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Effectiveness of Social Stories™ for children with Autism Spectrum Disorders

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EFFECTIVENESS OF SOCIAL STORIES™ FOR CHILDREN WITH

AUTISM SPECTRUM DISORDERS

by

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Abstract

This study evaluated the effectiveness of Social Stories™ for children with Autism

Spectrum Disorders (ASD), by beginning to address three serious methodological

shortcomings in previous studies: (1) not using experimental research designs, (2) not

isolating Social Stories™ as the sole independent variable, and (3) not following Gray's

guidelines for writing and presenting Social Stories™. This study also examined the

minimum receptive language level required to benefit from Social Stories™. Fifteen boys

with ASD, between the ages of 27 and 92 months, participated. Participants were divided

into 4 groups based on their receptive language levels on the *Mullen Scales of Early*

Learning. The mean receptive language levels for Groups 1 to 4 were 13.75, 24.00,

31.50, and 45.25 months, respectively. A multiple baseline design was used for each

group. Lead therapists were 13 mothers, 1 father, and 1 teacher. Data were analyzed

using visual inspection. Three of the 4 participants in Group 4 demonstrated immediate,

notable downward shifts in level in their respective, challenging target behaviours

following intervention. By contrast, only 1 or 2 of the participants in Groups 1 to 3

demonstrated changes in their respective target behaviours following intervention. Thus,

the changes in these groups could not be reliably attributed to the Social Stories™. The

results provide support for the use of Social Stories™ to decrease challenging behaviours

in most children with receptive language at or above the 37-month level, plus or minus a

few months. The results also suggest that children's receptive language is a reasonably

good predictor of whether or not they will benefit from this intervention. Social validity

of Social Stories™ was assessed using a modified version of the *Treatment Evaluation*

Inventory Short Form. Most lead therapists considered Social Stories™ to be acceptable

and effective, even for children who did not show behaviour change. Furthermore, child

participants seemed to like this treatment. Recommendations are provided for parents,

clinicians, and researchers.

Acknowledgments

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Chapter I: Introduction

Children with Autism Spectrum Disorders display severe and pervasive

impairment in several areas of development (American Psychiatric Association,

Diagnostic and Statistical Manual of Mental Disorders text revision [*DSM-IV-TR*],

2000). Social difficulties may arguably be the most notable (Kabot, Masi, & Segal, 2003;

Olley & Gutentag, 1999; Perry & Condillac, 2003). A child with severe social deficits

may show no interest in people, no communication, and no copying or pretend play

(Wing, 1988). By contrast, a child with mild social deficits may be unable to engage in

two-sided conversations or empathize with others' emotions. Children at both ends of the

spectrum are likely to suffer from peer rejection (Perry & Condillac, 2003). Also, as

adults, they may have difficulty retaining steady employment due to a lack of

understanding of workplace etiquette and relationships among employees and supervisors

(Myles & Simpson, 2001).

It was once believed that the symptoms of Autism Spectrum Disorders were

untreatable (Ozonoff & Rogers, 2003). Recent evidence now suggests that these

symptoms may be significantly improved with early intervention. A number of symptom

specific treatments exist (Perry & Condillac, 2003). Given the prominence of social

difficulties, and the negative effects they may engender, treatments for social

development are of particular importance. Social Stories[TM], created by Gray (2000), were

designed with this goal in mind.

Social Stories[TM] research is still in its infancy. Presently, it is difficult to ascertain

the effectiveness of Social Stories[TM] because the current research suffers from three

serious methodological shortcomings: (1) not using experimental research designs, (2)

not isolating Social Stories™ as the sole independent variable, and (3) not following Gray's guidelines for writing and presenting Social Stories™ (Ali & Frederickson, 2006; Nichols, Hupp, Jewell, & Zeigler, 2005; Reynhout & Carter, 2006; Sansosti, Powell-Smith, & Kincaid, 2004). It is also difficult to determine the minimum cognitive and language levels that children must attain to benefit from Social Stories™ because the current research does not adequately assess and describe participants' cognitive and language skills (Reynhout & Carter, 2006). Without this information, individuals treating children with Autism Spectrum Disorders are at a loss as to whether to use Social Stories™, and as to which children may benefit. The purpose of this study was to shed light on both of these questions.

I evaluated the effectiveness of Social Stories™ for children with Autism Spectrum Disorders, by beginning to address the serious methodological shortcomings found in previous studies. I also examined the minimum receptive language level required to benefit from Social Stories™, by comparing the responses of participants with a range of receptive language levels to this treatment. Before examining the Social Stories™ literature, Autism Spectrum Disorders and Social Stories™ are defined and discussed.

