ANALYSIS OF A SOCIAL STORY INTERVENTION TO INCREASE APPROPRIATE SOCIAL INTERACTIONS OF INDIVIDUALS WITH AUTISM

By

Heidi Hillman

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Chairperson L. Keith Miller

_____
Jan Sheldon

_____
Pamela Neidert

_____
Jomella Watson-Thompson

_____
Meagan Patterson

Date Defended: April 11, 2011

The Dissertation Committee for Heidi Hillman certifies
that this is the approved version of the following dissertation:

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_____
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_____
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Abstract

This study used a multiple baseline across participants to examine the effectiveness of a social story intervention in increasing appropriate social behaviors in four individuals with an Autistic Disorder in a home setting. During baseline, participants demonstrated few appropriate social behaviors. Although an increase in appropriate social behaviors occurred for all four participants after the social story intervention was implemented, a greater increase was seen for two of the four participants. Appropriate behaviors for two of the participants were maintained up to 10 months during follow-up probes and for two of the participants, the data were variable during the intervention phases. This study extended the current research by (1) assessing the effects of comprehension questions, as part of the social story protocol, on increasing social interactions of individuals with autism; (2) assessing the level of program survival after the departure of the researcher; (3) assessing maintenance of the social skill behaviors; and (4) assessing the extent to which parents rated the effectiveness of social stories. The study also included participants ranging from five years of age through 18 years of age and was conducted in a home setting.

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Chapter 1
Introduction

Autistic Disorder, one of the more severe forms of pervasive developmental disorders (e.g., Mark, Reber, & Batshaw, 1997), is characterized by early onset of impairments in social interaction and communication and unusual, restricted repertoires of activity and interests. Manifestations of the disorder vary greatly depending on the developmental level and chronological age of the individual. In the behavior analytic view, "Autistic Disorder is a syndrome of behavioral deficits and excesses that have a biological basis but are nonetheless amenable to change through carefully orchestrated, constructive interactions with the physical and social environment." (Green, 1996. p. 74).

During the past decade, the number of children and youth diagnosed with an Autistic Disorder has increased approximately 173%, making it the fastest growing developmental disability in the United States (Autism Speaks, 2008). Several population-based studies have reported the disorder's prevalence of 3.4 and 6.7 per 1,000 individuals, respectively, or in other words the prevalence of individuals with Autistic Disorder ranges from 1 per 500 to 1 per 150 (e.g., Center for Disease Control, 2006; Center for Disease Control, 2007; Newschaffer, Falb & Gurney, 2005; Yeargin-Allsopp, Rice, Karapurkar, Doernberg, Boyle & Murphy, 2003). Most recently, Kogan et al. (2009) published data showing that the prevalence of parent-reported children with Autistic Disorder was 1 per 91 among children ranging in age from three to seventeen years old.

Many professionals consider Autistic Disorder to be a spectrum disorder with low-functioning students with Autistic Disorder and intellectual disability at one end of the spectrum and students with Asperger's Disorder at the other (Wing, 1981). In order to be diagnosed with Autistic Disorder or Asperger's Disorder, a child must have the onset of symptoms prior to the

age of three and display at least six of the twelve criteria listed in the Diagnostic and Statistical

Manual of Mental Disorders (DSM-IV-TR) (American Psychiatric Association, 2000). Both

disorders include qualitative impairments in nonverbal behavior, eye-to-eye gaze, social

reciprocity, and language development. As is evident by the definition, individuals with an

Autistic Disorder can present very different symptoms. However, all individuals diagnosed with

the disorder display some deficits in social interaction and social communication skills (Kanner,

1943). Because deficits in functional language and social interaction are a defining characteristic

of individuals with an Autistic Disorder, it is important to increase appropriate social

interactions. For the purpose of this paper, I will be using the term autism to refer to both

Autistic Disorder and Asperger's Disorder.

Social Deficits in Individuals with Autism

Researchers have identified the need for an increased emphasis on social skill

development to promote greater social competence (e.g., Gresham, Sugai, & Horner, 2001;

Ogilvy, 1994; Kolb & Hanley-Maxwell, 2002; Korinek & Popp, 1997; Sugai & Lewis, 1996).

Although individuals with autism express interest in the social world, their lack of social skills

creates lifelong challenges when interacting and communicating with peers and adults (e.g.,

Church, Alisanki, & Amanullah, 2000). Early on, individuals with autism often avoid being in

close proximity with others, even with their parents (Wing, 1997). Individuals may exhibit

inappropriate social behaviors, such as talking "at" another person or asking questions but do not

use communication (verbal or non-verbal) to direct the attention of people around them, known

as joint attention (Wing, 1997). Wing (1997) reported that many individuals with autism engage

in inappropriate or socially embarrassing behavior, such as temper tantrums, aggression,

destructiveness, restlessness, screaming, grabbing objects from shop counters, removing clothing in public, and running away, because they lack the understanding of the rules of social behavior.

As individuals with autism become school-aged and reach adulthood, the deficits in social behavior may become more apparent and more critical. Social interaction skills are critical for successful integration of students with autism into the regular education environment, and independent living is not possible unless some degree of social engagement skills are attained (Coots & Falvey, 1989; Koegel, 2000). Impairment in the use of verbal and nonverbal communication and odd social behaviors often deters others from socializing with the individual with autism, furthering social isolation. The lack of appropriate social behaviors may sometimes be accompanied by aggression and self-injurious behavior (e.g., Mesibov & Handlan, 1997) and that may lead to further social discrimination. Students without effective or age-appropriate social communication skills have a greater probability of peer relationship difficulties or peer rejection (e.g., Rubin & Clark, 1983). Consequently, these individuals may be more likely to develop behavioral problems than their peers (e.g., Ollendick, Weist, Borden, & Greene, 1992).

"Students with social communicative skill deficits are subject to academic and behavioral difficulties, and may be more likely to experience a variety of poor adult outcomes, including antisocial behavior" (Michelson & Mannarino, 1986, p. 373). In summary, due to the fact that social skills are an important aspect of our daily lives, improving social functioning is one of the most important intervention outcomes for individuals with autism (e.g., Jacobson, Mulick, & Green, 1998; Kamps & Tankersley, 1996; Odom, McConnell, & McEvoy, 1992; Ozonoff & Miller, 1995).

Social stories

One popular intervention strategy for individuals with autism is social stories (e.g., Gray, 1995; Gray & Garand, 1993; Sansosti, Powell-Smith, & Kincaid, 2004). Social stories are short "stories" written to describe specific social situations that have been identified as troublesome for individuals with autism. The story—written at the individual's level and from their point of view—describes appropriate behaviors and the appropriate stimuli to set the occasion for these behaviors (Gray, 1995). Social stories have been used to teach social skills, provide instruction on appropriate behavior during specific activities (e.g., homework completion, eating, following directions), to prepare individuals for new routines, and to teach replacement behaviors for inappropriate behaviors (e.g., chair tipping, talking out) in individuals with autism (e.g., Adams, Gouvousis, VanLue, & Waldron, 2004; Bledsoe, Myles, & Simpson, 2003; Crozier & Tincani, 2005; Ivey, Heflin, & Alberto, 2004; Thiemann & Goldstein, 2001)

Social stories explain social concepts and situations, describe necessary components, and suggest expected responses (e.g., Gray, 1996; Gray & Garand, 1993). However, it is important that the complexity of the information presented in the social stories match the individual's language comprehension abilities. For example, social stories may include pictures and/or be taped for non-readers (Quill, 2000). Within this perspective framework, social stories can be individualized to specific situations and to individuals of varying abilities and lifestyles.

Gray and Garand (1993) were the first to describe social stories in a professional journal. They reported—with anecdotal evidence—that social stories improved the behavior of four school-aged children with autism, by reducing the frequency of their aggressive behavior (e.g., kicking, hitting, head banging) and decreasing the amount of teacher prompts needed during daily activities.

Gray and Garand (1993) proposed that a child with autism presumably lacks the ability to "assume the perspective of another person" (p. 2). They stated that social stories provide the child with "an accurate understanding of the situation in which the behavior occurs, minimize potentially confusing instructional interactions, and provide the child direct access to social information" (p. 2). Gray and Garand argued that once the appropriate information is presented the new skills can be practiced in the target situation but that minimal support should be provided.

Social Story Protocol

Social stories are generally short and contain six sentence types: descriptive (states when a situation will occur), perspective (provides information about thoughts and feelings of others), affirmative (highlights concepts such as rules), cooperative (provides descriptions of the roles of other individuals in the situation), directive (states the correct response to the situation) and control (provides strategies for how to act in future similar situations) sentences. It is noteworthy to mention that Gray (2000) does not cite specific research to provide a rationale for adhering to these guidelines. Rather she suggests, "the guidelines for writing social stories are based on the learning characteristics of students with Autistic Disorder and Asperger's Disorder" (Gray, 1998, p. 167). Even though there are no studies that provide direct empirical support for Gray's guidelines, most researchers who have evaluated a social story intervention have followed her guidelines.

