target behaviors for each participant across baseline, intervention 1 and intervention 2. Detailed summaries of the data in terms of changes in level, slope, PND and PEM scores are reported.

Ean. During baseline, Ean demonstrated relatively consistent low rates of appropriate social interactions (see Figure 2). With the exception of one data point during session 2, Ean demonstrated zero instances of appropriate social behaviors. There was no evidence of an immediate increase in Ean's target behavior upon introduction of intervention1, the Social Story which did not incorporate the restricted interest of the participant. Specifically, from the last three data points in the baseline period (0% mean target behavior) to the first three data points in the first intervention phase (0.7% mean target behavior) there was only a 0.7% increase in rates of appropriate social interaction. This increase demonstrates a relatively low change in social behavior following the implementation of a Social Story intervention that does not incorporate the restricted interests of the participant.

The overall mean percentage of the target behavior exhibited by Ean during baseline was 0.3%. Ean's mean percentage of target behavior exhibited during intervention 1 was 0.2% (0.1% lower than the mean documented during baseline). Ean's engagement in appropriate social behaviors ranged from 0% to 2% during baseline and also from 0% to 2% during intervention 1, suggesting no treatment effect. Descriptive statistics highlighting changes in mean are presented in Table 4.

Table 4. Descriptive Statistics for Appropriate Social Behavior- Ean.

	M	*Median*	*SD*	*Min.*	*Max.*	*Slope*	*PND*	*PEM*
Baseline	0.3%	0	0.8	0	2	-0.2		
Intervention 1	0.2%	0	0.7	0	2	-0.1	0%	11.1%

A comparison of the lines drawn according to the Nugent method demonstrated a stable trend in appropriate social interactions during baseline and a decreasing trend following the implementation of the Social Story without the restricted interest. Examination of the value of the slopes, however, documented a decreasing trend in both the baseline phase (slope = -0.2) and the intervention 1 phase (slope = -0.1). From baseline to intervention 1 the PND was 0%, and the PEM was 11.1% indicating no treatment effect.

Kevin. Prior to the implementation of the intervention 1 phase, Kevin displayed relatively consistent low rates of appropriate social interactions (see Figure 2). No occurrences of appropriate social behaviors were observed, with the exception of one data point during session 4. Kevin brought Legos, the item of his restricted interest, with him to aftercare that day. The presence of Legos most likely justifies his engagement in appropriate social behaviors during that particular session. The presence of Legos was not indicated during the remaining baseline sessions. Upon implementation of intervention 1, an immediate increase in Kevin's appropriate

social behavior was evident. Specifically, from the last three data points in the baseline period (0% mean target behavior) to the first three data points in the intervention phase (13% mean target behavior) there was a 13% increase in rates of appropriate social interaction. This increase demonstrates a relatively rapid change in social behavior following the implementation of a Social Story intervention that does incorporate the restricted interest of the participant.

Kevin's overall mean percentage of appropriate social behavior was 1.4% during baseline. Upon introduction of intervention 1, Kevin's mean percentage of appropriate social behavior increased to 10.8%. Even though Kevin's performance dropped to 0% during intervention, his mean performance during the intervention 1 phase was 9.4% higher than baseline. Kevin's drop in performance during session 12 is perhaps justified by his fixation on the movie video that was playing during that session. Kevin's engagement in appropriate social behaviors ranged from 0% to 10% during baseline and from 0% to 27% during intervention 1, suggesting a positive treatment effect. Descriptive statistics highlighting changes in mean are presented in Table 5.

Table 5. Descriptive Statistics for Appropriate Social Behavior- Kevin.

	M	*Median*	*SD*	*Min.*	*Max.*	*Slope*	*PND*	*PEM*
Baseline	1.4%	0	3.8	0	10	-3.2		
Intervention 1	10.8%	10	8.5	0	27	0.4	37.5%	87.5%

A comparison of the lines drawn according to the Nugent method demonstrated a stable trend in appropriate social interactions during baseline, even though a decreasing trend is assumed upon calculation of the slope (slope = -3.2). Following intervention 1, an increase in trend (slope = 0.4), suggesting increased levels of appropriate social interactions, was evident. Kevin, therefore, demonstrated variable, but increasing intervention1 rates of appropriate social

behaviors. The PND score (PND = 37.5%) suggested that a positive treatment effect was not achieved. Calculations of the PEM score (PEM = 87.5%), however, which corrected the ceiling effect evident in baseline and PEM scores suggested that intervention 1 was moderately effective.

Marvin. Marvin displayed variable rates of appropriate social behaviors prior to intervention 1 phase (see Figure 2). Session 7 indicated a significant increase in Manning's display of appropriate social behaviors followed by a significant drop in his behaviors during session 8. Session 7 documented the presence of an iPhone (the item of Marvin's restricted interest) within the possession of Marvin, which might have contributed to the increase in appropriate social behaviors. A decrease, rather than an increase in Marvin's appropriate social behaviors was evident upon implementation of intervention 1. Specifically, from the last three data points in the baseline period (11.7% mean target behavior) to the first three data points in the intervention phase (9% mean target behavior) there was a 2.7% decrease in rates of appropriate social interaction.

Marvin's overall mean percentage of appropriate social behaviors was 11.6% during baseline. During the intervention 1 phase, Marvin's mean percentage of appropriate social behavior increased to 14.1% (2.5% higher than baseline). Marvin's engagement in appropriate social behaviors ranged from 3% to 27% during baseline and also from 3% to 27% during intervention 1, suggesting no treatment effect. Descriptive statistics highlighting changes in mean are presented in Table 6.

Table 6. Descriptive Statistics for Appropriate Social Behavior- Marvin.

	M	*Median*	*SD*	*Min.*	*Max.*	*Slope*	*PND*	*PEM*
Baseline	11.6%	10	7.4	3	27	0.0		
Intervention 1	14.1%	17	7.5	3	27	0.5	0%	66.7%

A comparison of the lines drawn according to the Nugent method demonstrated a stable trend in appropriate social interactions during the baseline (slope = 0.0) and intervention 1 phase. Calculating the slope (slope = 0.5) in intervention 1 suggested a slightly increasing trend. The PND score (PND = 0) indicated no treatment effect, and calculations of the PEM score (PEM = 66.7%) implied an ineffective and questionable treatment effect.

Research Question Two: What is the impact of a Social Story Intervention, Incorporating Elements of Circumscribed/Restricted Interests Specific to Young Children with ASD, on the Social Outcomes of Children with ASD?

Results were examined by means of visual analysis of data. Data representing intervention 2 were compared with baseline data followed by a comparison of intervention 2 with intervention 1 data. Figure 2 provides a graphic display of the percentage of target behaviors for each participant across baseline, intervention 1 and intervention 2. Detailed summaries of the data in terms of changes in level, slope, PND and PEM scores are reported.

Ean. Upon implementation of intervention 2, a slight increase in Ean's display of appropriate social behaviors was evident. Specifically, from the last three data points in the first intervention phase (0% mean target behavior) to the first three data points in the second intervention phase (3.3% mean target behavior) a 3.3% increase in rates of appropriate social interaction was reported. This increase demonstrates a relatively low change in social behavior following the implementation of a Social Story intervention that incorporates the restricted

interests of the participant. Ean's score then dropped to zero followed by an increase. A steady decline in scores then emerged.

The total mean percentage of the target behavior exhibited by Ean during intervention 2 was 2.1%. Anecdotal data revealed that prompting took place during sessions in which appropriate social behaviors were evident. Despite declining data, Ean's score was 1.9% higher than the mean documented during intervention 1. Specifically, Ean's display of appropriate social behaviors during intervention 2 was 9.5 times higher than that exhibited during intervention 1. Ean's engagement in appropriate social behaviors ranged from 0% to 10% during intervention 2, suggesting a wider variability than the scores documented during intervention 1 (range from 0% to 2%). Such wider variability might be indicative of a positive treatment effect. Descriptive statistics highlighting changes in mean are presented in Table 7.

Table 7. Descriptive Statistics for Appropriate Social Behavior- Ean.

	M	*Median*	*SD*	*Min.*	*Max.*	*Slope*	*PND*	*PEM*
Baseline	0.3%	0	0.8	0	2	-0.2		
Intervention 1	0.2%	0	0.7	0	2	-0.1	0%	11.1%
Intervention 2	2.1%	0	3.4	0	10	-0.2	22.2%	44.4%

Prior to the implementation of intervention 2, Ean demonstrated a slightly decreasing trend in appropriate social behaviors (slope = -0.1during baseline and slope = -0.2 during intervention 1). Even though the overall mean score during intervention 2 was slightly higher than the mean scores documented during baseline and intervention 1,the direction of the decreasing trend was maintained upon the introduction of the Social Story that incorporated Ean's restricted interest. From intervention 1 to intervention 2 the PND and PEM scores were 22.2%, 44.4% respectively, indicating no treatment effect.

Kevin. Upon implementation of intervention 2, an increase in Kevin's appropriate social behavior was evident. Specifically, from the last three data points in intervention 1 (13.3% mean target behavior) to the first three data points in the intervention phase (19.3% mean target behavior) there was a 6% increase in rates of appropriate social interaction. This increase demonstrates a relatively rapid change in social behavior following the implementation of a Social Story intervention that incorporates the restricted interest of the participant.

Kevin's overall mean percentage of appropriate social behavior increased from 10.8% during intervention 1 to 18.2% during intervention 2. His mean performance during the intervention 2 phase was 7.4% higher than baseline. Specifically, Kevin's display of appropriate social behaviors during intervention 2 was about two times higher than that exhibited during intervention 1 (68.5 % increase). Kevin's engagement in appropriate social behaviors ranged from 0% to 27% during intervention 1 and from 0% to 55% during intervention 2, suggesting a positive treatment effect for intervention 2. Descriptive statistics highlighting changes in mean are presented in Table 8.

Table 8. Descriptive Statistics for Appropriate Social Behavior- Kevin.

	M	*Median*	*SD*	*Min.*	*Max.*	*Slope*	*PND*	*PEM*
Baseline	1.4%	0	3.8	0	10	-3.2		
Intervention 1	10.8%	10	8.5	0	27	0.4	37.5%	87.5%
Intervention 2	18.2%	18	16.7	0	55	1.4	63.6%	81.8%

Following intervention 2, an increase in trend (slope = 1.4), suggesting increased levels of appropriate social interactions, was evident. Kevin, therefore, demonstrated variable, but increasing intervention 2 rates of appropriate social behaviors. Despite an increasing trend, the PND score (PND = 27 %) comparing intervention 1 with intervention 2 data did not show that intervention 2 was more effective than intervention 1. Compared with baseline, however, the

PND score (PND = 63.6%) obtained for intervention 2 data suggested that a positive treatment effect for intervention 2 was achieved, while a positive treatment effect was not achieved for intervention 1 (PND = 37.5%). Similarly PEM scores (PEM = 63.6%) comparing intervention 1 with intervention 2 data demonstrated that intervention 2 was ineffective, even though calculations of the PEM score (PEM = 81.8%), comparing data points between baseline and intervention 2 indicated a moderate intervention 2 effect.

Marvin. Following the introduction of intervention 2, an immediate increase in Kevin's appropriate social behavior was evident. Specifically, from the last three data points in the first intervention phase (12% mean target behavior) to the first three data points in the second intervention phase (18.3% mean target behavior) there was a 6.3% increase in rates of appropriate social interaction. This increase demonstrates a relatively rapid change in social behavior following the implementation of a Social Story intervention that incorporates the restricted interest of the participant.

Marvin's overall mean percentage of appropriate social behavior increased from 14.1% during intervention 1 to 30.9% during intervention 2. His mean performance during the intervention 2 phase was 16.8% higher than baseline. Specifically, Marvin's display of appropriate social behaviors during intervention 2 was approximately 2 times higher than that exhibited during baseline (119% increase). Marvin's engagement in appropriate social behaviors ranged from 3% to 27% during intervention 2 and from 3% to 57% during intervention 2, suggesting a positive treatment effect. Descriptive statistics highlighting changes in mean are presented in Table 9.

Table 9. Descriptive Statistics for Appropriate Social Behavior- Marvin.

