THE EFFECTIVENESS OF A SOCIAL STORY INTERVENTION IN DECREASING DISRUPTIVE BEHAVIOR IN AUTISTIC CHILDREN

DISSERTATION

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By

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ABSTRACT

Social skills deficits are a defining feature of children with autism. Over the last decade Social Stories, personalized brief fables with a lesson, have been used with autistic children. The rationale behind Social Stories is that they can provide autistic children with social information they are lacking, and thus can modify their social responses in social situations. However, studies addressing the efficacy of Social Stories (Gray, 2000) have been mixed. Critiques of the existing Social Story research show that the majority of stories deviate from recommended Social Story ratios, are confounded by the use of additional intervention strategies that are used at the same time as the Social Story intervention, or do not provide adequate descriptions of the participants’ communicative and cognitive skills even though the developer of Social Stories stated that they were more likely to benefit students with basic language skills and higher intelligence (Reynhout & Carter, 2006; Kuoch & Mirenda, 2003). Even though studies have been inconclusive, researchers have begun to modify populations that Social Stories are used for and the methods in which they are delivered, which is premature since the basic intervention has yet to be validated as effective.

This study controlled for many of the limitations criticized in previous Social Story literature. The present study used a multiple baseline design across six subjects diagnosed with Autistic Disorder who scored above 55 on the PPVT-III and were capable
of verbal speech. Furthermore, in the study teachers were not aware when students
started the intervention. Thus, potential decreases in students’ disruptive behaviors were
ostensibly not due to an increase in additional teacher prompting or an increase in teacher
attention. The undergraduate students who coded the data were similarly unaware of
when students began treatment so that it could not influence coding behavior. Results
indicated there was no significant decrease in number or duration of disruptive classroom
behaviors as a result of a Social Story intervention alone. Although frequency of teacher
directives did decrease after treatment started, based on the fact that overall behaviors did
not show a significant decrease either in number or duration, these results may be
spurious. It may be that teacher directives decreased due to the mere fact that teachers
knew their behavior was being recorded and were more aware of comments they were
making.
Dedicated to my wonderful husband, Steve
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CHAPTER 1

INTRODUCTION

The History of Autism

Autism was first described as a disorder in itself in 1943 by Leo Kanner, a child psychiatrist at Johns Hopkins University (Mesibov, Adams, & Schopler, 2000). He identified and labeled autism based on his personal observations of eleven children that he saw in his clinic. He noted that these children resembled those with childhood schizophrenia in many ways, but were different due to early onset, lack of hallucinations, and family histories. Children with schizophrenia did not have as many problems at such an early age, with most symptoms of childhood schizophrenia not appearing until the age of ten. These observed eleven children all showed signs of a disorder before the age of three, however. Furthermore, these children, although they had bizarre behaviors and unusual perceptions of the world, did not experience hallucinations and delusions, which are defining characteristics of schizophrenia. Family histories were also different for these children than for those with childhood schizophrenia in that these families showed much less evidence of psychosis (Mesibov et al., 2000).

Kanner differentiated autism from schizophrenia due to his study of these eleven children, but he also suggested a connection by describing autism as the earliest form of schizophrenia. Specifically Kanner focused on three defining characteristics of autism
that remain defining characteristics today: social isolation, language impairments, and insistence on sameness (Volkmar & Klin, 2005; Wolff, 2004; Mesibov et al., 2000). Social isolation was the most salient characteristic of the children. He reported that children with autism never formed relationships, a characteristic he referred to as “autistic aloneness” (Kanner, 1943). He differentiated this pattern from children with childhood schizophrenia who withdrew from previously established social relationships. Kanner described the language impairments of autism, including echolalia (parrot-like repetition), extreme literalness, and pronoun reversals, as further separating autistic children from those with schizophrenia. Insistence on sameness was the final defining characteristic of autism, since each child he observed compulsively followed routines and even minor change in their environments caused great distress, leading them to avoid anything new or different (Mesibov et al., 2000).

Although Kanner’s observations and description of autism has generally held up well, several of his hypotheses have since been proven to be incorrect. His greatest misinterpretation was the idea that autism was caused by inadequate parenting, especially from mothers. He observed in his small sample of families that the parents were similar in perfectionism, obsessiveness, and lack of humor, and he posited that these parents, although highly organized professionals, might be emotionally aloof and actually cause autism (Mesibov et al., 2000). Bruno Bettelheim, director of the Sonia Shankman Orthogenic School in Chicago in the late 1940’s, shared Kanner’s view that the source of autism was “refrigerator mothers,” or cold, unfeeling parents who drove their children into mental isolation. Bettelheim’s theories were internationally accepted for more than two decades, until Rimland, a psychologist and father of an autistic child, wrote *Infantile*
Autism: The Syndrome and Its Implications for a Neural Theory of Behavior. In this book Rimland argued that autism was a biological disorder and not an emotional illness, as had been previously posited (Rimland, 1964). This book helped to change the way autism was perceived and has had a major impact on the treatment of children with autism. Research has since disconfirmed Kanner’s and Bettelheim’s theories of cold, unfeeling parents causing autism and lent credence to Rimland’s theory of a biological origin. Autism and related spectrum disorders (Pervasive Developmental Disorder – Not Otherwise Specified and Asperger’s Disorder) are now regarded by the scientific community as “biologically based neurodevelopmental disorders that are highly heritable,” although the exact cause of these disorders remains unknown (Johnson, Myers, & American Academy of Pediatrics Council on Children with Disabilities, 2007). Kanner also incorrectly believed that children with autism are of average or above average intelligence and have the potential for normal language development. Ironically his sample of children were much higher functioning than the average autistic child today. For example, his sample of autistic children had IQ scores over 70 and all but one child had expressive language. Researchers today have found that the average autistic child has an IQ of around 50, however, and at least 40 percent of them do not develop any expressive language (Mesibov et al., 2000). Kanner did not take into account that his subject pool included only families with high intelligence and educational levels overall, which probably accounted for the higher-functioning autistic children. More recent studies have determined the prevalence of autism is proportionally distributed throughout all educational levels, social classes, races, and religious groups (Volkmar & Klin, 2005; Mesibov et al., 2000). Also, Kanner incorrectly assumed that autism was more likely to
occur in firstborn or only children, but more recent studies do not support this claim (Mesibov et al., 2000).

Asperger, a Viennese pediatrician who studied more than 400 children with what he described as “autistic psychopathy,” published his ideas about the disorder in 1944, a year after Kanner’s publication. Similar to Kanner’s beliefs, Asperger believed that there was present from birth a fundamental disturbance which gave rise to highly characteristic problems (Frith, 1989). Asperger described children who were capable of language and sometimes showed high intelligence, but did not participate appropriately in peer group activities and were likely to be teased by peers (Wing, 1998). Although Asperger described some children who seemed almost normal except for socialization, he also included severe cases, even those that showed severe organic damage (Frith, 1989). According to Frith (1989), Asperger’s definition of autism or was wider than Kanner’s definition. Later the children described by these two doctors were assigned different diagnostic labels. Dr. Lorna Wing of Great Britain coined the term Asperger’s Syndrome to define the more able individuals with autism (Wing, 1998).

Features of Autism

An impairment in the ability to interpret social cues appropriately has been described as being a key feature of autism (Wing, 1998). The gestures and expressions that are integral to human conversation frequently confuse children with autism (Frith, 1989), and therefore in social situations these children have difficulty engaging in reciprocal social interactions.
Children with autism are considered to have significantly delayed and impaired communication and social functioning in addition to stereotyped behaviors (American Psychiatric Association, 2000). The most commonly used diagnostic criteria for autism in the United States can be found in the Diagnostic and Statistical Manual of Mental Disorders: Fourth Edition – Text Revision (2000). These criteria, listed below, include:

“A. A total of six (or more) items from (1), (2), and (3), with at least two from (1), and one each from (2) and (3):

(1) qualitative impairment in social interaction, as manifested by at least two of the following:
   (a) marked impairment in the use of multiple nonverbal behaviors such as eye-to-eye gaze, facial expression, body postures, and gestures to regulate social interaction
   (b) failure to develop peer relationships appropriate to developmental level
   (c) a lack of spontaneous seeking to share enjoyment, interests, or achievements with other people (e.g., by a lack of showing, bringing, or pointing out objects of interest)
   (d) lack of social or emotional reciprocity

(2) qualitative impairments in communication as manifested by at least one of the following:
   (a) delay in, or total lack of, the development of spoken language (not accompanied by an attempt to compensate through alternative modes of communication such as gesture or mime)
   (b) in individuals with adequate speech, marked impairment in the ability to initiate or sustain a conversation with others
   (c) stereotyped and repetitive use of language or idiosyncratic language
   (d) lack of varied, spontaneous make-believe play or social imitative play appropriate to developmental level

(3) restricted repetitive and stereotyped patterns or behavior, interests, and activities, as manifested by at least one of the following:
   (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)
(d) persistent preoccupation with parts of objects

B. Delays or abnormal functioning in at least one of the following areas, with onset prior to age 3 years: (1) social interaction, (2) language as used in social communication, or (3) symbolic or imaginative play.

C. The disturbance is not better accounted for by Rett’s Disorder or Childhood Disintegrative Disorder” (American Psychiatric Association, 2000).

Individuals with autism misunderstand social cues such as body language, gestures, and facial expressions, and they often display a lack of eye contact (Church, Alisanski, & Amunullah, 2000; Wimpory, Hobson, Williams, & Nash, 2000). Certain cognitive scientists have recently attributed these difficulties to lacking a “theory of mind,” or the inability to infer what other people think and feel (Baron-Cohen, Ring, Moriarty, Schmitz, Costa, & Ell, 1994; Baron-Cohen, Leslie, & Frith, 1985). To have a “theory of mind” requires “representing” what others might be thinking, or being able to take another person’s point of view (e.g., Flavell, 1993). Development of a “theory of mind” begins in early childhood as children share joint attention with adults and begin to talk about mental states (Miller, 2006). As children continue to develop and to engage in conversations with others, they become able to understand that people’s representations of the world are based on experience, and that behaviors are driven by these representations (Miller, 2006).

This skill of understanding what others are thinking seems to be impaired specifically in individuals diagnosed with autism. “Theory of mind” is more frequently impaired in people with autism than in those without, and it is also more frequently impaired in people with autism than in those with other developmental disabilities (e.g.,
Down Syndrome, mental retardation without autism) (Stone, Baron-Cohen, & Knight, 1998; Edelson, 1995). Mundy, Sigman, and Kasari (1993) argued that the lack of theory-of-mind skills in children with autism relates to an incapacity for higher-ordered “representations”. Because of this impairment, these children have difficulty comprehending what others are thinking and taking another’s perspective, which has potentially serious social ramifications (Moyes, 2001; Moyes, 2002). If autistic individuals lack of theory of mind they do not understand that other people have their own thoughts, plans, and points of view (Edelson, 1995). By not understanding that other people may think differently than themselves, autistic individuals may have difficulty relating socially to others and may appear self-centered, rude, or uncaring (Edelson, 1995).

**Current Interventions in Autism**

There are a variety of treatment options for autism that are currently available. The educational treatment that has the most empirical support to date is based on the science of Applied Behavior Analysis (ABA) (e.g., Birnbrauer & Leach, 1993; McEachin, Smith, & Lovaas, 1993; Lovaas, 1987; Smith, 1999; Sallows & Graupner, 2005; Cohen, Amerine-Dickens, & Smith, 2006).

