Effects of Social Stories on Prosocial Behavior of Preschool Children with Autism Spectrum Disorders

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Abstract Social Stories[TM] are a popular intervention for preschool children with autism spectrum disorders (ASD), but little research on Social Stories has been conducted with this population. This study investigated the effects of Social Stories on prosocial behavior of three preschool children with ASD in an inclusive setting. An ABAB design was used for two participants, while an ABACBC was used for the third. Social Stories increased appropriate behavior and decreased inappropriate behavior for two participants. The addition of verbal prompts (condition C) was necessary to increase appropriate behavior for the third participant. Maintenance probes were conducted to assess whether stories became imbedded in classroom routines. Results are discussed in relation to applications, study limitations, and areas for future research.

Keywords Autism spectrum disorders · Social story · Behavior intervention · Early childhood

Introduction

Educating children with autism spectrum disorders (ASD) in an inclusive setting presents significant challenges to general and special educators (Simpson, de Boer, & Myles, 2003). There is a tremendous amount of information available on ASD though there

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is also significant variation in methodology between different treatment approaches (National Research Council [NRC], 2001). Given the wealth of information available, it can be difficult to determine which strategies are appropriate for which situations. It is important that educators are able to identify research and socially validated strategies that are effective for meeting the educational, social, and behavioral needs of children with ASD (Simpson et al., 2005).

One popular intervention strategy for children with ASD is Social Stories[TM] (Sansosti, Powell-Smith, & Kincaid, 2004). A Social Story is a short story written for an individual that describes a specific activity and the behavior expectations associated with that activity (Gray & Garand, 1993). For example, a Social Story about lining up in the classroom might describe the instruction given by the teacher, what the students do and why, and how the target individual should behave. Gray (1995) outlines four basic types of sentences in her Social Stories guidelines. These include descriptive, perspective, affirmative, and directive sentences. A *descriptive* sentence provides factual information. A *perspective* sentence provides information about the thoughts and feelings of others. An *affirmative* sentence can be used to reassure the reader. A *directive* sentence provides instruction on what the reader is to do.

Two recent additions to Social Story sentences include *control* sentences, those that use analogies to explain situations, and *cooperative* sentences, those that indicate who can assist the individual in a given situation (Gray, 2000). Gray recommends two ratios to create a balanced story. The *basic Social Story ratio* is made up of 2–5 descriptive, perspective, and/or affirmative sentences for each directive sentence (Gray, 1995). The *complete Social Story ratio* follows the same

principle but includes control and cooperative sentences, including two to five cooperative, descriptive, perspective, and/or affirmative sentences for every directive or control sentence (Gray, 2000).

In a synthesis of the Social Stories literature, Sansosti et al. (2004) concluded that although Social Stories have been recommended as an effective intervention for children with ASD since the early 1990s, the research on their effectiveness is still limited. Of the eight articles included in their synthesis, only six used experimental designs. Although all the studies reported positive effects on participant behavior, these findings are limited by either (a) weak effects (Hagiwara & Myles, 1999), (b) the use of multiple treatments (Kuttler, Myles, & Carlson, 1998; Theimann & Goldstein, 2001), or (c) variation in the delivery of the intervention (Brownell, 2002; Hagiwara & Myles, 1999).

Seven additional single subject studies on the effectiveness of Social Stories have recently been published, all reporting positive effects. Four studies used Social Stories to successfully decrease inappropriate behaviors of participants (Adams, Gouvousis, VanLue, & Waldron, 2004; Agosta, Graetz, Mastropieri, & Scruggs, 2004; Crozier & Tincani, 2005; Kuoch & Mirenda, 2003). Adams et al. employed parents as interventionists to decrease the frustration behaviors of a boy with ASD, reporting high levels of social validity. Crozier and Tincani examined the pairing of a Social Story with verbal prompts to decrease talking out behaviors of a boy with autism. They reported a decrease in challenging behavior with the Social Story but behavior change was more significant when verbal prompts were added. Agosta et al. (2004) and Kuoch and Mirenda (2003) also observed decreases in problem behaviors.

Three studies examined the effect of Social Stories on increasing appropriate behaviors of participants (Barry & Burlew, 2004; Bledsoe, Myles, & Simpson, 2003; Ivey, Heflin, & Alberto, 2004). Barry and Burlew (2004) reported an increase in independent choice making and appropriate play appropriate behaviors following the use of Social Stories by two participants with severe autism. However, their multiple baseline ABCD design did not establish a functional relationship between the Social Story and changes in participant behavior due to the use of multiple treatments in their intervention. Bledsoe and colleagues successfully increased the appropriate eating behaviors of an adolescent with Asperger syndrome. Ivey et al. increased participation in novel events for three participants with Pervasive Developmental Disorder—Not Otherwise Specified. They also employed parents as interventionists and reported a high level of social validity for Social Stories.

Sansosti et al. (2004) identified six issues in the Social Story literature for future study: (a) increased experimental rigor, (b) assessment of the critical components of Social Stories, (c) issues related to procedural fidelity, treatment integrity, and social validity, (d) assessment of generalization and maintenance, e) the use of Social Stories with students who are mainstreamed, and (f) comparing the participant outcome behavior with the behavior of typical peers.