History of Autistic Disorder

In 1943, Kanner described a group of 11 children who displayed the same five symptoms: an "*inability to relate themselves* in the ordinary way to people" (p. 242), odd or no spoken language, feeding difficulties, fear of loud noises and moving objects, and a desire for sameness indicated by ritualized motor mannerisms and activities. Kanner differentiated this pattern of symptoms from other emotional, behavioural, and

developmental problems, and named it "infantile autism" (Szatmari, 2000). He borrowed

the term "autism" from Bleuler's description of schizophrenia in order to highlight the

social deficits of his newly defined disorder (Szatmari, 2000). Although Kanner was the

first to introduce the term "infantile autism", there were reports of children with similar

behavioural characteristics long before the 20th century (Olley & Gutentag, 1999).

Conceptions of "infantile autism", now called "Autistic Disorder", have shifted

dramatically over the past 60 years (Olley & Gutentag, 1999). Nevertheless, modern

definitions still reflect many of Kanner's original ideas. Three of the five symptoms

Kanner (1943) noted - impaired social interaction, impaired communication, and narrow

repetitive behaviours and interests - are currently essential criteria for Autistic Disorder

(American Psychiatric Association, *DSM-IV-TR*, 2000). Furthermore, the other two

symptoms Kanner noted - feeding difficulties and fear of loud noises and moving objects

- are currently considered to be associated features of Autistic Disorder.

Of all five symptoms, impaired social interaction is considered to be the

fundamental problem for individuals with Autistic Disorder (Kabot et al., 2003; Olley &

Gutentag, 1999; Perry & Condillac, 2003). Impaired social interaction may also be

related to the other core symptom areas: impaired communication and narrow repetitive

behaviours and interests (Olley & Gutentag, 1999; Wing, 1988). Wing (1988) suggests

that there are three separate, but closely related, impairments of social interaction:

impairment of social recognition, impairment of social communication, and impairment

of social imagination and understanding. Each impairment "varies in its overt

manifestations, depending on the severity of the dysfunction" (p. 92), and is described

further below.

Social recognition refers to the ability to identify human beings as the most attractive feature in the environment (Wing, 1988). Individuals with severe deficits in this area may be completely indifferent to people, especially same-aged peers. They may approach others only to gratify basic needs. Although simple physical contact (e.g., tickling) may be tolerated and even enjoyed, there is no interest in the social aspects of the interaction. Dr. Temple Grandin, an author and professor with autism, fit this description as a young child:

> I had little interest in other children, preferring my own inner world. I could
>
> sit on the beach for hours dribbling sand through my fingers and fashioning
>
> miniature mountains. Each particle of sand intrigued me as though I were a
>
> scientist looking through a microscope (Grandin & Scariano, 2005, p. 26).

Individuals with moderate to severe social recognition deficits allow peers to pull them into activities, but do not initiate social contacts. By contrast, individuals with mild to moderate social recognition deficits make active social approaches, but only to discuss their narrow, repetitive interests. In other words, they do not take into account their listener's feelings, interests, or needs. Finally, individuals with mild social recognition deficits (i.e., often adults who were more impaired as children, but have made considerable progress) miss the subtle nuances of social interaction. Their social behaviour may appear typical on brief acquaintance, but look robotic with extended contact. This is because their social behaviour is learned rather than intuitive.

Social communication refers to a two-way exchange of nonverbal and/or verbal social signals (Wing, 1988). Individuals with severe deficits in this area do not communicate with others. Individuals with moderate to severe deficits express their basic

needs (e.g., hunger). Individuals with mild to moderate deficits make brief factual comments. Finally, individuals with mild deficits converse at length, but cannot engage in true two-way exchanges. Instead, they present lengthy monologues or repetitively question their listeners. Dr. Temple Grandin fit this latter description as a grade school student:

> I talked constantly about election posters, buttons, and bumper stickers. I was fixated on the election of our state governor. … Constantly asking questions was another of my annoying fixations, and I'd ask the same question and wait with pleasure for the same answer – over and over again. If a particular topic intrigued me, I zeroed in on that subject and talked it into the ground. It was no wonder I was nicknamed "Chatterbox" (Grandin & Scariano, 2005, p. 39).

Social imagination and understanding refers to the ability to put oneself in the position of another person (Wing, 1988). Individuals with severe deficits in this area show no copying or pretend play. Individuals with moderate to severe deficits copy others' actions (e.g., feeding a doll), but have no understanding of their meaning or purpose. Individuals with moderate deficits engage in spontaneous pretend play (e.g., acting like their favourite TV characters), but show no variation or empathy. Individuals with mild to moderate deficits recognize that people have different thoughts and feelings, but do not know how to go about discovering what they are. For example, Wendy Lawson (2000), an author and psychology graduate student with autism, stated, "I find emotions interchangeable and confusing. Growing up, I was not able to distinguish between anger, fear, anxiety, frustration, and disappointment" (p. 8). Finally, individuals

with mild deficits occasionally identify others' emotions, but cannot empathize with them. For example, Dr. Temple Grandin reported,

> I vividly remember one old episode [of *Star Trek*] ... A monster was attempting to smash the shuttle craft with rocks. A crew member had been killed. Logical Mr. Spock wanted to take off and escape before the monster wrecked the craft. The other crew members refused to leave until they had retrieved the body of the dead crew member. To Spock, it made no sense to rescue a dead body ... But the feeling of attachment drove the others to retrieve the body ... I agreed with Spock ... (Grandin & Scariano, 2005, p. 130 – 131).