Gray and Garand (1993) described a protocol outlining how the social story should be read. The adult initially reads the social story out loud to the child with autism, with the adult sitting to the side and slightly behind the child. After the initial reading, the child reads the story independently. If the child is unable to read, the story can be recorded on cassette and the child

uses the tape recorder, turning the page when prompted, so that the child can "read" the story independently. Following each reading of the social story, Gray and Garand recommend a test of the material covered in the story be conducted using three comprehension questions, asked by an adult and answered by the child. If the child answers a comprehension question incorrectly, the child is directed to re-read the social story and find the correct answer; after re-reading the social story, the comprehension question is asked again. When the child answers all three comprehension questions correctly, a situation should be set up to allow the child to practice the new skills learned via the social story. It is important to note that Gray and Garand did not provide any empirical evidence to support the use of this protocol.

Research on Social Stories

Even though social story interventions are used frequently with individuals with autism and previous research articles suggest an increase in appropriate behaviors of individuals with autism, there are a limited number of well-controlled investigations supporting their effectiveness (e.g., Chan & O'Reilly, 2008; Kuoch & Mirenda, 2003; Lorimer, Simpson, Myles, & Ganz, 2002; Norris & Dattilo, 1999; Reynhout & Carter, 2006; Rogers & Myles, 2001; Thiemann & Goldstein, 2001).

The author conducted a review of social story studies published after 1993 analyzing the effects of social stories on behaviors of individuals with autism. The literature review began at 1993 because the first journal article describing social stories was published in that year (Gray & Garand, 1993). The author searched *PsychInfo, First Search,* and *Proquest* (1993-2009) using the keywords "autism" and "social stories" and found 53 articles. The reference sections of all located sources were reviewed for additional sources not appearing in the on-line searches. Articles were examined to identify studies in which the authors empirically studied social stories

using single-subject designs—such as AB, AB reversal designs, and multiple baseline

experimental designs; twenty-eight studies were found. See Table 1 for a summary of the

findings.

Table 1: Results of social story literature review

Authors	Participant	Age	Setting	Target Behavior	Outcome	Social Validity	Maintenance	Comp. Checks
Adams, Gouvousis, VanLue, & Waldron, 2004	1 male	7 yrs	Home	Disruptive Behavior	Decreased by 50%	Yes	not reported	No
Barry & Burlew, 2004	1 male 1 female	7 & 8 yrs	School	Social Skills	Increased by 70%	No	not reported	No
Bernad-Ripoll, 2007	1 male	9 yrs	School	Labeling emotions Explaining emotions	Increased by 50% Increased by 70%	No	Not reported	No
Bledsoe, Myles, & Simpson, 2003	1 male	13 yrs	School	Food spills Wipe mouth	Decreased by 20% Increased by 10%	No	not reported	No
Brownell, 2002	4 males	6-9 yrs	School	Disruptive behavior	Decreased by 40%	No	not reported	No
Chan & O'Reilly, 2008	2 males	5 & 6 yrs	School	Inappropriate behaves Appropriate social	Decreased by 40% Increased by 35%	Yes	2 probes: 2 and 7 month	Yes
Crozier & Tincani, 2005	1male	8 yrs	School	Disruptive Behavior	Decreased by 50%	Yes	2 probes over 2 week period	Yes
Crozier & Tincani, 2007	3 males	5 years old	school	Talking and playing with peers	Increased by 60%	Yes	2 probes 3 weeks after study	Yes
Delano & Snell, 2006	3 males	6-9 yrs	School	Social Skills	Increased by 50%	Yes	not reported	Yes
Dodd et al. 2008	2 males	9; 12 yrs	Home	Decrease directions; complimenting	Decreased by 43% Increased 19%	Yes	3 probes over 3 weeks for P1	Yes
Hagiwara & Myles, 1999	3 males	7-9 yrs	School	On task	Increased by 2%	No	not reported	No
Ivey, Heflin, & Alberto, 2004	3 males	5-7 yrs	School	Novel social events	Increased 15% to 30%	Yes	not reported	No
Kuoch & Mirenda, 2003	3 males	3, 5, & 6	Home & School	Social Skills	Decreased by 50%	No	yes	No
Kuttler, Myles, & Carlson, 1998	1 male	12 yrs	School	Tantrum behaviors	Decreased by 90%	No	not reported	No
Lorimer, Simpson, Myles, & Ganz, 2002	1 male	5 yrs	School	Tantrum behaviors	Decrease by 90%	No	Not reported	No
Mancil, Haydon, and	2 male 1 female	6yrs-9yrs	School	Pushing	Decreased by 50%	Yes	Not reported	No

Whitby (2009)					Decreased by 40% Decreased by			
Norris & Dattilo, 1999	1 female	8 yrs	School	Inappropriate social interactions	Decreased by 50%	No	Not reported	No
Ozdemir, 2008	3 males	7-9	School	Disruptive behavior	Decreased by 51% Decreased by 37% Decreased by 52%	Yes	2 probes	No
Quilty, 2007	3 students	6; 10 yrs	School	Inappropriate behavior	Decreased by 50% Decreased by 20%	No	3 probes over 9 week period	No
Reichow & Sabornie, 2009	1 male	11 yrs	School	Verbal greeting initiations	Increased by 60%	No	Not reported	No
Reynhout & Carter, 2007	1 male	8 yrs.	School	Tapping of hands	Decreased by 22%	No	3 probes over 1 week period	Yes
Sansosti & Powell-Smith, 2006	3 males	9-11 yrs	School	Social Skills	Increased 32% and 80% for two participants	Yes	3 probes over 2 week period	No
Sansosti & Powell-Smith, 2008	3 males	6 -10 yrs	School	Social Communication	Increased by 45% for all three	No	4 probes over 2 week period	No
Scattone, 2008	1 male	9 yrs	Med clinic	Eye contact Smiling Initiations	Increased by 90% Increased by 0% Increased by 40%	No	One datum point	Yes
Scattone, Tingstrom, & Wilczynski, 2006	3 males	8, 13, 13	School	Appropriate social interaction	Increased by 3% Increased by 32% Increased by 15%	Yes	Not reported	Yes; only once in beginning
Scattone, Wilczynski, Edwards, & Rabian, 2002	3 males	7-15 yrs	School	Disruptive Behavior	Decreased 45% for two males; 11% for third	Yes	Not reported	Yes
Swaggart et al., 1995	3 males	7-11 yrs	School	Social Skills	Increased by 30%	No	Not reported	No
Thiemann & Goldstein, 2001	5 males	6-12 yrs	School	Approp. Social skills Inapprop. Social skills	Increased by 40% Decreased by 50%	Yes	6 probes over 6 week period	Yes

Participants and target behaviors. Fifty-five children diagnosed with Autism Disorder—53 boys and two girls—participated in the reviewed studies. Their ages ranged from five-15 years old (M = 7.88 years old). Participants' communication skills ranged from non-verbal—communicating by manual signs or gestures—(Kuttler et al., 1998; Thiemann & Goldstein, 2001) to those who verbally communicated. Researchers in seven of the studies (Bernad-Ripoll, 2007; Bledsoe, Myles, & Simpson, 2003; Lorimer, Simpson, Myles, & Ganz, 2002; Norris & Datillo, 1999; Sansosti & Powell-Smite, 2008; Scattone, Wilczynski, Edwards, & Rabian, 2002; Thiemann & Goldstein), noted the participants' cognitive abilities based on standardized test results.

The 28 reviewed studies addressed various social behaviors—as shown in Table 1. Thirteen studies targeted social skills; eight targeted tantrum or disruptive behaviors; one targeted on-task behaviors; one study targeted preparation for novel social events; one targeted eating behaviors; and one targeted labeling and explaining emotions of others.

Twenty-four studies took place in a school setting; two studies took place in a home setting; one study took place in a school and home setting; and one study took place in a medical clinic setting.

Comprehension checks. Following each reading of the social story Gray and Garand (1993) recommend a test of the material covered in the story be conducted using three comprehension questions—asked by an adult and answered by the child. Eight of the 28 reviewed studies included social story comprehension checks as part of the intervention, however, only seven asked comprehension checks after each reading of the social story. None of the authors of the eight studies reported data referring to how many of the comprehension questions the participants answered correctly.

Program survival. Even though studies analyzed maintenance of the target behaviors after completion of the social story intervention, none of the authors of the reviewed studies analyzed

whether the social stories were being used during the maintenance period, only whether target behaviors remained at intervention levels.

Maintenance. Researchers in twelve of the 28 reviewed studies reported maintenance data. Results indicate that the behaviors maintained above baseline levels; however an average of three data points collected over two weeks makes it difficult to assess the effectiveness. More studies assessing the long-term maintenance of behavior change across several months or even a year after the completion of the study is recommended.

