ORIGINAL PAPER

The Effectiveness of Social Stories on Decreasing Disruptive Behaviors of Children with Autism: Three Case Studies

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Abstract The purpose of this study was to determine the effectiveness of social stories on decreasing the disruptive behaviors of children with autism. Social stories were created for three participants, ages 7 and 9, to decrease three target disruptive behaviors, using a loud voice in class, chair tipping, and cutting in lunch line. Using a multiple-baseline across participants design, social stories were implemented, and direct observations of participants' target behaviors were conducted three times per week. The present study findings suggest that the use of properly constructed social stories without additional behavioral management interventions may be effective in decreasing the disruptive behaviors of children with autism.

Keywords Autism · Social stories · Disruptive behaviors · Intervention

Introduction

Social Stories are short stories intended for children with autism to understand social situations. These short, individualized stories provide support in new and sometimes confusing social experiences (Gray 1993a). While typically developing children may intuitively recognize what is appropriate behavior in different social situations, children with autism often find social situations confusing and appear isolated and oblivious to the outside world (Lord and Magill-Evans 1995; Sigmon and Ruskin 1999; Kuoch and Mirenda 2003; Reynhout and Carter 2006). Carol Gray, a special education teacher, developed social stories

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in order to enable individuals with autism the opportunity to "read, interpret, and respond effectively to their social world" (Gray 1994, p. 5). Social Stories attempt to help ensure a child's accurate understanding of social information for a given setting (Gray 1998) and gives instruction regarding the who, what, when, where, and why of a social situation (Atwoord 1998; Lorimer et al. 2002).

Social stories can be used for a variety of purposes. Gray recognized numerous uses for social stories including: (a) explaining routines or changes in routines, (b) describing social situations in a way that is non-intimidating, (c) teaching academic skills, (d) teaching social skills (Gray 1993b), (e) training adaptive skills, and (f) dealing with difficult behaviors, including emotional expression, aggression, or obsessive behavior (Gray 2000).

Gray identified four types of sentences that can be used to write social stories—descriptive, directive, perspective, and control—to explain abstract situations, often through the use of analogies (Gray, 1997). Descriptive sentences define who is involved, where the situation takes place, what is happening, what is expected, and why. Directive sentences explain to the child what is expected of and how to respond to the situation, by using "I will try…" statements. Perspective sentences describe what others may be feeling or thinking. Finally, control sentences are used to help the child define or remember the story better. These four basic sentence types and a ratio that defines their frequency are the most important components of the Social Story. Gray (2003) suggests that a Social Story should have a ratio of 2–5 descriptive, perspective, and/or control sentences for every 0–1 directive sentence. This means that for every directive sentence in the story there will be two to five other sentences in the story. This ratio should be maintained regardless of the length of a Social Story and applies to the story as a whole Sansosti et al. (2004).

There are several considerations that need to be taken into account when writing a Social Story (Gray 2000, 2003). One of the most important considerations is that the author must adopt and maintain the perspective of the child for whom the story is written. The story should be within the child's comprehension level and limited to the vocabulary and print size that are appropriate to the child's age and ability. Social Stories also use pictorial icons, consistent with literature suggesting that students with Autism Spectrum Disorders respond well to visual representations (MacDuff et al. 1993; Pierce and Schreibman 1994). The visual representations of social rules is thought to be less confusing than other forms of social skills teaching (e.g. social skills groups), where children may struggle with the high verbal demands (Smith 2001; Quill 1997). However, Gray (1998) cautions that the use of pictures should only be permitted where they do not distract the child and do not restrict his or her ability to generalize the principle beyond the depicted situation.

Prior research has investigated the effects of Social Story interventions on (a) improving positive social behaviors (Barry and Burley 2004; Norris and Dattilo 1999), (b) decreasing challenging behaviors (Adams et al. 2004; Brownell 2002; Kuoch and Mirenda 2003; Lorimer et al. 2002; Scattone et al. 2002), (c) increasing hand washing and on-task behavior (Hagiwara and Myles 1999), (d) greeting people appropriately and sharing toys (Swaggart et al. 1995), (e) increasing the frequency of social communication behaviors (Thiermann and Golstein 2001), and (d) increasing appropriate play (Barry and Burley 2004). In each of these studies, positive trends are provided for the effectiveness of the use of the Social Stories with children with autism or autism spectrum disorders. However, many of these studies have inherent limitations to the research design or unusual construction of the intervention such as using different Social Stories to target the same social situation. Such limitations may impede the direct interpretation of the results.

