

Social Stories™ for Children with Autism: A Review of the Literature  
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**Abstract**

Social Stories™ were developed as an intervention to help individuals with autism better handle unfamiliar, stressful, or difficult situations. The popularity of this intervention has grown although there is still a relatively limited amount of research to support the effectiveness of this type of intervention. For this article, research published between 1993 and May 2011 was examined to determine the strengths and weaknesses of the current research that explores the use of social stories™ as the only intervention rather than as part of a treatment package.

## Introduction

Children diagnosed with autism spectrum disorders (ASD) display unique characteristics that distinguish them from their peers with other types of challenges. Characteristics of persons with ASD include difficulty relating to other individuals and situations, delayed communication skills, and displays of repetitive or self-stimulatory behaviors (Simpson & Myles, 1998).

Children with ASD may engage in repetitive behaviors, exhibit hyperactivity or inattention, have difficulty with social situations, dislike changes in their environment, have issues with communication and language, experience difficulty generalizing learned skills to new situations, and they may display aggressive or disruptive behaviors (Simpson & Myles, 1998). In recent years there has been an increase in the number of children diagnosed with ASD. In 2006 the average total prevalence of children with ASD was one in 110 children (Center for Disease Control and Prevention, 2010). Over 220,000 children and students, ages 3-21, diagnosed with ASD nationwide are receiving special education services (U.S. Department of Education, 2006). The increasing numbers of students being diagnosed with ASD has increased the necessity of school districts to provide interventions to help these students make academic and social gains. There are a number of interventions available that promote learning and address the needs of

students with ASD however there is no one intervention or method that is effective for all individuals with ASD. In the literature, some of these interventions include visual or picture schedules (Bryan & Gast, 2000), video modeling (Banda, Matuszny, & Turkan, 2007; Nikopoulos & Keenan, 2007), and self-monitoring (Ganz & Sigafoos, 2005). Simpson (2005) identified a number of evidence-based interventions for individuals with autism spectrum disorders including applied behavior analysis, discrete trial teaching, and pivotal response training.

A social story™ is another intervention that has been used with individuals with ASD. Social stories™ (Gray & Garand, 1993) were created to provide individuals with ASD the information they may need to learn new information or to understand and function appropriately in different social situations. Gray (1995) described four basic types of sentences to be used in the creation of a social story™: descriptive, perspective, affirmative, and directive. Descriptive sentences are opinion-free statements of fact. According to Gray this is the only required sentence in a social story™. Perspective sentences attempt to describe a person's feelings, beliefs, or thoughts. Affirmative sentences stress an important point or refer to a rule or law. Finally, directive sentences provide suggestions for how to handle a specific situation. Gray proposed that a directive sentence is not necessary in all social stories™. Gray additionally suggested that each type of sentence should be used in a story based upon a specific ratio; specifically a basic social story™ should have a ratio of two to five descriptive, perspective, and/or affirmative sentences for every zero to one directive sentence.

There are some reviews of the literature on social stories™ for students with ASD. Reynhout and Carter (2006) and Sansosti, Powell-Smith, and Kincaid (2004) found that the effects of social stories™ are highly variable, have limited experimental control, and are

frequently confounded by concurrent use of other interventions. Ali and Frederickson (2006) discuss how the popularity of social stories continues to grow despite the limited research base. Their review focused on case study and single subject designs that had positive effects from a practitioner standpoint. Test, Richter, Knight, and Spooner (2011) indicated that there was a need for additional research that examines the impact of social stories™ only. Their review of the research included a number of articles that used social stories™ as a part of a treatment package. In order to better isolate the effects of social stories™ on the targeted skill sets, this review focused on studies in which the independent variable was a social story™ alone and not part of a treatment package. The purpose of this review was to summarize empirical studies published in the past 18 years that evaluated the use of social story™ interventions with children with autism spectrum disorders. The following research questions were addressed:

1. What are the characteristics of the students for whom social stories™ were being written and what settings were described in the studies?
2. Were the social stories™ used in the research written to follow the protocol developed by Gray (2000)?
3. What types of dependent variables were used?
4. What types of single subject research designs were employed? Were data collected on maintenance and/or generalization?
5. How effective were the social story™ interventions in changing the skills and/or behaviors of the individuals with autism?