Early interventions based on the principles of Applied Behavior Analysis (ABA), defined as operant learning procedures used to systematically change socially relevant behaviors, have been shown to produce large, comprehensive, meaningful improvements across a variety of domains in children with autism (e.g., Birnbrauer & Leach, 1993; McEachin et al., 1993; Lovaas, 1987; Smith, 1999; Sallows & Graupner, 2005; Cohen et
al., 2006). Only a small proportion of children studied (about 10%) have been found to make few or no improvements despite intensive behavioral programs (e.g., Birnbrauer & Leach, 1993; Lovaas, 1987; McEachin et al., 1993; Sallows & Graupner, 2005; Cohen et al., 2006). The best documented effect of using ABA principles has been improved intellectual functioning as measured by standardized IQ tests and/or developmental scales, with the majority of children studied making at least some gains in IQ over the course of between 1 and 6 years of treatment, and slightly fewer than half of all children studied making large gains (from levels indicative of moderate to severe mental retardation to levels in the normal range, in many cases) (Anderson, Avery, DiPietro, Edwards, & Christian, 1987; Birnbrauer & Leach, 1993; Harris, Handleman, Gordon, Kristoff, & Fuentes, 1991; Lovaas, 1987; Sallows & Graupner, 2005; Cohen et al., 2006). Improvements in language, social skills, play behaviors, self-help skills, and problematic behaviors (e.g. self-injury, stereotypic responding, aggression) were found to be less robust than IQ changes and also less widespread, but extremely meaningful and significant changes have been attained by some children, who are reportedly indistinguishable from their peers after treatment (Maurice, 1993; McEachin, et al, 1993; Perry, Cohen, & DeCarlo, 1995). Another positive effect of ABA treatment is the successful integration into regular schools by many children with autism who received at least two years of intensive behavioral intervention starting at an early age, some with little or no ongoing support (Fenske, Zalenski, Krantz, & McClannahan, 1985; Harris et al, 1991; Maurice, 1993; Lovaas, 1987; McEachin et al, 1993; Perry et al., 1995; Cohen et al., 2006). When ABA programs (25-40 hours/week) have been compared to equally intensive eclectic approaches, results have suggested that ABA programs were
significantly more effective (Cohen et al., 2006; Eikeseth, Smith, Jahr, & Eldevik, 2002; Howard, Sparkman, Cohen, Green, & Stanislaw, 2005). However, it is important to point out that these studies showing treatment gains in intellectual functioning have been criticized for possible methodological flaws. Lovaas’ original study (1987) and the follow-up of the original children by McEachin et al. (1993) have especially been the target of criticism. Assignment to groups was not random, but was based on whether or not therapists were available to provide intensive treatment in many cases, so therefore assignment could have been biased (Gresham & MacMillan, 1997; Schopler, Short, & Mesibov, 1989). Selection criteria such as IQ cut-offs might also have been unduly restrictive, yielding a sample with higher IQ scores to begin with, which lend to favorable prognoses (Gresham & MacMillan, 1997; Schopler et al., 1989). Other critiques include the fact that there was an absence of usual outcome measures in Lovaas’ (1987) original study, such as social, behavioral, and communication measures, and that measures of IQ and classroom placement may not have measured true progress (Schopler et al., 1989). As was noted by Schopler et al. (1989), improvement on IQ measures may have simply reflected improvement in compliance and test-taking skills rather than an actual improvement in intellectual functioning. Another concern with the IQ tests administered was that the same tests were not administered both pre- and post-test, and that it has been documented that the Bayley, Binet, and Cattell tests that were used for 90% of the pre-tests tended to yield low scores for autistic children, which would underestimate initial intelligence (Schopler et al., 1989; Short & Marcus, 1986; Lord & Schopler, 1988). The concern with classroom placement reflecting improvement was that this placement may have less to do with actual
improvement in the child and more to do with policies of the school system and advocacy efforts made by parents and staff (Schopler et al., 1989).

More recent studies on ABA treatment have improved in design, but continue to have some flaws. In the Cohen et al. (2006) study, assignment to an ABA group or special education class at a local public school was based on parent choice. In the Sallows & Graupner (2005) study, different tests were again used for pre- and post-measures of IQ (Bayley and Wechsler respectively), so that increase in IQ may have reflected the use of different tests rather than true treatment effects.

Although results from many of these studies have been criticized for possible methodological flaws, intensive instruction using the methods of Applied Behavior Analysis for children with autism does meet criteria for an empirically supported treatment (Howard et al., 2005; Krantz & McClannahan, 1998; Lovaas, 1987; McGee, Morrier, & Daly, 1999; Strain & Kohler, 1998) and is therefore a recommended approach for treating children with autism (Hagopian & Boelter, 2005). Guidelines for what defines an Empirically Supported Treatment (EST) were set in 1993 by Division 12 of the American Psychological Association. These guidelines state that a large series of single-case design experiments must demonstrate efficacy with (a) use of good experimental design and (b) comparison of intervention to another treatment (Chambless & Ollendick, 2001). Based on these criteria, ABA-based behavioral treatments have been defined as ESTs for individuals with autism and other developmental disabilities (Chambless, Sanderson, Shoham, Johnson, Pople, Crits-Christoph, Baker, Johnson, Woody, Sue, Beutler, Williams, & McCurry, 1996; Lilienfeld, 2005; Grey & Hastings,
In contrast, a popular non-behavior-analytic program for teaching children with autism is Project TEACCH, a statewide program in North Carolina founded by Eric Schopler (Mesibov, Shea, & Schopler, 2005). Important elements of this “structured teaching” approach include organization of the physical environment, a predictable sequence of activities/routines throughout the day, visual schedules, structured work/activity systems, and visually structured activities (Mesibov et al., 2005). Adequately designed scientific studies have not yet been carried out on TEACCH procedures to compare them to gains made by children in Applied Behavior Analysis treatment programs (Smith, 1996).

Ozonoff and Cathcart (1998) did find that children treated with a TEACCH-based home program in addition to local day treatment programs did improve significantly more than children in the control group who received only local day treatment services, however. Other models for teaching children with autism that are not discussed in detail in this paper include the Denver model (Rogers & Lewis, 1989), Greenspan and Wieder’s developmental, individual-difference, relationship-based (DIR) “floor-time” model (Greenspan & Wieder, 1997), Gutstein and Sheely’s relationship-development intervention (RDI) (Gutstein & Sheely, 2002), and the responsive-teaching (RT) curriculum developed by Mahoney and colleagues (Mahoney & McDonald, 2003; Mahoney & Perales, 2005). Controlled trials are lacking for the Denver model, evidence of the efficacy of the DIR model is limited to an unblinded review of case records and a descriptive follow-up study of a small subset of patients, only anecdotal evidence exists for RDI treatment, and no research has been done comparing RT treatment to a control
Many children with autism also are believed to benefit from speech and language therapy, specific social skills instruction, occupational therapy, and sensory integration therapy, although empirical evidence for these treatments is currently lacking (Myers et al., 2007).

Behavior Problems in the Classroom

Aggression, property destruction, disruptions/tantrums, self-injury, and stereotypies are the primary challenging behaviors for children with autism (Horner, Carr, Strain, Todd, & Reed, 2002). For children with autism, problems associated with behavior in the classroom are common (Moyes, 2002). Traditionally, the most common approaches utilized by teachers to address problem behaviors are behavior modification techniques (e.g., positive reinforcement), aversives (punishment), and restraints. However, these approaches do not take into account the reason for the behavior, and often result in the student simply replacing one inappropriate behavior with another (Moyes, 2002). A simpler and farther-reaching approach to solving behavioral problems is to first determine the reason why the behavior is occurring, and then to focus on this aspect when developing an intervention (Moyes, 2002). It has been determined, as discussed earlier, that communication difficulties are one of the principal areas of deficit for children with autism, with behavioral problems and social skills deficits being two other characteristics of the disorder. There is increasing acknowledgement of the fact that there is a strong correlation between the communication difficulty experienced by children and the
number of behavioral problems they may display (Hodgdon, 1995), so it seems likely that
a principal reason why children with autism may be displaying inappropriate behaviors is
that they do not understand what appropriate behavior for the given situation would entail
due to their difficulties with communication, especially receptive communication. Due to
this innate lack of understanding of what appropriate behavior in the classroom looks
like, teachers must explicitly teach children with autism appropriate classroom behavior,
or social skills.

The challenge when teaching social skills to children with autism is that the teacher and
the child are working from two different perspectives. It is important that the technique
employed approach learning from the child’s perspective, helping the child identify what
behaviors are important, and why the behaviors are important. The approach needs to be
from the child’s perspective due to the fact that autistic children have trouble taking
another person’s perspective (lack of “theory of mind”) (Mundy et al., 1993). Autistic
children need to learn social skills relevant to their own experiences so they can better
understand what behavior is desired (Gray, 1995). The Social Story intervention (Gray &
Garand, 1993; Gray, 1994) was developed to provide individuals with autism with the
information they are missing so that they can interact appropriately in social situations.

**Social Stories**

Core deficits in autism (functional language and social interaction) not only impede
development, but also may lead to social withdrawal, isolation, and behavior problems
(Rubin & Clark, 1983; Ollendick, Weist, Borden, & Greene, 1992). Because of this,
improving social functioning is one of the most important intervention outcomes for
children with autism (Delano & Snell, 2006). Although teaching social skills to autistic children is part of the intensive behavioral training in an ABA program, it has been suggested that a less intensive method that could easily be added to a current school placement with little effort on the part of the teacher would be the usage of Social Stories (Gray & Garand, 1993; Moyes, 2001). Social Stories are claimed to be a convenient, unobtrusive intervention that can be easily carried out with children at school. Ethically, the least intrusive intervention that can effectively change behavior is desired, and when compared to alternate forms of treatment designed to change behavior (e.g., discrete trial instruction, functional equivalence training, etc.), Social Stories are clearly the easiest to implement (Scattone, Wileczynski, Edwards, & Rabian, 2002).

Social Stories are brief fables with a lesson, often just a few personalized sentences written for students having difficulty following rules, routines, or directions. Each story presents a series of events as experienced by the student for whom the story is intended. Social Stories describe one of the student’s problem behaviors in the setting in which it is most often observed (e.g., the student’s locker, the playground, etc.). The story’s characters are the people who interact with the student when the problem behavior occurs (e.g., the classmates, the teacher). Social Stories are claimed to be successful when no effect resulted from traditional teaching techniques such as social skills training programs, picture schedules, sticker charts, and token systems (Kuttler, Myles, and Carlson, 1998; Swaggart, Gagnon, Bock, Earles, Quinn, Myles, and Simpson, 1995). Social Stories are intended to direct the behavior of children with autism by describing behaviors the child is to use, in a sequence designed to increase the child’s independence (e.g., Gray & Garand, 1993; Gray, 1995). Social Stories could supply autistic children
with social information they are lacking in a format that describes effective social responses for challenging social situations (Gray & Garand, 1993; Gray, 1998; Gray, 2000). Social Stories can help to correct false assumptions, provide a concrete method for teaching a skill, use a visual medium (a strength for many autistic children), and can be implemented by teachers or parents and in various environments (Moyes, 2001). Because of their ease of implementation, Social Stories are widely used with children with autism, even though their effectiveness has not been adequately evaluated. Gray and Garand (1993) were the first to describe this technique in a professional journal. They claimed it improved the behavior of four school-aged children labeled with autism by reducing the frequency of their aggressive behavior (kicking, biting, and head banging), or decreasing the amount of teacher prompts needed during daily activities. Social Stories are intended to direct the behavior of children with autism by describing behaviors the child is to use, in a sequence designed to increase the child’s independence (e.g. Gray & Garand, 1993; Gray, 1995).