	M	*Median*	*SD*	*Min.*	*Max.*	*Slope*	*PND*	*PEM*
Baseline	11.6%	10	7.4	3	27	0.0		
Intervention 1	14.1%	17	7.5	3	27	0.5	0%	66.7%
Intervention 2	30.9%	30	14.3	3	57	1.4	54.5%	90.9%

Following intervention 2, an increase in trend (slope = 1.4), suggesting increased levels of appropriate social interactions, was evident. Marvin, therefore, demonstrated variable, but increasing intervention 2 rates of appropriate social behaviors. The PND score (PND = 54.5%) comparing intervention 1 data with intervention 2 data suggested a mildly effective treatment for intervention2, while the PEM score (PEM = 90.9%) indicated a highly effective treatment effect for intervention 2.

Research Question Three: Do Teachers Value Social Stories Incorporating the Circumscribed/Restricted Interests of Young Children with ASD as Acceptable Interventions?

Analysis of data obtained from the modified Intervention Rating Profile- 15 (IRP – 15; Martens & Witt, 1985) was used to answer this question. For this study, total scores fell within the acceptable range for all participants. Specifically, the score for Ean was 78, the score for Kevin, was 79, and the score for Marvin was also 79. Two teachers were involved in the social validity rating process; Ean's teacher and Kevin and Marvin's teacher. The latter teacher provided similar responses on all items of the scale for both Kevin and Marvin, thus explaining their identical scores. It is worth noting that both teachers indicated that they "strongly agree" that most teachers would find this intervention appropriate for social skills problems for their students. Both teachers also noted that they "strongly agree" that most teachers would find this intervention suitable for a variety of social skills deficits and would be willing to use this

intervention in their classroom. Interestingly, Ean's teacher slightly agreed that the intervention used in this study was effective in changing the participant's social skill difficulties, even though the other teacher agreed that the intervention was effective.

Conclusion and Summary of Findings

Despite an overall higher mean of appropriate social interactions during intervention 2, data documented for Ean revealed that neither intervention 1 nor intervention 2 was significantly effective in improving the quality of his social interactions. While the data relative to Kevin revealed that both interventions 1 and 2 were moderately effective, the increasing trend and mean of scores evident across the three phases, demonstrate that intervention 2 might have been slightly more effective than intervention 1. The data relative to Marvin revealed an increasing trend and mean across the three phases of the multiple baseline design. Data for Marvin also suggested that while there was no indication of a positive treatment effect during intervention 1, a positive treatment effect during intervention 2 was evident. Finally, based on ratings obtained from the IRP- 15, all teachers involved deemed the study socially valid and acceptable.

Qualitative Description of Dependent Measure Via Field Notes

Ean. During baseline, Ean showed one instance of contingent response (CR) when he reached out his hand to receive candy from a peer. Ean demonstrated seeking attention (SA) behavior during intervention 1 as he pulled out his hand and made a waving gesture towards another peer. One of the paraprofessionals working with Ean noted that such seeking attention behavior was something that Ean has never done before. During intervention 2, Ean also exhibited seeking attention (SA) behavior as he tapped on the shoulder of one of his peers in order to ask him whether he wanted to listen to music (initiating comment – IC). Throughout intervention 2, Ean demonstrated 3 other instances of initiating comments (IC), two of which

consisted of Ean inviting his peers to listen to music with him while the remaining instance consisted of Ean telling his friend that he was 'happy' listening to music with him. On two occasions, Ean displayed appropriate social interactions that were contingent on initiations or utterances made by other peers. On one occasion, Ean thanked his peer after he agreed to listen to music with him, and in another instance, Ean played along with a friend by repeating, on cue, song lyrics that she uttered.

During the three phases of the study, Ean was frequently observed sitting in a corner by himself engaging in handclapping behaviors or fidgeting around his seat. Ean would make no attempts at initiating or responding to social interactions despite being surrounded by other students. Ean regularly engaged in inappropriate social behaviors including switching the TV off as his peers were watching, wandering around aimlessly in the cafeteria, running towards the kitchen (a forbidden area) and grabbing food items, stealing other students' food, and running through the teacher's purse, grabbing her iPhone and turning the music on.

Kevin. Kevin was not observed engaging in appropriate social interactions with his peers during baseline, except during the session in which Legos were involved. Kevin's social interactions during that session consisted of a few contingent responses (CR) and initiating comments (IC) most of which were Lego related (The Legos present during this session were a few Lego pieces that were brought with Kevin from home and were not purposely provided by the researcher). Kevin's appropriate social interactions during intervention 1 most commonly consisted of seeking attention (SA) behaviors as he joined and watched iPad videos with another peer. Initiating comments (IC) and contingent responses (CR) relating to conversations about the iPad were also evident. As soon as Legos (the item of Kevin's restricted interest) were introduced at the start of intervention 2, a significant drop in Kevin's appropriate social

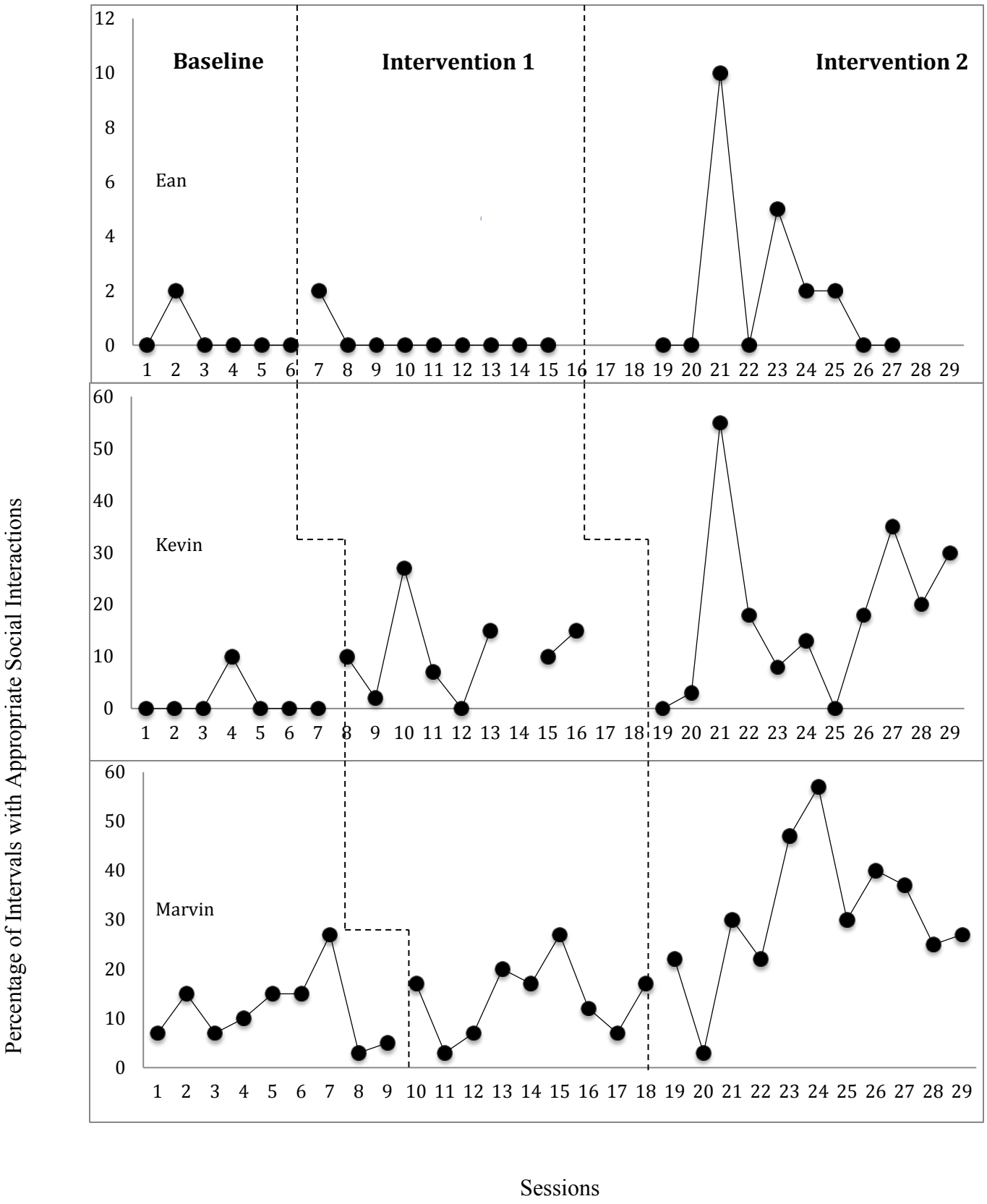

Figure 2. Percentage of intervals with appropriate social interactions.

behaviors was observed. This drop in Kevin's appropriate social behaviors is manifested in his grabbing of the Lego bucket, and taking complete possession of it immediately following the introduction of the Lego bucket. Kevin played independently and refused to share his Legos the first couple of sessions during intervention 2. Following Kevin's drop in appropriate social behaviors, an overall increase in these behaviors was apparent throughout the remaining intervention 2 sessions. Seeking his peers' attention (SA) by sharing his Legos and by initiating comments (IC) requesting his peers to take notice of his Lego creations were strongly evident throughout intervention 2. Occasional drops in Kevin's appropriate social behaviors observed over the course of intervention 2 were explained by his frequent fixation on movies that were sometime played during the aftercare program.

In addition to manifesting a certain level of appropriate social interactions towards his peers during interventions 1 and 2, Kevin seemed more comfortable making social initiations towards teachers and other adults. In one instance, Kevin acknowledged the researcher and asked her whether she would like to join him in his Lego play. After accepting his invitation to play, the researcher tried to coax Kevin into inviting one of his peers to join in. Rather than complying, Kevin shrugged and replied 'wrong answer.'

Marvin. Prior to intervention 2, Marvin's appropriate social behaviors primarily consisted of responses that were contingent on peers' prior utterances (CR). Examples of contingent responses elicited by Marvin included responding to questions asked by his peers, and laughing at comments made by other students. Few initiating comments (IC) and seeking attention (SA) behaviors were also evident. For instance, Marvin would explain iPhone features to a friend and make comments related to movie playing during aftercare. Marvin would also seek the attention of his friends by calling out their names asking them to look at something or

observe a certain behavior (e.g. ‘hey AJ, check this out’) or wishing them goodbye (‘bye, Sarah,’ or ‘see you later alligator’). A lot of Marvin’s comments, however, seemed random and not directed at a specific person. Additionally, prior to the implementation of intervention 2, Marvin seemed reserved about pulling out his iPhone and sharing it with his friends, with the exception of one session during baseline, where a significant increase in behaviors was apparent as a result of Marvin’s use of his iPhone and sharing it with his friends. Other baseline and intervention 1 sessions documented the use of the iPhone and/or the iPad, but their use was not tied to any increases in appropriate social behaviors. Rather, independent play with the iPhone or the iPad was evident. Marvin would sometimes start out by playing with the iPhone or the iPad with a friend, then he would grab it and relocate to a more secluded table where he gets to keeps it to himself and engages in independent play. Furthermore, conversations documented during the baseline and intervention 1 sessions did not ensue from iPhone topics, rather they were general play conversations that, for the most part, were uttered in response to peers’ comments.

During the first two sessions of intervention 2, lower rates of appropriate social interactions were evident. Marvin was in possession of the iPad during these two sessions and was engaging in independent play despite researcher prompting. However, during the remaining sessions, a marked increase in Marvin’s appropriate social interactions was demonstrated. Marvin continued to take control of the iPad for the remainder of intervention 2 and spent most of the time sharing it with his peers rather than playing in seclusion. Marvin’s iPad sharing consisted of playing ‘mine craft’ with his friends or watching videos clips. In addition to seeking the attention (SA) of his friends in the form of sharing the iPad, Marvin demonstrated numerous instances of initiating comments (IC) and making contingent responses (CR) all of which were related to the content of the iPad play session. For instance, Marvin engaged in frequent episodes

of laughter accompanied by expressions such as ‘oh my God!’ He would also make comments such as ‘Hey Chris, looks at this. This is so funny, right?’ as a means of sharing his enjoyment with his friends.