Social validity. In addition to examining experimental rigor, maintenance and generalization of social story studies, social validity should be established for goals, procedures, and outcomes when deciding whether a proposed intervention is effective. Wolf (1978) proposed social validity as a way for society to validate the social significance of an intervention's effectiveness. Social validity assessments allows society to validate the acceptability of the intervention by stating whether the intervention is socially appropriate, whether the behaviors targeted for change are deemed socially important, and whether the effects of the intervention are considered socially important or have meaningful clinical significance (Wolf, 1978). Social validity can also lead to assessing program sustainability (Baer, Wolf, & Risley, 1987). Of the 28 social story studies reviewed, researchers in 13 studies reported social validity measures. Researchers should continue to explore whether and how teachers and families perceive benefits from the use social stories.

Effectiveness. Researchers in the 28 reviewed studies, as shown in Table 1, reported positive outcomes. One way to assess effectiveness of social story interventions is to visually inspect the data and compare the data with the authors' conclusions. Numerous studies exhibited a degree of variability and overlapping data. For example, Adams et al., (2004) stated social stories were effective; however, visual inspection of the data showed a high rate of within condition variability. When taking the variability into account, there was not much change in behavior from

baseline to intervention conditions. Sansosti and Powell-Smith (2006) reported social stories effective; due to overlapping data within the intervention condition, however, there was only a nine percent increase between baseline and intervention conditions. In addition, baselines were unstable prior to social story implementation in many of the reviewed studies. Future research demonstrating baseline stability prior to social story implementation is recommended.

When interpreting the results, it is important to be cautious. First, authors in three studies (i.e., Adams et al., 2004; Bledsoe, 2003; Kuoch & Mirenda, 2003) showed that the dependent variable did not return to baseline levels after the social story intervention was removed. However, all three studies used a reversal design. The reversal design is not suitable for evaluating interventions that teach a new skill because those behaviors usually do not exhibit the property of reversibility, and the results may suggest the intervention was not effective when it actually was (e.g., Martella, Nelson, & Marchand-Martella, 1999).

Second, evaluation of the efficacy of social stories was confounded in five of the studies where unplanned additional strategies were used. For example, three studies (Kuoch & Mirenda, 2003; Reynhout & Carter, 2007; Scattone et al., 2002) reported the teachers provided unplanned verbal prompts telling the participants what behaviors they should be exhibiting. In two studies (Kuttler et al., 1998; Swaggart et al., 1995), tangible reinforcers (e.g., edibles, stickers) were used to reward participants for engaging in target behaviors. Hence, it is unknown whether the additional unplanned strategies were required for the social stories intervention to be effective. Finally, in regard to target behaviors, two studies (Hagiwara & Myles, 1999; Ivey & Heflin, 2004) included participants displaying high rates of appropriate behaviors, and one study (Scattone et al.) included participants displaying low rates of inappropriate behaviors prior to the implementation of the intervention. Due to target behaviors being close to intervention level at the start of the study, one

needs to be cautious in concluding that the social story intervention caused the change in the behavior.

Discussion and Purpose of Current Study

A total of 28 social story articles were reviewed. This review indicates that social stories show promise in reducing problem behavior and improving social interactions in individuals with Autism (Ali & Frederickson, 2006). Even though the social story research base is limited it is likely social stories will continue to be a popular intervention among parents and professionals alike. After reviewing the social story literature, several strengths came to light. Social stories have the advantage of being age-appropriate, individualized to each participant, target behavior and setting, thereby facilitating maintenance of the social skill behaviors. Strategies that incorporate both a lifestyle change approach and program for maintenance and generalization are currently considered best practice when working with individuals with autism (National Research Council, 2001). Given this, future research regarding the effectiveness of social story interventions is needed.

Even though social stories are promising and have several strengths, several areas of improvement need to be considered. First, as noted earlier Gray and Garand (1993) recommended that comprehension questions be asked after each reading of the social story. Only eight of the 28 studies reviewed conducted comprehension checks; however none of those studies provided data on whether the comprehension questions were answered correctly or incorrectly. The author of the present study addressed this limitation by including comprehension questions, and collecting data on whether participants correctly answered the questions after each social story reading. In addition, the author examined the effects of comprehension questions on the target social skill behaviors.

Second, additional research in the area of continued implementation of social stories after departure of researcher (program survival) is needed. Even reporting when interventions are not used after the departure of the researcher is a step in the right direction. Data on whether social

stories are used after the departure of the researcher may provide valuable data showing whether social stories are needed to maintain target behaviors at intervention levels. In addition, assessing whether social story interventions are continually being used after completion of the research study is one way to demonstrate sustainability of an intervention (e.g., Baer, 1989). None of the reviewed studies reported information regarding use of social stories after the researcher departed the setting. The author of the present study addressed this limitation by collecting monthly data, for up to nine months, and reporting on whether the parents in the study continued using the social story intervention after the departure of the researcher.

Third, further research is required regarding maintenance of target behaviors after completion of the social story intervention. Due to the lifelong social skill difficulties faced by individuals with Autism Disorder, it is imperative to collect information on whether behaviors taught through social stories maintain over time. The author of the present study addressed this limitation by collecting weekly and monthly maintenance probes on whether the target behaviors (appropriate social behaviors) maintained at intervention levels after completion of the study.

Fourth, social validity measure of social stories were reported in 13 articles (Ivey et al., 2004; Sansosti & Powell-Smith, 2006). Wolf (1978) proposed social validity as a way for society to validate the social significance of an intervention's effectiveness. This assessment can also lead to assessing program survival (Baer, Wolf, & Risley, 1987). The author of the current study included social validity measures, by asking the parents to rate the effectiveness of the social story. Two of the parents rated the social story intervention as effective in increasing social behaviors whereas the other two parents rated the social story as ineffective. Research should continue to explore whether teachers and family perceive social stories to being beneficial.

Finally, additional research in the area of naturalistic settings (i.e., home setting) would be helpful. Social skill behaviors are necessary in all areas of social engagement, not just in the school

setting. Demonstrating that social stories are effective both in structured and naturalistic settings would indicate that social stories are effective in various environments and would bring social stories closer to being an evidenced-based approach. Additionally, three researchers (e.g., Dunlap & Koegel, 1999; Sugai et al., 2000) have emphasized the need to offer interventions in natural settings to increase sustainability and facilitate generalization. These three studies demonstrated promising results for using social stories in a home setting. However, these three studies included a total of four participants across three studies, thus far more research needs to be conducted involving home settings to warrant the effectiveness of social stories in home settings.

Purpose of Study. Social stories appear to be a somewhat effective method to teach social behaviors to individuals with an autism spectrum disorder. The purposes of the present study were to assess: (1) the effects of comprehension questions as part of the social story protocol addition to social stories on increasing social interactions of individuals with autism; (2) the level of program survival after the departure of the researcher; (3) maintenance of the social skill behaviors; and (4) the extent to which parents rated the effectiveness of social stories. The study also included participants ranging from five years of age through 18 years of age and the study was conducted in a home setting.

Chapter 2

Methods

Participants and Setting

Four individuals with an Autistic Disorder and their parents served as participants in this study. Three of the four participants were recruited following a presentation on social stories presented by the researcher at a local Autism/Asperger Parent Support group meeting in which the researcher mentioned that participants were needed for a study analyzing the effects of social stories. The fourth participant was referred for participation by his school counselor. A qualified physician diagnosed all participants with Autistic Disorder previously. Each participant had the following characteristics: (a) all but Jonas were enrolled in a public school and were integrated into a regular classroom with supports (e.g., assigned para-professional, current Individualized Educational Plan (IEP)), (b) all had functional verbal communication, (c) all were at age-appropriate reading levels and all but Jonas read their own social stories, and (d) ability to follow directions. In addition, the participants demonstrated impairments in social functioning including: lack of social involvement with peers and difficulty responding to initiations from others. The researcher, through interviews with the parents and observations, verified these characteristics. The participants are described next.

Jonas. Jonas was a Caucasian male, 5 years old at the start of the study and was not enrolled in any formal education. Jonas' family previously worked with the researcher on increasing Jonas' consumption of fruits and vegetables. Jonas' mother, who participated in the study, was a stay at home mother of two, Jonas and his younger brother.

Josh. Josh was a Caucasian male, 9 years old at the start of the study and was enrolled in the third grade at the local elementary school and was at grade level in all his classes. Josh had a current IEP and was assigned a full time 1:1 para-professional to help him stay on task and help with in-

class assignments. Josh was not receiving any other special education services. Josh's mother, who participated in the study, worked the night shift in order to be home during the day. Josh's father worked a full time job that included monthly business trips.

Chris. Chris was a Caucasian male, 7 years old at the start of the study and was enrolled in the first grade at the local public elementary school. He had a current IEP that provided him with extra time for in-class assignments, and a modified schedule that allowed him to go into PE class and Pep Assemblies five minutes prior to the other children due to sensory overstimulation during these activities. Chris also had a schedule of the daily classroom activities taped to his desk. During recess, if he preferred, he could stay with the janitor instead of going to recess with his peers. Chris' father, who participated in the study, was a stay at home dad. Chris's mother worked full time as a family physician; however she took the initiative in enrolling Chris and his father in the study. Her rationale was she wanted Chris' father to take a more active role in working with Chris developing appropriate social skills.