In a 1994 presentation to the Midwest Educational Leadership Conference on Autism in Kansas City, Missouri, Gray identified many uses for Social Stories. First, Gray contended that Social Stories help describe situations to students with autism. She reported the description of situations given in the social story assisted students by identifying antecedents as cues for correct student responses. In this way, Gray reported that Social Stories provided information in a nonthreatening manner.

Secondly, Gray reported that Social Stories can provide a means for individualizing social-skill instruction to the needs of the student. Students with autism often fail to benefit from traditional social-skill instruction because of deficits in communication
skills. Gray asserted that Social Stories can accommodate the communication deficits of students with autism by providing instruction without the distractions of teacher-student or student-student interaction. Social Stories can also be written to address only those skills needed by the student with autism.

Thirdly, Gray identified Social Stories as useful for teaching routines. Routines to be taught are broken down and each step of the routine is described in the social story in detail on a page. A checklist of the steps are listed in sequential order at the end of the story. This provides students with autism cues for responses and needed information about the responses of others. Gray also suggests that Social Stories can prepare students with autism for changes in routines (e.g., field trips, teacher absence, assemblies, new students in the class).

Fourth, Gray argued that Social Stories can reduce aggressive and stereotypic behavior. Gray explained that the information provided in Social Stories can teach students with autism appropriate responses to frustration and anger. She urged that Social Stories should provide information to students with autism about how others respond to their behavior. Gray contended that this kind of information in Social Stories can assist students with autism to participate in activities with greater success.

Fifth, Gray offered Social Stories as a method for academic instruction that promotes generalization. Gray and Garand (1993) provided a detailed discussion of curriculum Social Stories. Curriculum Social Stories use “situations from the student’s life experiences as a backdrop to demonstrate the functional application of academic skills and their relationship to the student’s everyday experiences”. Curriculum Social Stories are suggested for application of skills in mathematics and writing.
To quote Gray and Garand (1993), “the use of traditional instruction to teach social behavior presents children with autism with a compounded challenge. Traditional teaching involves interaction between teacher and student, creating a social situation whenever it occurs”. Gray and Garand (1993) argued that “Social Stories seek to minimize potentially confusing instructional interactions, to provide students with autism direct access to social information”.

**Developing A Social Story**

Social Stories are written only after the behavior(s) and the setting have been thoroughly observed (Gray & Garand, 1993; Gray, 1995; Gray, 2000). Gray (1995) explained a 3-step process for observing. First, at least one observation is required to thoroughly record when and where the problem behavior occurs, who is present, the routines taking place, the rules of the setting, the social cues given, signals for beginning and ending an activity, and any other observable data. Second, those people who are present each day in the setting are interviewed to determine how changes in time of day, routines, or expectations influence the behavior observed. Third, the observer is to consider the series of events observed, as they could be experienced by the student for whom the story is intended. Gray (1995) regarded this last step as critical for writing successful Social Stories, because it assists in “determining the focus of the social story” and helping the writer to “decide which aspects of a situation take priority”.

Thus, developing a social story begins by identifying: (a) the problem behavior(s) (e.g., hitting, kicking, talking out, etc.), (b) the new behavior(s) to be taught (e.g., standing in line without touching others), and (c) the situations(s) where this lesson would benefit the
person most (e.g., lining up with his or her classmates) (Gray & Garand, 1993). Social stories have defining characteristics that distinguish them from other social scripts and task analyses. The most important elements of a Social Story are the basic sentences types and the ratio that defines their frequency within the story as well as how each sentence is written (Gray, 2000).

There are four basic sentence types within a Social Story: descriptive, perspective, affirmative, and directive (Gray, 2000). Descriptive sentences usually begin the story because they explain the story setting, or the sequence of events that make up an activity where learning is to take place. These sentences are “truthful, opinion-and-assumption-free statements of fact” (Gray, 2000). They identify the most relevant factors in a situation, are the only required type of sentence in a Social Story, and form the “backbone” of the story (Gray, 2000). An example of a descriptive sentence is: “My name is _______. ”

Perspective sentences are statements that refer to a person’s thoughts, feelings, beliefs, and opinions. Usually perspective sentences are used to refer to the internal states of other people in the story who may be affected by the child’s behavior (Gray, 2000). These sentences are important because many children with autism have difficulty understanding the perspective of others (“theory of mind”). An example of a perspective sentence is: “My friends are happy when I keep my hands and feet to myself.”

Affirmative sentences enhance the meaning of other statements in the story, often expressing a commonly shared opinion or value within the culture (Gray, 2000). Statements representing an opinion specific to a small group or individual are not classified as affirmative sentences. Rather, the role of an affirmative sentence is to refer
to a rule or law, or to stress an important point. Usually affirmative sentences follow immediately after a descriptive, perspective, or directive sentence (Gray, 2000). An example of an affirmative sentence might be: “It is important to look both ways before crossing the street.”

Directive sentences identify a suggested response or responses to a situation, gently directing the behavior of the child for whom the story was written (Gray, 2000). Directive sentences that begin with “I will,” “I can,” or “I will try to,” for example, present the behavior(s) to be taught in a more encouraging manner than sentences using “not” (e.g. “I can walk,” instead of “I will not run”).

Sometimes partial sentences are used in a Social Story. These sentences are fill-in-the-blank sentences, which encourage the reader to complete the statement. These types of sentences are suggested as a way for the reader to demonstrate comprehension (Gray, 2000).

Two additional sentence types are also described by Gray (2000): control sentences and cooperative sentences. These supplementary sentence types are not used as frequently as the basic sentence types described above. Control sentences are statements written by the person for whom the story is written that identify personal strategies to recall and apply information (Gray, 1994). These control sentences are often in the individual’s own unique writing style and may reflect the individuals’ personal interest(s). An example of a control sentence is: “When the bell rings it is time for recess to be over, just like when the whistle on a teapot sounds it means the water is finished boiling”. Cooperative sentences are sentences that identify what others will do to assist the student, or what others will do to cooperate with the student in helping him/her learn
a new behavior (Gray, 2000). An example of a cooperative sentence is, “My teachers will help me when I start to get frustrated.”

In response to some initial concerns with Social Stories being too much like a list of commands on how to behave, Gray (1997) responded by writing an article titled, “Your concerns result in a new social story ratio: A closer look at directive sentences.” The article was first published in 1995 in The Morning News, a newsletter published by Jenison Public Schools where Gray was employed. It later appeared as a one-and-one-half page article in Access Express, a newsletter published by an organization called, “Project ACCESS” which is state-wide in Missouri. Project ACCESS trains parents and teachers of students with autism and is sponsored by the Missouri Department of Elementary and Secondary Education and Southwest Missouri State University.

Gray (1997) began to discourage the excessive use of directive sentences and to seemingly abandon directive Social Stories. She emphasized that Social Stories should “provide accurate information without needlessly limiting a student’s choices when it comes to how to respond to a given situation”. Ratios have now been provided to prevent overuse of directive sentences and to ensure the descriptive quality of Social Stories (Gray, 1997; Gray, 2000).

0-1 directive sentences

Basic Social Stories Ratio = ------------------------------------------

2-5 descriptive, perspective, and/or affirmative sentences
When a story includes control and/or cooperative sentences, control sentences are placed with directive sentences and cooperative sentences are placed with descriptive, perspective, and affirmative sentences. The ratios shown above stay the same (Gray, 2000).

Gray (1997) urged that this ratio be used regardless of story length and the use of directive sentences no longer be required. This article took the opposite position from the one taken in Gray and Garand (1993), in which it was suggested that most stories contain both descriptive and directive sentences and may also contain perspective sentences, but with no recommendation about the proportion of each type of sentence that should be used in a story.

Gray (1998) described the Social Story Ratio as completing the standard for Social Story writing. She explained that, “a basic premise of the social story approach is that each story should describe more than direct”. The ratio was presented as the last step to determine the proper proportion of sentence types found in the story as a whole, and to insure a story that describes rather than directs.

As far as how to introduce the Social Story, Gray and Garand (1993) suggested reading the story to the child twice, then letting the child read it. Thereafter the child was to read it once daily, followed by discussion or role-play.

Social Stories have been used in a variety of formats (Gray, 1995; Gray and Garand, 1993). Social Stories can be printed on a single page or as a book. Gray (1995) wrote that Social Stories can be recorded on audiocassettes using a bell or tone to signal when a page is to be turned. Social Stories can also be audio- or video-taped to adapt to the needs of students who do not read independently (Gray, 1995). Computers have also been
used in the adaptation of Social Stories (Gray, 1995; Hagiwara, 1998; Hagiwara and Myles, 1999). Gray (1995) suggests allowing students to read Social Stories from the computer screen to increase their interest in reading the story independently. Social Stories have also been presented in a multi-media format using computers (Hagiwara, 1998; and Hagiwara and Myles, 1999). Overall, Gray (1995) encouraged social storywriters to “keep the story simple and easy to understand,” whatever format is selected.

**Critiques of the Social Story Literature**

Gray and Garand (1993) presented the rationale and instructions for writing Social Stories, and offered four cases of children diagnosed with autism. Liesl was 9 years old, and became upset when accompanying her mother as they picked her brother up from school. Liesl would kick the dashboard, become verbally upset, hit at her brother, remove her seat belt, and pinch and scratch her mother. Liesl’s mother wrote the following story, that Liesl read independently before picking up her brother from school.

> “After I get off the bus, Mom and I pick up Gavin at St. Luke’s School. When we get there, a lot of kids are in the parking lot. I look for Gavin. Gavin gets in the van and I say “Hi.” I sit quietly, keep my hands to myself and keep my seat belt on while Mom drives home. At home, Gavin and I will have a snack. I wonder what today’s snack will be!”

Liesl’s behavior was reported to improve the same day. Following the first day, Liesl’s mother was reported to refer to the story and have Liesl read the story when behavior problems returned.
Max was 6 years old, and having problems learning to follow a routine each morning as he entered the classroom. Once the social story was read to Max, he was said to follow the routine except taking his hat off and hanging it up. When this sentence was added to Max’s story, “Take your hat off and put it in the locker,” Max was reported to immediately put his hat in his locker once he read the revised social story (p.7).

Celeste was 7 years-old and was said to scream, throw herself on the floor, and bang her head when she became angry or frustrated. A social story read aloud and whispered to Celeste was reported to prevent her self-abusive and aggressive responses.

J.B. was described as a high school student who sang too loudly in choir. J.B. was said to lower his volume after reading a social story including the sentence, “I will sing so I can hear the people singing next to me.” The social story was reported to reduce the number of reminders needed to manage his volume when singing. J.B. was said to return to his original volume on one day when the story was not read.

Gray and Garands’ (1993) results can be described only as a series of anecdotes with no research design. No information was given about recording, measurement, or reliability-assessment procedures. There were no baseline data or long-term results. The results were only qualitative statements of “improvement.”

Since Gray and Garand’s original study (1993), few quality studies on Social Stories have been conducted, and of those conducted, results have been variable. A number of articles reviewing the empirical research literature on Social Stories have concluded that interpretations of studies are frequently confounded by inadequate description of participants as well as the usage of these stories coupled with other interventions (Reynhout & Carter, 2006; Rust & Smith, 2006; Kuoch & Mirenda, 2003;
Reynhout and Carter (2006) have provided the most extensive review of Social Story research to date. Of the 16 studies Reynhout and Carter (2006) reviewed, there was considerable variability in the actual stories written, the procedures employed, the selection of participants, and the behaviors targeted.