Overall Impressions and Emerging Theme

The above anecdotal data documented by the researcher revealed a change in the quality of the social interactions exhibited by all three participants over the course of the study. Specifically, during the baseline and the intervention phases, participants’ social interactions mostly consisted of responses that were contingent on peers’ social initiations. Upon the introduction of the Social Story which integrated participants’ restricted interest, a noted increase in participants’ initiating comments and joining in play was evident. This shift from passive to more active social initiations is perhaps indicative of the motivating and stimulating effects of circumscribed and restricted interests.

Even though the iPad was available (not purposely) for various sessions during intervention 1, Marvin did not show interest in sharing it with his friends. During intervention 2, on the other hand, Marvin was observed on numerous occasions eagerly sharing the iPad. Such instance further highlights the theme related to the potency of the integration of restricted interests within the context of a Social Story intervention.

Throughout the Social Story reading during intervention 1, Kevin was obviously frustrated and seemed overly disengaged. Specifically, Kevin kept complaining that he’s been reading the same book over and over and continued nagging about how boring the story was. Kevin’s lack of interest was evident in his deliberate mispronouncing of certain words and sentences and replacing them by bizarre and nonsensical ones. Kevin was unable to successfully get through the Social Story reading sessions, unless a reinforcer in the form of a 10-minute

computer time was provided immediately following the Social Story reading. Shortly after the introduction of the second Social Story (the story in which Kevin's restricted interest, Legos, was incorporated), it was obvious that Kevin began to take more interest in the Social Story. He stopped complaining about the length and the redundancy of the story, became more cooperative and more enthusiastic about the reading process. Strikingly, all throughout intervention 2, Kevin read through the Social Story despite withdrawing the reinforcer component. Such shift from disengagement to over eagerness over the course of the two interventions further substantiates the strength of incorporating the restricted interested of participants within a Social Story intervention.

Across intervention 1, Ean demonstrated extreme disengagement and non-responsiveness. Specifically, Ean showed no attempts at reading the Social Story, failed to comply to instructions provided by the researcher, and either looked away or covered his head with his hands and placed it on the table face down. Upon the introduction of the second Social Story, clear changes in Ean's behaviors and demeanor were evident. Ean became unusually focused, engaged, responsive, and cooperative throughout the reading of the Social Story. He responded to related comprehension questions with 100% accuracy, as compared to 0% during intervention 1. He even began reading large parts of the Social Story on his own (specifically those pages that included images and sentences which pertain to his restricted interest). Furthermore, Ean began making predictions about what the Social Story was about by merely looking at the cover illustrations. Ean's teachers and other school staff noted these improvements in his behaviors and were in awe of what Ean was suddenly capable of accomplishing. They noted that Ean was 'brought to life.' For instance, one of Ean's teachers was stunned at how Ean would quite willingly jump out of his seat as soon as the researcher walks in and follow her to

the reading area. According to the teacher, it is unusual for Ean to show interest in working with others. The same teacher also commented at how Ean would stay put with the researcher, since he typically runs away from his seat and an adult would have to chase him around to keep him seated and focused. Other teachers made note of how Ean's improvements were reflected academically in their classrooms. Specifically, they emphasized that Ean now reads, solves math problems and asks for help, all of which were behaviors that were unusual and uncharacteristic of Ean. Such drastic improvements in Ean's behaviors from intervention 1 to intervention 2 provide further evidence that incorporating restricted and circumscribed interests in a Social Story contributes significantly to the effectiveness of the Social Story.

Chapter V

Discussion

Impact of the Intervention

A research study that compared the effects of a Social Story intervention that incorporated the restricted interest of students with ASD with a Social Story intervention that did not incorporate students' restricted interest was conducted. The impact of these two Social Story interventions on the social outcomes of three participants with ASD was examined. Overall, the intervention that included participants' restricted interests within the Social Story had the effect of increasing participants' appropriate social behaviors in contrast to the intervention that did not employ restricted interests.

With the exception of Kevin, no increases in participants' appropriate social behaviors were evident following the implementation of intervention 1. Even though Marvin's overall mean score during intervention 1 was higher than Kevin's overall mean score during intervention 1, Kevin's mean score was relatively higher than that displayed by him during baseline. Marvin demonstrated several occurrences of appropriate social behaviors during baseline that were almost comparable to the level of appropriate social behaviors displayed during intervention 1. Unlike Ean and Kevin, Marvin started out displaying appropriate social behaviors and continued to do so during intervention 1. Even though Marvin possessed a certain level of positive behavioral interactions in his repertoire of skills, lots of room for improvement was still needed as evident by the increase in social behaviors during intervention 2. Quantitative data analysis demonstrates that Ean was the only participant that did not seem to benefit from the effects of

intervention 2, albeit anecdotal data suggests that qualitative improvements were indeed evident. Such improvements, however, were not fully related to the behaviors that were targeted for intervention. Specifically, observed changes in Ean's behaviors included improvements in his reading skills, math skills (as documented by Ean's teachers) and asking for help skills. Ean also became more responsive and cooperative with the researcher during the intervention. Furthermore, visual analysis of the data and examination of the overall mean score during intervention 2 suggest that slight improvements in Ean's target behaviors were evident. However, researcher prompting was employed during intervention 2, thus undermining the impact that intervention 2 might, otherwise, have had on Ean.

Prior to the study, Ean was characterized by having very delayed expressive and receptive skills. His communication and comprehension skills were severely lacking and he frequently engaged in repetitive behaviors including hand clapping, hand flapping and rocking behaviors. According to his educational records, Ean's attention difficulties and ability to understand verbal directions were so severe to the extent that administration of an IQ test was not possible. Ean showed no interest in academic tasks including solving math problems and reading. Furthermore, Ean demonstrated severe social skills deficits as evident by his lack of participation in appropriate social play, and little to no interest in making eye contact and in initiating and responding to conversations with his peers. Kevin also demonstrated distinctive features of autism; his symptoms, however, were not as severe as those exhibited by his fraternal twin, Ean. Even though Kevin's reading was slower than a typical student his age, he showed interest in reading and his reading was significantly more advanced than Ean's. Furthermore, unlike Ean, Kevin did not show difficulties comprehending texts, as evident by his ability to appropriately respond to comprehension questions. Although Kevin demonstrated difficulty

using appropriate verbal and nonverbal communication with other children, he did not appear to have difficulties approaching adults and initiating conversation. Marvin, on the other hand, demonstrated social behaviors that were more advanced than those exhibited by Kevin. Although limited, Marvin showed instances of appropriate social interactions directed towards adults as well as other children. Furthermore, Marvin displayed reading skills that were appropriate to his age and grade level. The varying level of participants' academic, communication, and social traits highlighted above, validates Gray and Garand's (1993) assertion that children with ASD who are higher functioning will more likely benefit from a Social Story interventions than lower functioning children. In this research, Social Stories have proven effective with both Kevin and Marvin, both of whom were on the higher end of the autism spectrum, than with Ean, whose symptoms were on the severe end of the autism spectrum.

Embedding the restricted interests of participants within the context of a social activity improved Kevin's and Marvin's motivation to make social initiations and to engage in social interactions with their peers. The fact that an immediate increase in Kevin's and Marvin's social behaviors occurred following the introduction of the Social Story that incorporated the restricted interest, suggests that motivation might have played a key role in the participants' acquisition of appropriate social behaviors. Clearly, Marvin already possessed a certain level of appropriate social behaviors in his repertoire, as evident during baseline. Slight improvement in Marvin's display of appropriate social behaviors occurred once the Social Story, which did not include the restricted interest, was introduced. However, a notable increase in Marvin's appropriate social behaviors occurred following the introduction of the Social Story that incorporated his restricted interest. The focus by the teachers for Marvin was not on him acquiring appropriate social behaviors. There was more urgency in helping Marvin build on his previously acquired skills and

to help him exhibit them more effortlessly and consistently. Findings suggests that the inclusion of a restricted interest within a Social Story intervention may have potential for being particularly practical and effective for participants such as Marvin who are working toward more consistent and fluent use of acquired social skill behaviors.

It is also worth noting that the nature of the restricted interests that the participants enjoyed contributed to the positive results achieved in the study. Specifically, the participants possessed restricted interests (music, Legos, and iPhone) that were realistic to utilize in an educational setting, common to obtain, and easily accessible by the researcher. Furthermore, it was observed by the researcher that that the participants' restricted interest were also shared and enjoyed by their peers suggesting that they were socially acceptable to the participant's classmates. The nature of the restricted interests therefore may have played a role in the results for intervention 2 and is consistent with previous research showing that the introduction of activities that are mutually reinforcing is necessary for the development of appropriate relationships between children with and without disabilities (Hurley-Geffner, 1995; Rogers & Lewis, 1989). The current study, however, has demonstrated that the formation of positive relationships amongst children with disabilities in the absence of other participants without disabilities is also possible when incorporating restricted interests valued by peers within a social story intervention. A different group of participants may have had restricted interests that were inappropriate (such as body parts), may have had restricted interests that were less plausible to incorporate within an educational setting (such as weather reports or ceiling fans), or may not have had restricted interests at all. This reality could limit applicability of this study's findings to other children with ASD who may possess qualitatively different restricted interests (Vismara & Lyons, 2007).

Significance of Findings

The findings of this study contribute in a number of ways to the literature addressing effective treatments for improving the social behaviors of children with ASD. First, this research provides data on the potential benefits of using a Social Story to teach appropriate social skills to students with ASD. More importantly, this research enriches the existing literature by demonstrating that supplementing Social Stories with students' restricted interests can be even more efficacious than the use of Social Stories alone. Certainly, replication of the findings of this study is warranted in order to strengthen this assertion.

Second, the majority of previous research has either demonstrated the effects of a Social Story intervention alone (Lorimer, Simpson, Myles, and Ganz, 2002), or a Social Story combined with a different intervention (Swaggart & Gagnon, 1995; Crozier & Tincani, 2006). The research base, however, is void of studies that have sought to examine the inclusion of students' restricted interest within a Social Story intervention. Rather than focusing on the value of restricted interests and their role in creating positive and substantial outcomes in students' social behaviors, other studies (Epstein, Taubman, &Lovaas, 1985) have chosen to examine means of eliminating such restricted interests.

Third, this study further contributes to previous research (Gray & Garand, 1993) that considers Social Stories to be more effective with children with ASD who are higher functioning. In this research, Social Stories were more valuable and successful with both Kevin and Marvin, both of whom were on the higher end of the autism spectrum, than with Ean, whose symptoms were on the severe end of the autism spectrum.

Finally, this study contributes to the development of evidence-based practices for student support personnel (including school psychologists, and behavior analysts) working with students

with ASD. The rapidly increasing number of children with ASD in addition to the increase in the number of children included within general education classes, calls for prompt and frequent development and implementation of social skills interventions. Student support personnel play a leading role in mentoring and assisting educators with the design and proper implementation of such evidence-based interventions.

Limitations

Despite its many contributions to the existing literature, this study has a number of limitations that should be indicated. One limitation involves including the restricted interest in the social setting during which observations occurred exclusively in intervention 2, rather than keeping it constant across all phases of the study. By doing so, it becomes unclear as to whether participants' engagement in appropriate social behaviors occurred as a result of the intervention, or the presence of the restricted interest, which could be highly motivating to the participant. Furthermore, keeping the inclusion of the restricted interest constant across all phases might have controlled for the resulting variability of baseline and intervention 1 data. Specifically, the unintentional and intermittent inclusion of the restricted interest across the baseline and the intervention 1 phases of the study was evident. An occasional increase in participants' target behavior was therefore evident, as the restricted interest was sporadically made available prior to intervention 2. It is likely that improvement in participants' social behaviors was associated with the availability of the interest. A positive correlation between the presence of the restricted interest and improvement in target behavior further validates the potency of restricted interests in creating positive changes in participants' social behaviors.