Some of these areas have been examined in the more recent literature. Several of the studies summarized above used experimental designs. In addition, three studies included social validity measures (Adams et al., 2004; Crozier & Tincani, 2005; Ivey et al., 2004) and two provided treatment integrity measures (Crozier & Tincani, 2005; Kuoch & Mirenda, 2003). Finally, Kuoch and Mirenda (2003) examined the structure of the Stories reported in the literature. They found that, although positive effects were generally reported, the majority of Stories did not conform to the guidelines established by Gray (1995, 2000). Thus it appears that Stories that deviate from Gray's guidelines may be effective. Additionally, most of the studies examined Social Stories with children older that preschool age, leaving the effectiveness of Social Stories with younger children undetermined. A recent investigation of early intervention settings in southern California indicated that 23% of programs interviewed included Social Stories in their intervention program (Stahmer, Collings, & Palinkas, 2005). The numbers were slightly greater for programs serving children 0–3 years (30%) than those serving children 3–5 years (17%; Stahmer et al., 2005). This recent evidence confirms the need for studies on the use of Social Stories with this age group.

The purpose of this study was to address some of the recommendations made by Sansosti et al. (2004) and to provide an example of the effect of a Social Story intervention on participant behavior in an inclusive, preschool setting. Only one study described examined the use of Social Stories with children under 4-years-old (Kuoch & Mirenda, 2003) while two other studies included 5-year-old participants (Ivey et al., 2004; Lorimer et al., 2002). Given the general consensus of the importance of effective early intervention for children with ASD (NRC, 2001), preschool children were selected for this study to assess the appropriateness of Social Stories for this age group. Finally, this study assessed the treatment integrity, social validity, and maintenance of the intervention to provide more information about the implementation and reception of Social Stories in two preschool classrooms.

Method

Participants

All three participants attended an early childhood education preschool on the campus of an urban university. Participants were recruited through the preschool director and classroom teachers' nominations of children who were diagnosed with ASD and were between 3 and 5 years of age. Participant standardized test scores were obtained from existing student records, which reported results from different assessment and diagnosis tools. Therefore, for Participants 1 and 2, results from different standardized tests are described. Standardized test scores were not available for Participant 3; however, he was reportedly diagnosed with "high functioning" autism.

The first participant, Thomas, was a 3-year, 9-month-old boy in an integrated classroom for 3–4-year-olds. Thomas was an only child who lived with his mother and father. His parents were both university-educated, middle class professionals. Thomas had been evaluated and diagnosed with ASD at 2 years, 11 months by an educational psychologist. His Gilliam Autism Rating Scale standard score (SS) was 85 (16th percentile) and, although this score put him at a 'Below Average' risk for autism, the psychologist determined through observations and interviews that Thomas exhibited sufficient ASD characteristics to warrant that diagnosis. Thomas was also given the Differential Ability Scale cognitive and achievement assessment. His General Cognitive Ability fell in the 13th percentile and his Non-verbal Ability in the 42nd percentile. His Vineland Adaptive Behavior Scales scores for communication were SS 76 (5th percentile), socialization SS 73 (4th percentile), and adaptive behavior SS 69 (2nd percentile). In addition to attending preschool, Thomas also had a discrete trial home program for approximately 20 h per week.

Daniel was also a 3-year, 9-month-old boy in the same integrated classroom as Thomas. Daniel lived with his mother, father, and younger brother who attended preschool in a different classroom. His parents were also middle class professionals. Daniel had been diagnosed with ASD by an educational psychologist at 3 years of age. His Autism Diagnostic Observation Schedule total score was 11 (ASD cut-off 7, autism cut-off 12). Daniel was also assessed with the Mullen Scales of Early Learning. His Visual Reception t-score was 52 (age equivalence [AE]: 36 months), Fine motor $t = 35$ (AE: 28 months), and Receptive Language $t = 41$ (AE: 30 months). His Vineland scores were communication SS 81 (10th percentile), socialization SS 76 (5th percentile), and adaptive behavior SS 74 (4th percentile). Daniel did not participate in a home program.

James was a 5-year, 1-month-old boy in an integrated preschool classroom for 4–5-year-olds. James lived with his mother and father and one younger brother, who did not yet attend school. His parents were both university-educated, middle class professionals. A standardized assessment profile and diagnosis documentation were not available for James. He had attended the preschool for 2 years and his teacher reported that his diagnosis was high functioning autism. James demonstrated strong expressive language skills in the classroom and had a precocious vocabulary. He preferred talking with adults and could have long conversations on topics of interest to him. James' receptive language skills appeared to be somewhat lower than his expressive language skills and he exhibited the characteristic impairments in pragmatics (e.g., walking away from a speaker), intonation, and volume. He was extremely interested in books and demonstrated emergent reading skills such as an awareness of text, directionality of text, and could identify some basic sight words (e.g., I, will, James). His teacher reported that James was impulsive and erratic during unstructured play and often resisted adult redirection. He had one preferred peer whom he often sought out during play. James received speech and language services through the school but did not participate in a home program.

Setting

The university preschool followed a full inclusion model of early childhood education. Classes were divided by age groupings and were comprised of students with disabilities and typical peers. Special education services were delivered within the regular classroom and were scheduled to occur during appropriate activities (e.g., physical therapy sessions occur during gross motor play). Thomas and Daniel were in the classroom for 3–4-year-olds. This classroom had 20 students, one general education teacher, a full time 1:1 special education assistant for Thomas, and 2–3 university work-study students as general assistants. James was in the 4–5 year-old classroom with 22 students, one general education teacher, one full time assistant, and 2–3 university work-study students as general assistants. A special education teacher and related service personnel provided consultation and direct support to the students and teachers in both classrooms.