Reynhout and Carter (2006) determined that of existing Social Story research, approximately 40% of the stories deviated from recommended Social Story ratios (Gray, 2000). This is similar to criticism previously offered by Kuoch and Mirenda (2003), who found in a review of 10 Social Story journal articles prior to 2003 that 50% did not conform to applicable Social Story guidelines. Evaluation of the efficacy of these stories was also confounded by the use of additional intervention strategies in many studies. Other strategies used along with Social Stories included verbal and/or physical prompting, tangible reinforcers (stickers, edibles) (Kuttler et al, 1998; Staley, 2002; Swaggart et al., 1995), teacher modeling and rehearsal, and self-evaluation using video-feedback (Thiemann & Goldstein, 2001).

Staley’s (2002) study is of particular interest in regard to using additional strategies. In his study using reversal and multiple-baseline designs to compare the effects of Social Stories and reinforcers, results showed no effect of the Social Stories, but an almost immediate effect of the reinforcers (Staley, 2002). Reinforcement systems utilizing operant processes are well documented as an effective teaching method (e.g., Martin and Pear, 1992; Skinner, 1953). If Social Stories are used in combination with such techniques, component analysis will be required to determine the relative contribution of each technique, especially when one is already known to be effective.
A general critique of the existing Social Story research by Reynhout and Carter (2006) was that adequate descriptions of the participant’s communicative and cognitive skills were not always provided. Since Gray and Garand (1993) state that social stories are most likely to benefit students “functioning intellectually in the trainable mentally impaired range or higher who possess basic language skills,” the documentation of level of cognitive and communicative functioning is relevant and important when doing this type of research. Reynhout and Carter (2006) concluded that it is possible that this Social Story intervention is suited only to participants with specific characteristics.

Communication skills of participants in the 16 studies reviewed by Reynhout and Carter (2006) ranged from non-verbal to those able to communicate verbally. Only four studies included information regarding cognitive ability of participants. Only five studies provided a description of the reading ability of the participants (Reynhout & Carter, 2006). Regarding target behaviors, six studies targeted disruptive or challenging behaviors, nine targeted social skills, four targeted communicative behaviors, and four targeted on-task behaviors (Reynhout & Carter, 2006).

The level of investigation of Social Story effectiveness has advanced from anecdotal reports (e.g., Gray & Garand, 1993) to basic “pre” and “post” comparison (Swaggart et al, 1995), and then to studies with reversal (Kuttler et al., 1998) and multiple baseline designs (Hagiwara, 1998). Overall, the research literature regarding the effectiveness of Social Stories remains limited (Sansosti, Powell-Smith, & Kincaid, 2004; Ali & Frederickson, 2006). Findings have been mixed and further research is needed in this area (Scattone, 2007). Nichols, et al. (2005) stated that based on available research Social Stories are neither considered well established nor probably efficacious.
After reviewing the current research on Social Stories, Rust and Smith (2006) stated that there was no single study to date that employed comprehensive stringent standards.

Ali and Frederickson (2006) in a review of 14 studies concluded that although most studies showed positive results, changes in target behaviors were often modest, other interventions were frequently employed, and the evidence base is almost exclusively founded on single case design studies. Due to this, Ali and Frederickson (2006) concluded that although there is a sufficient evidence base to suggest that the approach may have promise and warrants further research, the intervention has yet to be proven as effective. Taken together, published research does provide preliminary support that Social Stories might be effective with at least with some individuals with an autism spectrum disorder, but due to a lack of experimental control and confounding treatment variables in many studies, it is difficult to say whether Social Stories alone were responsible for positive behavioral changes (Sansosti et al., 2004).

**Evaluation of Social Story Research based on Existing Recommendations and Guidelines**

All research to date on Social Stories and autism was garnished through searches on PsycINFO and the Social Sciences Citation Index. Additional sources were added if they were referred to in other articles that were being reviewed. Dissertations were not
considered unless they were cited in multiple other studies. In total, not counting solely review articles which were discussed previously, 27 research articles were reviewed. The following guidelines for acceptable research on Social Stories were determined based on recommendations from previous studies and guidelines from Gray (Gray & Garand, 1993; Gray, 1997; Gray, 2000): 1) the usage of Social Stories alone without concurrent treatments, 2) participants diagnosed with Autism (not Pervasive Developmental Disorder – Not Otherwise Specified or Asperger’s Disorder), 3) strict adherance to Gray’s (1997, 2000) guidelines for Social Story implementation, including appropriate Social Story ratio, 4) the usage of specific behavioral outcomes (not simply anecdotal data), and 5) participants were not reported to be nonverbal or to have an IQ or comparable score (such as a PPVT score) <55 (lower than trainable mentally impaired range).

Of 27 studies reviewed, only one study met the above guidelines and is reviewed in more depth here, and that study is simply an AB design. Overall, the existing research on Social Stories is weak at best. There are significant methodological and treatment integrity issues that make most research in this area inconclusive. Studies include a wide variety of participants with a wide range of abilities and employ variations on Social Stories even though it has not yet been established that these stories are useful for the intended target population in the original formulation set forth by Gray.

Norris and Dattilo (1999) used an AB design study to increase the appropriate social interactions of an 8-year-old girl with autism who was verbal and had cognitive functioning levels reported to be in the average to mildly intellectually disabled range. Three different stories were created according to Gray’s guidelines to decrease the
frequency of the participant’s inappropriate behaviors during lunch, and one of these
stories was read each day for 10 to 15 minutes before the lunch period. The following
frequencies of behavior were recorded: a) appropriate social interactions (i.e., initiating or
responding to other students verbally or gesturally), b) inappropriate social interactions
(i.e., verbalizations with bizarre content, making noises), and c) absence of social
interactions (i.e., no verbal, physical, or gestural initiations) for 8- to 10-minute periods.
Results demonstrated a delayed, but positive, effect on decreasing inappropriate social
interactions during lunch, but there was no effect on level of appropriate social
interactions or absence of social interactions. Due to the lack of experimental control
associated with an AB design, it is not possible to say that the Social Stories caused the
change in inappropriate social interactions, however. Another concern with this study is
that three Social Stories with varying content were used in this study to address a single
behavior. The authors suggested that using several stories with varying content may have
interfered with the participant’s ability to focus on any one or two key points.

The majority of the articles reviewed (26 of 27) are not discussed in more depth because
they did not meet one or more of the above criteria for acceptable research on Social
Stories that were established. Although multiple research articles have urged researchers
not to use concurrent treatments and to control for possible concurrent treatments, a
surprisingly large number of studies continue to have another possible treatment as a
confound (Swaggart et al., 1995; Kuttler et al., 1998; Delano & Snell, 2006; Scattone et
al, 2002; Lorimer, Simpson, Myles, & Ganz, 2002; Scattone, Tingstrom, & Wilcynski,
2006; Rogers & Myles, 2001; Staley, 2002; Zimbelman, Paschal, Hawley, Molgaard, &

Because research has not clearly demonstrated the effectiveness of Social Stories for their original intended audience of autistic children, it is also premature to broaden the audience to children diagnosed with other disabilities, even autism spectrum disabilities, since this adds variation and makes it harder to determine whether the stories are effective even for the originally targeted audience of children with autism. However, many researchers use a variety of children with different diagnoses, which makes it more difficult to determine whether this treatment is effective even for the originally proposed diagnosis of autism (Kuoch & Mirenda, 2003; Scattone et al., 2006; Rogers & Myles, 2001; Crozier & Tincani, 2007; Bledsoe, Myles & Simpson, 2003; Ivey et al., 2004; Adams, Gouvousis, VanLue, & Waldron, 2004).

Because the effectiveness of Social Stories has not yet been well-documented in their original form, it is similarly premature to modify the way in which stories are written (to deviate from the Social Story ratio) or to deviate from their originally prescribed method of implementation. Although the Social Story treatment in original form has not yet been validated, many researchers have already modified the way in which stories are written and do not adhere to the Social Story ratio (Hutchins & Prelock, 2005; Crozier & Tincani, 2005). Other variations from the original implementation, such as group social stories (Pettigrew, 1998), Multimedia Social Stories (Hagiwara & Myles, 1999), and musical Social Stories (Brownell, 2002) are similarly premature. Even though Gray did stated that Social Stories could not be adapted to needs of the student (Gray, 1995) these
adaptations make it more difficult to determine if the intervention as it was originally described is effective.

Some reviewed studies simply reported anecdotal data and did not include specific behavioral outcomes (Rowe, 1999; Smith, 2001; Gray & Garand, 1993; Moore, 2004), and it was felt that these studies were below a minimum standard for research in this area since it was impossible to know if there was truly an effect if there was no objective behavioral data. Other studies included participants who were reported to be nonverbal or to have an IQ or comparable score (such as a PPVT score) <55 (lower than trainable mentally impaired range) (Kuoch & Mirenda, 2003; Crozier & Tincani, 2007; Agosta, Graetz, Mastropieri, & Scruggs, 2004; Barry & Burlew, 2004). Since it was noted that these stories were developed for students who were capable of verbal communication and who were higher-functioning, it does not make sense to broaden the usage of these stories to lower-functioning children at least until an effect can be determined for the original targeted audience.

Although Social Story interventions have been suggested to have positive results for children with autism since the early 1990s, unfortunately little information is available that supports the use of Social Stories as an evidence-based approach (Sansosti, et al., 2004; Ali & Frederickson, 2006; Reynhout & Carter, 2006). Of studies showing positive outcomes of Social Stories, most have serious methodological flaws, which temper conclusions which can be drawn from such studies. Taking all research results together, Social Story effectiveness has not yet been proven. More stringent research is needed to determine which children this intervention is effective for and the exact conditions under which effectiveness can be shown.
Taking the limitations of all previous research to date into account, the present study seeks to expand upon the current literature base of Social Stories by testing the efficacy of Social Stories in a more homogeneous population and in a larger and better controlled case series than has been done in the past. The current study will focus on the usage of Social Stories to decrease disruptive classroom behaviors in children with autism between the ages of 6 and 9 who are capable of at least some communication using verbal speech, earn a score no more than 3 standard deviations below the mean (55) on the Peabody Picture Vocabulary Test – Third Edition, a screening test of verbal ability and intellectual functioning (Williams & Wang, 1997), and are capable of answering basic comprehension questions after reading a story. The Peabody Picture Vocabulary Test score of at least 55 demonstrates that each subject is at least in the trainable mentally impaired range. It was felt that below this level the stories would have much less chance of showing a positive effect. In addition to children being able to verbally respond to basic comprehension questions, the stipulation for IQ score is important since Gray and Garand (1993) claim that Social Stories are “most likely to benefit students functioning intellectually in the trainable mentally impaired range or higher who possess basic language skills.” This study will evaluate the effects of Social Stories as they were originally designed, adhering to the Social Story ratio (Gray, 2000). This study will also evaluate the effect of Social Stories alone without the usage of concurrent treatments. Even the effect of verbal comments by teachers about the stories will be controlled due to the fact that teachers will be unaware of when each student starts the intervention. The present study also will employ a multiple-baseline design with six students, the largest multiple baseline design study of Social Stories employed to date.
The primary aims of this study are as follows: (1) to determine whether Social Stories alone will have an effect on reducing disruptive classroom behaviors in these targeted children with autism and (2) to determine whether a decrease in teacher directives would occur after treatment with a Social Story alone. Based on past research, it is hypothesized that Social Stories alone will have a small effect on reducing disruptive classroom behaviors (both frequency and duration), and that there will be a slight decrease in teacher directives following Social Story treatment due to the decrease in disruptive classroom behaviors.
METHOD

Participants and Setting

Participants were six children between the ages of six and nine who attended a private school for children with developmental disabilities. All children attended the same classroom within the school. This targeted classroom was the only classroom that had six subjects who all met criteria for inclusion in this study. Parental informed consent forms were sent home by the school director and school psychologist to parents of potential participants telling them about the study and requesting them to give permission for their children to participate (see Appendix A). Three additional children not targeted by this study were also students in this classroom, two of whom had a diagnosis of an autism spectrum disorder, and one who was undiagnosed (typical peer). These parents were sent a parental consent form for non-targeted children giving permission for their children to be videotaped as part of the research that would be going on in the classroom (see Appendix B). There were three teachers assigned to this classroom, and because teacher behavior was also being assessed, each teacher signed a consent form giving permission to be studied (see Appendix C). Lastly, each targeted child was read a verbal assent script explaining the study and agreed to participate (see Appendix D).