## **Method**

### **Search Procedures**

An electronic search of the Educational Resources Information Center (ERIC), Psychology and Behavioral Sciences Collection of EBSCO Host, and ProQuest Education Journals databases was conducted for the years 1993 – May 2011. Keywords used in the search were social stories™, story interventions, and social skills interventions. Relevant studies cited in each article were read to locate additional articles.

### **Selection Criteria**

Articles selected for this review had to meet several criteria. First, articles were published in a peer-reviewed journal between 1993 and May 2011. Second, articles described an experimental investigation in which an investigator manipulated and controlled one or more independent variables to determine the effects on the dependent variable. Case studies, studies without quantitative data and pre-experimental studies (e.g., AB single subject designs) were excluded. Third, the participants in the study were identified as having autism spectrum disorders (e.g. autism, Asperger syndrome, Pervasive Developmental Disorder-Not Otherwise Specified). Fourth, the independent variable was a social story™. Research studies that included social stories™ as part of a treatment package (e.g., social story™ and video models) were excluded in order to examine the effects of only the social story as the independent variable. Research studies that compared the effectiveness of the social story™ intervention alone to a social story™ as part of package were included (e.g., a social story™ alone compared to a social story™ combined with verbal prompts).

### **Results**

An initial pool of 55 possible articles was located through the search. Application of the inclusion criteria identified 24 studies that used a single-subject research design for inclusion in this review.

## **Participant Characteristics and Setting Descriptions**

Five females and 51 males (N=56) with an autism spectrum disorder participated in the 24 studies reviewed. Eleven of these 24 studies involved three participants and eight of the investigations involved only one participant. Twenty-two of the 24 investigations involved fewer than four participants. Participants in all 24 studies ranged in age from 3 years 9 months to 15 years of age. Forty-four of the participants were considered to be of elementary school age (i.e., between the ages of 5 and 10). Eight of the participants were between the ages of 11 and 13 or considered to be of middle school age. Only one participant was considered to be of high school age (age 15). Some researchers (Bledsoe, Myles, & Simpson, 2003; Dodd, Hupp, Jewell, & Krohn, 2008; Ozdemir, 2008; Scattone, Tingstrom, & Wilczynski, 2006; Scattone, Wilczynski, Edwards, & Rabian, 2002) included IQ scores for the participants. Scores ranged from 107 (Dodd et al., 2008) to a score of 40 (Scattone et al., 2002). Some researchers gave no information on the IQ scores for their participants (Brownell, 2002; Crozier & Tincani, 2005). Hagiwara and Myles (1999) included the developmental ages of their participants which ranged from 26 months to 40 months. Mancil, Haydon, and Whitby (2009) provided the mental age for their participants. The mental age for all three of their participants was approximately 2 years below their chronological age. Other researchers gave a general description of the participants' cognitive abilities, for example Lorimer, Simpson, Myles, and Ganz (2002) indicated that their participant had above average cognitive ability. Hanley-Hochdorder, Bray, Kehle, & Elinoff (2010) provided a general description of the participants' cognitive functioning. The cognitive functioning level of their participants ranged from low average to high average. Agosta, Graetz, Mastropieri, and Scruggs (2004) indicated that the participants in their study were developmentally delayed in all areas and had limited communication skills. Where discussed, all

researchers indicated that the participants were capable of at least limited verbal communication, however for some participants' verbal communication was limited to repeating one-word utterances (Agosta et al., 2004) and echolalia (Barry & Burlew, 2004).

For 11 of the participants, data were taken while the students were in a self-contained classroom for students with disabilities. For 23 of the participants in the studies reviewed data were collected in an inclusive setting (e.g., inclusive lunchroom, general education classroom, recess). In one study researchers collected data on three children in a hospital setting at the speech clinic and in another study the researchers took data on one student in a residential special education facility. For one participant the research was conducted at his separate public alternative school in a classroom for children with emotional disabilities. The social story™ intervention was implemented with seven students in a home setting.