Classification of Autistic Disorder

Autistic Disorder is categorized as a Pervasive Developmental Disorder (PDD) according to the American Psychiatric Association (*DSM-IV-TR*, 2000). Impaired social interaction is characteristic of all the PDDs. PDDs also include Rett's Disorder, Childhood Disintegrative Disorder (CDD), Asperger's Disorder, and Pervasive Developmental Disorder Not Otherwise Specified (PDD-NOS). This study addressed only Autistic Disorder, Asperger's Disorder, and PDD-NOS. Asperger's Disorder differs from Autistic Disorder by the presence of age-appropriate self-help skills and cognitive development, and the absence of a clinically significant language delay. PDD-NOS differs from Autistic Disorder by atypical symptomatology, subthreshold symptomatology, and/or late age of onset (American Psychiatric Association, *DSM-IV-TR*, 2000).

Problems of Classification. In practice, Autistic Disorder, Asperger's Disorder, and PDD-NOS are extremely difficult to differentiate. For example, in the DSM-IV field trial, clinicians' agreement on a diagnosis of Autistic Disorder versus non-PDD was excellent (k = .95), but fell considerably when differentiating between Autistic Disorder versus another PDD (k = .68; Volkmar et al., 1994). Similarly, in a more recent study, clinicians' agreement on a diagnosis of PDD versus non-PDD was good (k = .67), but fell considerably when differentiating among Autistic Disorder, Asperger's Disorder, and PDD-NOS (k = .51; Mahoney et al., 1998). Furthermore, several studies have shown that it is almost impossible to meet criteria for Asperger's Disorder without also meeting criteria for Autistic Disorder (e.g., Miller & Ozonoff, 1997; Szatmari, Archer, Fisman, Streiner, & Wilson, 1995). Since the American Psychiatric Association (*DSM-IV-TR*, 2000) states that children who meet criteria for both disorders are preferentially given a diagnosis of Autistic Disorder, the separate diagnostic category of Asperger's Disorder seems redundant (Szatmari, 2000).

Autism Spectrum Disorders. Currently, most professionals use the term Autism Spectrum Disorder (ASD) to refer to Autistic Disorder, Asperger's Disorder, and PDD-NOS due to the difficulties differentiating among these disorders and the similarity in their etiology, course, and response to treatment (Perry & Condillac, 2003; Szatmari, 2000). The term ASD was coined by Wing (1988) and Allen (1988). The word 'spectrum' refers to a continuum of developmental functioning, with Autistic Disorder at the more severe end, Asperger's Disorder at the less severe end, and PDD-NOS in the middle (Perry & Condillac, 2003; Szatmari, 2000). Although several authors have raised questions about the validity of a one-dimensional view of Autistic Disorder, Asperger's

Disorder, and PDD-NOS, their alternative classification system (i.e., the pathways model) has not been widely discussed in the literature (Szatmari, 2000; Szatmari et al., 2002). Consequently, in this paper, when research related to a specific disorder is discussed, the name for that disorder is used (e.g., Autistic Disorder), and when research related to all three disorders is discussed, the term ASD is used.

Description of ASD

Course. ASD is usually diagnosed in early childhood. For example, the average age at diagnosis for Autistic Disorder, Asperger's Disorder, and PDD-NOS in Stafford, UK was between 32.9 and 44.7 months (Chakrabarti & Fombonne, 2005). By contrast, the average age at diagnosis for these three disorders in Ontario, Canada was between 40.96 and 95.67 months (Spadafora, 2005). ASD symptoms tend to diminish as children mature (Ozonoff & Rogers, 2003). Nevertheless, most children continue to meet criteria for ASD as teenagers and adults (Ozonoff & Rogers, 2003). The most powerful predictors of outcome are the presence of communicative speech by age five and the level of cognitive functioning (American Psychiatric Association, *DSM-IV-TR*, 2000; Ozonoff & Rogers, 2003).