During all phases of the study, intervention and observations took place in the participant's classrooms.

Immediately prior to the target activity the Social Stories were read at an empty table on the side of the rooms. The first author sat to the side of the group during the target activity to collect data.

Target Behaviors and Response Definitions

After participants had been selected, teacher interviews were conducted to identify possible behaviors for intervention. The first author, who was also the primary observer, met with each teacher, explained the social story intervention and provided an example of a social story. The teachers were asked to describe the participant and then to identify activities during the school day that were challenging for the participant. The teachers identified two to three areas of concern for each participant. Through further discussion, the target behaviors were selected based on the following criteria: (a) the behaviors reportedly interfered with the learning or socialization of the participant, and (b) the behaviors were not concurrently being addressed through another targeted intervention. General classroom management by the teacher and staff were not considered to be targeted interventions. Teachers were then asked to identify when those behaviors were likely to occur, when they were least likely to occur, and what they knew about how the behavior functioned for each participant.

After the initial teacher interview, the observer conducted two to three classroom observations for each participant to verify the target behaviors and to develop operational definitions. Based on the information from teacher interviews and observations, replacement behaviors were then identified and defined for each participant based on functional equivalence and social appropriateness. Since functional assessments were not conducted, the function of each challenging behavior was established from interview and observation data.

The target behavior for Thomas was sitting appropriately during the first 10 min of morning circle. During circle time, students were expected to sit on the edge of the circular carpet, attend to the teacher, and participate in songs and stories. At the beginning of the study, Thomas preferred to roam around the classroom and spent little time at circle. Thomas typically received a lot of teacher attention for wandering around the room. When he engaged in the target behavior, he received attention for appropriate sitting. Examples of sitting appropriately at circle included sitting on his bottom or kneeling on his heels on the carpet facing the teacher or activity. Responses not recorded as sitting appropriately included walking around the room, lying down on the carpet, and

engaging with materials other than those included in the current circle activity.

The target behavior for Daniel was talking with his peers during snack time. During snack, students sat at the snack table in groups of four to five and were encouraged to chat and interact with each other. At the beginning of the study Daniel initiated with staff members but not with his peers and did not typically respond to initiations from peers. Daniel received attention from staff when he spoke to them. When he engaged in the target behavior and spoke to his peers he received peer attention. An utterance was considered to be anything from a single word to a group of phrases or sentences. A new utterance was recorded when Daniel spoke to a peer after not speaking for at least 5 s, changed the person to whom he was speaking, or stopped to listen to his communication partner. Examples of talking with his peers included saying hello, using a peer's name to gain their attention, asking for food, and asking or answering questions. Responses not recorded as talking with peers included nodding or shaking his head and talking to adults.

For James, the goal was to replace inappropriate play with appropriate play with peers in the block center. When in the block center, students were expected to cooperate and share materials with two to three other students. At the beginning of the study James displayed low rates of appropriate play and high rates of inappropriate play, so both behaviors were observed and recorded. James received a lot of teacher attention for inappropriate behavior. His inappropriate behavior appeared to be attempts to recruit peer attention. When he engaged in the target behavior, James received more positive peer attention and less negative teacher attention. Examples of playing appropriately with peers included asking to use materials, offering materials to others, using materials cooperatively, and making an appropriate comment (e.g., praise, observation) about the play of another student. Responses not recorded as appropriate play included refusing to share materials, and leaving the block area. Play behaviors included discrete behaviors (e.g., giving an item to another) and chains of behaviors (e.g., building a train track). Examples of inappropriate play included hitting, grabbing items from others, kicking, biting, yelling, and pushing. Responses not recorded as inappropriate play included touching gently to gain attention, talking to peers, laughing, and hugging.

Recording Procedures

Thomas' target behavior of sitting at circle was measured with duration recording. Observation sessions

were 10 min in length and began as soon as the teacher sat in her chair and started the first circle activity, which was a song. When Thomas started to engage in the target behavior, observers activated a stopwatch. When he ceased engaging in the behavior, the stopwatch was paused until he sat appropriately again. A separate timer was used to keep track of the 10 min session. At the end of the session, the cumulative time recorded by the stopwatch was recorded on a data sheet.

Event recording was used to measure the target behaviors for Daniel and James. Each occurrence was recorded as one event during the 10 min observation sessions according to the response definitions. For James, a new behavior event was recorded if he switched behaviors (e.g., went from talking to exchanging toys), interrupted an appropriate play sequence with an inappropriate behavior, or if he stopped engaging in a behavior for more than 5 s and then began the same behavior again (e.g., yelled at a peer, stood by himself for 8 s, yelled at a peer again).

The data collection forms were printed with the participant's name, target behavior definition, and examples and non-examples of the target behaviors across the top and a table below with space to record the date, event frequency or duration, and study phase. Observers held the sheets on a clipboard and sat or stood approximately 1.5 m away from the participant during observation. The exception to this arrangement occurred during the prompting phase with Daniel when the first author sat beside and slightly behind Daniel to deliver verbal prompts.