### **Gray's Social Story™ Protocol**

The majority (83%) of the studies reviewed evaluated the effectiveness of a social story™ written following the sentence types and ratio suggested by Gray (2000). Two studies (Barry & Burlew, 2004; Sansosti & Powell-Smith, 2006) did not indicate whether or not the stories that were written followed Gray's suggestions for sentence type or ratio. Sansosti and Powell-Smith (2006) did state that they used a journal to assess whether the social story™ implementation followed the guidelines provided by Gray and Garand (1993). Crozier and Tincani (2005) specifically stated that they altered the sentence ratio that had been suggested by Gray and included sentences that were more directive although they used her sentence types. Adams (2004) followed Gray's sentence types and ratio but targeted four behaviors with one story which deviates from Gray's recommendation of addressing only one behavior per story. Researchers in one of the studies reviewed followed Gray's guidelines, but wrote a multimedia

story which is a story presented in a computer-based format, (Hagiwara & Myles, 1999) a presentation format that varied from that suggested by Gray. Mancil, Haydon, and Whitby (2009) followed Gray's sentence types and ratios but only one story was written for all three participants so the story was not an individualized story. Mancil and colleagues used a paper story and a story created on a PowerPoint. Like Hagiwara and Myles they were examining the usefulness of a technology based story. Hagiwara and Myles (1999), Quilty (2007), and Scattone (2006) examined the validity of the stories that were written in their research studies by having at least one person with experience in creating social stories™ ensure they were written to contain specific components and were within each participants' functioning level.

### **Types of Dependent Measures**

Six of the studies reviewed compared the effectiveness of a social story™ alone to either a social story™ variation (e.g., musically presented story, computer assisted) or a social story™ combined with an additional intervention (e.g., reinforcement system). Brownell (2002) compared the use of a traditional social story™ with a musically presented story for 4 males who ranged in age from 6 to 9. Target behaviors included echolalia of television shows and movies, difficulty following directions, and use of a loud voice. For all four participants, introduction of either form of the social story™ was successful in reducing the target behavior. Mancil and colleagues (2009) compared the effectiveness of social stories™ presented in two different formats. The target behavior for the three participants was pushing during the transition to lunch and the transition to recess. The researchers used an ABABCBC multicomponent reversal design to compare the PowerPoint social story™ to the paper format social story™. The rate of pushing decreased for each participant although the results were slightly better for the story presented using PowerPoint. Kuoch and Mirenda (2003) used an ABA design for two of the participants in

their study. However, for the third participant they used an ACABA design with the C phase serving as a book plus reminder condition and the B phase consisting of the social story™ alone. The book plus reminder condition consisted of the student being read a book unrelated to the target behavior. The goal was to compare the impact of adult attention (C phase) with the actual effectiveness of the social story (B phase). Results of this study indicated that the book plus reminder had no effect on the target behavior while the social story™ alone did in fact decrease the third participant's negative behaviors. Agosta and colleagues (2004) used an ABCA design to compare the use of a social story with a reinforcement system with the use of a social story alone to decrease the disruptive behavior of a young boy with autism. The authors indicated that the change in behavior was not solely dependent upon the reinforcement system as the decrease in behavior was continued when the reinforcement was removed as part of the intervention in the C phase. Crozier and Tincani (2005) compared the effectiveness of a social story™ alone and a social story™ paired with a verbal prompt. In this study they used a modified social story™ to decrease the disruptive behavior of an 8-year-old boy with autism. The results indicated that the introduction of the social story™ alone decreased his disruptive behavior. After a return to baseline, a greater reduction in behavior was seen when the social story™ was combined with verbal prompts. These researchers conducted a second study (2007), which compared the use of a social story™ alone to a social story™ that was paired with verbal prompts when the initial intervention (e.g., social story™ alone) proved to be ineffective for the third participant in their study. For this participant social stories™ alone were not sufficient to change the target behavior. Teacher prompts were needed in combination with the social story™ to see the desired change in behavior for this participant. The researchers hypothesized two possible explanations for the lack of success with the social story™ intervention alone. This participant had poor communication

and social skills and little motivation to interact with his peers. However, this participant was very motivated to please adults which could account for the increase in talking to peers with the addition of an adult prompt to the social story™ intervention.