Luke. Luke was a Caucasian male, 18 years old at the start of the study and was a senior at the local public high school. He took all the regular senior classes and performed at or above grade level in all his classes. Luke had a current IEP that stipulated extra time to complete assignments, both in class and out of class, and tests. In addition, he took some classes online at the high school in order to receive more one-on-one instruction from the instructor. Luke also received one hour of speech therapy twice a week with the school's speech therapist. Luke was referred by the school counselor due to frequent outbursts in response to directions given by teachers. For example, on the day he was referred, he told the teacher he would hit her and throw her out the window because he did not want to sit down at his desk. Luke's mother, who participated in the study, was a stay at home mother and very knowledgeable about behavior analysis. Since Luke's diagnosis of Autistic

Disorder, she took an active role in locating and participating in home-based behavior analytic

programs geared towards individuals with autism.

Written consent was obtained from the individuals with Autistic Disorder and their parents,

except for Jonas where only parental consent was obtained. All study sessions occurred in the

participants' homes, specifically the family/dining rooms.

Dependent Variables

Data were collected via direct observation on participants' rates of three target behaviors,

not mutually exclusive, during weekly 20-min sessions in the child's home. The target behavior for

Josh and Luke was "following directions" and was defined as the participant completing one, or a

series of, verbal requests within 15 seconds of the request given. The target behavior for Chris was

"appropriate social interactions" and was defined as (a) agreeing (e.g., head nod, "yeah") with a

peer, (b) answering a peer's question, (c) responding to a peer with a related comment about objects

or events within the ongoing activity, (d) asking a question related with the ongoing activity, or (e)

uttering statements related to the ongoing event. The target behavior for Jonas was "appropriate

play" and was defined as (a) playing with peer without hitting the peer, (b) playing with a peer

without pinching the peer, (c) playing with peer with same activity but not directly interacting

during play, (d) responding to peer while playing with a peer, or (e) asking a peer for a toy and

waiting for the peer to hand over toy without hitting the peer or taking the toy away by force.

Data were also collected on answering comprehension questions. Each participant was asked

three comprehension questions, after each social story reading, selected from a list of

comprehension questions the researcher developed prior to implementing the social story condition

(see Appendix A for a list of the target comprehension check questions). Correct responses were

followed with, "yes, that's correct!" If the participant provided an incorrect response, the researcher

directed the participant to reread the relevant page and the question was restated until the participant made a correct response.

Data collected included the number of occurrences a participant engaged in either the target behavior or an inappropriate behavior. For example, the number of times a parent gave a direction was collected along with the number of times a participant followed the direction.. If a parent gave a direction and the participant did not follow the direction after 15 s, the parent repeated the same direction. That was recorded as two possible opportunities. Appropriate play and appropriate interactions were measured using duration of the interactions. During each session the researcher started a stop watch when the participant was engaging in appropriate play or interactions and stopped the watch when the participant ceased engaging in the appropriate behavior.

Design

A multiple baseline across participants experimental research design (Baer, Wolf, & Risley, 1968) was used to demonstrate experimental control across four participants. Baseline conditions ranged from three to six session with at least one datum point delay across legs; social story conditions ranged from 14 to 16 sessions; follow-up probes ranged from three to nine probes, with at least three follow-up probes for each participant.

Social Story Development

The researcher met with each of the participants' parents for target social skill selection. After deciding on a target behavior, the operational definition of the behavior was written and approved by both the researcher and the parents prior to the development of the social story. A social story was written for each participant—based on the target social skill. Each social story was written using the formula described by Gray and Garand (1993). The reading grade level of each social story was evaluated using Microsoft Word Flesch-Kincaid Grade statistic so that social stories matched the participants' reading levels. After the social story was written, the researcher

met with each family and took pictures to use as visuals in the social stories. The text was presented

on white paper with a 3x5 picture of the participant above the text and the font size was 18 points.

Three participants (Jonas, Chris, and Josh) had social stories where pictures of the participant

engaging in the target social skill accompanied each page of the social story. Luke said he did not

want pictures in his social story, so his social story was typed out on one page without pictures.

Refer to Appendix B for two samples of social stories used in the study.

Procedure

  Baseline. All sessions took place in the participants' family/dining room portion of their

house. The researcher talked socially with the participants and their parents for approximately five

minutes prior to the start of each session. During baseline, participants were observed during 20-

min sessions that were scheduled during times in which engagement in the target social skill would

be appropriate (as identified by the parents). Observation times were 5:00pm, 3:30pm, 4:30pm, and

3:30 for Jonas, Josh, Chris, and Luke respectively. Frequencies of target behaviors were recorded

during each session using the aforementioned definitions.

  These observations were conducted twice a week until stable rates of the target behaviors

were observed. No changes to the home environment or routine were made during baseline.

  Social Stories intervention. All sessions took place in the participants' family/dining room

portion of their house. The researcher socially talked with the participants and their parents for

approximately five minutes prior to the start of each session. The researcher then asked the

participant to get his social story and bring it back to where the researcher was sitting. The session

consisted of three steps: (1) reading the story out loud, (2) answering three comprehension

questions, and (3) practicing the target social skill. These steps were always presented in this order.

All the participants, except Jonas, read their own social story. Josh, Chris, and Luke sat on a chair,

and the researcher sat behind and slightly to the side of them. Jonas sat next to the researcher while

the researcher read the social story out loud. After reading the social story, the researcher asked the participant three comprehension questions.

After the comprehension question check, participants were given the opportunity to practice the target social skill. For the practice sessions, Jonas was paired with his younger brother in pre-arranged play sessions set up by his mother. Josh's practice sessions consisted of his mother asking him to follow a set of directions. Chris' practice sessions consisted of either playing outside with at least three other similar aged neighbor children or playing with his younger brother. Activities consisted of either riding bicycles outside or playing on Chris' two story play fort. Luke's practice sessions consisted of his mother asking Luke to engage in school activities (e.g., practicing xylophone, looking at homework planner and doing homework) or household chores (e.g., folding laundry and taking it upstairs). Data were collected for 20 minutes beginning after the participant correctly answered all comprehension questions. During this condition specific verbal prompts to engage in the target social skill were delivered by the researcher if the participant was not engaging in the appropriate social skill. Prompts were behavior specific and related to the social story. (i.e., "What do you say to Joe if you want to join him riding bicycles?" Or, "what do we do when we want a toy someone else is playing with?"). Praise was delivered when the participant engaged in the appropriate target social skill. Between weekly sessions parents were asked to have their children read their social story once a day, prior to participant engaging in the target skill, and self-report every time their children read their social story.

Follow-up probes were conducted for each participant: weekly for Jonas and Chris, weekly and monthly for Josh, and monthly for Luke. All follow-up probes took place in the participants' family/dining room portion of their house. The researcher talked socially with the participants and their parents for approximately five minutes prior to the start of each follow-up probe. The researcher then asked the parent(s) whether they were using the social story and what their

"procedure" for using the social story was. The follow-up probes were similar to the social story condition except that the parents led the session while the researcher observed.

Inter-observer Reliability and Treatment Fidelity

The researcher was the primary observer during the study; the parents were used as secondary observers for the purpose of assessing inter-observer reliability. The researcher and parents reviewed the definitions of appropriate interactions prior to data collection. The researcher and the parents independently recorded participant behavior (occurrence of appropriate interaction) during at least 25% of sessions, across participants. No reliability data were collected during baseline conditions or follow-up conditions, across participants. Interobserver reliability was calculated by totaling the number of agreements on target behaviors (i.e., both observers scored the participant's behavior the same) divided by the number of agreements and disagreements (i.e., observers scored the participant's behavior differently) and converting this ratio to a percentage.

Interobserver reliability data were collected for Jonas during 25% of sessions for Jonas. Reliability was 80% (range, 70-100%). Reliability data were collected for Josh during 33% of sessions. Reliability was 91% (range, 80-100%). Reliability data were collected for Chris during 25% of sessions. Reliability was 87% (range, 64%-100%), and all but one score (64%) was above 80%. Reliability data were collected for Luke during 33% of sessions. Reliability was 93% (range, 66-100%), and all but one score (66%) was above 80%.

To assess reliability during baseline sessions (and as an additional assessment of reliability during social story conditions), archival data were also gathered from archival videos taken during baseline and social story conditions. The researcher and a research assistant concurrently (but independently) viewed the videos and recorded data on the target behavior. Sessions were divided into equal length (1-min) intervals. For each interval, an agreement was defined as both observers recording the same number of target behaviors in an interval. Interobserver agreement (reliability)

was calculated by dividing the total number of agreements by the total number of intervals (agreements plus disagreements), and converting this ratio to a percentage.