A second limitation in this study is the variability of the data within and across participants. Even though all three participants (more so for Kevin and Marvin than for Ean)

demonstrated an increase in appropriate social behaviors, there was significant variability in the results. Such variability clouded the effects of the interventions on appropriate social behaviors. Ean's data showed the least amount of variability during baseline and intervention 1. Variability in Ean's results, however, was also evident during intervention 2. Such variability was most probably brought about as a result of inconsistent prompting initiated by the researcher. Specifically, in Ean's case, the use of researcher prompting during intervention 2 contributed to increases in appropriate social behaviors. A drop in appropriate social behaviors was evident during sessions in which researcher prompting was not utilized. Kevin's data did not show variability during baseline, even though variability during interventions 1 and 2 was clearly evident. Factors external to the study might have also contributed to the results. For example, a different movie was presented for the students to watch during every session of the aftercare program. Anecdotal data revealed that Kevin was intensely focused on the movies which could explain his consistent lack of display of appropriate social behaviors during baseline. Moreover, upon further examination of Kevin's anecdotal data during interventions 1 and 2, it was obvious that the intermittent drops in appropriate social behaviors were tied to sessions during which Kevin was observed watching a movie. It could perhaps be concluded that prior to the administration of the Social Story interventions, Kevin's primary interest during aftercare sessions was watching movies. Upon implementation of interventions 1 and 2, Kevin began to show interest in engaging in social interactions with other kids, but the level of interest seemed to drop when a more attention-grabbing event (i.e., a movie) was presented. Marvin's data showed variability during all three phases of the intervention. Anecdotal data also revealed that paraprofessionals who were present during the aftercare program would often block students' (particularly those who were involved in this study) attempts at approaching other peers or trying

to engage in any form of social interaction with them. Specifically, in most cases, the paraprofessionals would yell at the students instructing them to sit still as soon as they tried to make their way out of their seat as they were likely concerned that this may lead to them engaging in some type of disruptive behavior. Even though the paraprofessionals were informed of the researcher's study objectives, they regularly discouraged students' social initiation attempts. This variability may also be explained by the presence of contextual variables such as setting events that were not noticed or documented by the researcher. In other words, it is possible that Marvin, and conceivably Kevin too, experienced events (such as mood changes, fatigue, illnesses, and/or lack of sleep) that has made them less motivated to engage in appropriate social interactions on random days throughout the intervention. As children with ASD come across a negative setting event, they will more likely rebuff their peers, causing peers to cut down on their social responses and initiations (Owen-DeSchryver, G. Carr & Blakely-Smith, 2008).

According to Granpeesheh, Tarbox, Najdowski, & Korrack (2014), behavior is bound to be characterized by some level of variability. However, as in the case with this study, the variability in the data across participants diminishes the researcher's ability to fully evaluate an effect. Despite the fact that lower variability profoundly facilitates the detection of a change in level, and despite the fact that a change in level was not visually obvious in this study, a change in variability in the desirable direction is evident in the data.

A third limitation of this study is the lack of parent involvement. The original intent was to involve parents of the participants in the intervention. Efforts to involve parents of all participants were made in this study. Despite efforts to involve parents, enthusiasm, full and active participation of parents in this study were lacking. To be more precise, at the very early

stages of the study, Kevin and Ian's mother failed to respond to the researcher's attempts at reaching out to her for purposes of recruiting her children into the study. Failure to respond to the researcher's communication efforts occurred even though the mother had already expressed interest and had already given Kevin's and Ian's teachers verbal approval to participate in the study. The researcher was eventually able to make initial contact with the mother by approaching her during student pick up hours. At that point, the mother was briefed about the study procedures and was provided the consent form for her to review. Subsequently, the mother expressed her willingness to involve her children in the study. Despite her approval, the mother's demeanor suggested discomfort and a sense that she wanted to rush through the meeting. The trend of failing to respond to the researcher's communication efforts continued throughout the remainder of the study. The mother's aloofness, avoidance, and reservation could perhaps be explained by feelings of embarrassment brought about as a result of both her sons' diagnosis (or not taking the researcher seriously). Marvin's mother, on the other hand, was fully cooperative and responsive at the beginning and during the study. She demonstrated genuine interest in the study and in working collaboratively with the researcher in finding the most suitable social approach for Marvin. However, despite the mother's initial enthusiasm and involvement during the study, her interest seemed to fade by the end. The mother's dwindling interest was particularly evident when she failed to acknowledge and respond to the researcher's request to assess the overall validity of the study and to weigh in on its study outcomes. The researcher's contact attempt came during the termination of the school year, which might explain the mother's lack of response.

A fourth limitation includes the presence of external factors that may have influenced the results. During intervention 1, an increase in Kevin's appropriate social interactions was evident.

Interestingly, this behavioral increase occurred, for the most part, in the presence of the iPad, which, according to the paired stimulus preference assessment, was Kevin's second most preferred item. It is, therefore, not clear which of the two factors, the Social Story or the iPad, accounted for the observed increase in appropriate social behaviors in intervention 1.

Even though quantitative analysis of data did not show improvements in Ean's social behaviors following the two interventions, anecdotal data revealed that improvements did occur to some extent and extended beyond intervention sessions. Asserting that the Social Stories introduced in this study played a significant role in producing the observed improvements in Ean's social behaviors would be imprecise. Ean might have benefited from the much-needed one-on-one attention he received while working with the researcher. Additionally, researcher prompting occurred during the observation period, following the reading of the Social Story, thus limiting the accuracy of the data collected. The introduction of researcher prompting was concurrent with the increase in data points evident during intervention 2. Such findings are consistent with those obtained by Crozier and Tinccani (2005), who concluded that the pairing of a Social Story with verbal prompts was more effective than the use of a Social Story alone. Due to time limitations, prompting occurred inconsistently and did not take place sufficiently enough to allow for independent display of desired social behaviors. Extending the study timeline would have likely enabled the researcher to administer the prompts frequently followed by their gradual withdrawal until no prompts are provided. By means of prompt fading, the researcher would expect Ean to independently engage in appropriate social behaviors with his peers without the need to administer any prompts.

A fifth limitation involves a focus on the measurement of the frequency as opposed to the quality of appropriate social interactions elicited by participants. Data collection procedures

primarily consisted of tallying the frequency of targeted social behaviors during the baseline, intervention 1, and intervention 2 phases using an observational data-recording sheet. Data were then plotted in a line graph as a percentage of intervals per session across the baseline and the intervention phases and inspected visually for changes in level, trend, and variability. Even though anecdotal data was recorded and was used to inform the researcher about the quality of the social interactions, the data was not substantial enough to make accurate inferences about the validity of the intervention. The use of a reliable scale assessing quality of social interactions would have been particularly useful for Ean. Quantitative analysis demonstrated that Ean did not benefit from the effects of either intervention, even though qualitative data seemed to show that he experienced significant changes in the quality of his social interactions as a result of his participation in the intervention.

A sixth limitation was that, over the course of the study, Marvin was receiving ABA therapy for behavior modification. Additionally, Marvin's ABA therapist had used Social Stories with him in the past. It is, therefore, difficult to know if Marvin would have responded to the study's Social Story interventions in the same manner had he not been receiving ABA therapy or had not been previously introduced to Social Stories.

A seventh limitation consists of having the researcher rather than an outside person mark the items on the procedural fidelity checklist. Having an outside person evaluate whether procedures used within interventions 1 and 2 were implemented as planned eliminates researcher bias.

An eighth limitation of this study involves the generalizability of the study findings to other children with ASD, types of disabilities behaviors, or settings. The Social Stories may have been moderately effective only with the types of children included in the study, the study

environment, and other included variables. Furthermore, both the limited number of participants, and the modest and variable results undermines the generalizability of the study's results to other children. In addition to its failure to collect generalization data in a variety of settings, this study fell short of assessing the extent to which social skills taught through the Social Story interventions have maintained over time.

A final limitation involves the administration of the Social Story interventions by a researcher who was not associated with the participants' classroom and everyday schedule. Having a non-staff person, as opposed to a classroom teacher or parent, implementing the interventions prevents the Social Story from becoming an embedded component within the classroom or home routine. Using teachers or parents as intervention agents makes possible the implementation of the Social Stories beyond the predetermined intervention sessions.

Recommendations for Future Research

Future research into Social Story interventions, particularly as they pertain to the integration of students' restricted interests, should address a number of issues. First, it is important to take into account the inconsistent researcher prompting administered to Ean during intervention 2 observation sessions, which contributed to an increase in Ean's appropriate social behaviors. A decrease in Ean's appropriate social behaviors was also evident upon withdrawal of researcher prompting. Future research should further investigate the role of researcher prompting introduced within the context of a Social Story intervention and its effects on the social outcomes of children with ASD. Specifically, research comparing the effects of a Social Story with prompting and a Social Story without prompting should be more thoroughly examined.

Second, future research should replicate methods and procedures used in this study under more controlled conditions. Students were shown a different movie every day of the aftercare

program. Data points indicating significant drops in Kevin's display of appropriate social interactions during interventions 1 and 2 corresponded with sessions during which Kevin was observed intensely concentrated on a movie. Furthermore, it was evident that paraprofessionals would occasionally prevent students participating in this study from moving out of their chairs and approaching their peers fearing that such actions might lead to negative behavioral consequences. Such external factors, including the presentation of a movie and paraprofessionals' thwarting of students' behaviors, resulted in data variability, which blurred the effects of the intervention. Controlling for these extraneous conditions should therefore be carefully considered in future research.

Third, the use of a multiple baseline that provides more substantial experimental control should be considered for future research. The nonconcurrent multiple baseline design employed in this study fell short of concurrently evaluating social outcome levels exhibited by the participants across different sessions of the intervention. This design was mainly a series of A-B-C replications with differing baseline lengths.

Fourth, it is important that future research assess how newly learned skills generalize to other settings, and should extend beyond the intervention phases of the study and examine the long-term effects of Social Stories.

Fifth, future research should focus on implementing Social Story interventions in general education environments as opposed to self-contained settings. As the identification of students with ASD increases, so will the demand for the implementation of services within the least restricted environment. Social Stories appear to be highly suitable for general education classrooms particularly due to their ease of execution. Kokina and Kern (2010) defended this notion in their meta-analysis by concluding that Social Stories implemented in general education

environments produced far more effective results than Social Stories that were implemented in self-contained environments.

Sixth, future research should look into the implementation and delivery of Social Stories in a variety of formats, other than the traditional teacher-read method. As suggested by Gray (2004), such methods might include Power Point presentations, and Stories acted out by puppets. Other methods could include iPad, video modeled, computer, or musical stories.

Seventh, given the diversity of skills and abilities of children with ASD, it is still unclear whether all children who fall under the umbrella of ASD could benefit from Social Stories. Future research should therefore seek to garner more information regarding the use of Social Stories with children on varying ends of the spectrum. Even though Gray and Garand (1993) determined that higher functioning children and/or children with advance language skills will most likely benefit from Social Stories, other studies have maintained that Social Stories may also benefit more severely challenged children (Swaggart et al. 1995). Future research should also focus on identifying the characteristics of children who were shown to respond well to Social Stories.

Eighth, in view of the fact that ASD is a heterogeneous condition, replicating the results of this study with a larger sample size is recommended. Further research should, therefore, probe deeper into uncovering motivational strategies that may be effective in addressing the different and various needs of children with ASD. Examining other types of motivational procedures should therefore be further examined.

Ninth, future research should delve further into assessing the possible role of peers in the Social Story intervention. Numerous research (Laushey & Heflin, 2000; Stichter et al., 2007; Ogilvie, 2011; Wang, Cui, & Parrila, 2011) on social skills supports the efficacy and importance

of peer involvement in social skills intervention for children with ASD. Such research has recognized the importance of improving social interactions between children with ASD and typical peers through peer-mediated interventions. Very few studies, on the other hand, have evaluated the importance of peer involvement within the context of Social Story interventions.

Finally, future research should be more focused on the continued use of methods and procedures that use experimental control. A number of available research (Norris & Datilo, 1999; Swaggart et al., 1995) demonstrated limited experimental control due to the use of an AB design. Such designs do not provide sufficient information to rule out the possible impact of a host of extraneous variables. The continued use of research designs that lack experimental rigor limits researchers' attempts at adequately assessing the internal validity of the studies. Therefore, the use of designs that employ experimental control is critical.