### **Methodological Components**

**Research Designs.** The 24 studies reviewed used a single-subject research design. Thirteen of the investigations used a reversal design, ten used a multiple baseline design, and one study used a multiple probe across participants design (Delano & Snell, 2006).

**Interobserver Agreement.** Twenty-three of the 24 studies included in this review reported data on interobserver agreement. Fifteen of the studies reported mean levels of interobserver agreement of 90% or higher. Seven of the other studies reported interobserver agreement at mean levels of 80% or higher. One study (Dodd, 2008) reported interobserver agreement for the behavior of giving directions to be at a mean of 65.1%. Interobserver agreement for the second behavior of giving compliments was reported to be at 100%. Interobserver agreement data for all 24 studies were taken on average of a low of 20% to a high of 73% of the data collection sessions.

**Treatment Integrity.** Twelve of the studies provided a measure of treatment integrity for the implementation of the social story™. In 11 of these studies the researchers used a checklist to indicate whether the participant read or was read the social story™. Treatment integrity ranged from 91% to 100% in these 11 studies. In one study (Sansosti & Powell-Smith, 2006), a journal was kept by the participants' care givers indicating that the story was read at home each day at the specified time. Treatment integrity for two of the participants was 88% and 92%. The third participant's family failed to complete the journal so integrity could not be calculated.

**Social Validity.** Nine of the studies provided some measure of social validity for the social story™ intervention. Crozier and Tincani (2005) interviewed their participants' teachers about what they thought of the modified social stories™. All the teachers reported favorable impressions about the modified social stories. Crozier and Tincani (2007) used a questionnaire and interviewed the teachers about their impressions of social stories™. The feedback on the intervention was positive. The participant's parents and teacher were asked to complete a survey regarding the social story™ intervention in the study completed by Adams, Gouvousis, VanLue, and Waldron (2004). Mancil and colleagues (2009) determined teachers' opinions of the intervention by using a social validity scale. Additionally, the teachers were asked which form of the story, paper or Power Point, they liked the best. All teachers reported that the stories were not time consuming to use but that they liked the story created with PowerPoint better than the paper format. Dodd and colleagues (2008) interviewed both the participants and their mothers as to their reactions to the social story™ intervention. The participants indicated that they "somewhat liked" the social story™. Both mothers reported favorable impressions of the intervention. Researchers in four studies (Hanley-Hochdorfer et al., 2010; Ozdemir, 2008; Scattone et al., 2006; Scattone et al., 2002) indicated that they used the Intervention Rating Profile (IRP-15) to evaluate intervention acceptability. Results for these investigations returned scores within the acceptable range which signifies that the intervention was seen as socially valid.

**Story implementation.** In 12 of the studies the researchers specifically stated that the story was read to the participant just prior to the data collection period. Hanley-Hochdorfer and colleagues (2010) indicated that the participants in their study were read the story no more than 15-minutes before the data collection period. Agosta and colleagues (2004) stated that their participant was shown the story just prior to and during the data collection period. The

researchers in one study (Scattone et al., 2005) indicated that the participants had access to the stories throughout the day in addition to reading the story just prior to the data collection period. In two of the studies (Barry & Burlew, 2004; Bledsoe et al., 2003) the participants were instructed by the teacher to look at the story at other times other than just prior to data collection. Two of the participants in the Ozdemir (2008) study were shown the story twice a day while the third participant only saw his story one time per day prior to the data collection period. Sansosti and Powell-Smith (2006) stated that the participants in their study were shown their story twice a day, once prior to leaving for school in the morning and once upon returning home after school at the end of the day. Mancil and colleagues (2009) reported that their participants were shown either format of the story as the same time each day in the participants' classrooms. Three of the studies reviewed did not indicate when or how often the social story™ intervention was read to or by the participants (Adams et al., 2004; Delano & Snell, 2006; Quilty, 2007).