Interobserver reliability data were collected for one baseline condition and two social story conditions for Jonas. Reliability was 92% (range, 90%-95%). Interobserver reliability data were collected for one baseline condition and two social story conditions for Luke. Reliability was 97% (range, 90%-100%). Interobserver reliability data were collected for two social story conditions for Josh. Reliability was 97% (range, 95%-100%). Interobserver reliability data gathered via videos were not collected for Chris, whose father did not allow research sessions to be video recorded.

The researcher recorded data on her implementation of treatment components by completing a fidelity data sheet (see Appendix F) after every social story session across participants. Treatment implementation consisted of the researcher: (a) having the participant sit next to the researcher; (b) having the participant reading the social story or reading the social story to the participant; (c) asking the first comprehension question; (d) asking the second comprehension question; (e) asking the third comprehension question; (f) providing praise for correct answers; and (g) having the participant to practice the skill during a 20-min session. To assess integrity of the treatment implementation, an independent observer collected treatment integrity data for two social story sessions, across participants. These data were gathered via a review of videos taken during social story conditions. The independent observer recorded the researcher's behavior on the fidelity data sheet while watching the video. The observer's data was compared to the researcher's data, and agreement was defined as both observers recording the same number of completed treatment components. The observer reported that the researcher implemented the treatment with 100% fidelity for social-story sessions assessed.

Chapter 3

Results

Data are reported for frequency of participants engaging in the appropriate social skill. Figure 1 shows the percentage of the target social skills for the four participants (Jonas, Josh, Chris, and Luke) during baseline, social story condition, and follow-up probes. Follow-up probes were conducted weekly for three of the participants (Jonas, Josh, and Chris) except for Luke whose follow-up probes were conducted monthly because he had started taking community college courses and was not readily available weekly.

As shown in Figure 1, data for all four participants indicate the social stories intervention helped increase the target social skills. For Jonas, implementation of the social stories resulted in an increase in appropriate play, increasing from an average of 15% during baseline to 44% during social stories and prompts. However, the data were very variable within the social stories condition. During follow-up, one probe each week for three weeks, appropriately playing began to decrease to 30%. It would have been interesting to see whether Jonas' behavior returned to baseline levels however his parents decided to discontinue the project due to not seeing positive effects of the social story on Jonas' playing behaviors.

For Josh, implementation of the social stories intervention resulted in a steady increase in following directions, increasing from an average of 10% during baseline to 70% during social stories condition. During follow-up, one probe each week for three weeks and then monthly thereafter for six months, appropriately following directions remained near 80%.

For Chris, implementation of the social stories plus prompts resulted in a steady increase in appropriate social interactions, increasing from an average of 28% during baseline to an average of 70% during the social story condition. Appropriate social interactions, however, remained at 80% for the last five sessions within the social story condition. During follow-up, one probe each week

for four weeks, Chris' appropriate interactions began to decrease from 80% to 55%. It would have been interesting to examine whether Chris' behavior would continue to decrease; however Chris' father decided to discontinue participation due to their busy schedule.

For Luke, implementation of the social story condition resulted in an immediate increase in following directions, increasing from an average of 30% during baseline to an average of 75% during social story intervention. During follow-up, one probe each month for five months starting three months after the end of the social story plus prompts condition, Luke's following directions initially decreased to 65% but slowly increased to 80%.

Figure 1. Percentage of appropriate interactions across participants Jonas (playing), Josh (directions), Chris (social interactions), and Luke (directions).
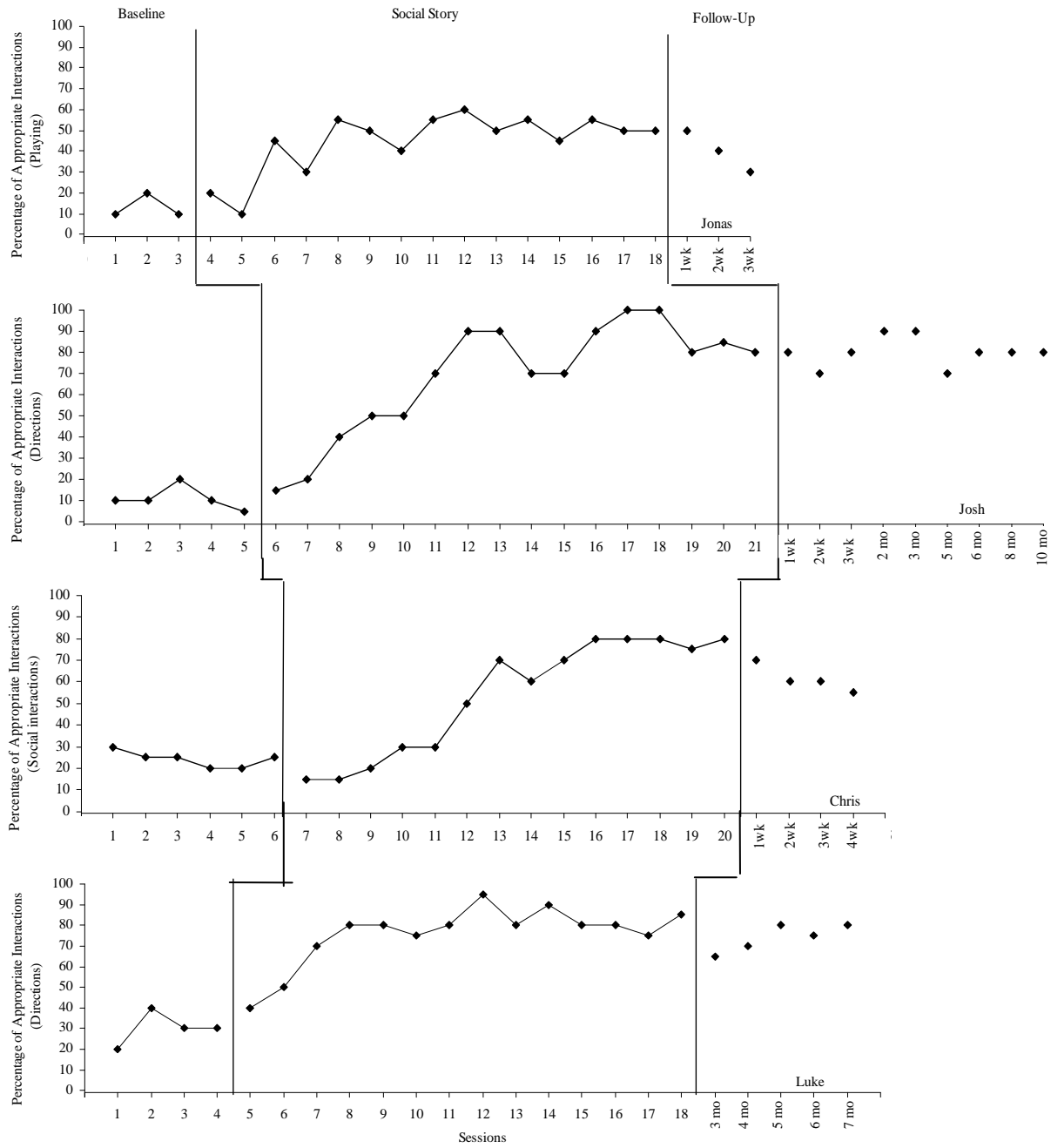
Comprehension questions. During the social story intervention condition, each participant was asked three comprehension checks following the reading of his social story. Figure 2 shows the number of comprehension questions answered correctly, ranging from zero to three questions. Comprehension questions were only asked during the social story plus prompts condition.

Jonas correctly answered an average of two comprehension questions per session, however the data were variable within condition. The comprehension question Jonas answered incorrectly was, "when you want to play with a toy another person has what would you do?" Jonas' most frequent response was to take the toy away or hit the person who has the toy. Every time Jonas answered the question incorrectly, he was directed to read the social story where it provided the correct answer. However, the data show that Jonas correctly answered all three comprehension questions only three out of fifteen sessions, or 25% of the sessions.

Josh correctly answered an average of three comprehension questions per session. Josh initially answered two of the three comprehension questions correctly the first two sessions; however he correctly answered all three comprehension questions in 14 of the 16 sessions.

Chris correctly answered an average of 2.5 comprehension questions per session, however the data were variable. Chris answered all three comprehension questions correctly in 10 of the 14 sessions, answered two of the three comprehension questions correctly in three of the 14 sessions, and answered only one comprehension question correctly during the initial session.

Luke correctly answered an average of 2.5 comprehension questions per session. The data show a trend. Luke would correctly answer two of the three questions correctly for one or two sessions, followed by answering all three questions for three consecutive sessions, followed by correctly answering two of the three questions for a session.