Associated Disorders. ASD co-occurs with other disorders, most commonly intellectual disabilities and seizures (Ozonoff & Rogers, 2003). There has been agreement in the literature in the past that approximately 75% of children with Autistic Disorder have intellectual disabilities (Kabot et al., 2003). A recent review, however, has questioned whether the percentage may be lower (Edelson, 2006). Approximately 30% of children with Autistic Disorder have seizures (Kabot et al., 2003). ASD is also associated with tic disorders, anxiety disorders, mood disorders, Fragile X syndrome, Tuberous

Sclerosis, hyperactivity, impulsivity, and self-injurious behaviours, as well as abnormalities in eating, sleeping, and affect (American Psychiatric Association, *DSM-IV-TR*, 2000; Kabot et al., 2003; Ozonoff & Rogers, 2003). ASD is more common in males, with a male to female ratio of approximately 4.3 to 1 (Fombonne, 2003).

Prevalence. ASD was once considered to be extremely rare (Nicolson & Szatmari, 2003). Today, however, it occurs in approximately 6.7 per 1000 children, making it more common than childhood cancer, Down's syndrome, or Cystic Fibrosis (Kabot et al., 2003; Rice, 2007). Several explanations have been advanced to account for the apparent increase in the prevalence of ASD, including broader classification systems, increased awareness, better diagnostic tools, and the existence of yet unknown environmental risk factors (Kabot et al., 2003; Ozonoff & Rogers, 2003; Perry & Condillac, 2003).

Etiology. From 1943 until the early 1960's, it was widely believed that Autistic Disorder was caused by exposure to emotionally cold and rejecting parents (Ozonoff & Rogers, 2003). This line of thinking began to change in 1964, when Rimland provided evidence of an organic etiology. Today, most authorities agree that Autistic Disorder, Asperger's Disorder, and PDD-NOS are related to structural and functional brain differences (Kabot et al., 2003; Tsai, 1999). Neural imaging and post-mortem studies of individuals with ASD have indeed shown a number of brain differences (Perry & Condillac, 2003). For example, it appears that "brain volume is exaggerated ... and corpus collosum size is reduced" (Nicolson & Szatmari, 2003, p. 526). These, however, are the only consistent findings. Studies of most brain areas are inconclusive or

contradictory. "This suggests there may be multiple neurological and developmental pathways to the Autism Spectrum Disorders" (Perry & Condillac, 2003, p. 33).

The atypical brain development found in individuals with ASD appears to have a genetic basis (Nicolson & Szatmari, 2003; Ozand, Al-Odaib, Merza, & Al-Harbi, 2003). Evidence for this assertion stems from four different sources. First, Autistic Disorder is associated with several known genetic disorders, such as Fragile X syndrome and Tuberous Sclerosis (Ozonoff & Rogers, 2003; Rutter, 2000). Second, the concordance rate for Autistic Disorder is higher for monozygotic twins than dizygotic twins (Ozonoff & Rogers, 2003; Szatmari, Jones, Zwaigenbaum, & MacLean, 1998). Third, the recurrence risk estimate of Autistic Disorder (i.e., the chance that each sibling born after a child with Autistic Disorder will develop the disorder) is approximately 9%, a rate that far exceeds the risk to the general population (Ritvo et al., 1989). Reliable recurrence risk estimates for Asperger's Disorder and PDD-NOS are currently unknown, but likely to be similar (Whitelaw, Flett, & Amor, 2007). Fourth, the broader autism phenotype (i.e., an extended set of familial cognitive and social difficulties that are milder, but similar to Autistic Disorder) is found in the families of autistic probands, but not in the families of children with other disorders (Ozonoff & Rogers, 2003). The risk of a sibling exhibiting one or more features of the broader autism phenotype (BAP) may be as high as 30% (Folstein & Rosen-Sheidley, 2001).

Despite acceptance of a genetic basis for ASD and extensive genetic research, no simple genetic model has been found to explain the empirical data (NIH/National Institute of Mental Health, 2008; Ozonoff & Rogers, 2003). The inheritance pattern of ASD seems to be complicated, involving multiple susceptibility genes, in combination

with environmental factors (Ozand et al., 2003; Wassink, Brzustowicz, Bartlett, & Szatmari, 2004). At least 12 genome-wide linkage studies have been completed in order to map the location of potential susceptibility genes (DiCicco-Bloom et al., 2006; Gupta & State, 2007). Although there is minimal agreement among the studies and few findings that reach statistical significance, there is convergence for suggestive linkages on chromosomes 2q, 7q, 16p, and 17q. Close to 100 genes have been evaluated for their association with ASD (Wassink et al., 2004). The cerebellar developmental patterning gene *ENGRAILED 2* has been associated with ASD in several separate studies (DiCicco-Bloom et al., 2006). Other promising candidate genes include *UBE3A* (the gene for Angelman's syndrome), SLC64A (the serotonin transporter gene), and several GABA system genes on chromosome 15q11-13 (DiCicco-Bloom et al., 2006; Gupta & State, 2007; Wassink et al., 2004). Hypothetical environmental causes include infectious diseases, immune factors, chemicals, diet, drugs, and heavy metals (DiCicco-Bloom et al., 2006; Ozonoff & Rogers, 2003).