In 16 of the research studies the intervention was read or sung to the participants by an adult (e.g., parent, teacher, paraprofessional, researcher). In the study by Hagiwara and Myles (1999) the story was read through a computer program. In the study by Ozdemir (2008) the story was read to two of the participants while the third participant read the story aloud with the teacher's help. In four of the research studies (Dodd et al., 2008; Mancil et al., 2009; Reichow & Sabornie, 2009; Sansosti & Powell-Smith, 2006) the participant was responsible for reading the story. In two of the studies the authors do not indicate who was responsible for reading the story interventions (Adams et al., 2004; Quilty, 2007).

### **Types of Dependent Measures**

Three general areas were selected for intervention in the studies that were selected. These areas include prosocial behaviors, functional skills (e.g., hand washing, following directions), and disruptive behaviors (e.g., tantrums, crying, making disruptive noises).

Prosocial behaviors were targeted in nine investigations. Specifically, these behaviors included how to make activity choices, play appropriately with materials, and play appropriately with peers (Barry & Burlew, 2004; Crozier & Tincani, 2007; Dodd, Hupp, Jewell, & Krohn, 2008; Sansosti & Powell-Smith, 2006; Scattone, Tingstrom, & Wilczynski, 2006), sit appropriately during circle (Crozier & Tincani, 2007), talk appropriately to peers (Crozier & Tincani, 2007; Delano & Snell, 2006; Reichow & Sabornie, 2009; Sansosti & Powell-Smith, 2006), seek attention, initiating responses, and making contingent responses (Delano & Snell, 2006; Dodd et al., 2008; Hanley-Hochdorfer et al., 2010; Soenksen & Alper, 2006). Four of the investigations attempted to examine the participants' social interactions with peers with and without disabilities (Crozier & Tincani, 2007; Delano & Snell, 2006; Reichow & Sabornie, 2009; Sansosti & Powell-Smith, 2006; Scattone, Tingstrom, & Wilczynski, 2006). Barry and Burlew used the social story™ intervention to teach two children with autism to make activity choices and play appropriately with peers in a special education classroom.

Five investigations examined the use of social stories™ to address functional skills. Hagiwara and Myles (1999) used a multimedia story to teach hand washing and on task behavior to students with autism. Another study, (Bledsoe, Myles, & Simpson, 2003) targeted eating skills (e.g., using a napkin, not spilling food or drink). Brownell (2002) compared the use of a traditional story to a musically adapted story to teach one of his four study participants how to follow directions. Pasioli (2004) used therapeutic songs or social stories™ that were song to teach one of their participants to properly use a VCR to watch a video tape. Finally, Ivey, Heflin,

and Alberto (2004) used social stories™ to prepare children with PDD-NOS for novel events that required functional skills such as being on task, appropriately using the necessary materials, and following directions or the rules of the game.

The majority of the studies (N=12) used social stories™ to reduce disruptive behaviors in children with autism spectrum disorders. Behaviors included inappropriate vocalizations such as shouting or echolalia of violent or aggressive words and phrases from TV and movies (Adams et al., 2004; Agosta et al., 2004; Brownell, 2002; Kuoch & Mirenda, 2003; Kuttler et al., 1998; Lorimer et al., 2002; Pasiali, 2004; Scattone et al., 2002), dropping to the floor (Adams et al., 2004; Kuttler et al., 1998; Quilty, 2007), staring inappropriately at females (Scattone et al., 2002), tipping a chair (Ozdemir, 2008; Scattone et al., 2002), aggression towards others (Adams et al., 2004; Kuoch & Mirenda, 2003; Ozdemir, 2008; Quilty, 2007; Mancil et al., 2009) throwing up while eating (Kuoch & Mirenda, 2003), crying (Adams et al., 2004; Agosta et al., 2004; Kuoch & Mirenda, 2003), and talking out during class (Crozier & Tincani, 2005; Quilty, 2007).