Summary and Final Thoughts

In summary, this study investigated the effects of a Social Story intervention that employed the restricted interests of three students with ASD. Findings from this study support positive results obtained from other studies regarding the efficacy of Social Story interventions. Additionally, this study further contributed to previous research by establishing that once students' restricted interests are added to Social Stories, additional improvements in social behaviors have been observed. This study, however, provides only preliminary evidence that the integration of restricted interests within a Social Story intervention may be a helpful method for improving social skills difficulties for many children who are diagnosed with ASD.

This research substantiates the principle that the restricted interests of children with ASD should not be viewed as a form of deficiency that needs to be eliminated. Rather, restricted interests should be viewed as reinforcing agents that increase children's motivation to pursue

activities that involve social initiations and interactions with their peers. Providing all children, irrespective of their skills and abilities, the opportunity to participate in activities that center around their restricted interests and that are particularly relevant and meaningful to their daily experiences should be viewed as a fundamental right. Doing so provides the children with a sense of control over their environment, builds their self-esteem and promotes feelings of self-worth and well-being.

References

Adams, L., Gouvousis, A., VanLue, M., & Waldron, C. (2004). Social story intervention: Improving communication skills in a child with an autism spectrum disorder. *Focus on Autism and Other Developmental Disabilities,* 19, 87-94.

Asmus, J. M., Conroy, M. A., Ladwig, C. N., Boyd, B., & Sellers, J. (2004). Social Skills Interview. Unpublished document.

Attwood, T. (1998). *Asperger's Syndrome: A guide for parents and professionals*. Philadelphia: Taylor & Francis.

Attwood, T. (2000). Strategies for improving the social integration of children with asperger syndrome. *Autism, 4*, 85-100.

Baer, D. M., Wolf, B. M., & Risley, T. R. (1968). Some current dimensions of applied behavior analysis. *Journal of Applied Behavior Analysis, 1,* 91-97.

Baker, M. J. (2000). Incorporating the thematic ritualistic behaviors of children with autism into games: Increasing social play interactions with siblings. *Journal of Positive Behavior Interventions, 2,* 66-84.

Baker, M. J., Koegel, R. L., & Koegel, L. K. (1998). Increasing the social behavior of young children with autism using their obsessive behaviors. *The Journal of the Association for Persons with Severe Handicaps, 4,* 300-308.

Banda, D. R., & Grimmett, E. (2008). Enhancing social and transition beh\\\aviors of persons with autism through activity schedules: A review. *Education and Training in Developmental Disabilities, 43,* 324-333.

Baron-Cohen, S., Leslie, A. M., & Frith, U. (1985). Does the autistic child have a theory of mind*? Cognition, 21,* 37-46.

Barry, L. M., & Burlew, S. B. (2004). Using social stories to teach choice and play skills to children with autism. *Focus on Autism and Other Developmental Disabilities, 19,* 45-51.

Bellini, S., & Akullian, J. (2007). A meta-analysis of video modeling and video self-modeling interventions for children and adolescents with autism spectrum disorders. *Exceptional Children, 73,* 264-287.

Bellini, S., Peters, J. K., Benner, L., & Hopf, A. (2007). A meta-analysis of school-based social skills interventions for children with autism spectrum disorders. *Remedial and Special Education, 28,* 153-162.

Bishop, S.L., Richler, J., & Lord, C. (2006). Association between restricted and repetitive behaviors and non-verbal IQ in children with autism spectrum disorders. *Child Neuropsychology, 12,* 247-267.

Blacher, J., & Christensen, L. (2011). Sowing the seeds of the autism field: Leo Kanner (1943). *Intellectual and Developmental Disabilities, 49,* 172-191.

Bodfish, J. W., Symons, F.J., Parker, D. E., & Lewis, M. H. (2000). Varieties of repetitive behaviors in autism: Comparisons to mental retardation. *Journal of Autism and Developmental Disorders, 30,* 237-243.

Bondy, A. (2001). PECS: Potential benefits and risks. *The Behavior Analyst Today, 2,* 127-132.

Bondy, A., & Frost, L. (1994). The picture exchange communication system. *Focus on Autistic Behavior, 9,* 1-18.

Bondy, A., & Frost, L. (2001). The picture exchange communication system. *Behavior Modification, 25,* 725-744.

Boyd, B.A., Alter, P.J., & Conroy, M.A. (2005). Using their restricted interests: A novel strategy for increasing the social behaviors of children with autism. *Beyond Behavior, 14,* 3-9.

Boyd, B. A., Conroy, M. A., Mancil, G. R., Nakao, T., & Alter, P.J. (2006). Effects of circumscribed interests on the social behaviors of children with autism spectrum disorders. *Journal of Autism and Developmental Disorders, 37*, 1550-1561.

Carr, E. G., Dunlap, G., Horner, R. H., Koegel, R. L., Turnbull, A. P., Sailor, W., Anderson, J., Albin, R. W., Koegel, L. K., & Fox, L. (2002). Positive behavior support. Evolution of an applied science. *Journal of Positive Behavior Interventions, 4*, 4-16.

Centers for Disease Control and Prevention. (2012).

Chan, J. M., O'Reilly, M. F., Lang, R. B., Boutot, E. A., White, P. J., Pierce, N., & Baker, S. (2011). Evaluation of a Social Stories intervention implemented by pre-service teachers for students with autism in general education settings. *Research in Autism Spectrum Disorders, 5,* 715-721.

Charlop-Christy, M. H., Carpenter, M., Le, L., LeBlanc, L. A., & Kellet, K. (2002). Using the picture exchange communication system (PECS) with children with autism: Assessment of PECS acquisition, speech, social-communicative behavior, and problem behavior. *Journal of Applied Behavior Analysis, 35,* 213-231.

Charlop-Christy, M. H., & Haymes, L. K. (1996). Using obsessions as reinforcers with and without mild reductive procedures to decrease inappropriate behaviors for children with autism. *Journal of Autism and Developmental Disorders, 26,* 527-546.

Chen, Y. H., Rodgers, J., & McConachie, H. (2009). Restricted and repetitive behaviours, sensory processing and cognitive style in children with autism spectrum disorders. *Journal of Autism and Developmental Disorders, 39,* 635-642.

Chowdhury, M., Benson, B. A., Hillier, A. (2010). Changes in restricted repetitive behaviors with age: A study of high-functioning adults with autism spectrum disorders. *Research in Autism Spectrum Disorders, 4,* 210-216.

Cotugno, A. J. (2009). Social competence and social skills training and intervention for children with autism spectrum disorders. *Journal of Autism and Developmental Disorders, 39,* 1268-1277.

Crozier, S., & Tincani, M. (2007). Effects of social stories on prosocial behavior of preschool children with autism spectrum disorders. *Journal of Autism and Developmental Disorders, 37,* 1803-1814.

Cuccaro, M.L., Shao, Y., Grubber, J., Slifer, M., Wolpert, C.M., Donnelly, S.L., et al. (2003). Factor analysis of restricted and repetitive behaviors in autism using the Autism Diagnostic Interview-R. *Child Psychiatry and Human Development, 34,* 3-17.

Delano, M., & Snell, M. E. (2006). The effects of social stories on the social engagement of children with autism. *Journal of Positive Behavior Interventions, 8,* 29-42.

Dillenburger, K., Keenan, M., Doherty, A., Byrne, T., & Gallagher, S. (2012). ABA-based programs for children diagnosed with autism spectrum disorder: Parental and professional experiences at school and at home. *Child and Family Behavior Therapy, 34,* 11-129.

Engel, R. J. & Schutt, R. K. (2012). The Practice of Research in Social Work. 3rd. Thousand Oaks, CA: Sage Publications.

Fecteau, S., Mottron, L., Berthiaume, C., & Burack, J. A. (2003). Developmental changes of autistic symptoms. *Autism, 7*, 225-268.

Flynn, L., & Healy, O. (2012). A review of treatments for deficits in social skills and self-help skills in autism spectrum disorder. *Research in Autism Spectrum Disorders, 6,* 431-441.

Freedman, B., & Silverman, W. (2008). Improving social skills for children with high functioning autism. *Exceptional Parent, 38,* 64-66.

Frith, U. (1989). *Autism: Explaining the enigma.* Oxford: Blackwell.

Frith, U. (1991). Autism and Asperger's disorder. London: Cambridge University press.

Gillis, J. M., & Butler, R. C. (2007). Social skills interventions for preschoolers with autism spectrum disorder: A description of single subject design studies. *Journal of Early and Intensive Behavior Intervention, 4,* 532-546.

Gray, C.A. (1995). Teaching children with autism to "read" social situaiotns. In K. Quill (Ed.), *Teaching Children with Autism: Strategies to Enhance Communication and Socialization.* Albany, NY: Delmar.

Gray, C. A. (1998). Social stories and comic strip conversations with students with asperger syndrome and high-functioning autism. In E. Schopler, G. B. Mesibov, & L. J. Kunce (Eds.), *Asperger Syndrome or High-Functioning Autism?* New York: Plenum Press.

Gray, C. A. (2004). Social stories 10.0: The new defining criteria and guidelines. *Jenison Autism Journal, 15,* 2-21.

Gray, C. A., & Garand, J. D. (1993). Social stories: Improving responses of students with autism with accurate social information. *Focus on Autism and Other Developmental Disabilities, 8,* 1-10.

Gresham, F.M. & Lopez, M.F. (1996). Social validation: A unifying concept for school-based consultation research and practice. *School Psychology Quarterly, 11,* 204-227.

Grossman, R., & Verobyev, l. (1998). The neurobiology of stereotypic movement behaviors and SMD. *Psychiatric Annals, 28,* 317-323.

Hanley, G. P., Iwata, B. A., Thompson, R. H., & Lindberg, J. S. (2000). A component analysis of "stereotypy as reinforcement" for alternative behavior. *Journal of Applied Behavior Analysis, 33,* 285-297.

Horner, R. H., Carr, E. G., Halle, J., McGee, G., Odom, S., & Wolery, M. (2005). The use of single-subject research to identify evidence-based practice in special education. *Exceptional Children, 71,* 165-179.

Howlin, P., Mawhood, L., & Rutter, M. (2000). Autism and developmental receptive language disorder- A follow up comparison in early adult life.II: Social, behavioural, and psychiatric outcomes. *Journal of Child Psychology and Psychiatry, 41*, 561-578.

Hurley-Geffner, C.M. (1995). Friendships between children with and without developmental disabilities. In R. L. Koegel & L. K. Koegel (Eds.), *Teaching children with autism: Strategies for initiating positive interactions and improving learning opportunities.* Baltimore: Paul H. Brookes.

Jolliffe, T., & Baron-Cohen, S. (1997). Are people with autism or Asperger's syndrome faster than normal on the Embedded Figures Task? *Journal of Child Psychology and Psychiatry, 38,* 527-534.

Kazdin, A. E. (1980). Acceptability of time-out from reinforcement procedures for disruptive child behavior. *Behavior Therapy, 11,* 329-344.

Kazdin, A.E. (2011). Single-case research designs: Methods for clinical and applied settings (2nd ed.). New York: Oxford University Press.

Kazdin. A. E., & Kopel, S. A. (1975). On resolving ambiguities of the multiple-baseline design: problems and recommendations. *Behavior Therapy, 6,* 601-608.

Kugler, B. (1998). The differentiation between autism and Asperger syndrome. *Autism, 2,* 11-32.

Klin, A., Danovitch, J. H., Merz, A. B., & Volkmar, F. R. (2007). Circumscribed interests in higher-functioning individuals with autism spectrum disorders: An exploratory study and a theory. *Research and Practice for Persons with Severe Disabilities, 32,* 89-100.

Koegel, L. K., Koegel, R. L., & Carter, C. M. (1999). Pivotal teaching interactions for children with autism. *School Psychology Review, 28,* 576-594.

Koegel, L. K., Koegel, R. L., Harrower, J. K., & Carter, C. M. (1999). Pivotal response intervention I: Overview of approach. *The Journal of the Association for Persons with Severe Handicaps, 24,* 174-185.

Koegel, L., Matos-Freden, R., Lang, R., & Koegel, R. (2011). Interventions for children with autism spectrum disorders in inclusive school settings. *Cognitive and Behavioral Practice, 19,* 401-412.