Through a previous comprehensive psychological evaluation each targeted child had received a primary diagnosis of Autistic Disorder (DSM-IV-TR, 299.00). These six children were also capable of communication using speech, were able to answer comprehension questions about a sample story correctly (assessed through a combination
of teacher report and observation), and as mentioned earlier each child scored over 55 on the Peabody Picture Vocabulary Test (PPVT-III), a brief screening tool used to assess basic intelligence level and language comprehension. The correlation between the PPVT-III and the Weschler Intelligence Scale for Children – IV, a well-accepted measure of intelligence, was found to be .90, indicating that the PPVT-III is a valid screening tool for intelligence (Dunn, & Dunn, 1997).

Subject 1 was a 9 year-old female who received a standard score of 60 on the PPVT-III. Her main targeted behaviors were making vocal self-stimulatory noises and talking to herself. Subject 2 was a 7 year-old boy who received a standard score of 103 on the PPVT-III. His main targeted behaviors were making vocal self-stimulatory noises and getting out of his seat. Subject 3 was a 9-year old girl who received a standard score of 107 on the PPVT-III. Her main targeted behavior was talking at inappropriate times. Subject 4 was a 6 year-old male who received a standard score of 94 on the PPVT-III. His main target behaviors were making vocal self-stimulatory noises, talking at inappropriate times, and kicking the desk with his feet. Subject 5 was a 7 year-old male who received a standard score of 69 on the PPVT-III. His main target behaviors were making self-stimulatory noises with objects and talking at inappropriate times. Subject 6 was a 7 year-old male who received a standard score of 79 on the PPVT-III. His main target behaviors were making self-stimulatory noises with objects and making vocal self-stimulatory noises. Please refer to Table 1 for a synopsis of the above descriptions of subjects.

Materials
Once the child met all other requirements for inclusion (parental consent, verbal assent, diagnosis of autism, PPVT-III score $\geq 55$, and capable of communicating using speech, a sample Social Story (see Appendix E) was read to the child and basic comprehension questions asked to the child to assess comprehension ability. If the child was able to answer 80% of the questions correctly after three readings of the story and explanations of answers if necessary, he/she was allowed to be included in the study. All target students were able to answer at least 80% of the comprehension questions after two readings of the story.

To address Social Story effectiveness as they were designed originally, each Social Story for this study was designed to conform to the basic Social Stories format (Gray & Garand, 1993; Gray, 1998) and was written by the principal investigator.

Basic Social Stories format (Gray, 1998):

1. Write social stories from the perspective of the individual with autism.

2. Use a combination of descriptive, perspective, and directive sentences.

   - Descriptive sentences describe what people do in a given social situation, why they are doing it, when and where the event will take place, and who will be involved.

   - Perspective sentences describe the thoughts and feelings of other individuals. These sentences may be related to consequences because they describe how another individual may react when the individual with autism engages in the behavior.
• Directive sentences state the goals of the story by listing the responses
  the student is expected to provide during a given situation.

3. Employ the social story ratio: one directive sentence for every two to five
descriptive and/or perspective sentences.

Gray (2000) expanded the format of Social Stories to include other types of sentences
(perspective, control, and cooperative) that could also be used in a story. While the
present research did not utilize these other types of sentences, the stories still adhered to
Gray’s Complete Social Story Ratio (Gray, 2000) based on all types of sentences. The
Social Stories used in this research had four descriptive sentences, four perspective
sentences, and three directive sentences.

A second reader (school psychologist) also trained in writing Social Stories evaluated
the stories to make sure they followed the above guidelines. Because disruptive
classroom behaviors in general were targeted, the same Social Story was used for all
children, with the only modifications between stories being that the pictures and name
used in the story were specific to each child to personalize the story. The Social Story
used was:

How I Should Act During Center Time

My name is _________. I go to school at Helping Hands. At school I work at centers
each day. When it is time to work I will try to stay in my seat, listen to my teacher, and
do what she says. My teachers will be happy when I listen to them and do my work. I will try to keep my hands and feet to myself during center time. My friends are happy when I keep my hands and feet to myself. I will also try to stay quiet and not make noises. My friends are happy when I am quiet during center time. When I am quiet my friends can do their work. I can be silly, run around, and talk to my friends at recess time.

Comprehension Questions:

1) How should I act during center time?

2) Should I make noises during center time? Why not?

3) Where should my hands and feet be during center time?

4) How do my teachers feel when I listen to them and do my work?

Each story was composed using Microsoft Powerpoint and was printed with four small book pages per 8 1/2 X 11 inch sheet of white paper in landscape view. The pages were cut and stapled together to form a book. Each page excluding the title page and comprehension questions page included a picture or pictures(s) illustrating the written words on that page. Each story was 11 pages in length.

Teacher behavior was also observed and recorded on an observation form to determine if more attention was given to children after they received the Social Story treatment. Teacher directives in response to disruptive behaviors were also observed and recorded, and positive teacher comments were also observed and recorded. An example of a positive teacher comment would be, “You’re doing a nice job working”. Since
teachers were blind to the beginning of treatment, an increase in attention to behaviors or an increase in positive attention when students started the treatment might indicate that teachers were able to determine when each child started treatment. Making sure that teacher attention did not increase at the same time that treatment started for each child would suggest that teachers were indeed blind to the beginning of treatment.

**Design**

A multiple-baseline design across subjects was employed for this study (Kazdin, 2001). This type of design was chosen because it was not feasible to obtain a large enough sample size of this specific population for group-oriented research. A multiple-baseline design across subjects was also desirable for this study because of potential ethical concerns of not giving the treatment to some of the children who may have benefited from it. The multiple-baseline design was preferable to an AB design due to increased internal validity (being able to determine that effects were not due to history or maturation, for example). It was also preferable to the ABA design or ABAB design because it did not require the removal of the potentially helpful treatment. The multiple-baseline design across subjects requires the intervention to be implemented in a staggered fashion so that each participant serves as a control for the other participants. The graphs of each child’s behavior at baseline and during treatment will visually show effectiveness of treatment if behaviors improve when treatment is implemented, but remain stable across participants still in the baseline condition.

**Procedure**
After the targeted children were read the solicitation letter (see Appendix D) and agreed to participate, and after inclusion criteria were met for the six children, disruptive behaviors were observed in the classroom by the experimenter and school psychologist to determine what behaviors should be targeted for each child. It was determined that the disruptive behaviors were all members of the same general class of behaviors. Behaviors were disruptive to the other children and to the classroom in general, such as humming, talking out, running, or touching a neighbor. Because of the transient nature of the behaviors (some specific disruptive behaviors were not observed on a daily basis), the fact that each child engaged in multiple behaviors, and the fact that if one simple behavior was tracked for each subject the frequency of disruptive behavior would be much lower, and consequently it would be more difficult to show an effect during a short period of observation time each day, it was decided to lump all disruptive behaviors together and to simply count disruptive behaviors in general rather than trying to isolate specific behaviors.

After a Social Story was constructed by the primary investigator with input from teachers and the school psychologist, baseline data for all six children was recorded via video camera for five days. After the behaviors of each individual reached a relatively stable rate (a perfectly stable rate was not feasible given the transient nature of the behaviors and the history of the behaviors as reported by the school psychologist and teachers), the Social Story condition was implemented for the first child, while baseline conditions were continued for the other children. It is also important to note that the primary investigator (along with the school psychologist and teachers) assessed when relatively stable rates of behavior had been reached. The actual data reported in this
study was coded later by trained undergraduate students. However, these students were not available to come to the school on a daily basis to observe, so all coding was from video recordings after the entire study was completed.

Social Story treatment consisted of the child being presented the Social Story approximately 10 minutes before the behavior was to be assessed (children were taken from the classroom in random order daily), having the child read the Social Story (with help as needed) along with the principal investigator, and then having the child answer basic comprehension questions provided at the end of the story. If the child showed any difficulty with the comprehension questions regarding the Social Story initially, the answers were explained to make sure the child truly understood the story and was able to answer comprehension questions independently with at least 80% accuracy. For four of the subjects (Subjects 1, 2, 4, and 6), comprehension was 100% after the first reading of the story and remained at that level for the remainder of the study. For the remaining two subjects, comprehension was 80% after the first reading of the story and was 100% for the remainder of the study, showing that the students were able to comprehend the stories. Social Stories (and control stories) were read with the primary investigator in the hallway outside the classroom with one student at a time. Children still in the baseline condition were read a library book that had nothing to do with behavior or school in general. The reason for these control stories was so that teachers would not know when treatment was starting for each child and to make sure that all children did not improve simply after given increased attention (the reading of any story). Each child spent approximately 3-5 minutes with the primary investigator reading the story and answering comprehension questions daily. The Social Stories were not available to the students at
other times and were stored in a locked office at the school where teachers did not have access to them. If the treatment was effective, it was expected that the targeted behavior of the child exposed to the Social Story should change, but the behavior of the other children should not change.

The procedure was continued with one student at a time (each for three days before the next child began treatment) being administered the Social Story intervention until all had been administered the intervention. (After initially receiving a Social Story intervention, each child continued to receive the intervention daily until the end of the study.) Three days was chosen because, according to Gray (1995) a “child’s response to a social story is often immediate, with improvement apparent within a few days.” No return to baseline was required to demonstrate that a treatment was responsible for the behavior change with this design.

Observers were the primary investigator and two other undergraduate students who had been taught previously about ethical standards in research and data collection methods. Each undergraduate student independently completed an online university course in ethics and research. Additionally the primary investigator met with each student for several hours individually before the student began coding data to train the student on what behaviors to code, how to time duration of behaviors, and how to record teacher directives and comments. Each student coded alongside the primary investigator until her data matched the investigator’s data at least 90%. Definitions of behaviors and multiple examples of how to code behaviors were given. A simple disruptive behavior was operationalized as a discrete, observable, inappropriate classroom behavior that could be a distraction to another member of the classroom regardless of the function of
the behavior. Examples of disruptive behaviors were tapping a pencil on the desk, kicking another classmate, removing clothing, and making stereotypical vocalizations such as humming or repeating words. Simply looking up from work, sitting quietly, talking to a peer at an appropriate time, or asking a teacher a question were non-examples of disruptive behavior. A teacher directive was operationalized as a discrete, observable, verbal comment made to a child regarding an inappropriate behavior. Examples of teacher directives were, “Sit down,” “Put your shirt back on,” and “No humming”. Giving directions for work or answering questions were non-examples of teacher directives. A positive teacher comment was operationalized as a discrete, observable, verbal comment made to a child that was positive in nature rather than corrective or instructive. Examples of positive teacher comments were, “I like how you are working,” “Good job,” and, “I like your quiet voice”.

After the initial training of student data coders, the investigator re-trained with each student approximately bi-weekly to make sure there was no drift in the way behaviors were being coded or timed. The investigator remained available whenever coding was being done to answer specific coding questions via phone as well, so that the way coding was being done would remain consistent.

Observations of each child were videotaped by the primary investigator daily for approximately 15 minutes during small group time (center time). This small group time was usually in the mornings, but the exact time varied from day to day. Children were taken individually to read stories with the primary investigator before small group time started. They were always taken in a random order to read the stories to control for
length of time between reading of the story and small group time. On average students read the stories approximately 10 minutes prior to small group time.