### **Effectiveness of Social Story Interventions**

Overall, the data in the 24 studies reviewed suggest that social story™ interventions resulted in positive changes in prosocial skills, functional skills, and disruptive behaviors. However, five of the research teams (Crozier & Tincani, 2007; Dodd et al., 2008; Hanley-Hochdorfer et al., 2010; Sansosti & Powell-Smith, 2006; Scattone et al., 2006) reported mixed results. Crozier and Tincani (2007) found positive changes in behavior for two of their three participants with the social story™ alone. The third participant's behavior did not change until the introduction of adult prompting in combination with the social story™ intervention. Sansosti and Powell-Smith (2006) also reported positive changes in behavior as a result of the social

story™ intervention for two of their three participants. A marked change in behavior was not seen for their third participant. One participant showed a marked positive change, one participant demonstrated a modest positive change, and one participant demonstrated no change in appropriate social interactions in the study conducted by Scattone and colleagues (2006). The first participant in the study conducted by Dodd and her colleagues showed a positive change in behavior with the introduction of the social story™. The second participant in this study demonstrated a dramatic positive change in behavior the first day the social story™ was read. However, this trend declined to baseline rates with the continued use of the social story™ for the next 3 days of the study.

There are several explanations as to the lack of effectiveness seen in these investigations. First, social stories™ alone may not always provide enough instruction or motivation to change the target behaviors. Social stories™ may need to be combined with another intervention to positively change behavior. This was demonstrated by Crozier and Tincani (2007) when they included a prompt by an adult to the social story™ intervention for the one student for whom the social story™ alone was ineffective. This explanation is further supported by the first study done by Crozier and Tincani (2005) when they compared the impact of a social story™ alone to a social story™ combined with verbal prompts on the disruptive behavior of a boy with autism. While the social story™ alone decreased the disruptive behaviors the behavior was decreased to a greater degree when the social story™ was paired with the verbal prompting. Second, the ineffectiveness may be due to a lack of treatment integrity. For example, Sansosti and Powell-Smith (2006) indicated that the parents of the third participant, whose behavior did not change with the use of the social story™ intervention, did not use the treatment journal for making sure the participant was read his social story™. Third, researchers who reported mixed results

indicated that personality traits (e.g., lack of motivation, poor communication skills, wide range of intellectual abilities) of the individual participants could be related to the variability in effectiveness. Hanley-Hochdorfer and colleagues (2010) indicated that limited increase in social engagement as a result of the social story™ intervention could be due to the fact the intervention was used in a “natural school setting” rather than in a controlled setting. Finally, another possible explanation for the variability in results seen by these researchers could be related to what extent researchers followed Gray’s suggested protocol. Specifically, the possibility of a story not being written to adequately address the target behavior or not being written to the cognitive level of the student could impact the effectiveness of the social story™ intervention.

A further analysis of the articles revealed that four of the seven studies that examined the use of social stories™ to target prosocial behaviors showed positive results (Barry & Burlew, 2004; Crozier & Tincani, 2007; Delano & Snell, 2006; Reichow & Sabornie, 2009). Three of the four studies that targeted functional skills reported positive changes in behavior as a result of the social story™ intervention (Bledsoe et al., 2003; Brownell, 2002; Ivey et al., 2004). Finally, only one of the 11 studies that examined the use of social stories™ to address disruptive behaviors reported a lack of change in behavior for three of the four behaviors targeted with the social story intervention (Adams et al., 2004).

**Generalization and Maintenance.** Eleven of the studies reported data on just while both generalization and maintenance were assessed in two studies. Positive yet variable results were reported in one study by Delano and Snell (2006). Mancil et al. (2009) collected data on both generalization and maintenance but results were mixed with respect to maintenance and the behaviors for all three participants did not generalize to recess. In the 11 studies where maintenance probes alone were conducted the data do not indicate clear long-term success.