Interventions. It was once believed that individuals with ASD had little prospect of improvement; however, current research suggests that these individuals can make great strides with early intervention (Ozonoff & Rogers, 2003). A multitude of treatments for ASD exist. For a review, see Perry and Condillac (2003). Treatments that focus on improving social impairments are particularly important for four reasons. First, impaired social interaction is considered to be the core deficit in ASD, regardless of the level of cognitive functioning (Kabot et al., 2003; Olley & Gutentag, 1999; Perry & Condillac, 2003). Second, impaired social interaction may be related to the other core symptom areas: impaired communication and narrow repetitive behaviours and interests (Olley &

Gutentag, 1999; Wing, 1988). Third, impaired social interaction results in a number of negative effects, such not being able to develop and keep friends or retain steady employment (Myles & Simpson, 2001). Fourth, these negative effects may lead to the development of additional psychological symptoms that are not characteristic of ASD, such as anti-social behaviours and depression (Perry & Condillac, 2003). One treatment that focuses on improving social impairments is Social Stories™ (Gray, 2000).

Social Stories™

History and Definition of Social Stories™. Social Stories™ were defined by Gray in 1991 (Gray, 2000). They are brief narratives that describe "a situation, skill, or concept in terms of relevant social cues, perspectives, and common responses" (Gray, 2004, p. 2). Their goal is to provide readers with accurate social information that they may be lacking (Gray, 2000; Gray, 2004). Social Stories™ can be used for multiple purposes (e.g., identifying important social cues, describing another person's point of view, explaining the rationale behind expectations, and introducing novel events or routines), and can be written by almost anyone (e.g., parents, teachers, speech therapists, and psychologists), making them a broad and economical intervention.

Gray developed Social Stories™ while working with children with ASD in school settings (Attwood, 2000). The origin of Social Stories™ separates them from other narrative therapies for children with special needs (e.g., Costantino, Malgady, & Cardalda, 2005; Gardner, 1972; Jennings, 2004). Although the goal of Social Stories™ has remained the same since their inception, the format has been revised several times (Gray, 2000). Currently, Social Stories™ are composed using six different types of

sentences: descriptive, perspective, directive, affirmative, cooperative, and control (Gray, 2004).

Descriptive sentences provide information regarding *"where and when* a situation occurs, *who* is involved, *how* events are sequenced, *what* occurs, and *why"* (Gray, 2000, p. 13-5). In other words, descriptive sentences provide objective answers to the "wh" questions. These sentences are the most frequent, and the only required type of sentence used in Social Stories™ (Gray, 2000; Gray, 2004). Examples include (a) *My name is* _____, and (b) *I usually walk to school at 8:30 a.m.*

Perspective sentences refer to peoples' internal states, such as their thoughts, feelings, and beliefs (Gray, 2000; Gray, 2004). Gray suggested using these sentences only to refer to the readers' internal states if they are known (e.g., *I like the colour blue*), or if they are likely to be true of most people (e.g., *I feel tired if I stay up all night*). Thus, in most cases, these sentences are used to refer to the internal states of others. Examples include (a) *My teacher is happy when I hand in my assignments on time,* and (b) *My brother believes in Santa Claus.*

Directive sentences describe appropriate responses to the situation featured in the Social Story™ (Gray, 2000; Gray, 2004). Gray suggested beginning these sentences with phrases like *I will try* and *I will work* on, rather than phrases like *I will* and *I can*, to allow room for error. She also suggested using positively worded appropriate responses (e.g., *I will try to walk*), instead of negatively worded appropriate responses (e.g., *I will try not to run*), to maintain self-esteem. Examples include (a) *I will try to keep my hands to myself,* and (b) *I will work on keeping my mouth closed when I am eating.*

Affirmative sentences "stress an important point, refer to a law or rule, or reassure" (Gray, 2004, p. 8). They usually follow a descriptive, perspective, or directive sentence and help to enhance its meaning. Examples (in bold) include (a) *Most people eat items from the four basic food groups at every meal.* **This is a smart thing to do**, and (b) *Sometimes my dog barks.* ***This is okay.***

Control sentences identify strategies that can be used to help remember and apply the information in the Social Story™ (Gray, 2000; Gray, 2004). They are always created by the readers after they have read through their stories at least once or twice. They frequently reflect the readers' personal interests or preferred writing styles. For example, a child with ASD developed the following control sentence after reading a Social Story™ explaining why people change their minds: "*When someone says, 'I changed my mind', I can think of an idea becoming better – like a caterpillar, changing into a butterfly*" (Gray, 2000, p. 13-4).