Materials

Based on the information gathered from the general and special education teachers, the first author wrote a social story for each participant addressing their target behavior. For Thomas the social story described the expected behavior of sitting at circle. For Daniel the social story described how and why to talk to his friends during snack. James' story described appropriate play behaviors and the rule for keeping hands and feet to himself. All of the stories were typed in 14-point Times New Roman with one sentence per page. Each page included a simple color icon illustrating the main point (e.g., an icon of pretzels and juice to illustrate snack). Stories were printed on 8 1/2 × 11 in. white paper and stapled at the top, middle, and bottom of the left side of the page to create a book. See Appendix A for the text of the Social Stories used in this study. The stories were written in accordance with Gray's (1995) guidelines and adhered to the basic Social Story sentence ratio of 2–5 descriptive/perspective/affirma-

tive sentences for every directive sentence (Gray, 2000). For example, James's story contained two directive sentences, two perspective sentences, and six descriptive sentences for a ratio of four descriptive/ perspective sentences for every directive sentence.

Experimental Design

An ABAB reversal design was used for Thomas and James (Kennedy, 2005). An ABCACBC multicomponent reversal design was used for Daniel when the initial intervention of social story alone proved insufficient. The reversal design was selected because it permitted replication of intervention effect within each participant, enhancing internal validity of the experiment (Kennedy, 2005, p. 125). It also allowed for experimental evaluation of more than one intervention component, as was the case for Daniel. Visual analysis of level, trend, variability, immediacy, and magnitude of behavior change were used to make decisions about when to change experimental phases, as well as to infer functional relations between independent and dependent variables (Kennedy, 2005, pp. 196–206; see also Bailey & Burch, 2002, p. 147; Cooper, Heron, & Heward, 1987, pp. 108–109; Kazdin, 1982, pp. 230–240). For Daniel and James, initial baselines were continued until responding was sufficiently stable to predict that improvement would not occur without intervention. Although Thomas' initial baseline demonstrated an ascending trend, his level of appropriate sitting remained fairly low, allowing for reasonable prediction that appropriate sitting would not increase significantly without intervention. While several of the remaining experimental phases were brief (five or fewer sessions), the immediacy and magnitude of behavior change between phases indicated functional relationships between Social Stories, Social Stories with prompts, and participants' behavior. For example, when Social Stories with prompts were reintroduced to Daniel after his second baseline, his frequency of talking to peers increased immediately from 0 to 10.

In baseline (A), participants were observed for 10 min in their respective classrooms to assess the occurrence of target behaviors. During intervention (B) the social story was read immediately prior to the target activity and observation period. For Daniel's second intervention phase (C), the social story was read before snack began and the first author provided verbal prompts during the observation session. During the final phase, maintenance and embedding, the Social Stories had been turned over to the preschool staff and participants were observed without receiving any intervention from the researchers.

Baseline and Intervention Procedures

During baseline, the classroom staff was instructed to continue with regular instruction and to use whatever behavior management procedures they typically employed. Interviews with staff already indicated that these strategies had been ineffective in decreasing inappropriate behaviors or increasing appropriate behaviors. For baseline observation sessions, the observers sat approximately 1.5 m away from the participant being observed and record data on a clipboard. Observers did not interact with the participants during baseline sessions. The classrooms were busy settings and unfamiliar adults in the room were common occurrences. As a result, the presence of the observers was not unusual and students did not appear to pay much attention.

The first day of intervention phase (B) consisted of a training session for each participant. For each participant, the classroom teacher introduced the child to the first author. The first author then said, "I have a story for you. Let's read it together!" The author and child then went to over to a quiet table. The child sat across from the author and the book was placed in front of the child. The author read the book to the child. After the first reading and with the Social Story open in front of them, each participant was asked three comprehension questions like "What is the rule for hands and feet?" and "Point to what to do at circle." Each participant answered either by pointing or verbally responding and answered 100% of comprehension questions accurately. After the story was read, the author told the child it was over and guided the child back to the appropriate activity (i.e., snack table, carpet, or block area). Once the participant had joined the appropriate activity, the observation session began.

For all subsequent intervention (B) sessions, the first author arrived 5 min before the target activity and invited the participant to come and read the story. As soon as the story was completed, the author gave a verbal instruction to join the activity (e.g., "It's time for circle!) In all cases the participants willingly complied. The observation session started after the child joined the activity. On average, there were three intervention sessions per week for each participant.

Daniel was the only participant who received more than one intervention. His first intervention is described above. When this intervention proved to be ineffective for him by the end of the 10th session, a second intervention of social story plus verbal prompts was designed. The procedures for reading the social story in invention phase (C) were identical to those of phase (B). After the story was finished, Daniel was told to go to snack. The author moved a chair to sit beside and slightly behind Daniel at the table. During the 10-min observation period Daniel received verbal prompts on a variable interval schedule. An average of two prompts per minute were given. The author had a timer on her clipboard. Prompts were usually delivered on the minute and the half-minute. However, in order to minimize the potentially reinforcing nature of verbal prompts, prompts were not delivered if Daniel had just spoken to the author. In this case the prompt was delayed for 5–15 s. Only prompts, no praise or reinforcement, were delivered during the observation. Verbal prompts were selected as an additional intervention for two reasons. First, Scattone, Wilcyznski, Edwards, and Rabian (2002) had noted that verbal prompts were used by the teachers in their study without having been directed. Second, Crozier and Tincani (2005) found the pairing of verbal prompts and a Social Story to be effective.

Maintenance

After the last intervention session, the first author met with the general and special education teachers to share information about the study and to teach them how to use the social story with their students. The first author gave each teacher a copy of the treatment integrity checklist for future reference and answered questions relating to how the story had been used and received by each participant. All teachers expressed interest in continuing to use the stories and keep them available in the classroom.