Figure 2. Number of comprehension questions answered correctly across for all participants.
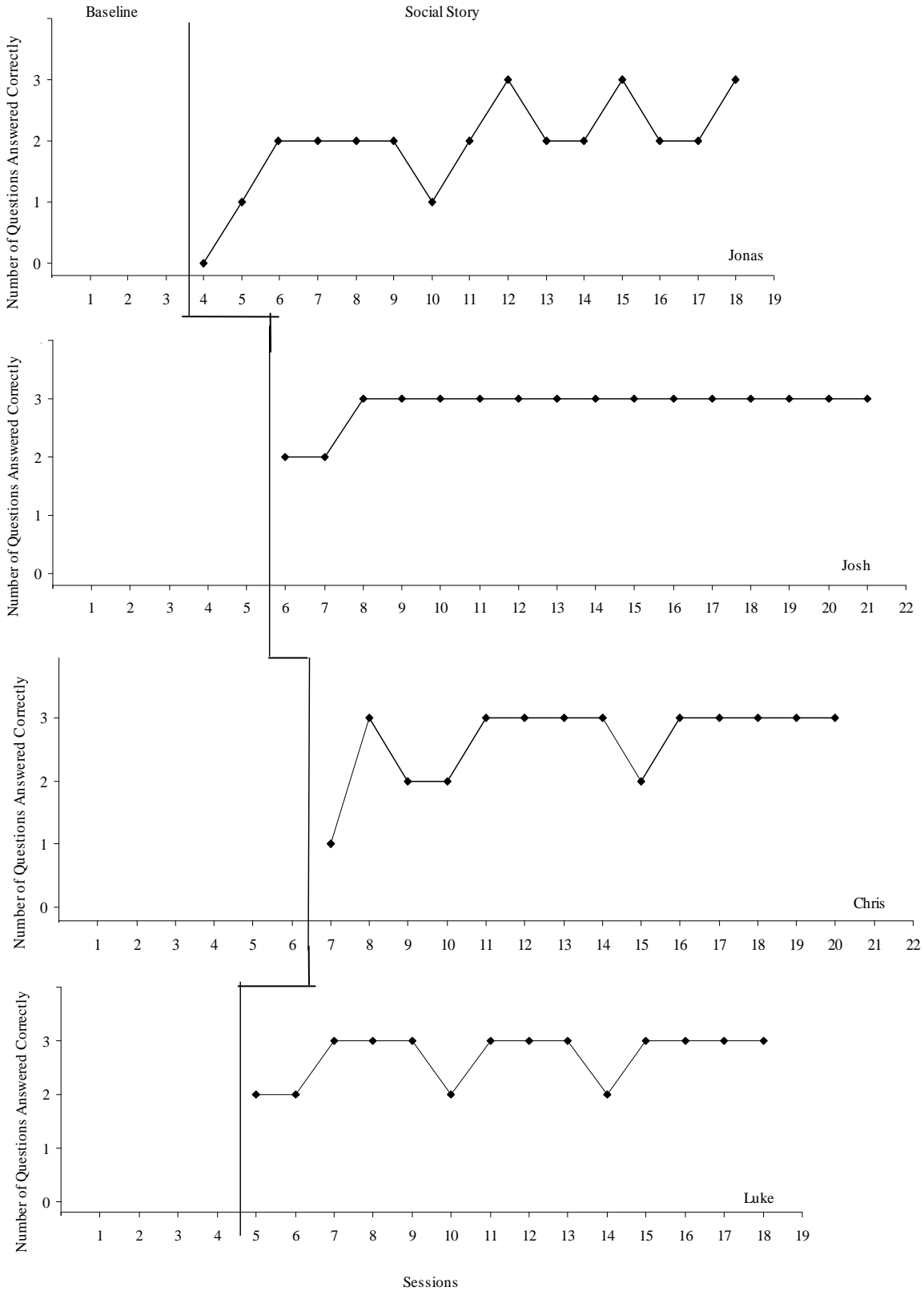
Further analysis of comprehension questions was conducted to determine whether there was a relationship between correctly answering the questions and engaging in the appropriate social skill. Gray and Garand(1993) argued that comprehension checks are important since the individual has to understand the skill before he or she can engage in it. Figure 3 shows the relationship between participants correctly answering comprehension questions and engaging in the target social skills. These data indicate that correctly answering the comprehension questions does not necessarily lead to an increased engagement of the target social skills. For example, Jonas was correctly answering an average of two comprehension questions per session—however he was engaging in appropriate play only 44% of the time.

Figure 3. Comprehension questions answered and engagement in target social skill for all participants.
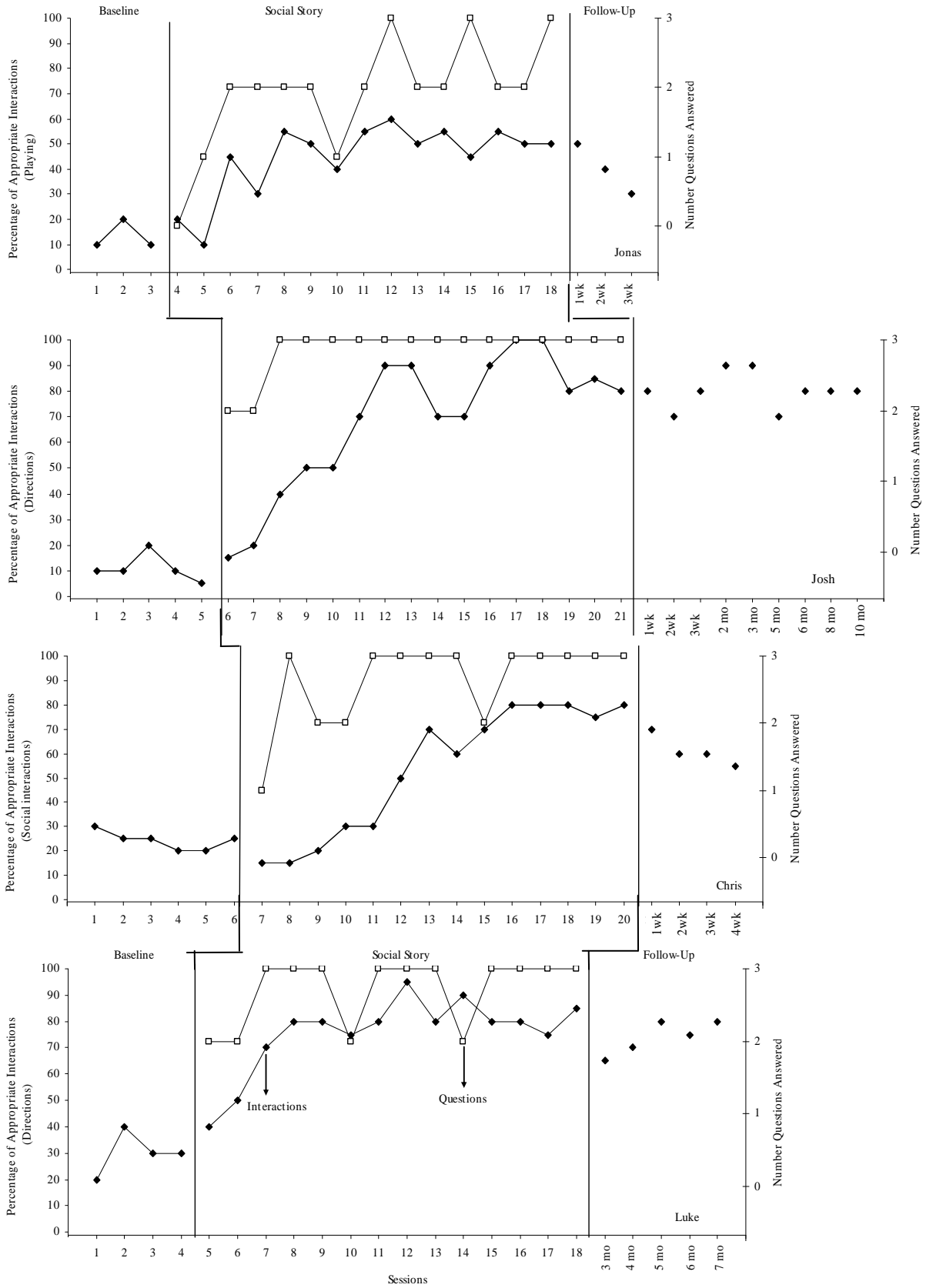
Program survival. A secondary purpose of the study was to analyze continued implementation of the social stories by the parents after the researcher departed the setting (program survival). See Figure 1 for follow-up data. During each follow-up probe the researcher observed whether the parents used the social stories; parents were also asked whether they were using the social stories implemented during the study. The degree of implementation varied among the four participants.

Jonas' parents reported at the first and second follow-up probe they were still using the social story; at the third follow-up probe, however, they reported not using the social story and began using a token system where Jonas' received a star for every time he played nicely with his brother. Jonas's parents decided to withdraw from the study after the third follow-up probe.