In a review study, Reynhout and Carter (2006) reviewed literature on Social Stories including a descriptive review and single-subject meta-analysis of appropriate studies. The data from this study showed that the effects of Social Stories are highly variable. The researchers' major criticisms were that adequate descriptions of participant's communicative and cognitive skills were not always provided and Social Stories were used in combination with other interventions. Criticism of previous research has been also offered by Kuoch and Mirenda (2003) in another review of research of 10 Social Story interventions. Kuoch and Mirenda noted several major limitations of this body of literature including non-conformity of many of the stories with recommended guidelines, flawed and weak research designs, and confounding effects as additional interventions were often used

with Social Stories. Overall, research suggests Social Stories may effectively help address the social/behavioral needs of individuals with autism; however, the specific effect of implementing the Social Story alone is unclear.

The purpose of the present study was to evaluate the effects of Social Stories constructed within the parameters of Gray's (1998) guidelines on reducing the disruptive behaviors of three children with autism. This study adds to the literature by evaluating the extent to which Social Stories effectively reduce disruptive behaviors of children with autism without the addition of planned behavior management systems.

Method

Participants

Three children with an existing diagnosis of autistic disorder were selected from an elementary school located in upstate New York participated in this study. The level of autistic behavior of all children was measured with the Childhood Autism Rating Scale (CARS: Schopler et al. 1988). The three participant children were all males between the ages of 7 and 9 years and attended either the first or second grade. For the inclusion in this study, participants (a) had a current diagnosis of autism; (b) possessed the ability to communicate orally with others; (c) demonstrated pre-reading or beginning reading skills; and (d) was given daily opportunities for interaction with same-age peers in inclusive general education.

Participant 1 was Pic, an African American boy, 9 years of age, whose target behavior was using a quiet voice in class. He received a diagnosis of autistic disorder at age 3 from an outside agency. Pic obtained standard score 62 on the Wechsler Intelligence Scale for Children (WISC-III) and a score of 34.5 on the CARS indicating mild autism. He participated in second grade classroom and received speech and language services during the course of the study. Pic was not able to read independently; therefore, a teacher's aide read the Social Story to him. Pic communicated with single words and short phrases and recognized some letters and approximately 1 dozen sight words.

Participant 2, Nathan was a Caucasian boy, 8 years of age, whose target behavior was tipping his chair backward or sideways, which sometimes resulted in his falling on the floor. This behavior often disrupted the activities of other students who were nearby and disrupted the teacher who attended to the behavior. Nathan was participated in second grade classroom and received speech and language services during the course of the study. Nathan received a diagnosis of autistic disorder at age 5 from an outside agency. He received standard score 86 on the Wechsler Intelligence

Scale for Children (WISC-III) and a score of 30.5 on the CARS indicating mild autism. He spoke fluently using long phrases. However, Nathan's academic performance was below grade-level expectations. A teacher's aide helped Nathan to read the Social Story by himself.

Participant 3, Aaron was a Caucasian boy, 7 years of age, whose target behavior was waiting in line to get his lunch in the cafeteria. Aaron was participated in first grade classroom and received speech and language services during the course of the study. Aaron received a diagnosis of autistic disorder at age 4 from an outside agency. He obtained standard score 74 on the Wechsler Intelligence Scale for Children (WISC-III) and a score of 32.5 on the CARS indicating mild autism. He identified letter names and sounds and recognized 3 dozen sight words. Aaron spoke in complete sentences. An assistant teacher read the Social Story to him.

Materials

Three Social Stories specifically developed for each child's disruptive behavior were used in this study. The Social Stories were constructed according to the guidelines proposed by Gray (1998). The stories were printed on a white paper with a 16 point font, mounted on black construction paper. There were seven to nine pages in each story that were laminated and fastened together so that the children could carry to and use in multiple settings. The participant children's own pictures depicting their problem behaviors were used in each page to capture the children's attention in the Social Stories. The last page of the each story contains two pictures with callouts. One picture with teacher had a callout that states, "Nice work, Pic!" and a callout by the photograph of the teacher's aide states, "Great job, Pic!" Following is a sample social story written for Pic:

> People talk quietly when they are in class. If I talk quietly inside, my friends and teachers can still hear me. If I yell inside I might scare my friends and teachers. I don't like to scare anyone. I will try to use a quite voice while I am in class. My teacher is proud of me when I use a quite voice in class. She says, "Nice job, Pic!" Ms. Brown also says, "Great job, Pic!