Krantz, P. J., & McClannahan, L. E. (1993). Teaching children with autism to initiate to peers: Effects of a script-fading procedure. *Journal of Applied Behavior Analysis, 1,* 121-132.

Krantz, P. J., & McClannahan, L. E. (1998). Teaching children with autism to initiate to peers: Effects of a script-fading procedure. *Journal of Applied Behavior Analysis, 26,* 121-132.

Kratochwill, T. R., Hitchcock, J., Horner, R. H., Levin, J. R., Odom, S. L., Rindskopf, D. M., & Shadish, W. R. (2010). Single-case design technical documentation. Retrieved from What Works Clearinghouse website: http://ies.ed.gov/ncee/wwc/pdf/wwc_scd.pdf

Kuttler, S., Myles, B. S., & Carlson, J. K. (1998). The use of social stories to reduce precursors to tantrum behavior in student with autism. *Focus on Autism and Other Developmental Disabilities, 13,* 176-182.

Lam, K.S.L., Bodfish, J. W., & Piven, J. (2008). Evidence for three subtypes of repetitive behavior in autism that differ in familiarity and association with other symptoms. *Journal of Child Psychology and Psychiatry, 49,* 1193-1200.

Lang, R., Sigafoos, J., Rispoli, M., Chan, J.M., Lancioni, G., O'Reilly, M.F., Machalicek, W., Shogren, K., Davis, T., & Hopkins, S. (2010). Review of teacher involvement in applied intervention research for children with autism spectrum disorders. *Education and Training in Autism and Developmental Disabilities, 45,* 268-283.

Laushey, K. M., & Heflin, J. (2000). Enhancing social skills of kindergarten children with autism through the training of multiple peers as tutors. *Journal of Autism and Developmental Disorders, 30,* 183-193.

Lewis, M. H., & Bodfish, J. W. (1998). Repetitive behavior disorders in autism. *Mental Retardation and Developmental Disabilities Research Reviews, 4,* 80-89.

Loftin, R. L., Odom, S.L., Lantz, J. F. (2007). Social interaction and repetitive motor behaviors. *Journal of Autism and Developmental Disorders, 38,* 1124-1135.

Lorimer, P. A., Simpson, R. L., Myles, B. S., & Jennifer, B. G. (2002). The use of social stories as a preventative behavioral intervention in a home setting with a child with autism. *Journal of Positive Behavior Interventions, 4,* 53-60.

Ma, H. H. (2006). An alternative method for quantitative synthesis of single-subject researches. *Behavior Modification, 30,* 598-617.

Mackay, T., Knott, F., & Dunlop, A. W. (2007). Developing social interaction and understanding in individuals with autism spectrum disorder: A groupwork intervention. *Journal of Intellectual and Developmental Disability, 32,* 279-290.

Mancil, G. R., & Pearl, C. E. (2008). Restricted interests as motivators: Improving academic engagement and outcomes of children on the autism spectrum. *Teaching Exceptional Children Plus, 4,* 2-14.

Martens, B. K., Witt, J. C., Elliot, S. N., & Darveaux, D. X. (1985). Teacher judgements concerning the acceptability of school-based interventions. *Professional Psychology: Research and Practice, 16,* 191-198.

Matson, J. L., & Minishawi, N. F. (2006). *Early intervention for autism spectrum disorders: A critical analysis.* Oxford, UK: Elsevier Science.

Matson, J. L., Turygin, N. C., Beighley, J., Rieske, R., Tureck, K., & Matson, M. L. (2012). Applied behavior analysis in autism spectrum disorders: recent developments, strengths, and pitfalls. *Research in Autism Spectrum Disorders, 6,* 144-150.

Mercire, C., Mottron, L., & Belleville, S. (2000). Psychosocial study on restricted interests in high functioning persons with pervasive developmental disorders. *Autism, 4,* 406-425.

Mottron, L., Burack, J. A., Iarocci, G., Belleville, S., & Enns, J. T. (2003). Locally oriented perception with intact global processing among adolescents with high-functioning autism: evidence from multiple paradigms. *Journal of Child Psychology and Psychiatry, 44,* 904-913.

Nadig, A., Lee, I., Singh, L., Bosshart, K., & Ozonoff, S. (2010). How does the topic of conversation affect verbal exchange and eye gaze? A comparison between typical development and high-functioning autism. *Neuropsychologia, 48,* 2730-2739.

Norris, C., & Dattilo, J. (1999). Evaluating effects of a social story intervention on a young girl with autism. *Focus on Autism and Other Developmental Disabilities, 14,* 180-186.

Nyhus, E., & Barceló, F. (2009). The Wisconsin Card Sorting Test and the cognitive assessment of prefrontal executive functions: A critical update. *Brain and Cognition, 71,* 437-451.

Ogilvie, C. R. (2011). Step by step social skills instruction for students with autism spectrum disorder using video models and peer mentors. *Teaching Exceptional Children, 43,* 20-26.

O'Neill, R., Horner, R., Albin, R., Sprague, J., Storey, K., & Newton, J. (1997). Functional Assessment and Programme Development for Problem Behaviour: A Practical Handbook. Pacific Grove, CA. Brooks/Cole Publishing Company.

Ozdemir, S. (2008). The effectiveness of social stories on decreasing disruptive behaviors of children with autism: three case studies. *Journal of Autism and Developmental Disorders, 38,* 1689-1696.

Ozonoff, S., & Miller, J.N. (1995). Teaching theory of mind: A new approach to social skills training in individuals with autism. *Journal of Autism and Developmental Disorders, 25*, 415-433.

Quirmbach, L. M., Lincoln, A. J., Feinberg-Gizzo, Ingersoll, B. R., & Andrews, S. M. (2009). Social stories: Mechanisms of effectiveness in increasing game play skills in children diagnosed with autism spectrum disorder using a pretest posttest repeated measures randomized control group design. *Journal of Autism and Developmental Disorders, 39,* 299-321.

Reichow, B., & Sabornie, E. J. (2009). Brief report: Increasing verbal greeting initiations for a student with autism via a social story. *Journal of Autism and Developmental Disorders, 39,* 1740-1743.

Reichow, B., & Volkmar, F. R. (2010). Social skills interventions for individuals with autism: Evaluation for evidence-based practices within a best evidence synthesis framework. *Journal of Autism and Developmental Disorders, 40, 149-166.*

Reynhout, G., & Carter, M. (2007). Social story efficacy with a child with autism spectrum disorder and moderate intellectual disability. *Focus on Autism and Other Developmental Disabilities, 22,* 173-182.

Riley-Tillman, T.C. & Burns, M.K.(2009). Evaluating Educational Interventions: Single-Case Design for Measuring Response to Intervention. New York, NY: The Guilford Press.

Roane, H. S., Vollmer, T. R., Ringdahl, J. E., & Marcus, B. A. (1998). Evaluation of a brief stimulus preference assessment. *Journal of Applied Behavioral Analysis, 3,* 605-620.

Rogers, S. J., & Lewis, H. (1989). An effective day treatment model for young children with pervasive developmental disorders. *Journal of the American Academy of Child and Adolescent Psychiatry,* 28, 207-214.

Rutter, M., Le Couteur, A., & Lord, C. (2003). *ADI-R: The Autism Diagnostic Interview-Revised.* Los Angeles, CA: Western Psychological Services.

Sansoti, F. J., Powell-Smith, K. A., & Kincaid, D. (2004). A research synthesis of social story interventions for children with autism spectrum disorders. *Focus on Autism and Other Developmental Disabilities, 19,* 194-204.

Scattone, D. (2007). Social skills interventions for children with autism. *Psychology in the Schools, 44*, 717-726.

Scattone, D., Wilczynski, S. M., Edwards, R. P, & Rabian, B. (2002). Decreasing disruptive behaviors of children with autism using social stories. *Journal of Autism and Developmental Disorders, 32,* 535-543.

Scattone, D., Tingstrom, D. H., & Wilczynski, S. M. (2006). Increasing appropriate social interactions of children with autism spectrum disorders using social stories. *Focus on Autism and Other Developmental Disabilities, 21,* 211-222.

Schneider, N., & Goldstein, H. (2010). Using social stories and visual schedules to improve socially appropriate behaviors in children with autism. *Journal of Positive Behavior Interventions, 12,* 149-160.

Seltzer, M. M., Shattuck, P., Abbeduto, L., & Greenberg, J. S., (2004). Trajectory of development in adolescents and adults with autism. *Mental Retardation and Developmental Disabilities Research Reviews, 10,* 234-247.

Shah, A., & Frith, U. (1983). An islet of ability in autism: A research note. *Journal of Child Psychology and Psychiatry, 24,* 613-620.

Shao, Y., Cuccaro, M.L., Hauser, E.R., Raiford, K.L., Menold, M.M., Wolpert, C.M., et al. (2003). Fine mapping of autistic disorder to chromosome 15q11q13 by use of phenotypic subtypes. *American Journal of Human Genetics, 72,* 539-548.

Shattuck, P.T., Seltzer, M.M., Greenberg, J. S., Orsmond, G. I., Bolt, D., Kring, S., et al. (2007). Change in autism symptoms and maladaptive behaviors in adolescents and adults with an autism spectrum disorder. *Journal of Autism and Developmental Disorders, 37,* 1735-1747.

Shukla-Mehta, S., Miller, T., & Callahan, K. J. (2010). *Focus on Autism and Other Developmental Disabilities, 25,* 23-36.

South, M., Ozonoff, S., & McMahon, W. M. (2005). Repetitive behavior profiles in Asperger syndrome and high-functioning autism. *Journal of Autism and Developmental Disorders, 35,* 145-158.

South, M., Ozonoff, S., & McMahon, W. M. (2007). The relationship between executive functioning , central coherence, and repetitive behaviors in the high-functioning autism spectrum. *Autism, 11,* 437-451.

Spencer, V. G., Simpson, C. G., & Lynch, S. A. (2008). Using social stories to increase positive behaviors for children with autism spectrum disorders. *Intervention in School and Clinic, 44,* 58-61.

Stichter, J. P., Randolph, J., Gage, N., & Schmidt, C. (2007). A review of recommended practices in effective social competency programs for students with ASD. *Exceptionality, 15,* 219-232.

Swaggart, B. L., & Gagnon, E. (1995). Using social stories to teach social and behavioral skills to children with autism. *Focus on Autistic Behavior, 10,* 1-16.

Szatmari, P., Georgiades, S., Bryson, S., Zwaigenbaum, L., Roberts, W., Mahoney, W., et al. (2006). Investigating the structure of the restricted, repetitive behaviors and interests domain of autism. *Journal of Child Psychology and Psychiatry, 47,* 582-590.

Teijlingen, E., & Hundley, V. (2001). The importance of pilot studies. *Social Research Update, 35,* 1-4.

Thiemann, K. S., & Goldstein, H. (2001). Social stories, written text cues, and video feedback: effects on social communication of children with autism. *Journal of Applied Behavior Analysis, 34,* 425-446.

Turner, M. A., (1999). Annotation: Repetitive behavior in autism: A review of psychological research. *Journal of Child Psychology and Psychiatry, 4*0, 839-849.

Vacca, J. J. (2007). Incorporating interests and structure to improve participation of a child with autism in a standardized assessment: A case study analysis. *Focus on Autism and Other Developmental Disabilities, 22,* 51-59.

Van Krevelen, D. A., (1971). Early infantile autism and autistic psychopathy. Journal of *Autism and Childhood Schizophrenia, 1,* 82-86.

Wang, S. Y., Cui, Y., & Parrila, R. (2011). Examining the effectiveness of peer-mediated and video-modeling social skills interventions for children with autism spectrum disorders: A meta-analysis in single-case research using HLM. *Research in Autism Spectrum Disorders, 5,* 562-569.

Wang, P., & Spillane, A. (2009). Evidence-based social skills interventions for children with autism: A meta-analysis. *Education and Training in Developmental Disabilities, 44,* 318-342.

White, S. W., Koenig, K., & Scahill, L. (2007). Social skills development in children with autism spectrum disorders: A review of the intervention research. *Journal of Autism and Developmental Disorders, 37,* 1858-1868.