Undergraduate student researchers viewed videotapes for scoring purposes after the study was completed. Due to restrictions imposed by this study, videotapes remained in an office at the school and will be destroyed after the study is completed. Frequency data was collected, which simply required tallying the number of times that disruptive behaviors occurred in a given period. Frequency measures are desirable for use in applied settings because they are simple to score and they readily reflect changes over time. Furthermore, frequency measures show the amount of behavior performed, and would show the decrease in the amount of behavior performed, which is a direct measure of the treatment goal: to decrease disruptive behavior.

Another measure of disruptive behaviors was a duration measure of the total amount of time that disruptive behaviors were engaged in by each child during each time period. This measure was taken in addition to the frequency count due to a concern that some behaviors only occurred infrequently but lasted a longer period of time than other, more common, disruptive behaviors. Examples of such behavior were running out of the room and having to be pursued by a teacher, and engaging in inappropriate verbalizations that lasted for a long period of time without interruption. A simple frequency count would simply count these more extensive behaviors as one behavior when behaviors like this that lasted for a long period of time were clearly more disruptive than a simple short outburst or kick to the desk.
Teachers were asked not to comment about the story after the day’s presentation. They were instructed to react to the child’s behavior as they normally had before the Social Story treatment was implemented. A frequency count of teachers’ directives about disruptive behavior and a frequency count of teachers’ positive comments were also taken. It was also noted if a teacher made any comment about a Social Story (unlikely because they had not seen them and did not know what they were targeting).

Teachers as well as undergraduate student researchers who scored the data were not informed when children were starting a Social Story. Therefore, they could not be biased in their ratings based on knowledge of when a child’s disruptive behavior was targeted.

Because small group work did not always last 15 minutes exactly and often children were finished early and were allowed to leave the table when finished, all data was later converted to a 15-minute period of time for comparability. The frequency of behaviors, duration of behaviors, frequency of teacher directives, and frequency of teacher positive comments were all converted using the following formula: (15 X number of behaviors/duration actually observed) / length of time actually observed. The mean length of time each child was recorded while in small group work each day was 13.4 minutes (Range = 3.1 minutes – 29.4 minutes).

**Interobserver Agreement**

After one undergraduate student researcher coded all of the data from the videotapes, a second undergraduate student researcher coded 26% of all data to assess reliability. Because of the nature of the data, reliability was not able to be calculated by dividing the
number of agreements by number of disagreements. Instead intraclass correlations were performed (Case 3, measure of absolute agreement) (Shrout & Fleiss, 1979) to answer the question, “Are the raters interchangeable?” In all cases, frequency of disruptive behaviors, duration of disruptive behaviors, frequency of teacher directives, and frequency of teacher positive comments, the intraclass correlation was .999 showing exceptionally good agreement between the two raters.

Another measure of reliability was simply calculated by dividing the smaller number by the larger number in each 15-minute set of corresponding data points and multiplying by 100 and then taking an average. Percent agreement for number of disruptive behaviors was 97% (Range = 86% - 100%). Percent agreement for duration of disruptive behaviors was 96% (Range = 88% - 100%). Average agreement percentage for number of teacher directives regarding behavior was 99% (Range = 91% - 100%), and average percent agreement for number of teacher positive comments was 99% (Range = 82% = 100%). Inter-rater reliability was found to be acceptable across all measures.

Treatment Integrity

The treatment variable in this investigation was the reading of a Social Story with the primary investigator daily before observation of classroom behavior during small group time (center time). Each child in the study read the Social Story every day for the 23 days of the study except for when a particular child was absent, in which case no data for that child was recorded for that particular day. A notebook of dates each child read the story was kept. Procedural reliability measures for implementation of the Social Story treatment for each child were 100%.
Another measure of treatment integrity was assessing whether or not teachers referred to Social Stories during small group time (center time). They were instructed not to say anything about the stories so as not to bias results by potentially reinforcing ideas in the stories. No teacher commented on the stories at any point during baseline or treatment.

CHAPTER 3

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RESULTS

Frequency of Disruptive Behaviors

Figure 1 shows the number of disruptive behaviors engaged in by each participant both during baseline and then during treatment for each 15-minute period of small group time (center time) that was recorded daily. No clear effect was observed for Subject 1 when the Social Story treatment was put into effect. There appeared to be a decrease in frequency of disruptive behaviors initially after treatment started and lasting for approximately one week, but then there were spikes in behavior that were higher rates than were seen during baseline. Although the mean number of disruptive behaviors did decrease after treatment started (from 17.5 to 16.7), this difference was negligible. Subjects 2-5 showed no significant decrease in behavior when treatment was started (mean number of behaviors actually increased).

Although Subject 6 appeared to show some improvement in behavior after treatment, decreasing from an average of 46.1 disruptive behaviors before treatment to an average of 8.9 disruptive behaviors after treatment, upon careful investigation his decrease in behaviors actually starts the day before treatment. There are also other periods of time equal to the treatment time (three days in length) that are equally low during baseline. Unfortunately only three data points exist for this subject since he was the last subject in this study, however, so based on the available data it cannot be claimed that the Social Story caused the decrease in disruptive behaviors even for this subject. More data points may have made a stronger argument that the Social Stories were truly effective for this
subject, but since it was the end of the school year and many of the students were not continuing for summer, it was impossible to continue the study further. Overall, there was no significant decrease in number of disruptive behaviors after the Social Story treatment was implemented.

*Duration of Disruptive Behaviors*

Figure 2 shows the total duration of time that disruptive behaviors were engaged in by each participant both during baseline and then during treatment for each 15-minute period of small group time (center time) that was recorded daily. Subjects 1, 2, 3, and 5 showed no decrease in mean duration of disruptive behaviors from baseline to Social Story treatment. In fact, the above subjects all showed a slight increase in duration once the treatment condition was started. Subject 4 showed a slight decrease in mean duration of disruptive behaviors from baseline (M = 3.5) to treatment condition (M = 3.1), but again this difference was negligible. It is notable that there was less variability (no significant behavior spikes) for Subject 4 once treatment started. Again, Subject 6 seemed to show a significant decrease in duration of behaviors after treatment with the Social Story began, decreasing from an average duration of 3.7 minutes to an average of 0.2 minutes per 15-minute period, suggesting that there was an immediate effect for this subject. However, this must be interpreted with caution since it is based on only three days and there were similarly low days during baseline. Taken as a whole, there was no significant decrease in duration of overall disruptive behaviors after the Social Story treatment was implemented.
Frequency of Teacher Directives

Figure 3 shows the number of teacher directives to each child regarding disruptive behavior both during baseline and during treatment. Although number of teacher directives was tallied in order to make sure that teachers were not directing more attention to behaviors once they were targeted by the Social Story (a measure of treatment integrity), it is interesting to note that for all subjects mean number of teacher directives decreased from baseline to treatment. On average teachers actually made fewer comments about students’ disruptive behaviors after treatment started for all subjects.

Frequency of Positive Teacher Comments

Figure 4 depicts number of positive teacher comments made to each subject during baseline and treatment conditions. These comments were recorded in an attempt to make sure that positive attention for appropriate behavior (verbal praise) did not increase when treatment started. For subjects 1, 3, 4, and 6, number of positive comments decreased somewhat after treatment was started. Subjects 2 and 5 received a somewhat greater number of teacher comments after treatment started when comparing means, although visually there were no significant effects of treatment.

When total positive teacher comments during baseline were compared to total positive teacher comments after treatment, there was no increase in positive teacher comments from baseline (M = 3.0) to after treatment (M = 2.7). It is interesting to note that the student who received the least number of positive teacher comments both during baseline and during treatment was also the student who had the lowest levels of
disruptive behaviors. This relationship did not hold true for the student with the highest levels of disruptive behaviors, however. The student with the highest levels of disruptive behaviors did not have the highest frequency of positive teacher comments.
Strengths of this study

This study controlled for many of the limitations criticized in previous Social Story research. Only children who were in the trainable mentally impaired range of cognitive ability or higher who were capable of verbal communication were used in this study. These are the children that Gray (Gray & Garand, 1993) originally suggested these stories be used for. Additionally all children had a primary diagnosis of Autistic Disorder, the disorder that Social Stories were originally written to address. Social Stories adhered to Gray’s Social Story ratio (Gray, 1998; Gray, 2000), and were presented without any additional potentially confounding treatments, such as reinforcement systems, verbal and/or physical prompting, or teacher modeling and rehearsal, being implemented at the same time as the Social Stories.

Teachers were not aware of when students began treatment or what behaviors were being targeted by the Social Story. No references to the Social Stories were made during observations, and there was no change in frequency of verbal praise for appropriate behaviors upon implementation of the Social Stories. Trained observers who coded the data were similarly not aware of when students began treatment and were not aware of what behaviors the Social Story targeted, so therefore they could not be biased in their ratings. A multiple baseline design was also utilized, which provided more control than many simpler research designs which have been previously used in Social Study research. This study was also noteworthy in that six subjects were used, when the
majority of research on Social Stories to date has included only one or two participants per study.

**No Significant Effect of Social Stories Overall**

The present study results are overall not impressive. Only one child appeared to decrease number and duration of disruptive classroom behaviors after the Social Story treatment, and for that child unfortunately only three data points exist past the start of treatment, making it very possible that the apparent decrease is not due to the story but rather just a random variation. One additional child showed less variability (scatter) in duration of behaviors after treatment started. Although frequency of teacher directives did decrease after treatment started, based on the fact that overall behaviors did not show a significant decrease either in number or duration, these results may be spurious. It may be that teacher directives decreased due to the mere fact that teachers knew that their behavior was being recorded and were more aware of comments they were making.

**Additional Classroom Interventions**

It is difficult to tease out the effect of Social Stories alone versus Social Stories combined with typical classroom interventions for behaviors when children are observed in a classroom setting. Because these sorts of interventions cannot be easily dismantled, it is important that they be controlled and that they do not change when treatment is initiated. In an attempt to measure one typical classroom intervention that would be difficult to remove, the present study tallied positive teacher comments before and after treatment began as a measure of positive teacher attention. Results indicated no
significant difference in the amount of positive attention shown to the children after treatment started, which suggests teachers were not changing their behavior due to treatment starting, and further suggests that changes in the children’s behavior were at least not due to changes in positive teacher attention.

Teachers were instructed not to start any new classroom interventions during the time this study was taking place so that no additional confounds were introduced that might make it impossible to interpret what was responsible for a change in behavior. Two of the children had previous interventions that had been ongoing for over a month before this study started. One was a Social Story for one specific behavior that was read on a variable schedule (Subject 4), and the other was a token reinforcement system whereby the student could earn a reward for appropriate behavior (Subject 2). These interventions were unable to be removed since they were put in place by the school psychologist as part of each child’s existing behavior plan. It is possible that these interventions could have caused some delayed decrease in disruptive classroom behavior that would have potentially confounded this study, but since both subjects showed a relatively stable baseline before treatment and neither of these children showed a decrease in disruptive behavior after treatment, it appears that these additional preexisting treatments had little effect during the course of the present study.

Limitations of this Study

A limitation of the current study was that more general disruptive behaviors were targeted instead of one specific problematic target behavior (e.g., humming). It may have been easier for the children to learn to change one specific behavior rather than disruptive
behaviors in general. A recommendation for future research would be to conduct studies targeting a single behavior that each child in the study exhibits at a high frequency at baseline. The challenge in doing this is that there is considerable variability between children with autism and the disruptive behaviors they exhibit. It would be difficult to find a large enough sample size in the same setting to conduct the present study, but focusing on only one specific disruptive behavior. Even if multiple children are found who all exhibit the same disruptive behavior, frequencies of behavior can vary drastically, and it would be difficult to show a change in frequency for students who display low frequencies of the behavior at baseline.