Design

A single-subject, multiple-baseline design across subjects (Cooper et al. 1987; Kazdin 1982; Tawney and Gast 1984) was utilized for this study. Multiple baseline designs display the effect of a treatment by showing that more than one baseline changes as a consequence of a treatment. By examining more than one baseline, effects of confounds

from other variables are reduced. Thus, a multiple baseline design introduces the treatment at a different time for each group of participants (Tawney and Gast 1984).

Procedure

During the baseline condition, observational data were recorded for each participant's targeted disruptive behaviors. No intervention occurred prior to or during this period. During the baseline and intervention phases, the teachers conducted the lesson, and interacted with the participant children in their usual manner. Gathering of baseline data began at the same time and was collected simultaneously across three participants. When the mean percentages of target behaviors across all participants were higher than 40%, the intervention was applied to Pic while Nathan remained in baseline. More specifically, the principal researcher continued to monitor the data and implemented the initiation of Social Story intervention with Nathan when increasing data trends were observed and maintained for at least three data points (1 week) in Pic's data. The same process was used for the implementation of the intervention for Aaron.

During the intervention phase, the teacher's aide read the story aloud to Pic once each morning before the class began and once after the recess. Nathan read the story aloud with the help of the teacher's once each morning before the class began and once after the recess. The time selected for Aaron reading his Social Story was 30 min before the recess as his target behavior occurred at lunch time. The teachers' aide read the story aloud to Aaron as Aaron was not capable of reading the story by himself.

Two maintenance probes were conducted after the final intervention session. In order to decide when the intervention would be faded, a criterion was established. According to this criterion, fading began after 27 intervention sessions and when the percentage of disruptive behaviors was at least 40 % lesser than baseline for four of the last six data points. When a participant met with this criterion, then rewritten story was read to participant child by omitting the directive sentence (Fade A). Reading the rewritten social story continued for 5 sessions. If the percentage of disruptive behavior remained at least 40% lesser than baseline for four of the last five data points, then Fade B started. During the Fade B, the written social story was read every other session. If the percentage of disruptive behavior remained at least 40% lesser than baseline for four of the last five data points, then no story was read to participant children. This no story condition continued for five sessions.

Gray (2000) cautioned that fading may not always be appropriate but provided some suggestions for fading Social Stories. One of the Gray strategies involves rewriting the

Social Story and omitting control sentences. This would provide and opportunity for the target child to recall key information without fading the entire story. Another strategy suggested by Gary is to increase the amount of time between readings of the Social Story.

Data Collection and Inter-rater Reliability

A 15-s cued partial interval recording system during 20-min daily observations was used to record behavior of each participant per week. For Pic, data were gathered mid-morning during math; for Nathan, data were gathered mid-morning during math; and for Aaron, data were gathered at the lunch room during recess. In order to have inter-rater reliability, the principal researcher and a trained graduate student collected the observational data for each participant child. The trained graduate student coded 30% of the observational data for reliability. Inter-rater reliability data were gathered nine times during the study per child (i.e., once per week for 9 weeks), representing 30% of the observations. Agreements were calculated by dividing the number of intervals in which the observers agreed by the number of agreements plus disagreements and multiplying by 100. An inter-rater reliability coefficient of 0.80 was required between coders. For Pic, Nathan, and Aaron inter-rater reliability was 100%.

Treatment Integrity

A 2-h teacher training was provided to the participant teacher's aids prior to the implementation of the Social Story intervention. The training offered necessary knowledge on the key components of Social Story intervention, implementation procedure, responsibilities of the teacher's aides and principal researcher; In addition, the fidelity implementation analyses were conducted by a daily checklist. On the checklist, the teacher's aides indicated whether or not the participant read or was read the Social Story that day at the specified time. For 50% of the intervention sessions, the principal researcher was present to record on a checklist whether or not the Social Story was read that day. The number of program days in which the participant read/was read the Social Story were divided by the number of total days, and then multiplied by 100 to obtain the percentage of treatment integrity for each teacher's aide. For Pic, Nathan, and Aaron, the treatment integrity was 100%.

Social Validity

To evaluate the social validity of Social Story intervention, the Intervention Rating Profile (IRP-15; Mathens et al. 1985) was used to assess teacher levels of satisfaction with

the intervention. The Intervention Rating Profile involved 15 items. The scores on the IRP-15 can range from 15 to 90, with higher scores indicating a greater acceptance level. Scores above 52.50 are acceptable (Von Brock and Elliot 1987). Scores on the IRP-15 were well within the acceptable range for all participants. Specifically, the treatment acceptability scores for Pic was 76, the score for Nathan was 88, and the score for Aaron was 86.