Wing, L. (1981). Asperer's syndrome: A clinical account. *Psychological Medicine, 11,* 115-129.

Wing, L. (1997). The history of ideas on autism: Legends, myths and reality. *Autism, 1,* 13-23.

Wing, L., & Gould, L. (1979). Severe impairments of social interaction and associated abnormalities in children: Epidemiology and classification. *Journal of Autism and Developmental Disorders, 9,* 11-29.

Winter-Messiers, M. A., Herr, C. M., Wood, C. E., Brooks, A. P., Gates, M. A. M., Houston, T. L., & Tingstad, K. I. (2007). How far can Brian ride the daylight 4449 express? A strength-base model of Asperger syndrome based on special interest areas. *Focus on Autism and Other Developmental Disabilities, 22,* 67-79.

Wolery, M., Kirk, K., & Gast, D. L. (1985). Stereotypic behavior as a reinforcer: Effects and side effects. *Journal of Autism and Developmental Disorders, 15,* 149–161.

Wolf, M. M. (1978). Social validity: The case for subjective measurement or how applied behavior analysis is finding its heart. *Journal of Applied Analysis, 11,* 203-214.

Wright, L. A., & McCathren, R. B. (2012). Utilizing social stories to increase prosocial behavior and reduce problem behavior in young children with autism. *Child Development Research, 2012,* 1-13.

Yerys, B. E., Wallace, G. L., Harrison, B., Celano, M. J., Giedd, J. N., & Kenworthy, L. E. (2009). Set-shifting in children with autism spectrum disorders: Reversal shifting deficits on the Intradimentional/Extradimentional Shift Test correlate with repetitive behaviors. *Autism, 13,* 523-538.

APPENDICES

Appendix A: Social Skills Interview

Child's name _____ Age _____ Sex: M F

Date of Interview _____ Interviewer _____

Respondent/ Relationship to child _____

Placement Type _____

A. Communication strategies

1. Describe specific communication strategies (appropriate and inappropriate) used by the child (e.g., vocal speech, signs/gestures, communication boards/books, or disruptive behaviors).

_____

_____

2. How consistently does the child use these communication strategies during social interaction opportunities with peers?

_____

_____

3. How does the child respond to complex (2-3 step directions) vs. simple (one step) directions?

_____

_____

B. Current social behavior

1. For each ***social behavior***, define the topography (i.e., what it looks like) and the frequency (i.e., how often the child engages in the behavior). Include both appropriate and inappropriate social behaviors (e.g., positive initiations to peers/adults, negative initiations or responses to peers/adults, such as yelling, taking toys without asking), and behaviors that are likely to lead to social interactions such as observing peers' play, responses to others social initiations. Also indicate the times/activities in which the child is most likely to display these behaviors.

a. Appropriate social behaviors (e.g., may include gestures, verbal initiations, sharing play materials, may include passive acceptance, verbal gestures, walking away from peer)

Behavior	**Time/Activity**
1. _____	_____
2. _____	_____
3. _____	_____

b. Inappropriate social behaviors (e.g., **external** may include aggression, taking toys, crying, tantrums, stereotypy; **internal** may include failure to approach peers who are socially interacting or no response to peer initiations).

External behaviors	**Internal (withdrawn) behaviors**
1. _____	_____
2. _____	_____
3. _____	_____

c. Does the child often engage in the same type of play over and over (e.g., with peers, with materials)? If so, identify the activities that promote different types of play behaviors (i.e., cooperative or associative)

_____

_____

d. What medical or physical conditions (if any) does the child have that may affect his or her social behaviors (e.g., physical impairments, current medications)?

_____

_____

e. Does the child's social behaviors/interaction skills remain constant or change depending on the activities? If it changes based on activity, identify which activities increase or decrease likelihood of social behaviors.

Increase:

_____

Decrease:

C. Schedule of Social Interaction Opportunities 1. Identify social times and activities (or situational factors) listed below (see project staff for definition of activities/situational factors) when the child has access to socially competent peers.

Times/Activities	
Dance/Music	
Computer	
Art	
Cognitive Skills (matching, color identif.)	
Sensory/water play	
Pretend/Sociodramatic play	
Outdoor play	
Manipulatives/blocks	
Book Center	

Situational Factors	
1:1 with peer	
Small group of peers (2-3 total)	
Large group of peers (4 or more total)	
Child directed activity	
Adult directed activity	
Adult engaged in activity	
Adult not engaged in activity	

2. Are there specific materials that increase appropriate social interactions or increase the likelihood of problem behaviors/decreased social interactions? If so, please list them below and describe how they influence social behaviors.

Most Likely:

_____

Least Likely:

_____

3. Does the child have the opportunity to make choices about engaging in social interactions (i.e., with whom, what activities, etc.)? If so, when and how often and what activities are typically selected? Does the child typically choose to engage with peers or adults?

_____

_____

_____

_____

4. Are there other peer characteristics that make a difference in the child's display of appropriate/inappropriate social behaviors (e.g., playing with same gender peers, familiar peers, older peers, younger peers, more verbal peers)?

_____

_____

D. Antecedent events that predict when the child is most likely and least likely to engage in appropriate and inappropriate social behavior.

1. With whom is the child most and least likely to interact (include adults and peers and identify by name)?

Most Likely:

_____

Least Likely:

_____

2. Rate on a scale of 1 (not at all likely) to 5 (highly likely to occur) the likelihood of the child engaging in an **appropriate** social interaction due to one of the following:

	Not at all likely				Highly likely
a. If a peer initiates the interaction?	*1*	*2*	*3*	*4*	*5*
b. If a peer responds to his/her initiation?	*1*	*2*	*3*	*4*	*5*
c. If an adult actively helps the child get engaged in play with peer(s)?	*1*	*2*	*3*	*4*	*5*
d. If the adult simply tells the child or peers to play with one another?	*1*	*2*	*3*	*4*	*5*
e. If adult plans activity and child follows through and does activity?	*1*	*2*	*3*	*4*	*5*

f. Target child is in a large group (more than 6 children) of peers playing?	*1*	*2*	*3*	*4*	*5*
g. Target child is in a small group (less than 6 children) of peers playing?	*1*	*2*	*3*	*4*	*5*
h. If the adult directs the activity?	*1*	*2*	*3*	*4*	*5*
i. If the child directs the activity?	*1*	*2*	*3*	*4*	*5*
j. If the adult is present and participating in the play activity?	*1*	*2*	*3*	*4*	*5*
k. If the adult is absent and disengaged from the play activity?	*1*	*2*	*3*	*4*	*5*
l. If the peers playing are the same gender as the target child?	*1*	*2*	*3*	*4*	*5*

3. Rate on a scale of 1 (not at all likely) to 5 (highly likely to occur) the likelihood of the child engaging in an **inappropriate** social interaction due to one of the following:

	Not at all likely				Highly likely
a. If a peer initiates the interaction?	*1*	*2*	*3*	*4*	*5*
b. If a peer responds to his/her initiation?	*1*	*2*	*3*	*4*	*5*
c. If an adult actively helps the child get engaged in play with a peer(s)?	*1*	*2*	*3*	*4*	*5*
d. If the adult simply tells the child or peers to play with one another?	*1*	*2*	*3*	*4*	*5*
e. If adult plans activity and child follows through and does activity?	*1*	*2*	*3*	*4*	*5*
f. Target child is in a large group (more than 6 children) of peers playing?	*1*	*2*	*3*	*4*	*5*
g. Target child is in a small group (less than 6	*1*	*2*	*3*	*4*	*5*

children) of peers playing?

h. If the adult directs the activity?	*1*	*2*	*3*	*4*	*5*
i. If the child directs the activity?	*1*	*2*	*3*	*4*	*5*
j. If the adult is present and participating in the play activity?	*1*	*2*	*3*	*4*	*5*
k. If the adult is absent and disengaged from the play activity?	*1*	*2*	*3*	*4*	*5*
l. If the peers playing are the same gender as the target child?	*1*	*2*	*3*	*4*	*5*

4. Are there particular idiosyncratic situations or events not listed above that may increase or decrease the occurrence of appropriate and inappropriate social interactions (e.g., presence or absence of certain peers, types of directions, transitions, presence or absence of certain toys)?

Increase:

_____

Decrease:

_____

5. What one thing could you or do you do or could happen that would most likely encourage or discourage the child to positively interact with peers?

Encourage:

_____

Discourage:

_____

E. Identification of consequences or perceived outcomes of appropriate and inappropriate social behaviors (i.e., the functions the behaviors serve for that child in particular situations).

1. What do you think the child obtains from social interactions, whether appropriate or inappropriate (i.e., peer/adult attention, self reinforcement, play materials, etc.)?

_____

_____

2. What do think the child escapes if s/he chooses to not engage in social interactions (i.e., peer/adult attention, activity, situation, etc.)?

_____

_____

3. Do appropriate or inappropriate social initiations result in successful outcomes for the child (i.e., does s/he obtain attention or tangibles)?

_____

_____

F. Description of interventions to use or avoid in working with and supporting this child during social situations.

1. What strategies used in the past have been successful at improving the child's social interactions?

_____

_____

2. What things should be avoided that might interfere with or disrupt a social situation with this child (such as particular adult demands, crowded situation, noisy toys, lights etc.)?

_____

_____

3. What strategies are you currently using to promote appropriate social behaviors?

_____

_____

4. What strategies are you currently using to decrease inappropriate social behaviors?

_____

_____

5. How much does adult proximity predict the child's engagement in social interactions?

Adult in proximity:

_____

Adult not in proximity:

_____

G. Questions Related to Restricted Interests

1. Often times, children with autism have particular objects, items, or topics that they are preoccupied with. We are trying to gather information to see if the child has any interests like this. Does the child frequently and repeatedly engage with a specific object or item (e.g., Disney characters, a certain color), and/or want to discuss a particular topic for long periods of time? If so, please list the object or items and describe the child's behavior with that object, item, or topic.

_____

_____

_____

_____

_____

2. Will s/he allow peers to play with that object or item, or talk with peers about the topic of interest?

_____

_____

3. Does the child become upset or frustrated if others want to play with the same object or join in the conversation about the topic?

_____

Appendix B: Preference Assessment Form

Target Person's Name: _____Date: _____
Observer: _____ Time of Observation: _____
Location: _____

Length of each interval:

Total time:

		Interval #									
		1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Preference Item #	**1**										
	2										
	3										
	4										
	5										
	6										
	7										
	8										
	9										
	10										

		Interval #									
		11	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**
Preference Item #	**1**										
	2										
	3										
	4										
	5										
	6										
	7										
	8										
	9										
	10										

√ = Child engages in physical contact with item

		Interval #									
		21	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**
Preference Item #	**1**										
	2										
	3										
	4										
	5										
	6										
	7										
	8										
	9										
	10										

√ = Child engages in physical contact with item

Appendix C: Paired Stimulus Preference Assessment Data Sheet

Student: _____Classroom: _____

Assessed by: _____Date: _____ Time: _____

Stimulus Items	Overall Rank (largest percent is #1)
1.	
2.	
3.	
4.	
5.	