Finally, cooperative sentences identify who will assist the readers as they learn new skills (Gray, 2000; Gray, 2004). For example, *My mom and Dad will help me as I learn to dress myself.* They may also identify what the helpers may do. For example, *My mom and dad will zip me up.*

Gray (2004) set a specific ratio for the six different types of sentences. This ratio, called the *Social Story Formula*, calls for two or more descriptive, perspective, affirmative, and/or cooperative sentences for every directive and/or control sentence. Its purpose is to ensure that Social Stories™ are more descriptive than directive. Descriptive stories are more desirable than directive stories because they allow the readers to determine their own responses (Gray & Garand, 1993).

Gray (2000; 2004) proposed a number of other guidelines for writing Social Stories[TM]: (1) match the abilities and interests of the reader, (2) focus exclusively on one concept or skill, (3) use a first or third person perspective, (4) emphasize positive language, that is, by (a) focusing on what the reader should do versus should not do, and (b) making disapproving comments about challenging behaviours in the third person or omitting these comments altogether, and (5) have a clearly identifiable title, introduction, body, and conclusion. The title follows all general Social Stories[TM] guidelines. The introduction identifies the topic. The body provides further description and/or explanation. The conclusion summarizes and restates the topic.

Gray (2000; 2004) also proposed a number of guidelines for presenting Social Stories[TM]: (1) assemble in book format, (2) introduce one at a time, and (3) review once per day. Illustrations, photographs, and other visual supports are permitted, but not required. Gray's guidelines are not theory or evidence-based (Kuoch & Mirenda, 2003). Nevertheless, they need to be followed for Social Stories[TM] studies to be comparable (Gray, 2004).

Social Stories[TM] Literature

Social Stories[TM] have only been in use since the early 1990's (Gray & Garand, 1993; Gray, 2000). Thus, research in this area is still in its infancy. Systematic searches of several major psychology databases (e.g., psycINFO and Scholar's Portal), using the keyword *social stor**, revealed just 35 published treatment studies as of September 1, 2008.

In 32 of the 35 studies, Social Stories[TM] were used to decrease challenging behaviour and/or increase prosocial behaviour (see Table 1, Column 1). Although

Table 1

Information about Previous Social Stories^TM Studies' Designs, Treatment Isolation (TI), and Adherence to Gray's Guidelines (GG)

Study	N	Target Behaviour(s) and Direction of Change	Design	TI	GG
Choi & Nieminen (2008)	1	Appropriate social interactions with peers (↑)	Non-experimental	No	No
Dodd, Hupp, Jewell, & Krohn (2008)	2	P1: Directions (↓), compliments (↑) P2: Compliments (↑)	Multiple baseline	No	No
Okada, Oshtake, & Yanagihara (Study 1, 2008)	2	P1: Aggressive verbal behaviours (↓) P2: Inappropriate sitting behaviours (↓)	P1: ABCA P2: ABC, B = Story without perspective sentences, C = Story with perspective sentences	Yes	No
Sansosti & Powell-Smith (2008)	3	P1/P2: Joining in (↑) P3: Maintaining conversations (↑)	Multiple baseline	No	No
Scattone (2008)	1	Eye contact (↑), smiling (↑), initiations (↑)	Multiple baseline	No	No
Bernad-Ripoll (2007)	1	Labelling emotions (↑), explaining emotions and determining action responses (↑)	Non-experimental	No	No
Crozier & Tincani (2007)	3	P1: Sitting appropriately during circle time (↑) P2: Talking with peers during snack time (↑) P3: Playing inappropriately and appropriately in the block centre (↓/↑)	P1, P3: ABAB P2: ABCACBC, C = Story plus verbal prompts	Yes	Yes

Table 1 *(Continued)*

Study	N	Target Behaviour(s) and Direction of Change	Design	TI	GG
Quilty (2007)	3	P1: Use of the phrase "go home" (➜) P2: Aggression towards others (➜) P3: Inappropriate behaviour, e.g., laughing, falling to the floor, tickling, etc. (➜)	Multiple baseline	Yes	No
Reynhout & Carter (2007)	1	Repetitive tapping (➜)	Non-experimental	No	No
Delano & Snell (2006)	3	Appropriate social engagement with peers (↑)	Multiple baseline	No	No
Hutchins & Prelock (2006)	2	P1: Cruel behaviour towards sister (➜) P2: Insisting that others continue an activity when they no longer want to (➜)	Non-experimental	No	Yes
Sansosti & Powell-Smith (2006)	3	P1: Sportsmanship (↑) P2: Maintaining conversations (↑) P3: Joining in (↑)	Multiple baseline	Yes	No
Scattone et al. (2006)	3	Appropriate social interactions with peers (↑)	Multiple baseline	No	Yes
Crozier & Tincani (2005)	1	Talking out in class (➜)	ABAC, C = Story plus verbal prompts	No	No
Adams et al. (2004)	1	Frustration behaviours during homework (➜)	ABAB	Yes	No