Positive maintenance results were found in the two studies conducted by Crozier and Tincani (2005, 2007), in the study by Reichow and Sabornie (2009), and in the study by Dodd and colleagues (2008). Participants in the study by Ozdemir (2008) maintained levels of the disruptive behavior that were lower than during baseline after the social story intervention had been withdrawn. Quilty (2007) demonstrated positive initial maintenance results but for two of the study participants the levels in which the negative behaviors were being displayed were increasing during the additional maintenance probes. The initial maintenance probe in the study by Sansosti and Powell-Smith (2006) demonstrated positive results, however, the next probes revealed a decrease in the desired behaviors for all three participants. Generalization was studied by Hagiwara and Myles (1999), but only one participant in the study demonstrated generalization of skills to other settings.

### **Discussion**

This review examined the research studies that used social stories™ as an intervention for children with autism spectrum disorders. Specifically, the review of the literature included the following findings:

1. Fifty-one of the 56 total participants were males. Twenty-two of the studies included fewer than four participants. The majority of the participants were of elementary school age (5-10 years of age).
2. Eighty-four percent of the articles included in this review specified that they used the sentence types and ratios suggested by Gray (2000). Crozier and Tincani (2005) specifically stated that they altered the sentence ratio that had been suggested by Gray and included sentences that did not use words such as usually or sometimes. Two studies (Barry & Burlew, 2004; Sansosti & Powell-Smith,

2006) did not indicate whether the stories that were written followed Gray's suggestions for sentence type or ratio.

3. Prosocial behaviors were the focus of nine of the research studies. Five of the reviewed studies used social stories™ to teach functional skills to students with autism spectrum disorders. The majority of the research studies (N=12) reviewed for this paper examined the use of social stories™ to decrease disruptive behaviors.
4. Single subject research designs were used in all of the studies in this review. All but one (Agosta et al., 2004) of the studies collected data on interobserver agreement. Treatment integrity for the implementation of the social story™ intervention was measured in 12 of the studies. Only nine of the 24 studies measured the social validity of the intervention.
5. The data in the 24 studies reviewed suggest that social story™ interventions resulted in mostly positive short-term changes in prosocial skills, functional skills, and disruptive behaviors. Due to the minimal amount of maintenance data there is little evidence to support the long-term success of these interventions. Forty-six of the 56 participants experienced positive changes in one or more of the targeted behaviors. Six research teams reported positive results for some but not all of the participants in their studies (Crozier & Tincani, 2007; Dodd et al., 2008; Hagiwara & Myles, 1999; Ivey et al., 2004; Sansosti & Powell-Smith, 2006; Scattone et al., 2006). Only 11 studies examined maintenance of the behaviors and eight of those researchers reported that behaviors were maintained after the removal of the intervention for at least one of their participants or in at least one

setting. For example, Mancil and colleagues (2009) reported that the frequency during the maintenance phase increased while all three participants were at recess but remained low while in the classroom. It is not clear whether social stories™ change behavior successfully for the long-term.

### **Recommendations for Future Research**

While the results of the 24 studies reviewed are promising, there is a need for additional research to further evaluate the use of social story™ interventions for children with autism spectrum disorders. First, future researchers should consider the type of research design used to evaluate the effectiveness of the social story™ intervention. Approximately half of the studies in this investigation employed a single subject reversal design. However, the purpose of a social story™ is to teach new behaviors or skills (Gray, 2000), which should make a reversal to baseline levels of behavior after the withdrawal of the intervention difficult. If social stories™ do in fact teach new behaviors, then alternate research designs (e.g., multiple baseline single subject design) may be more appropriate to examine their effectiveness. For example, Adams, Gouvousis, VanLue, and Waldron (2004) used a reversal design to decrease the disruptive behavior; falling, hitting, crying, and screaming, of a boy with Asperger syndrome. In this study, the participant's rate of behavior initially increased with the introduction of the social story™ for three of the four target behaviors. When the social story™ was removed the rate of his behavior decreased for two of the target behaviors, increased for one of the target behaviors, and stayed the same for the final target behavior. Only when the social story™ intervention was again introduced was a reduction seen in all four target behaviors. Cooper, Heron, and Heward (1987) noted, "When an investigator can and does reliably turn the target behavior on and off by presenting and withdrawing a specified variable, a clear and convincing demonstration of the

experimental control is made” (p. 177). Adams and colleagues were not successful at turning on and off the target behavior making the choice of an ABAB design questionable. Furthermore, it leads to the need for future research to focus on determining how many sessions are required for the participant to achieve mastery of the target behavior. In this study, a decrease in rate of behavior was seen only from the first baseline phase to the second intervention phase.