Dependent Variables and Data Analysis

Each participant's target behaviors were graphed as percentage of intervals of disruptive behavior during 20 min observations. Data gathered during baseline and intervention were inspected visually for changes in mean, level, and overlap (Kazdin 1982). For Pic, disruptive behavior was defined using a loud voice as raising his voice above the typical level in class. For Nathan, chair tipping was defined as occurring when one chair leg broke contact with the floor. For Aaron, disruptive behavior was defined as cutting in lunch line and disturbing other students nearby by pushing them.

Results

Pic

This study sought to determine the effectiveness of Social Stories in decreasing disruptive behaviors of three children with autistic disorder. During the baseline phase, percentages of Pic's target behavior of using a loud voice ranged from 42.5 to 85% with a mean level of performance of 62.9% intervals. On the fourth day, the Social Story was introduced to Pic. The level of performance during the intervention phase ranged from 6.25 to 21.25% with a mean level of performance of 11.5%.

During the initial fading phase (Fade A), Pic's percentage of disruptive behavior ranged from 15 to 23.75% with a mean of 20.5%, and the data indicated a slight increase in level. As the fading process continued (Fade B) and the Social Story was read in every other session, Pic's percentage of disruptive behavior ranged from 23.75 to 31.25% with a mean of 27.75% and once again the data indicated a slight increase in level. During No Story condition, Pic continued to exhibit lower levels of disruptive behavior ranging from 28.75 to 31.25% with a mean of 29.36%. Figure 1 illustrates Pic's percentage of disruptive behavior during fading conditions.

Anecdotally, Pic was very excited about his Social Story book. When it was first shown to him, he had a huge smile and tried to grab it from his teacher aide. He was very fascinated with all of the pictures on the story, especially

Fig. 1 Percentages of disruptive behavior for Pic, Nathan, and Aaron
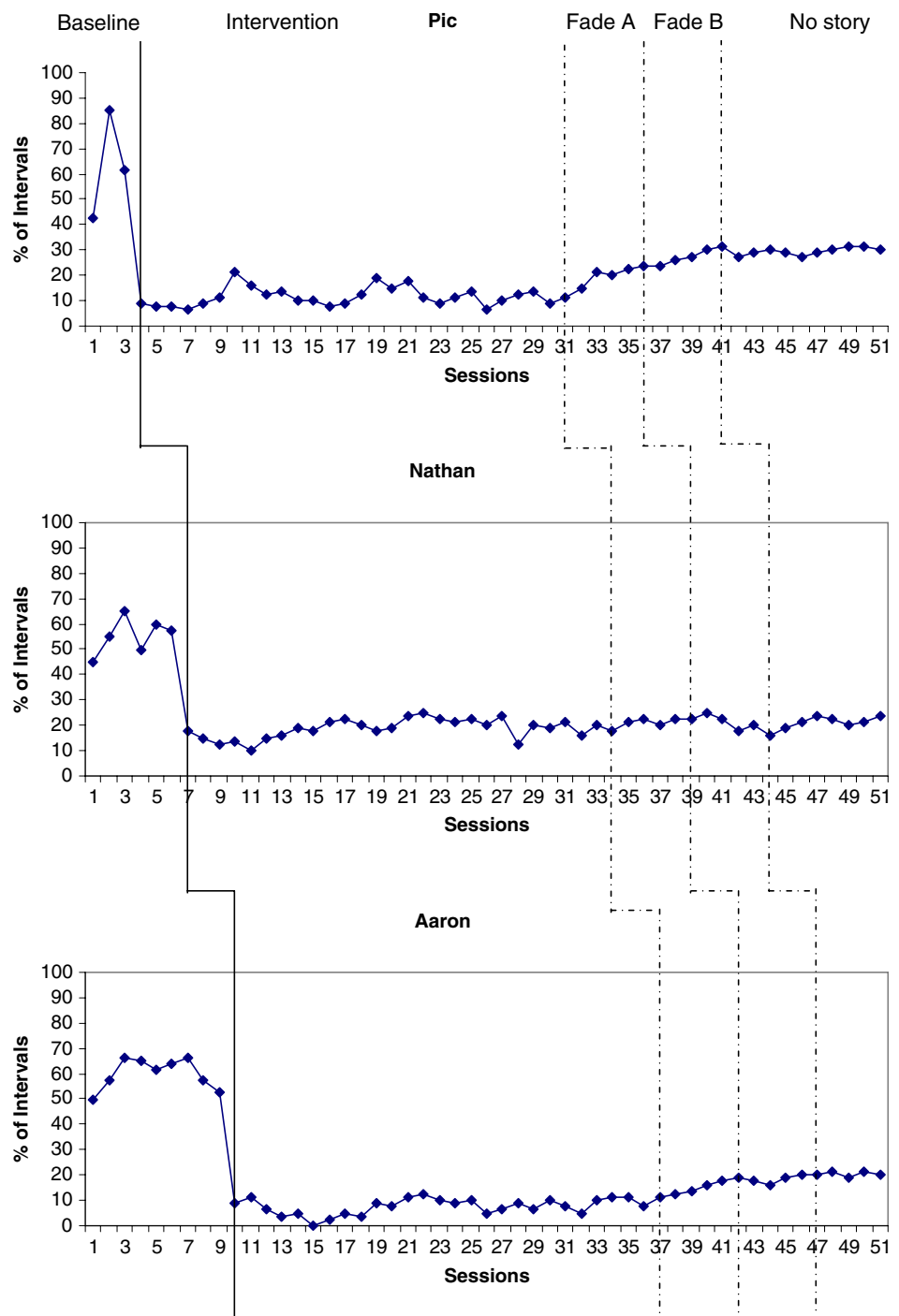
his own photo on the story. Even tough Pic appeared fascinated with his pictures presented in his Social Story immediately when his teacher's aide attempted to read it, he began engaging in behaviors. The teacher's aide read the story two times a day for 9 weeks, during the morning and early afternoon just before class began. The teachers' aide spent approximately 20 min reading the story each day and encouraged Pic to practice the quite voice in class. Occasionally, Pic appeared bored and disinterested with the