Another limitation of this study was that the baseline levels of behavior were evaluated by the primary investigator. The actual undergraduate researchers who coded the data were not able to code the data in real time. Therefore, judgment of when to start treatment and which subjects should start treatment based on stability of baseline behaviors was not based on the actual study data, but rather preliminary data collected by the primary investigator who was videotaping the behaviors and implementing the treatments. Although behaviors were relatively stable (looking at a combination of frequency and duration measures of behavior) at baseline, different decisions about the timing of implementations may have been made if decisions were based on the actual data.

The fact that this study lasted for only 23 days was another possible limitation. There was significant variability in behaviors in the current study. Frequent behavior spikes were seen that may have skewed the data to some degree. If the study had continued for a longer period of time it may have been easier to visually see significant changes in
behavior that were not obvious given the duration of the current study. Although a longer study may have been preferable, the multiple baseline design that was implemented should have visually shown immediate changes in behavior, and these changes were overall not apparent. A longer study might have shown that over a long period of time there was a small change in behavior for some additional children, but whether or not that change would have been clinically significant is debatable.

Another criticism of this study might be the way in which interobserver agreement was evaluated. It could be argued that even though intraclass correlations showed exceptionally good agreement between raters and percentages of agreement were high, that actually each rater was coding different behaviors as occurring. The present study was unable to show whether or not the exact same behaviors were being counted in the total numbers. Because of the high frequencies of behavior that some students exhibited, these measures of agreement appeared to be the only feasible ways to accurately and efficiently tabulate the data in a timely manner.

Overall Effectiveness of Social Stories and Ideas for Future Research

While Social Stories may provide some benefit and require little effort to use in a classroom setting, the present study suggests that it is not the Social Stories alone that are likely responsible for significant positive changes in behavior, but rather a combination of teachers and parents reinforcing those behaviors through positive reinforcement and other interventions throughout the day. If time and resources are limited, Social Stories alone might provide some benefit with little cost or effort, but when paired with other
reinforcers they may potentially prove more beneficial. Additional studies are needed to
determine whether children will respond positively to a Social Story alone, without any
additional intervention. Carefully controlled research should try to isolate variables that
could be responsible for differences in response to Social Story intervention. To date, the
characteristics of individuals with autism for whom Social Stories are effective remain
unidentified, although based on previous research it is hypothesized that individuals who
display functional language and higher intelligence would be more likely to benefit from
this approach.

Controlling for limitations criticized in previous Social Story research is necessary in
order to make gains in our knowledge base about why Social Stories have proven
effective for some children in some studies. At this point in time, until carefully designed
and controlled studies are able to isolate why Social Stories have proven effective in
some instances, it seems reasonable that other interventions that have proven effective in
teaching new skills, such as reinforcement systems utilizing operant processes, may be a
better approach to teaching these children social skills (e.g., Martin & Pear, 1992;
Skinner, 1953).

Another interesting avenue of research to pursue in this area would be to use the basic
Social Story intervention and then to add other components to the intervention in a
staggered fashion to assess each intervention’s effect separately. For example, after
adding in a Social Story intervention alone, teachers could then add in positive
reinforcement for the behavior that was targeted, and then a token reinforcement system
could be implemented where the child received a token or reinforcer when he/she was
engaging in appropriate classroom behavior throughout the day to reinforce appropriate
behavior. These types of studies might be able to help determine whether Social Stories are able to independently change social behaviors, and to what degree they are helpful when compared to other types of intervention strategies.

Further information is also needed regarding maintenance and generalization of Social Story effects. More information is needed on whether skills taught through Social Stories maintain over time and generalize across settings. Some research has indicated that behaviors returned to baseline after the removal of a Social Story using an ABAB design (Kuttler et al., 1998; Lorrimer et al., 2002). Research should extend beyond the intervention phase and assess potential long-term benefits of Social Stories.

In conclusion, unfortunately the present study with a limited implementation time frame does not support the overall efficacy of Social Stories for decreasing disruptive behavior in autistic children between the ages of six and nine. Based on the current study as well as the analysis of prior research on Social Stories, enthusiasm for the widespread use of Social Stories should be tempered. It is recommended that if Social Stories are used to attempt to change social behaviors in autistic children, that other active treatment variables be implemented along with them to help create the desired changes in behaviors.

LIST OF REFERENCES

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APPENDIX A

PARENTAL CONSENT FORM
The Ohio State University Parental Permission
For Child’s Participation in Research

Study Title: The Effectiveness of a Social Story Intervention in Decreasing Disruptive Behavior in Autistic Children
Researcher: Steven Beck, Ph.D.
Sponsor: N/A

This is a parental permission form for research participation. It contains important information about this study and what to expect if you permit your child to participate. Your child’s participation is voluntary. Please consider the information carefully. Feel free to discuss the study with your friends and family and to ask questions before making your decision whether or not to permit your child to participate. If you permit your child to participate, you will be asked to sign this form and will receive a copy of the form.

Purpose:
The main purpose of this study is to determine if reading personalized Social Stories explaining appropriate behavior to children diagnosed with autism will decrease specific disruptive classroom behaviors. Social Stories provide a convenient intervention that can be easily carried out with children at school, but additional research is needed to determine the effectiveness of this intervention. This study will focus on the effectiveness of individualized Social Stories to decrease specific disruptive behaviors in children diagnosed with autism (according to DSM-IV-TR standards) between the ages of six and ten who obtain a standard score of 55 or above on the Peabody Picture Vocabulary Test – Third Edition (PPVT-III).

Procedures/Tasks:
If you agree that your child will participate (and your child also agrees), a researcher will administer the PPVT-III to your child to make sure he/she qualifies for the study. This test should take approximately 11-12 minutes to administer and will be administered during school hours, but during a time that is convenient for your child when he/she will not miss important school work. If you would prefer, the test can also be administered before or directly after school hours. To make sure your child qualifies for the study, a researcher will also have your child read (or be read, as necessary) a sample Social Story to make sure he/she is able to answer simple comprehension questions about the story.
If your child qualifies for the study, a researcher will then observe your child in his/her classroom and will meet with your child’s teacher to discuss his/her behavior in the classroom. A behavior will be selected to target with a Social Story, and then a researcher will create a personalized story showing appropriate behavior (instead of the disruptive behavior) using pictures that will be taken of your child behaving appropriately in the situation. The pictures will be used to create a personalized Social Story that will be read to/by your child each day for up to two months. The Social Story will be read to/by your child at school and simple comprehension questions will be asked to your child to make sure that he/she understood the story. Your child’s behavior will be observed and videotaped by a researcher to monitor whether or not the targeted disruptive behavior is decreasing. Your child will not know that the researcher is monitoring him/her, however, as the researcher will appear to simply be observing the classroom. Your child’s behavior will be monitored and videotaped for 20 minutes each school day for up to two months. Video tapes will be reviewed by researchers from Ohio State University. These researchers are trained in data collection and research ethics. The tapes will be stored on school property and will be destroyed after they have been viewed.

**Duration:**

Your child may leave the study at any time. If you or your child decides to stop participation in the study, there will be no penalty and neither you nor your child will lose any benefits to which you are otherwise entitled. Your decision will not affect your future relationship with The Ohio State University.

**Risks and Benefits:**

*The treatment is similar to classroom techniques already used by teachers at the school, so the risks are minimal. Anticipated benefits are that this treatment proves beneficial in reducing disruptive classroom behaviors and teaching more appropriate behaviors. It is important to document the efficacy of this treatment so that it can be used with more children if this treatment indeed proves efficacious.*

**Confidentiality:**

Efforts will be made to keep your child’s study-related information confidential. However, there may be circumstances where this information must be released. For example, personal information regarding your child’s participation in this study may be disclosed if required by state law. Also, your child’s records may be reviewed by the following groups (as applicable to the research):

- Office for Human Research Protections or other federal, state, or international regulatory agencies;
- The Ohio State University Institutional Review Board or Office of Responsible Research Practices;
- The sponsor, if any, or agency (including the Food and Drug Administration for FDA-regulated research) supporting the study.
**Incentives:**

No incentives are being offered for participation in this study.

**Participant Rights:**

You or your child may refuse to participate in this study without penalty or loss of benefits to which you are otherwise entitled. If you or your child is a student or employee at Ohio State, your decision will not affect your grades or employment status.

If you and your child choose to participate in the study, you may discontinue participation at any time without penalty or loss of benefits. By signing this form, you do not give up any personal legal rights your child may have as a participant in this study.

An Institutional Review Board responsible for human subjects research at The Ohio State University reviewed this research project and found it to be acceptable, according to applicable state and federal regulations and University policies designed to protect the rights and welfare of participants in research.

**Contacts and Questions:**

For questions, concerns, or complaints about the study you may contact Steven Beck, Ph.D. at (614) 292-6849.

For questions about your child’s rights as a participant in this study or to discuss other study-related concerns or complaints with someone who is not part of the research team, you may contact Ms. Sandra Meadows in the Office of Responsible Research Practices at 1-800-678-6251.

If your child is injured as a result of participating in this study or for questions about a study-related injury, you may contact Steven Beck, Ph.D. at (614) 292-6849.
Signing the parental permission form

I have read (or someone has read to me) this form and I am aware that I am being asked to provide permission for my child to participate in a research study. I have had the opportunity to ask questions and have had them answered to my satisfaction. I voluntarily agree to permit my child to participate in this study.

I am not giving up any legal rights by signing this form. I will be given a copy of this form.

Printed name of subject

Printed name of person authorized to provide permission for subject  Signature of person authorized to provide permission for subject  AM/PM

Relationship to the subject  Date and time

Investigator/Research Staff

I have explained the research to the participant or his/her representative before requesting the signature(s) above. There are no blanks in this document. A copy of this form has been given to the participant or his/her representative.

Printed name of person obtaining consent  Signature of person obtaining consent  AM/PM

Date and time
APPENDIX B

PARENTAL CONSENT FORM FOR NON-TARGETED CHILDREN
The Ohio State University Parental Permission
For Child’s Participation in Research

Consent Form for Non-Targeted Child’s Participation

Study Title: The Effectiveness of a Social Story Intervention in Decreasing Disruptive Behavior in Autistic Children

Researcher: Steven Beck, Ph.D.

Sponsor: N/A

This is a parental permission form for research participation. It contains important information about this study and what to expect if you permit your child to participate.

Your child’s participation is voluntary.

Please consider the information carefully. Feel free to discuss the study with your friends and family and to ask questions before making your decision whether or not to permit your child to participate. If you permit your child to participate, you will be asked to sign this form and will receive a copy of the form.

Purpose:

The main purpose of this study is to determine if reading personalized Social Stories explaining appropriate behavior to children diagnosed with autism will decrease specific disruptive classroom behaviors. Social Stories provide a convenient intervention that can be easily carried out with children at school, but additional research is needed to determine the effectiveness of this intervention. This study will focus on the effectiveness of individualized Social Stories to decrease specific disruptive behaviors in children diagnosed with autism (according to DSM-IV-TR standards) between the ages of six and ten who obtain a standard score of 55 or above on the Peabody Picture Vocabulary Test – Third Edition (PPVT-III). Your child is not a direct participant in this study.

Procedures/Tasks:

Six children from the school have been targeted for the intervention, and the purpose of the study is to observe the behaviors of these targeted children. However, we are asking for your permission to observe your child’s classroom because one or more of the targeted children are in your child’s classroom. The targeted children will be videotaped
by a researcher to monitor whether the targeted disruptive behavior is decreasing. Your child may be videotaped as well if he/she is in proximity to the targeted child. Your child’s classroom will be monitored and videotaped for 20 minutes each school day for up to two months. Video tapes will be reviewed by researchers from Ohio State University. These researchers are trained in data collection and research ethics. The tapes will be stored on school property and will be destroyed after they have been viewed.