Two maintenance probes were performed 2 and 3 weeks of the last intervention session. During the maintenance probes, the first author conducted observation sessions according to baseline procedures and did not interact directly with any of the participants. After the maintenance observation sessions were completed, classroom staff were interviewed about the location of the social story, whether it was being used, and how often it was read.

Treatment Integrity and Interobserver Agreement

A checklist was completed by the first author to assess treatment integrity during each intervention session. The first author used the checklist to indicate whether all of the five steps of reading the social story had been completed, checking 'yes' or 'no' for each step. See Appendix B for a copy of this checklist. Treatment integrity was 99% for Thomas, 100% for Daniel, and 100% for James. A graduate assistant was trained as a secondary observer. Interobserver agreement data was

collected on the days that the graduate assistant was available, thus a preferable 30% of interobserver agreement data sessions across all participants was not achieved. The percentage of intervention sessions for which interobserver agreement data were collected for Thomas, Daniel, and James was 27%, 33%, and 34.7%, respectively. At least one interobserver agreement session was conducted for each phase for each participant. Interobserver agreement sessions were selected according to the work schedule of the graduate assistant, who was only available 3 days per week. Interobserver agreement for treatment integrity checklists was 100%.

Interobserver agreement data was also collected for each of the target behaviors. Interobserver agreement data was collected on the days that the graduate assistant was available, thus a preferable 30% of interobserver agreement data sessions across all participants was not achieved. Sessions were distributed across phases but were not selected randomly. Interobserver agreement data was collected during the same sessions as treatment integrity data. For Thomas, the mean for interobserver agreement was 97%, (range, 91.4–100%). For Daniel the mean was 94% (range, 71.4–100%). The one session with 71.4% agreement was due to the second observer standing too far from the snack table as a result of end-of-term celebrations. Excluding this outlier, interobserver agreement for Daniel ranged from 85.7–100%. Interobserver agreement for James had a mean of 91% (range, 80–100%). The one session with 80% agreement was affected by unusually high numbers of

children playing around the second observer during centers, thus making accurate observations more difficult. Excluding this session, interobserver agreement data for James ranged from 88.8–100%.

Results

Overall there was a reduction of inappropriate behaviors and an increase in appropriate behaviors across all participants. Their results are depicted in Figs. 1, 2, and 3.
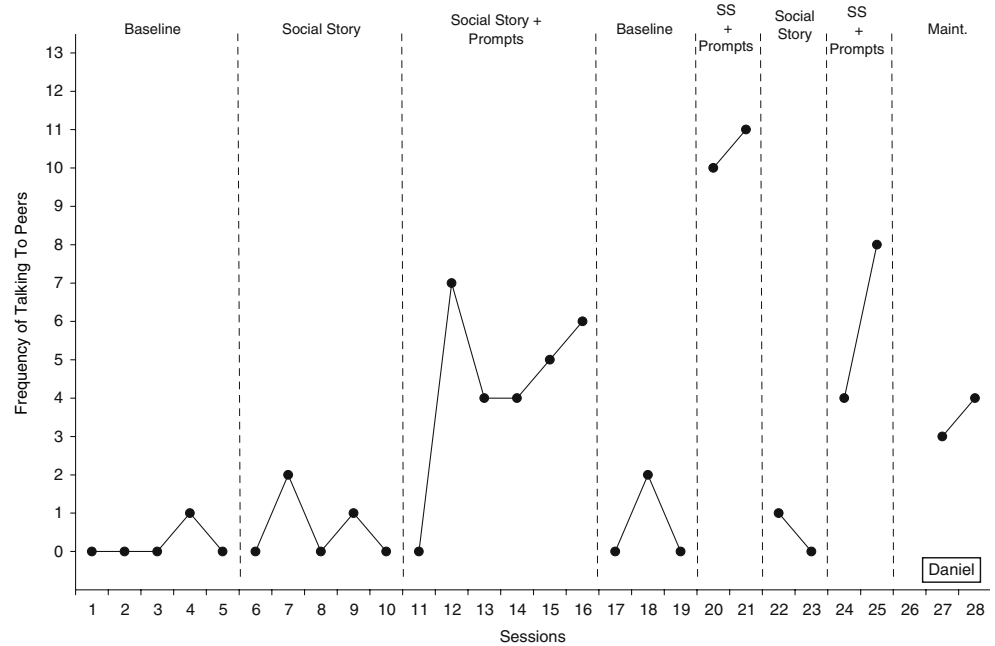
Thomas