Table 1 (*Continued*)

Study	N	Target Behaviour(s) and Direction of Change	Design	TI	GG
Agosta et al. (2004)	1	Loud and distracting noises during class (↓)	ABCA, B = Story 1 and reinforcement, C = Story 2 and no reinforcement	No	No
Barry & Burlew (2004)	2	Level of prompting needed for choice making (↓), appropriate play with materials (↑), appropriate play with peers (↑)	Multiple baseline	No	No
Moore (2004)	1	Challenging behaviours surrounding sleep and bedtime (↓)	Non-experimental	No	No
Pasiali (2004)	3	P1: Aberrant vocalizations (↓) P2: Rewinding/forwarding VCR (↓) P3: Rummaging in the kitchen (↓)	ABAB	No	No
Bledsoe at al. (2003)	1	Spilling (↓), wiping (↑)	ABAB	Yes	No
Kuoch & Mirenda (2003)	3	P1: Challenging behaviours when sharing (↓) P2: Challenging behaviours when eating (↓) P3: Challenging behaviours when gaming (↓)	P1, P2 = ABA P3 = ACABA, C = Attention control	Yes	Yes
Brownell (2002)	4	P1: Delayed echolalia (↓) P2: Difficulty following directions (↓) P3/P4: Use of a loud voice (↓)	P1, P3 = ABAC P2, P4 = ACAB, C = Story put to music	Yes	Yes
Lorimer et al. (2002)	1	Interrupting vocalizations (↓), tantrum behaviours (↓)	ABAB	No	No

Table 1 *(Continued)*

Study	N	Target Behaviour(s) and Direction of Change	Design	TI	GG
Scattone et al. (2002)	3	P1: Chair tipping (↓) P2: Staring at females (↓) P3: Shouting in class (↓)	Multiple baseline	No	No
Rogers & Myles (2001)	1	Redirections to class (↓), tardiness (↓)	Non-experimental	Yes	No
Smith (2001)	19	Dangerous behaviours (↓), inappropriate sexual behaviours (↓), self-help skills (↑), etc.	Non-experimental	Not clear	Not clear
Thiemann & Goldstein (2001)	5	Contingent responses (↑), securing attention (↑), initiating comments (↑), initiating requests (↑)	Multiple baseline	No	No
Hagiwara & Myles (1999)	3	P1/P2: Independent hand-washing (↑) P3: On-task behaviour (↑)	Multiple baseline	Yes	No
Norris & Dattilo (1999)	1	Inappropriate and appropriate social interactions during lunch (↓ / ↑)	Non-experimental	No	No
Rowe (1999)	1	Going to the dining hall for lunch (↑)	Non-experimental	Yes	Yes
Kuttler et al. (1998)	1	Precursors to tantrum behaviours during morning work and lunchtime (↓)	ABAB	No	No

Table 1 (*Continued*)

Study	N	Target Behaviour(s) and Direction of Change	Design	TI	GG
Swaggart et al. (1995)	3	P1: Inappropriate and appropriate behaviours related to greeting (↓/↑), aggression (↓) P2/P3: Inappropriate and appropriate behaviours related to sharing (↓/↑)	Non-experimental	Yes	No

Note. P = participant; ↑ = goal was to increase the target behaviour; ↓ = goal was to decrease the target behaviour.

Gray (2004) did not initially intend Social Stories™ to be used for changing behaviour, she acknowledged that they might result in this outcome as readers' understanding of their social world expands. In the three remaining studies, Social Stories™ were used to introduce a novel event or routine, such as a dental procedure (i.e., Backman & Pilebro, 1999; Chapman & Trowbridge, 2000; Ivey, Heflin, & Alberto, 2004). Social Stories™ for introducing a novel event or routine are not discussed further. Social Stories™ for changing behaviour are the focus of this paper.

At first glance, the evidence for the effectiveness of Social Stories™ seems to be strong. All the studies listed in Table 1, Column 1 (shown on page 16) found Social Stories™ to be beneficial for at least some participants. Furthermore, a number of professional organizations and researchers have supported Social Stories™ in their publications (Ali & Frederickson, 2006). For example, Perry and Condillac (2003) placed Social Stories™ on a list of "promising interventions with empirical support" (p. 20) in a review of evidence-based interventions for ASD. Upon closer examination, however, the evidence for the effectiveness of Social Stories™ seems to be weak. Serious methodological shortcomings can be found in most of the studies. Only 3 of the 32 studies listed in Table 1, Column 1 (shown on page 16) are relatively methodologically sound (i.e., Brownell, 2002; Crozier & Tincani, 2007; Kuoch & Mirenda, 2003). Other reviewers of the Social Stories™ literature have come to similar conclusions (i.e., Ali & Frederickson, 2006; Nichols et al., 2005; Reynhout & Carter, 2006; Sansosti et al., 2004). For example, Sansosti et al. (2004), who reviewed 10 studies between 1995 and 2002, commented that "the empirical foundation regarding the effectiveness of Social Stories is limited" (p. 200). Similarly, Reynhout and Carter (2006), who reviewed 16 studies