Josh's mother reported at all the follow-up probes she was consistently using the social story. In addition, she developed a social story focusing on Josh's father being away from the family so much due to business travel, and used that story when Josh's father was away on business. At 12 months follow-up Josh's father informally mentioned to the researcher that Josh was following directions "almost all the time now" after the initial request. Josh's mother was so happy with the results of the social story she told Josh's teacher about social stories and the teacher developed her own social story for Josh in the classroom. An anecdotal follow-up probe was conducted at 12 months via e-mail (no data collected) and Josh's dad said they were only using the social story about once every couple of weeks since Josh was consistently following directions. At that time Josh's parents decided to withdraw from the study.

Chris' father reported at the first follow-up probe he was not using the social story on a regular basis because he "would be too busy to use the story". The same response was given at the second and third follow-up probe. Chris' father decided to withdraw from the study after the fourth

follow-up probe due to lack of time. The follow-up data show that Chris' target behavior, appropriate social interactions, rapidly decreased during follow-up.

Luke and his mother reported at the first two follow-up probes she was having Luke read his social story every day when he returned from school, depending on whether he was consistently following directions after her first request. Luke graduated from high school between the second and third follow-up probe. Luke and his mother reported he was reading his social story about every other day—depending on whether Luke followed directions after his mother's first prompt. Luke has since started college at the local community college after the seventh-month follow-up probe.

Social Validity. Directly before follow-up data were collected, the parents (primarily the parent who participated in the study most frequently) were asked to complete a survey evaluating the usefulness of social stories. Questions included whether the parents thought social stories were a valuable treatment and whether social stories were easy to implement in the home setting. See Appendix E for a copy of the social validity survey given to the parents.

Jonas' mother and father both completed the survey and reported they did not find the social story useful. Chris' father completed the survey and reported he thought the social story was easy to implement however he did not find it a useful intervention. Josh's mother completed the survey and she thought the social story intervention was easy to implement as well as it was useful. During the study she had developed a separate social story to use with Josh when Josh's father was on business trips. Luke's mother thought the social story intervention was easy to implement however she mentioned she would need to have more time using it to decide whether it was a useful intervention. However, she said she did notice a change in Luke's behavior after implementation of the social story.

Chapter 4

Discussion

The present study examined the effects of a social story intervention on increasing appropriate social behaviors in four individuals with Autistic Disorder.

All four participants had gains in appropriate social behaviors; the rate of appropriate social behavior was higher after the introduction of the social story condition for each participant, than it was during baseline condition. However, two of the four participants, Josh and Luke, demonstrated the most significant increases in behavior after the introduction of the social story condition. Though the other two participants, Jonas and Chris, had gains in their appropriate social behaviors, the data were considerably variable, with both participants returning to baseline levels during follow-up. Since appropriate social behaviors for each participant increased after the implementation of the social story intervention, this suggests that the social story intervention was responsible for the increase in behaviors. Therefore, it is reasonable to conclude that the social story intervention was effective in increasing appropriate social behaviors.

This study extends the current literature on social stories by assessing the effects of comprehension questions as part of the social story protocol, assessing the level of program survival after the departure of the researcher, assessing maintenance of the social skill behaviors, and assessing how parents rated the effectiveness of social stories. In addition, the study was conducted in a home setting.

Although it is not possible to establish the exact variable responsible for the effectiveness of the social story intervention in increasing target behaviors, parents' involvement may be an important factor. Those families, Josh's and Luke, who reported using the social stories consistently in between the weekly sessions had participants who showed greater gains in appropriate behaviors after implementation of the social story intervention, and maintained those gains during follow-up

more so than those families, Jonas and Chris, who reported not consistently using the social stories in between weekly sessions. During the social story intervention, Joshs' and Luke's families reported they used the social stories three and four times each week. The families reported at each follow-up probe they were still using the social stories weekly. The two participants, Jonas and Chris, whose target behaviors decreased during follow-up probes were from families who reported using their social stories once or twice each week, during the social story intervention. The families reported at each follow-up probe they discontinued using the social stories.

This leads to an interesting question. Why did two families regularly use the social story whereas two families did not? A possible reason may be the cost-benefit-ratio for each family. For the families who did not see sustained change, reading the social stories with their children may have been arduous. In addition, the parents who reported on their social validity surveys the social story intervention was not useful in increasing social behaviors were the same parents who reported not consistently reading the social stories. For example, Chris' father continually mentioned he "would forget" to have Chris read the social story every day even though after school Chris primarily was out interacting with the neighbor children, which was the target behavior for Chris. Possibly the time consuming nature of reading a social story prior to each activity precludes parents from implementing the social stories consistently.

Another possible reason may be the apparent failure of effectively embedding the reading of the social story into the families' schedules. Having parents identify convenient times for them and their children to read the social stories may increase the likelihood of the social stories being utilized regularly during the intervention and follow-up conditions alike.

In regard to Chris' father not regularly using the social story, a more plausible reason may be that since Chris' mother signed Chris and his father up for the study, even though Chris and his father agreed to participate, Chris' father did not have a vested interest in the social story

intervention. This underscores the importance of including parents in social story implementation, measuring parents' perceptions of the usefulness of social stories as well as effectively embedding social stories into the families' schedules.

This raises another question. If the two families reported not consistently using the social stories, why did appropriate behaviors increase during the social story intervention condition but were not maintained during the follow-up condition? One possible explanation may be the researcher reading the social story weekly with the participants had an effect on the target behaviors. This may indicate it is unnecessary to read social stories every day in order to have desired effects. Gray (1995) suggested that the number of times an individual needs to read a social story may vary from individual to individual. However, to date no systematic evaluation of the optimal number of times a social story should be read has been conducted. The loss of treatment gains during follow-up probes for Jonas and Chris further indicates that social stories need to be read with some frequency to maintain the benefit from their desired effects. Evaluation of the number of times a social story needs to be read in order to be effective seems to be an important topic for future studies.

Effectiveness of social stories. It is the author's opinion that the principles of applied behavior analysis are more likely the responsible features of successful social story interventions, rather than the social stories themselves. Three variables are occurring when social stories are implemented: antecedents, description of target behavior, and consequences. First, social stories provide an antecedent, for the target behavior, in two ways. Social stories provide the individual with a rule regarding the target behavior. In addition, social stories provide an antecedent for the person (e.g., parents) working closely with the individual with autism. Daily reading of the social story reminds the parent what the target behavior is. This may lead to parents engaging in more

behaviors relevant to the individual's target behavior. For example, parents may provide more cues to evoke the target behavior and provide reinforcement when the appropriate behavior occurs.

Second, social stories provide a description, or the topography, of the target behavior. Social stories explain when a behavior occurs, why it occurs, and what the behavior looks like. Finally, social stories describe consequences (e.g., my parents will be happy) for the target behavior. A social story describes social consequences (e.g., my parents will be happy) as well as sets the stage for the individual to come into contact with natural reinforcers. For example, a story that encourages a student to use better table manners at school would likely result in natural positive reinforcement, an increase in peers eating at the same table. All forms of reinforcement increase the probability the appropriate behavior will occur in the future.

Even though authors of previous social story research attribute behavior change to the social stories themselves, this author believes social stories include all the components of a good rule. Thus, it may be the rule, presented through the social story, that is changing target behaviors.

Limitations and Directions for Future Research

This study provides several directions for future research. While this study extends the current literature, various methodological areas need to be addressed. First, in the current study, social stories, prompts, and comprehension checks were combined into one intervention; this makes it difficult to assess whether social stories alone or other components were effective in increasing the social behaviors. Future studies should analyze the critical components required for effective social story implementation by initially implementing social stories by themselves and then systematically introducing the other components, such as prompts, reinforcement, and comprehension checks. In addition, research isolating social story comprehension checks is encouraged when attempting to find a functional relationships between social stories and a change in target behaviors. For example, researchers could compare sessions where comprehension

questions are asked to sessions where comprehension questions are not asked. This would strengthen the current social story research base by analyzing whether comprehension questions are critical components for social stories to be effective.

Second, in the current study, three of the participants read their own social story out loud and one participant had his social story read to him. In most of the existing studies, either an adult or peer read the social stories to the participants. To date, there are only two published studies (Scattone,et al.,2002; Thiemann & Goldstein, 2001) in which the participant read his/her social story aloud to another person. However, no studies have investigated how reading a social story affects comprehension and behavior change. Thus, the difference between participants reading their own story versus participants having the social story read to them warrants further investigation.

Third, even though the current study included follow-up data and continued implementation of the social story after researcher departure (program survival) data, it is recommended researchers continue studying these two variables due to their importance in analyzing the effectiveness of social story interventions. As noted previously, few published studies provided follow-up data and no study provided program sustainability data. Due to the lifelong social skill difficulties faced by individuals with Autistic Disorder, it is imperative to collect information on whether social skills taught through social stories maintain over time.