During baseline, Thomas spent an average of 16.4% (0–69.7%) of each session sitting appropriately at circle. Although during Session 6 Thomas sat for 69.7% of the time, it was his first day back at school after severe asthma attacks while he was taking asthma medication, which reportedly had a sedating effect. In the first intervention phase sitting at circle increased to 78.5% (range, 63.7–85.8%) of the time, with an immediate increase of 33.2% after the first day of intervention. In the second baseline phase, Thomas' sitting decreased to 37.4% (range, 30.7–42.8%). When the social story intervention was reintroduced, the mean time sitting increased to 80.4% (range, 49.2–97%). Although there was a small increasing trend during the end of the second baseline, the rapid increase of time sitting appropriately when the social story was in place suggests the presence of a functional
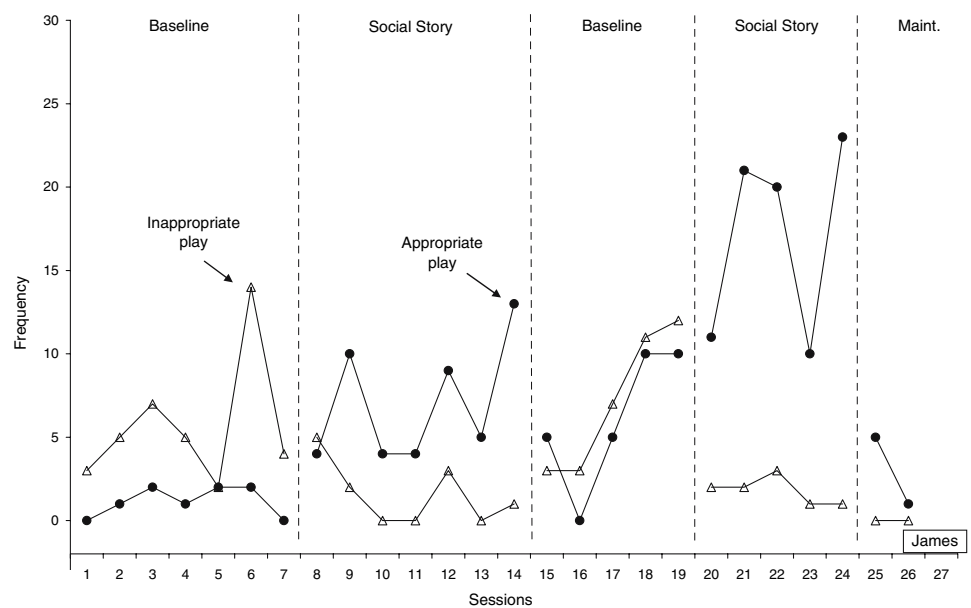

Fig. 1 Duration of time sitting appropriately at circle
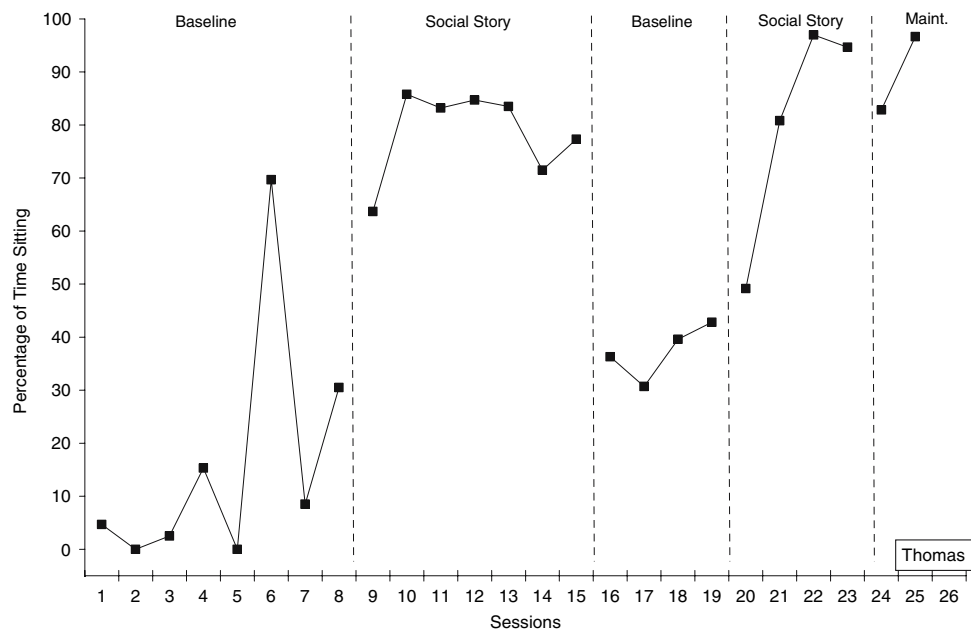
Fig. 2 Frequency of unprompted episodes of talking to peers

Fig. 3 Frequency of appropriate and inappropriate play

relationship between the target behavior and the intervention. Overall there was a 64% increase in the amount of time Thomas sat appropriately at circle from initial baseline to final intervention phase.

Daniel

During baseline Daniel talked to his peers during snack time an average of 0.2 (range, 0–1) times per session. During the social story phase (B), he averaged

0.6 (range, 0–2) verbal interactions per session. Because the social story intervention alone appeared unsuccessful in increasing Daniel's initiations, it was decided to implement a social story plus verbal prompts intervention in phase (C) and to record prompted and unprompted verbal interactions individually. With social story plus verbal prompts, Daniel averaged 4.7 (range, 3–8) prompted verbal interactions and 4.3 (range, 0–7) unprompted interactions. In the second baseline phase, Daniel averaged 0.7 (range,

0–2) verbal interactions. In (C2) Daniel averaged 7 (range, 7) prompted and 10 (range, 10–11) unprompted interactions. Returning to the social story only intervention Daniel's verbal interactions decreased to 0.5 (range, 0–1) per session. Again in the social story plus verbal prompts final phase his average interactions increased to 7.5 (range, 6–9) prompted and 6 (range, 4–8) unprompted. Overall there was an increase of 5.8 unprompted verbal interactions per session from initial baseline to final intervention phase.