book; on these occasions, the teacher's aide encouraged Pic to maintain good effort and reminded that he was showing in his use of quite voice in class.

Nathan

In the baseline phase, trend and level stabilities were established over six consecutive days in the inclusive classroom. The percentage of target behavior for Nathan,

chair tipping, ranged from 45 to 57.5% of intervals with a mean of 55.4%. On the 7th day, the Social Story intervention was implemented and the Social Story was implemented for a total of 9 weeks. Data indicate that the target behavior during the intervention phase ranged from 10 to 23.75% of intervals with a mean performance of 18.62.

The data pattern during Fade A condition ranged from 17.5 to 22.5% with a mean of 21.75. As the fading process continued, the level of data showed a slight decrease ranging from 20 to 22.5% with a mean of 21.5%. During No Story condition, Nathan's disruptive behavior continued to decrease ranging from 16.25 to 23.75 with a mean of 20.93. Figure 1 illustrates Nathan's percentage of disruptive behavior during fading conditions.

Similar to Pic, Nathan was enjoyed reading his book two times a day for 9 weeks. The teacher's aide encouraged him to practice reading his book by himself. He seemed to be engaged when his teacher aide first introduced to him and began to try to read aloud without further prompting. The teacher aide helped Nathan in reading his book two times a day for 9 weeks. During most sessions, Nathan put forth a commendable effort in reading the story each day and practicing not to tip his chair backward or sideways. Occasionally, when he appeared bored or tired, the teacher aid encouraged Nathan to maintain good effort in reading his book and practicing appropriate chair sitting behaviors.

Aaron

In the baseline phase, trend and level stabilities were established over nine consecutive days. During the baseline phase, cutting in line and pushing other students ranged from 50 to 66.25% of intervals with a mean level of performance of 60%. On the tent day, the Social Story was introduced to Aaron. The level of performance during the intervention phase ranged from 0 to 11.25% with a mean level of performance of 7.68%.

During Fade A condition, Aaron's percentage of disruptive behavior ranged from 12.5 to 18 75% with a mean of 15.75. As the fading process continued (Fade B), Aaron's percentage of disruptive behavior indicated a slight increase but remained low ranged from 16.25 to 20% with a mean of 17.81%. During No Story condition, Aaron's disruptive behavior continued to remain low ranging from 18.75 to 21.25% with a mean of 20.31%. Figure 1 illustrates Aaron's percentage of disruptive behavior during fading conditions.