Second, researchers should explore both the maintenance and generalization of newly acquired skills. Individuals with autism typically have difficulty with maintaining new skills and then generalizing those skills to new situations. Lifelong social difficulties also are characteristic of individuals with autism. Researchers need to examine the impact the social story™ intervention has to continue to affect a change in behavior over an extended period of time. Of the 24 studies reviewed only two (Delano & Snell, 2006; Mancil et al., 2009) examined both maintenance and generalization of the identified target behaviors for the study participants with mixed results in the study by Delano and Snell.

Third, future studies should examine the population used to determine the effectiveness of the social story™ intervention. Investigations with a greater number of participants will add weight to the research base supporting the use of these interventions. Ninety-two percent of the investigations reviewed included fewer than four participants and eight included only one participant. Research involving female participants is also needed. Only five of the 56 participants were females. While this investigation reviewed only those studies which examined the effectiveness of a social story™ intervention for individuals with autism spectrum disorder, additional research is needed to explore the usefulness of this intervention for individuals with other types of disabling conditions and for children who are typically developing. Additionally,

given the wide range within the autism spectrum, future studies should attempt to better delineate the characteristics of the subjects.

Fourth, while half of the studies reviewed provided a measure of treatment integrity, future researchers should also include this measure in their investigations. This measure can help to determine how often the social story™ intervention needs to be implemented (e.g., once a day, just before the observation period, every hour) in order to effectively change behavior.

Evaluating the integrity of the social story™ would ensure that the intervention is developed and implemented as planned for all study participants.

Fifth, only three of the studies (Hagiwara & Myles, 1999; Quilty, 2007; Scattone et al., 2006) included an examination of the use of Gray's protocol, specifically taking steps to ensure that the intervention was created to follow the sentence ratio and types suggested by Gray while also being written to the cognitive level of the participant. To date there are no research studies published which validate the social story™ sentence types and ratios suggested by Gray (2000). This suggests the need for future research to examine the effectiveness and necessity of the sentence types and ratio guidelines. While only one study (Crozier & Tincani, 2005) examined the effectiveness of a story not written to the sentence ratio guidelines specified by Gray, their results were positive. Such research will help to ensure that the specific components used to create each story are the most effective.

Finally, according to Gray (2000) social stories™ can be used for a large number of topics from how to handle a distressing situation to learning a new skill. However, much of the research on social stories™ has used the intervention for decreasing disruptive behaviors rather than in teaching replacement behaviors or new skills. This investigation identified only five studies that used the intervention to effectively teach functional skills (Bledsoe et al., 2003;

Brownell, 2002; Hagiwara & Myles, 1999; Ivey et al., 2004). Social stories™ were created with an instructional focus, to describe a situation or activity and the behaviors associated with that situation or activity. Future research should examine the benefit of this type of intervention as in instructional tool and not just as a tool to decrease aggressive or disruptive behaviors.

## **Conclusion**

Researchers have used social story™ interventions with children with ASD to improve social skills, change disruptive behaviors, and teach functional skills. While most researchers have used social stories™ to decrease disruptive behaviors, researchers are beginning to examine the use of this type of intervention as a positive behavior support strategy in which acceptable behaviors are taught to and practiced by children with ASD. This review of the research indicates that social stories™ are one method for instructing students with ASD. Social stories™ may be an effective intervention for children with autism because it allows information to be described explicitly while providing a visual representation (e.g., photographs, line drawings) of the skills being addressed in the story. Social stories™ have potential to be successful interventions when practitioners consider the cognitive level, age, and language ability of the student for whom the story is being written.

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