James

In baseline James displayed an average of 5.71 (range, 2–14) inappropriate play behaviors and 1.14 (range, 0–2) appropriate play behaviors per session. During the first intervention phase, his inappropriate play behaviors decreased to an average of 1.57 (range, 0–5) and his appropriate play behaviors increased to an average of 7 (range, 4–13) per session. On return to baseline conditions, James inappropriate play behaviors increased to an average of 7.2 (range, 3–12) and appropriate play behaviors decreased slightly to an average of 6 (range, 0–10) per session. With the reintroduction of the social story, inappropriate behaviors again dropped to an average of 1.8 (range, 1–3) and appropriate play behaviors increased to an average of 17 (range, 10–23) per session. Overall there was a decrease of 3.91 in the average number of inappropriate behaviors and an increase of 15.86 in the average number of appropriate behaviors per session.

Maintenance

Two probes for each participant were taken after the last intervention session. The first probe was 2 weeks after intervention ended and the second probe was 3 weeks after intervention ended. Thomas sat at circle for an average of 89.8% (range, 82.8–96.7%). Daniel had an average of 3.5 (range, 3–4) unprompted verbal interactions with peers during snack. James engaged in an average of 3 (range, 1–5) appropriate play behaviors and 0 (range, 0) inappropriate play behaviors per session. After the maintenance probes were completed, the teacher for James disclosed that he had been sick for 2 days prior to the final probe and he was noticeably subdued. Due to upcoming vacation it was not possible to reschedule an additional probe.

In addition to observing student behaviors during these probes, the classroom staff were interviewed to assess the presence and use of each participant's social story. Thomas and Daniel's stories were kept in the class library where they were visible and accessible to all students throughout the day. Their teacher reported that Thomas had read his story three or four times since the end of intervention, twice when he independently chose it during library center, but never in the morning before circle as had been done in the intervention. Daniel looked at his book once during library but had not read it with an adult since the end of intervention. James' teacher reported that the book was in the classroom though not on display or accessible to James. He had not read his book since intervention had concluded.

Social Validity

After the study concluded, each teacher was given a social validity questionnaire and interviewed by the first author. Both classroom teachers and the special education teacher reported positive impressions of Social Stories. Thomas and Daniel's teacher said that she was impressed by the change in Thomas' behavior and planned to include the social story in her classroom. She also committed to making time for the special education assistant to read the story with Thomas. Additionally, she expressed interest in developing other stories for Thomas to address some of his other challenging behaviors. While she also spoke positively about the behavior change for Daniel, her reaction was not as strong compared to her reaction about Thomas. One reason for this may be that Thomas' target behavior was highly disruptive to the classroom whereas the lack of social interaction by Daniel was not. Alternatively, reaction may have been due to the smaller change in Daniel's behavior as compared to Thomas.

James' teacher was similarly impressed with the change in his behavior over the course of the study. She reported that James' behavior was more appropriate in other play activities not targeted for intervention, indicating that she thought some generalization of skills across settings may have occurred. When asked if there were any changes she would recommend for future use of Social Stories with children like James, his teacher suggested using real photographs of the target child as a way to enhance the connection between the story and the student.

Discussion

Results of this study partially replicate previous research, which found positive effects for Social Stories

with children with ASD (Sansosti et al., 2004). The Social Story for Thomas significantly increased sitting at circle, which maintained 2 and 3 weeks after conclusion of intervention. James' Social Story produced positive changes in appropriate and inappropriate play behaviors, although increases in appropriate play were not maintained after intervention. These results also support Scattone and colleague's (2002) finding that it is not necessary for children to read the Social Story independently in order to produce a change in behavior.

In contrast, the Social Story alone had little effect on Daniel talking to his peers. When verbal prompts were added, he demonstrated higher levels of the target behavior compared to baseline and the Social Story alone condition. His behavior was maintained after conclusion of the intervention, though at lower levels. Two possible explanations for the small effect for Daniel are his weak communication and social skills and his low motivation to engage in social behavior with peers. His Vineland scores in communication (SS 81, 10th percentile) and socialization (SS 76, 5th percentile) indicate delayed skill development for his age. The Social Story may not have been a sufficiently robust intervention to compensate for these deficits. Motivation may have also been a factor. Although Daniel's teacher identified talking to peers as a priority for intervention, she also indicated that he had little desire to engage his classmates. In contrast, he was described as highly motivated to engage and please adults in the classroom, which may account for his increased talking to peers with the addition of adult-delivered prompts.

Gray's (1995) Social Story construction guidelines, followed in this study, do not include procedures for assessing the motivation of children to engage in social activities. Children who lack such motivation are less likely to demonstrate appropriate behavior, even when behavioral expectations are clearly described. For these children, it may be necessary to modify the social situation to make appropriate behavior more motivating. For example, a preference assessment (see Hagopian, Long, & Rush, 2004) could have been conducted to identify highly reinforcing snack items for Daniel. His social story could have targeted asking peers for snack items, thereby increasing his motivation to talk. In contrast, sitting at circle and playing with peers appeared to be motivating activities for Thomas and James, therefore such modifications were not indicated.

Alternatively, the functional equivalence of the replacement behaviors may have influenced participant outcomes. Daniel's target behavior may not have been as functionally equivalent as the behaviors selected for Thomas and James. While Daniel enjoyed and recruited adult attention throughout the day, he was more selective about peer attention. If he only wanted adult attention during snack time, this would account for both his failure to talk to his peers after reading the Social Story and for the increase in the target behavior once conditional adult attention was provided in the form of verbal prompts.