Duration:

Your child may leave the study at any time. If you or your child decides to stop participation in the study, there will be no penalty and neither you nor your child will lose any benefits to which you are otherwise entitled. Your decision will not affect your future relationship with The Ohio State University.

Risks and Benefits:

_The treatment is similar to classroom techniques already used by teachers at the school, so the risks are minimal. Anticipated benefits are that this treatment proves beneficial in reducing disruptive classroom behaviors and teaching more appropriate behaviors. It is important to document the efficacy of this treatment so that it can be used with more children if this treatment indeed proves efficacious._

Confidentiality:

Efforts will be made to keep your child’s study-related information confidential. However, there may be circumstances where this information must be released. For example, personal information regarding your child’s participation in this study may be disclosed if required by state law. Also, your child’s records may be reviewed by the following groups (as applicable to the research):

- Office for Human Research Protections or other federal, state, or international regulatory agencies;
- The Ohio State University Institutional Review Board or Office of Responsible Research Practices;
- The sponsor, if any, or agency (including the Food and Drug Administration for FDA-regulated research) supporting the study.

Incentives:

No incentives are being offered for participation in this study.

Participant Rights:

You or your child may refuse to participate in this study without penalty or loss of benefits to which you are otherwise entitled. If you or your child is a student or employee at Ohio State, your decision will not affect your grades or employment status.
If you and your child choose to participate in the study, you may discontinue participation at any time without penalty or loss of benefits. By signing this form, you do not give up any personal legal rights your child may have as a participant in this study.

An Institutional Review Board responsible for human subjects research at The Ohio State University reviewed this research project and found it to be acceptable, according to applicable state and federal regulations and University policies designed to protect the rights and welfare of participants in research.

**Contacts and Questions:**
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For questions about your child’s rights as a participant in this study or to discuss other study-related concerns or complaints with someone who is not part of the research team, you may contact Ms. Sandra Meadows in the Office of Responsible Research Practices at 1-800-678-6251.

If your child is injured as a result of participating in this study or for questions about a study-related injury, you may contact Steven Beck, Ph.D. at (614) 292-6849.
Signing the parental permission form

I have read (or someone has read to me) this form and I am aware that I am being asked to provide permission for my child to participate in a research study. I have had the opportunity to ask questions and have had them answered to my satisfaction. I voluntarily agree to permit my child to participate in this study.

I am not giving up any legal rights by signing this form. I will be given a copy of this form.

Printed name of subject

Printed name of person authorized to provide permission for subject

Signature of person authorized to provide permission for subject

Relationship to the subject

Date and time

Investigator/Research Staff

I have explained the research to the participant or his/her representative before requesting the signature(s) above. There are no blanks in this document. A copy of this form has been given to the participant or his/her representative.

Printed name of person obtaining consent

Signature of person obtaining consent

Date and time

AM/PM
The Ohio State University Consent to Participate in Research Teacher Form

Study Title: The Effectiveness of a Social Story Intervention in Decreasing Disruptive Behavior in Autistic Children
Researcher: Steven Beck, Ph.D.
Sponsor: N/A

This is a consent form for research participation. It contains important information about this study and what to expect if you decide to participate.

Your participation is voluntary.

Please consider the information carefully. Feel free to ask questions before making your decision whether or not to participate. If you decide to participate, you will be asked to sign this form and will receive a copy of the form.

Purpose:

The main purpose of this study is to determine if reading personalized Social Stories explaining appropriate behavior to children diagnosed with autism will decrease specific disruptive classroom behaviors. Social Stories provide a convenient intervention that can be easily carried out with children at school, but additional research is needed to determine the effectiveness of this intervention. This study will focus on the effectiveness of individualized Social Stories to decrease specific disruptive behaviors in children diagnosed with autism (according to DSM-IV-TR standards) between the ages of six and ten who obtain a standard score of 55 or above on the Peabody Picture Vocabulary Test – Third Edition (PPVT-III).

Procedures/Tasks:

Although observation of teacher behavior is not the main purpose of the study, it is important to observe both initial rates of praise/commentary regarding the child’s disruptive behavior as well as rates of praise/commentary regarding the child’s behavior during treatment to make sure that the Social Story treatment is the only difference and that any changes in the disruptive behavior are due to the treatment and not an increase in social praise from a teacher, for example.
A Social Story will be created for each of six targeted children, and each child will read the story daily with a researcher for up to two months. A researcher will videotape each child in the classroom for 20 minutes each day. Before the study begins, teachers will be interviewed to discuss disruptive classroom behaviors for each targeted child. During the study teacher behavior will also be recorded and observed, but the observation of teacher behavior is not the main purpose of the study. Video tapes will be reviewed by researchers from Ohio State University. These researchers are trained in data collection and research ethics. The tapes will be stored on school property and will be destroyed after they have been viewed.

**Duration:**

You may leave the study at any time. If you decide to stop participating in the study, there will be no penalty to you, and you will not lose any benefits to which you are otherwise entitled. Your decision will not affect your future relationship with The Ohio State University.

**Risks and Benefits:**

The treatment is similar to classroom techniques already used by teachers at the school, so the risks are minimal. Anticipated benefits are that this treatment proves beneficial in reducing disruptive classroom behaviors and teaching more appropriate behaviors. It is important to document the efficacy of this treatment so that it can be used with more children if this treatment indeed proves efficacious.

**Confidentiality:**

Efforts will be made to keep your study-related information confidential. However, there may be circumstances where this information must be released. For example, personal information regarding your participation in this study may be disclosed if required by state law. Also, your records may be reviewed by the following groups (as applicable to the research):

- Office for Human Research Protections or other federal, state, or international regulatory agencies;
- The Ohio State University Institutional Review Board or Office of Responsible Research Practices;
- The sponsor, if any, or agency (including the Food and Drug Administration for FDA-regulated research) supporting the study.

**Incentives:**

No incentives are being offered for participation in this study.
**Participant Rights:**

You may refuse to participate in this study without penalty or loss of benefits to which you are otherwise entitled. If you are a student or employee at Ohio State, your decision will not affect your grades or employment status.

If you choose to participate in the study, you may discontinue participation at any time without penalty or loss of benefits. By signing this form, you do not give up any personal legal rights you may have as a participant in this study.

An Institutional Review Board responsible for human subjects research at The Ohio State University reviewed this research project and found it to be acceptable, according to applicable state and federal regulations and University policies designed to protect the rights and welfare of participants in research.

**Contacts and Questions:**

For questions, concerns, or complaints about the study you may contact Steven Beck, Ph.D. at (614) 292-6849.

For questions about your rights as a participant in this study or to discuss other study-related concerns or complaints with someone who is not part of the research team, you may contact Ms. Sandra Meadows in the Office of Responsible Research Practices at 1-800-678-6251.

If you are injured as a result of participating in this study or for questions about a study-related injury, you may contact Steven Beck, Ph.D. at (614) 292-6849.
Signing the consent form

I have read (or someone has read to me) this form and I am aware that I am being asked to participate in a research study. I have had the opportunity to ask questions and have had them answered to my satisfaction. I voluntarily agree to participate in this study.

I am not giving up any legal rights by signing this form. I will be given a copy of this form.

<table>
<thead>
<tr>
<th>Printed name of subject</th>
<th>Signature of subject</th>
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<td>AM/PM</td>
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**Investigator/Research Staff**

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<td>Date and time</td>
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APPENDIX D

CHILD SOLICITATION LETTER
Today we are asking you to participate in a study to try to better understand how to improve your behavior in the classroom. Specifically, we want to know if creating stories about you showing appropriate behavior will improve your behavior.

We will ask you to take a short test and answer some questions, and then we will observe you in your classroom and talk to your teachers.

We will take pictures of you to make special books. You will read these books in your classroom each day and answer a few questions.

Your behavior will be videotaped for 20 minutes each day in class so we can see if the stories are helping your behavior. After we observe your videotapes, they will be thrown away so nobody can view them again.

No one but a few researchers from Ohio State who are involved in this project will know about your behavior. Those researchers have been especially trained to not talk to other people about your behavior.

You do not have to participate in this study if you or your parents do not want you to. Also you may quit the study at any time and you will not get in trouble with your teachers or school.

Do you have any questions? (Answer questions.) Your mom and/or dad has given permission for you to participate in this study, but we need to make sure that you are willing to participate in the study as well. Is it OK with you if we make some stories about you in your classroom and have you read them? (Obtain verbal assent.)
APPENDIX E

SAMPLE SOCIAL STORY
Sample Social Story to use for reading comprehension assessment (inclusion criteria)

Listening to Stories

Sometimes people listen to stories.

Stories can be about things that really happened or they can be make-believe.

Some stories are long. Others are short and take only a few minutes to read.

Some stories have pictures and others just have words.

Sometimes I can learn new things from stories.

When I listen to stories at school I sit quietly and pay attention to my teacher.

The other children in my class listen to the stories, too. That is why I have to be quiet, so everyone can listen.

Comprehension Questions:

Who listens to the stories the teacher reads?  Correct answer = me AND classmates

How do I sit when the teacher reads? Correct answer = quietly

Why do I need to be quiet when the teacher reads? Correct answer = so I can listen and other children can listen/hear, too

5 total points. 4 or more = meeting inclusion criteria of 80% or greater comprehension.
APPENDIX F

TABLE
<table>
<thead>
<tr>
<th>Subject</th>
<th>Age</th>
<th>Gender</th>
<th>PPVT score</th>
<th>Most frequently occurring disruptive behaviors</th>
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<tbody>
<tr>
<td>1</td>
<td>9</td>
<td>Female</td>
<td>60</td>
<td>Making vocal self-stimulatory noises, talking to herself</td>
</tr>
<tr>
<td>2</td>
<td>7</td>
<td>Male</td>
<td>103</td>
<td>Making vocal self-stimulatory noises, getting out of seat</td>
</tr>
<tr>
<td>3</td>
<td>9</td>
<td>Female</td>
<td>107</td>
<td>Talking at inappropriate times</td>
</tr>
<tr>
<td>4</td>
<td>6</td>
<td>Male</td>
<td>94</td>
<td>Making vocal self-stimulatory noises, talking at inappropriate times, kicking the desk with feet</td>
</tr>
<tr>
<td>5</td>
<td>7</td>
<td>Male</td>
<td>69</td>
<td>Making self-stimulatory noises with objects, talking at inappropriate times</td>
</tr>
<tr>
<td>6</td>
<td>7</td>
<td>Male</td>
<td>79</td>
<td>Making self-stimulatory noises with objects, making vocal self-stimulatory noises</td>
</tr>
</tbody>
</table>

Table 1: Description of subjects
APPENDIX G

FIGURES
Note: Scales on Y-axis are calibrated differently due to different levels of disruptive behaviors.

Figure 1: Frequency of Disruptive Behaviors during baseline and treatment during 15-min. sessions.
Note: Scales on Y-axis are calibrated differently due to different durations of disruptive behavior.

Figure 2: Duration of Disruptive Behaviors in minutes during baseline and treatment during 15-min. sessions.
Note: Scales on Y-axis are calibrated differently due to different frequencies of teacher directives

Figure 3: Frequency of teacher directives during baseline and treatment during 15-min. sessions.
Note: Scales on Y-axis are calibrated differently due to different frequencies of positive teacher comments.

Figure 4: Frequency of positive teacher comments during baseline and treatment during 15-min. sessions.