Aaron was very motivated to look at his Social Story when it was first presented to him as well. He immediately started saying "lunch" because of his pictures outlined in his Social Story. Once teacher's aide tried to read the story to Aaron, he became too distracted by all of the pictures on

his story. The teacher's aide covered up the pictures in order to read the text to Aaron, and then allowed him to look at the pictures once the text read. Once Aaron was allowed to look at the pictures, the teacher's aide talked about the pictures with him, showing a relationship of the pictures back to the text. Aaron's teacher's aide avoided the initial behaviors and attempted to motivate Aaron to read the Social Story again, telling Aaron first read the Social Story. The initial impression for all participants seemed favorable-all were highly motivated and interested in the stories. The adaptations of pictures of interest for each participant were a crucial factor in motivation. All participants' intervention data showed significant progress in decreasing the target disruptive behaviors.

Discussion

The purpose of the present study was to investigate the effectiveness of a Social Story intervention to decrease the disruptive behavior of children with autism. The Social Stories developed for this study contained an example of each of the participant children's target disruptive behavior and alternative behavior written according to Gray's (2003) guidelines. The present study results showed that following implementation of the Social Story, Pic, Nathan, and Aaron demonstrated a significant reduction of targeted disruptive behaviors compared to the baseline performance. During the initial fading process (Fade A), all three participants' percentage of disruptive behavior indicated a slight increase but remained low. As the fading process continued (Fade B), Pic and Aaron's percentage of disruptive behavior showed a slight increase but remained low whereas Nathan's percentage of disruptive behavior indicated a slight decrease. During No Story condition, all participant children's percentage of disruptive behavior continued to occur at low level. Overall, the maintenance data showed that as the intervention faded, three participants maintained levels of disruptive behavior that were significantly lower than their baseline performance. The results support previous studies that found reductions in disruptive behaviors through use of Social Stories (e.g., Kuttler et al. 1998).

The present study contributes to our understanding of the effectiveness of social stories in several ways. First, findings from this study demonstrate the potential benefits of using the social story intervention as the sole intervention to decrease the disruptive behaviors of children with autism. Second, a multiple-baseline experimental design was used in the present study. Many studies on the effectiveness of social stories have used nonexperimental designs that are plagued by threats to internal and external validity (Kuoch and Mirenda 2003; Reynhout and Carter 2006). Third, classroom

teachers of participant children and their teacher's aides reported favorable opinions of the Social Story intervention and continued to use it after completion of the study. This finding indicates that a Social Story intervention is not only effective in reducing problem behavior but also likely to be accepted by teachers and incorporated into typical classroom routines. This finding is important because through Social Stories are relatively easy to write and implement in inclusive settings, only a small number of studies remain that have carefully evaluated the effectiveness of the Social Story intervention. Another important benefit of the Social Story intervention was that no stigma seemed to be attached to the intervention. On the contrary, when the Social Story intervention was introduced to participant children, all participant children wanted to share their stories with their classmates and they enjoyed sharing the stories with their classmates. The classmates responded enthusiastically, and particularly liked participant children's photographs throughout the story and wanted to read the story to participant children. Thus, the Social Story intervention facilitated positive social interaction between participant children and their classmates.

This study also adds to the small but growing body of literature evaluating the effects of visual support strategies on decreasing the disruptive behavior of children with autism. Children with autism display poor language processing skills and reading comprehension skills (Scattone et al. 2002; Schreibman and Charlop-Christy 1998). As Social Stories rely heavily on written text, auditory processing and reading comprehension, this Social Story intervention used participant children's own pictures depicting their disruptive behaviors and directed the child's attention to the alternative behaviors. Overall, the Social Story intervention was effective in reducing disruptive behavior of children with autism because it capitalized on documented strengths regarding how this population learns best. The intervention took advantage of the strong visual learning strengths present in children with autism, by using their pictures outlined in their Social Stories.

As with any other study, this study has inherent limitations. First limitation involves the generalizability of the study's results to other children with autism and to other behaviors not included in this study. All of the participants in this study have functional verbal language and at least beginning reading skills. Therefore, it is unclear if the intervention would be effective with children having fewer verbal and reading skills. The small sample size with three children also limits the generalizability of the current study results. However, it is important to recognize that children with autism have unique characteristics; therefore, interventions for this population should be individualized to address each child's specific needs areas. Findings from this study do not provide clear answers that lead directly to practical solutions which will be successful with all individuals with autism. Rather, it attempts to add one more piece to the difficult puzzle of remediating disruptive behaviors of children with autism. Overall, the present study replicated and extended the literature by demonstrating that properly constructed and visually presented social stories may decrease the disruptive behaviors of children with autism. However, additional empirical Social Story research is essential to further develop this promising intervention in the field of autism.

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