Record item with corresponding item number		Item number selected
1.	2.	1 2 3 4 5 N
5.	4.	1 2 3 4 5 N
3.	1.	1 2 3 4 5 N
2.	4.	1 2 3 4 5 N
4.	5.	1 2 3 4 5 N
3.	2.	1 2 3 4 5 N
1.	5.	1 2 3 4 5 N
3.	4.	1 2 3 4 5 N
5.	1.	1 2 3 4 5 N
1.	4.	1 2 3 4 5 N
2.	3.	1 2 3 4 5 N
3.	5.	1 2 3 4 5 N
4.	2.	1 2 3 4 5 N
5.	2.	1 2 3 4 5 N
4.	3.	1 2 3 4 5 N
2.	5.	1 2 3 4 5 N
1.	3.	1 2 3 4 5 N
4.	1.	1 2 3 4 5 N
5.	3.	1 2 3 4 5 N
2.	1.	1 2 3 4 5 N

Times selected:

1. _____/_____ x100 = _____%
2. _____/_____ x100 = _____%
3. _____/_____ x100 = _____%
4. _____/_____ x100 = _____%
5. _____/_____ x100 = _____%

Appendix D: Observational Data Form

Target Person's Name: _____ Date: _____
Observer: _____ Time of Observation: _____
Location: _____

Setting:
PE Class
Recess/Playground
Cafeteria/Lunch
Other:

Behavior Definition (in specific, observable, measurable terms):
_____

_____

Total Observation Time: Length of each interval:

	Interval #										**Total times behavior occurred**
Date:	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	
Time:											
√ or X											
__											
B											

	Interval #										**Total times behavior occurred**
Date:	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	
Time:											
√ or X											
__											
B											

√ = Display of Appropriate Social Interaction (ASI)
X = Absence of Social Interaction
__ = Display of Inappropriate Social Interaction (ISI)
B = Display of ASI and ISI N/A = Not Applicable

	Interval #										Total times behavior occurred
Date:	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	
Time:											
√ or X											
—											
B											

	Interval #										Total times behavior occurred
Date:	**31**	**32**	**33**	**34**	**35**	**36**	**37**	**38**	**39**	**40**	
Time:											
√ or X											
—											
B											

	Interval #										Total times behavior occurred
Date:	**41**	**42**	**43**	**44**	**45**	**46**	**47**	**48**	**49**	**50**	
Time:											
√ or X											
—											
B											

	Interval #										Total times behavior occurred
Date:	**51**	**52**	**53**	**54**	**55**	**56**	**57**	**58**	**59**	**60**	
Time:											
√ or X											
—											
B											

√ = Display of Appropriate Social Interaction (ASI)
X = Absence of Social Interaction
__ = Display of Inappropriate Social Interaction (ISI)
B = Display of ASI and ISI N/A = Not Applicable

	Interval #										Total times behavior occurred
Date:	**61**	**62**	**63**	**64**	**65**	**66**	**67**	**68**	**69**	**70**	
Time:											
√ or X											
—											
B											

	Interval #										Total times behavior occurred
Date:	**71**	**72**	**73**	**74**	**75**	**76**	**77**	**78**	**79**	**80**	
Time:											
√ or X											
—											
B											

	Interval #										Total times behavior occurred
Date:	**81**	**82**	**83**	**84**	**85**	**86**	**87**	**88**	**89**	**90**	
Time:											
√ or X											
—											
B											

	Interval #										Total times behavior occurred
Date:	**91**	**92**	**93**	**94**	**95**	**96**	**97**	**98**	**99**	**100**	
Time:											
√ or X											
—											
B											

√ = Display of Appropriate Social Interaction (ASI)
X = Absence of Social Interaction
__ = Display of Inappropriate Social Interaction (ISI)
B = Display of ASI and ISI N/A = Not Applicable

Appendix E: OASIS (Observation of Appropriate Social Interaction Skills)

Section I: Identifying Information

Child's Name: _____ Male: _____ Female: _____
School: _____
Grade: _____
Date: _____
Observer's Name: _____
Reliability Observer: _____

Section II: Response Record

Carefully read each item. Ask yourself if the child can do what the item says. Check either *Yes* or *No* by each item. If you are uncertain or doubt that the child can do what the item states, check *No*.

Check *Yes* for those items that the child can do right now or is beginning to do.

Check *No* if the child cannot do what the item says. Remember, if you have not heard it or seen it, mark *No*.

Yes	No	
___	___	1. Smiles at a familiar person.
___	___	2. Calls peers by their name.
___	___	3. Asks questions using words such as "who," "what," and "where."
___	___	4. Starts a conversation with his or her peers.
___	___	5. Refers to himself or herself by name.
___	___	6. Makes eye contact with peers close to him or her for at least 5 seconds.
___	___	7. Uses age-appropriate language to talk to other peers.
___	___	8. Responds to other peers verbally, physically, or gesturally.
___	___	9. Engages in reciprocal conversations with peers.
___	___	10. Hands something to or receives something from peers.
___	___	11. Invites other to join in activities.
___	___	12. Gives compliments to peers.
___	___	13. Cooperates with peers without prompting.
___	___	14. Joins ongoing activity or group without being told to do so.
___	___	15. Accepts peers ideas for group activities.

Total Appropriate Skills _____ Percentage Appropriate Skills _____

Appendix F: Intervention Rating Profile-15 (IRP-15)

The purpose of this questionnaire is to obtain information regarding your acceptance of the intervention. Such information will aid in future selection of interventions that are most appropriate for students with autism spectrum disorders. Please circle the number that best describes your agreement or disagreement with each statement using the scale below.

1=strongly disagree 2=disagree 3=slightly disagree 4=slightly agree 5=agree 6=strongly agree

1. This would be an acceptable intervention for the child's social skills difficulties.

   1 2 3 4 5 6

2. Most teachers would find this intervention appropriate for social skills problems for their students.

   1 2 3 4 5 6

3. This intervention was effective in changing the child's social skill difficulties.

   1 2 3 4 5 6

4. I would suggest the use of this intervention to other teachers.

   1 2 3 4 5 6

5. The child's social skills difficulties were severe enough to warrant use of this intervention.

   1 2 3 4 5 6

6. Most teachers would find this intervention suitable for a variety of social skills deficits.

   1 2 3 4 5 6

7. I would be willing to use this intervention in my classroom.

   1 2 3 4 5 6

8. This intervention would not result in negative side effects for the child.

   1 2 3 4 5 6

9. This intervention would be appropriate for a variety of children.

1 2 3 4 5 6

10. This intervention is consistent with those I have used in my classroom.

1 2 3 4 5 6

11. The intervention was a fair way to handle the child's social skills difficulties.

1 2 3 4 5 6

12. The intervention was reasonable for the social skills described.

1 2 3 4 5 6

13. I liked the procedures used in this intervention.

1 2 3 4 5 6

14. This intervention was a good way to handle this child's social skills difficulties.

1 2 3 4 5 6

15. Overall, this intervention would be beneficial for the child.

1 2 3 4 5 6

Appendix G: Social Validity Interview (Parent Form)

Child's name: _____ Date of completion: _____

Parent's name: _____

1. At the beginning of the study, did you feel that your child needed social skills training? If yes, what social skills areas did you feel needed to be addressed the most?

   _____

   _____

   _____

2. Has your child received any social skills training prior to the initiation of this study? If yes, what sort of training?

   _____

   _____

   _____

3. What were you initial thoughts and beliefs about the integrations of your child's restricted interest into instruction as opposed to making attempts at reducing or eliminating this interest?

   _____

   _____

   _____

4. What are your thoughts and beliefs about this approach now?

   _____

   _____

   _____

5. Have you seen any changes in your child's social behaviors since the discontinuation of the study? If yes, please describe.

_____

_____

_____

6. What changes would you suggest on this intervention?

_____

_____

_____

7. Additional comments.

_____

_____

_____

Appendix H: Procedural Fidelity Checklist

Student: _____ Date: _____

Time: _____Observer: _____

Individual Observed: _____

For each major step listed below, please check "yes" or "no" to indicate if it was completed correctly during the observation session. Check "NA" if the step was not appropriate for the observation.

Step	Yes	No	NA
1. Room is available for student.			
2. Researcher sits at table across from student.			
3. Social Story is readily accessible for student.			
4. Social Story is initiated at appropriate time.			
5. Student reads, or is read, the Social Story.			
6. Comprehension questions are asked after student reads Social Story.			
7. Student immediately goes to the target social situation.			

Appendix I: Social Story not Including Restricted Interest

My name is _____. I go to school at _____.

After morning work, we go outside for recess.

Sometimes, recess is on the playground.

At recess, there are lots of kids I can play with.

Recess is a time when I get to play games and talk with my friends.

Most of the time, I love to play with my friends.

Most of my friends love to play with me too.

When I want to play with someone I will try to look around the playground to find a friend I can play with.

I will try to ask my friend to play with me.

I will try to say, “Hi, will you play with me?”

If my friend says “yes,” I can say, “Great. Let’s Play”

I will get to play with my friend.

If my friend says “no,” it’s ok.

I can find another friend to ask.

This is a good idea.

Having friends is fun.

It makes me feel happy that I know how to ask my friends to play with me.

When I play with my friends, I can feel proud of myself.

Appendix J: Social Story Including Restricted Interest

My name is _____. I go to school at _____.

After morning work, we go outside for recess.

Sometimes, recess is on the playground.

At recess, there are lots of kids I can play with.

Recess is a time when I get to play games and talk with my friends.

Most of the time, I love to play with my friends.

Most of my friends love to play with me too.

When I want to play with someone I will try to look around the playground to find a friend I can play with.

I will try to ask my friend to play with me.

There are a lot of fun things I can play with on the playground.

Some of my favorite things to play with are crayons, play-doh, and magnet sticks.

Today, I would love to play with play-doh.

Sometimes my friends love to play with play-doh too.

I will try to say, “I have play-doh, will you play with me?”

If my friend says “yes,” I can say, “Great. Let’s Play”

I will get to play with my friend.

If my friend says “no,” it’s ok.

I can find another friend to ask.

This is a good idea.

Having friends is fun.

It makes me feel happy that I know how to ask my friends to play with me.

When I play with my friends, I can feel proud of myself.

Appendix K: Social Story Comprehension Questions

Target person's name: _____ Date: _____

Person reading Social Story: _____ Time of Intervention: _____

Location: _____

1. What are some of the things I can play with on the playground?
2. Who can I play with on the playground?
3. What do I do when I want to play with someone?
1. What do I do if my friend says he can't play with me?

Appendix L: IRB Letter of Approval

USF
UNIVERSITY OF SOUTH FLORIDA

RESEARCH INTEGRITY AND COMPLIANCE
Institutional Review Boards, FWA No. 00001669
12901 Bruce B. Downs Blvd., MDC035 • Tampa, FL 33612-4799
(813) 974-5638 • FAX (813) 974-7091

October 1, 2013

Maya Nasr Special Education Tampa, FL 33647

RE: Expedited Approval for Initial Review

IRB#: Pro00014443

Title: Restricted and Repetitive Behaviors as Strengths, not Weaknesses: Evaluating the Efficacy of a Social Story Intervention on Social Skills by Embedding the Restricted and Repetitive Behaviors of a Child with an Autism Spectrum Disorder.

Study Approval Period: 9/30/2013 to 9/30/2014

Dear Ms. Nasr:

On 9/30/2013, the Institutional Review Board (IRB) reviewed and APPROVED the above application and all documents outlined below.

Approved Item(s): Protocol Document(s): Dissertation Proposal

Please note no research activities can begin until all letters of support are received and approved thru the Amendment process.

Study involves children and falls under 45 CFR 46.404: Research not involving more than minimal risk.

Consent/Assent Document(s)*: Parental Permission.pdf Teacher Consent.pdf

*Please use only the official IRB stamped informed consent/assent document(s) found under the "Attachments" tab. Please note, these

consent/assent document(s) are only valid during the approval period indicated at the top of the form(s).

It was the determination of the IRB that your study qualified for expedited review which includes activities that (1) present no more than minimal risk to human subjects, and (2) involve only procedures listed in one or more of the categories outlined below. The IRB may review research through the expedited review procedure authorized by 45CFR46.110 and 21 CFR 56.110. The research proposed in this study is categorized under the following expedited review category:

(5) Research involving materials (data, documents, records, or specimens) that have been collected, or will be collected solely for nonresearch purposes (such as medical treatment or diagnosis).

(7) Research on individual or group characteristics or behavior (including, but not limited to, research on perception, cognition, motivation, identity, language, communication, cultural beliefs or practices, and social behavior) or research employing survey, interview, oral history, focus group, program evaluation, human factors evaluation, or quality assurance methodologies.

As the principal investigator of this study, it is your responsibility to conduct this study in accordance with IRB policies and procedures and as approved by the IRB. Any changes to the approved research must be submitted to the IRB for review and approval by an amendment.

We appreciate your dedication to the ethical conduct of human subject research at the University of South Florida and your continued commitment to human research protections. If you have any questions regarding this matter, please call 813-974-5638.

Sincerely,

Kristen Salomon, Ph.D., Vice Chairperson USF Institutional Review Board