Sansosti et al. (2004) note in their research synthesis that a return to baseline behavior levels after withdrawal of the Social Story is problematic because Social Stories are meant to be teaching tools. They suggest that continual implementation may be required. Although the reversal design in this study allowed for the demonstration of functional relationships between Social Stories and prosocial behavior, results suggest that continual implementation of Social Stories is necessary to maintain desired effects. The loss of treatment gains during maintenance probes for Daniel and James further indicates that children should reread Social Stories with some frequency to continue to benefit from their desired effects. Strategies for fading Social Stories from the learning environment would therefore seem to be an important topic for future studies.

Another notable finding relates to social validity. Although teachers generally reported favorable impressions of the social story procedures and outcomes, they did not indicate continued use of Social Stories during maintenance probes. The reasons for this are unclear; however, the time consuming nature of reading a social story before each activity may preclude teachers who are responsible for large groups of students from implementing Social Stories consistently. This underscores the importance of incorporating Social Stories into lesson planning and embedding Social Stories efficiently into the classroom routine.

The study has at least three limitations that should be considered when interpreting the results. First, an experimenter who was not part of the participants' classroom staff implemented the intervention. The apparent failure of Social Stories to become an embedded part of the classroom routine may be partially attributed to a non-staff person implementing the intervention. Previous studies have almost exclusively used parents or classroom teachers as intervention agents and this may have affected the likelihood of the social story continuing after data collection ended. However, with exception of Thiemann and Goldstein (2001), previous studies have not reported maintenance data. Future studies should continue to examine the maintenance of Social Stories with classroom

personnel and parents, focusing on procedures for establishing lasting behavior change.

A second potential limitation was the use of a reversal design. As discussed, the withdrawal of intervention may not have allowed participants sufficient exposure to produce durable treatment effects. A single subject design that does not incorporate a withdrawal of treatment, such as a multiple baseline design (Kennedy, 2005), may be better suited for evaluation of Social Stories. The third limitation was the lack of a prompt only condition for Daniel. Because the effects of prompts were not observed independently, it is not know whether his behavior change was a function of the prompts alone, or the pairing of prompts with the Social Story. Social Stories with prompts or a prompt-only intervention may be more effective for certain children or for certain behaviors. Future research should include a component analysis of the critical features of Social Story design and implementation procedures, as well as an analysis of which features and procedures are most effective given specific participant characteristics.

Results indicate several additional areas for future study. First, because this was only the second study to focus on Social Stories with preschool children with ASD (see also Kuoch & Mirenda, 2003), additional replications are needed to confirm the efficacy of intervention with this population. Second, the maintenance data suggest that future studies should evaluate whether teachers and parents continue to use Social Stories after data collection ends, whether or not additional strategies are required to embed Social Stories within natural classroom routines, and should assess the durability of intervention for periods longer than 3 weeks (e.g., 3 months, 6 months, 1 year).

Similarly, given the time-consuming nature of reading a Social Story prior to each activity, procedures for fading a social story from the instructional setting should also be assessed. Gray (1995) suggested that the length of time a child needs a Social Story may vary. To date there has not been a systematic evaluation of the optimal length of intervention or the relevant participant characteristics that could determine an appropriate duration of use. Finally, along with Crozier and Tincani (2005), this study successfully incorporated the use of verbal prompts with the Story Social to increase participants' prosocial behavior, an issue identified by Scattone et al. (2002). Strategies for fading such prompts from the instructional setting while maintaining

gains in appropriate behavior and reductions in challenging behavior are also needed.

Appendix A: Participants' Social Stories

Text for James' Social Story

Playing with Friends
My name is James.
We have centers at school.
Friends can play together at centers.
Sometimes we use toys together.
Sometimes we play beside our friends.
We keep our hands and feet to ourselves when we play.
I will try to share toys with my friends.
I will try to keep my hands and feet to myself.
It is fun to play together.
My friends are happy when I play nicely at centers!

Text for Thomas' Social Story

Sitting at Circle
My name is Thomas.
We have circle time at school.
The kids sit on the carpet with the teacher.
The kids sit and watch the teacher.
Sometimes we sing and read at circle.
I will sit on the carpet with my friends at circle time.
I will look at the teacher in circle.
My teacher is happy when I sit at circle!

Text for Daniel's Social Story

Talking with friends at snack
My name is Daniel.
We have snack at school.
Friends talk and share at snack.
Some friends say ''Hi!''
Some friends ask for a drink.
Some friends ask for more snack.
I can say ''Hi'' to my friends.
I can ask for more snack.
Friends are happy when we talk at snack!

Appendix B: Treatment Integrity Checklist

Treatment Integrity Checklist
   Student: ………………………
   Date: ………………………
   Location: ………………………
   Observer: ………………………

Step	Completed?
Sit at table across from student	
Book on table in front of student	
Read book with student	
Encourage student to look and point to story	
Tell student it's time to do activity in story	
Direct student back to activity	

Appendix C: Social Validity Questionnaire

Social Story™ Study

Teacher Questionnaire

Please complete this brief questionnaire on the study conducted in your classroom. Thank you for your participation and cooperation!

1. Do you find the social story intervention easy to use and understand?
2. Will you use the social stories with the participants in the study when the study is over?
3. Do you think you will consider using social stories with your students in the future?
4. What do you consider to be the pros and cons of using social stories?

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