Fourth, in the current study social validity was assessed only once, at the completion of the intervention, by having parents complete a survey. Since social validity refers to validation of goals, outcomes, and procedures (Wolf, 1978) by consumers (who can include parents) it may be necessary to evaluate social validity several times throughout the intervention. This is a limitation that needs to be addressed in future research. Instead of assessing social validity once during the entire study, assessment of social validity may need to be collected several times during the social story condition.

Fifth, the current study does not provide generalization data. This limitation is fairly straight forward and could easily be addressed in future social story studies. In the future, researchers may want to analyze how well the participants display the target social skills behaviors in various environments, with several different people.

Finally, the current study does not provide comparative data of the appropriate social behaviors of the participants to similar-age peers following the introduction of the social story intervention. This is a limitation since the goal of most social skills interventions is to have the individual with autism display the social behaviors towards other children or adolescents. One way to study the effectiveness of social stories on appropriate social behaviors is to compare appropriate social behaviors of the participants with same-age peers. Comparison data may shed light on whether the appropriate behaviors achieved during the social story intervention were socially valid.

This study evaluated the effects of a social story intervention in four individuals with Autistic Disorder. The results of this study add to the growing literature base of social stories. Though the results are promising, the current research must be replicated while addressing the limitations and considering the recommendations. This study provides support that a social stories intervention can increase appropriate social behaviors and maintain the gains months after the researcher has departed the setting.

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Appendices

Appendix A

Target comprehension check questions

Jonas: Playing nicely with others social story

1. What do I say when someone has a toy I want to play with?

2. What else can I do while I am waiting for the toy?

3. How do I play nicely with others?

Josh: Listening and following directions social story

1. What should I say when I do not understand the direction given?

2. When others are talking to me what should I do?

3. What places do I listen to my mom and dad at?

Chris: Playing with others social story

1. When I want to play with other kids what do I say to them?

2. While I am playing, when other kids talk to me what do I do?

3. If I do not want to play with other kids what should I say and do?

Luke: Following instructions social story

1. What do I do when my mom or dad gives me an instruction?

2. When I do not understand an instruction given, what should I say?

3. When my mom or dad gives me an instruction and I argue with them, what will happen?

Appendix B

Sample Social Stories for Following Directions
Actual story is printed on 81/2 x 11 paper with story on bottom and 3x5 picture of participant
placed above the story.

Listening and Following Directions		
Listening and Following Directions **Josh's Social Story** 1	My name is Joshua. I go to school and live in Washington. I am learning to listen and follow directions. 2	At school I listen to the teachers. School is where I learn new things. Listening is important for learning. 3
If I do not hear or understand what an adult says, I use my words to say, "Will you repeat that?" 4	At home I listen to mom and dad. Home is where I live, relax, and learn. I stay safe and learn to do many things at home. 5	People at home and at school know I am listening when I look at them. When I listen, I am quiet. I let the other person talk. 6
I am learning to listen when mom and I go places. This is an important time to listen. 7	I listen to mom and dad when I am given directions at home and at places like Wal-mart, at the grocery store, and at the library. 8	I listen to my mom and dad the first time I am given directions. Following directions the first time makes mom and dad happy. 9
If I do not understand what I am supposed to do, I use my words to say, "I do not understand. Can you repeat that?" 10	Sometimes I will not want to follow directions. Even if I do not want to do something, I still listen and follow directions the first time. 11	For example, when mom and I are going places and mom asks me to walk next to her. I may not want to walk next to mom, but I still listen and follow mom's direction the first time she states it. 12
If I am not able to do something or do not understand what I am supposed to do, I use my words to ask for help. 13	Listening and following directions is important. I can learn new things and stay safe by listening and following directions. 14	

Sample story for Following Directions story without pictures

Actual story is printed on 8 ½ x 11 paper without pictures

Lukes' Social Story Following Instructions

My parents know a lot and they can help me learn lots of new things. How to follow instructions is an important skill to learn. If I follow my parents' instructions I will demonstrate I am responsible and mature. In the future I may get more freedom and be able to do what I want. All of us, even adults, are given instructions that we have to follow almost every day of our lives. If we follow them without protest or arguing there will be less conflict and everyone will be happier. When I promptly follow instructions I will have the task completed and will be able to engage in activities I enjoy.

When my mom or dad gives me a direction I will first stop talking and look at either mom or dad. Next I will listen to the instruction so that I will know what to do. Next I will acknowledge the instruction by saying, "OK." If I do not understand the instruction I will ask for more information. I can something like, "I do not understand, can you explain the instruction again?"

Sometimes writing the instructions down on paper can be helpful. If I have a hard time remembering the instructions or if I do not understand the instruction I can ask the person to write the instructions down on a piece of paper.

After my parents give me an instruction I will say, "I'll do it" and follow the instruction. During the interaction with my parents I will not argue or complain because if I argue or complain my parents may take away privileges or fun activities. However, if I immediately follow the instructions my parents will let me do a fun activity.

When I follow instructions I will be happy because I will not lose privileges, my parents will be happy with me, and in the future they may give me more freedom to do what I want to do because following instructions demonstrates I am responsible.

Appendix C

Sample Data Sheet and Scoring Instructions for Appropriate Social Behaviors

(**AG**) agreeing (e.g., head nod, ''yeah'') with a peer

(**AN**) answering a peer's question

(**RE**) responding to a peer with a related comment about observable objects within the ongoing activity

(**C**) confirming or clarifying a question or comment from the peer (e.g., ''What did you say?'')

(**QU**) requesting attention or acknowledgment from peers (e.g., ''Hey!'' ''See this?'' or ''Look.'')

(**CA**) calling the peer's name to gain attention

(**EN**) expressing enjoyment to the peer regarding their interaction together (e.g., ''This is fun!'')

(**ST**) uttering statements related to the ongoing topic or event.

Using the key above, for appropriate interactions, in the APPROPRIATE column circle the letter that best corresponds with the behavior exhibited by the participant. Inappropriate interactions should be scored as a simple frequency with vertical marks.

MINUTE	APPROPRIATE	INAPPROPRIATE
1	AG AN RE C QU CA EN ST	
2	AG AN RE C QU CA EN ST	
3	AG AN RE C QU CA EN ST	
4	AG AN RE C QU CA EN ST	
5	AG AN RE C QU CA EN ST	
6	AG AN RE C QU CA EN ST	

Appendix D

Sample Data Sheet and Scoring Instructions for Appropriate Play

(**PP**) playing with a peer, same activity but not directly interacting

(**RE**) responding to a peer with a related comment about observable objects within the ongoing activity

(**ASK**) asking peer for toy and not taking toy by force

(**QU**) requesting attention or acknowledgment from peers (e.g., ''Hey!'' ''See this?'' or ''Look.'')

(**EN**) expressing enjoyment to the peer regarding their interaction together (e.g., ''This is fun!'')

(**ST**) uttering statements related to the ongoing topic or event.

Using the key above, for appropriate interactions, in the APPROPRIATE column circle the letter that best corresponds with the behavior exhibited by the participant. For Inappropriate interactions , in the INAPPROPRIATE column circle appropriate behavior exhibited by participant.

MINUTE	APPROPRIATE	INAPPROPRIATE
1	PP RE ASK QU EN ST	Pinching hitting taking toy pushing other
2	AG AN RE C QU CA EN ST	Pinching hitting taking toy pushing other
3	AG AN RE C QU CA EN ST	Pinching hitting taking toy pushing other
4	AG AN RE C QU CA EN ST	Pinching hitting taking toy pushing other
5	AG AN RE C QU CA EN ST	Pinching hitting taking toy pushing other
6	AG AN RE C QU CA EN ST	Pinching hitting taking toy pushing other

Appendix E

End of story social validity survey given to parents directly before follow-up data were collected.

<u>Social Story End of Study Questionnaire</u>
<u>(participant's name here)</u>

1. Have you noticed any changes in (participant) behavior since the beginning of the social story study? If yes, what kind of changes have you noticed?

2. Have you noticed any changes in (participant) social behavior since the beginning of the social story study? If yes, what kind of changes have you noticed

3. Have you made any other observations or do you have any other comments to make about the social story study?

4. Do you see social stories as a valuable treatment for children with autism?

5. How easy do you think the social stories were to implement and use in the home setting?

Appendix F

Treatment Integrity Data Sheet

Instructions: Circle +/- or N/A for each step listed below.

Step		Score
1	Researcher sits behind or to the side of participant	+ -- N/A
2	Social story is read by the participant	+ -- N/A
3	Social story is read to participant by the researcher	+ -- N/A
4	After story researcher asks comprehension question	+ -- N/A
5	Researcher asks a second comprehension question	+ -- N/A
6	Researcher asks a third comprehension question	+ -- N/A
7	Researcher follows correct response with "yes!" or "good job."	+ -- N/A
8	Researcher follows participant's incorrect response with prompt to look in the story.	+ -- N/A
9	Researcher re-asks the question after participant looks in the story for correct answer.	+ -- N/A
10	Practice session begins within 5 minutes after story ending.	+ -- N/A