between 1995 and 2003, concluded that "the existing research does not demonstrate unequivocally that Social Story™ intervention is consistently effective in facilitating behavior change in children with autism" (p. 466).

Methodological Shortcomings in the Social Stories™ Literature. Not using experimental research designs is one serious methodological shortcoming in the Social Stories™ literature (Ali & Frederickson, 2006; Sansosti et al., 2004). Experimental research designs are designs "in which the conditions are prearranged in an attempt to rule out rival hypotheses and to discount the effects of confounding variables" (Meltzoff, 1998, p. 282). Examples include group designs, such as *random assignment, two treatment groups, pretest-posttest* and *random assignment, two groups, extended repeated measures*, as well as single case designs, such as *reversal* and *multiple baseline* (Kazdin, 1982; Meltzoff, 1998). Ten of the 32 published treatment studies were non-experimental (see Table 1, Column 4, shown on page 16). Three of the 10 studies did not report any numerical data (i.e., Choi & Nieminen, 2008; Moore, 2004; Rowe, 1999). For example, one study simply stated that the participant, George, started to willingly eat lunch with the other children following the introduction of a Social Story™ (Rowe, 1999). Two of the 10 studies did not include a baseline condition (i.e., Rogers & Myles, 2001; Smith, 2001). For example, one study merely asked parents and other caretakers to rate the changes in participants' target behaviours after the introduction of a Social Story™ (Smith, 2001). Finally, five of the 10 studies did not include a return to baseline condition (i.e., Bernad-Ripoll, 2007; Hutchins & Prelock, 2006; Norris & Dattilo, 1999; Reynhout & Carter, 2007; Swaggart et al., 1995). They simply compared the frequency (or mother's rating on a Likert-type scale) of target behaviours in the baseline condition

to the frequency (or mother's rating on a Likert-type scale) of these behaviours in the Social Story™ condition, and concluded that the Social Story™ was beneficial. Non-experimental studies can make only limited conclusions regarding the effectiveness of Social Stories™ because they cannot rule out alternative explanations for the changes in the participants' behaviours, such as history or maturation (Meltzoff, 1998).

Not isolating Social Stories™ as the sole independent variable is another serious methodological shortcoming in the Social Stories™ literature (Nichols et al., 2005; Reynhout & Carter, 2006). Nineteen of the 32 published treatment studies combined Social Stories™ with at least one other intervention that was not controlled for (i.e., not consistent across conditions), for more than half of their participants (see Table 1, Column 5, shown on page 16). Eight of the 19 studies combined Social Stories™ with one or more significant, unrelated intervention(s), such as reinforcement, comic strip conversations, modelling, videotaped feedback, self-evaluation, or graduated extinction (i.e., Agosta, Graetz, Mastropieri, & Scruggs, 2004; Bernad-Ripoll, 2007; Choi & Nieminen, 2008; Hutchins & Prelock, 2006; Moore, 2004; Sansosti & Powell-Smith, 2008; Scattone, 2008; Thiemann & Goldstein, 2001). The other 11 studies combined Social Stories™ with one or more minor, related intervention(s) (i.e., Barry & Burlew, 2004; Crozier & Tincani, 2005; Delano & Snell, 2006; Dodd, Hupp, Jewell, & Krohn, 2008; Kuttler, Myles, & Carlson, 1998; Lorimer, Simpson, Myles, & Ganz, 2002; Norris & Dattilo, 1999; Pasiali, 2004; Reynhout & Carter, 2007; Scattone, Wilczynki, Edwards, & Rabian, 2002; Scattone, Tingstrom, & Wilczynski, 2006). For example, one study provided participants with verbal praise when they performed the behavioural skills described in their Social Stories™ (e.g., playing appropriately with peers), and corrective

feedback when they made mistakes (Barry & Burlew, 2004). Another study ensured that the participant understood her Social Story™ by regularly asking her questions after every other page, and occasionally providing additional explanation (Norris & Dattilo, 1999). None of these studies can determine the effectiveness of Social Stories™ because they cannot separate the impact of the Social Story™ intervention from the impact of the other intervention(s) (Meltzoff, 1998).

Not following Gray's guidelines for writing and presenting Social Stories™ is a final serious methodological shortcoming in the Social Stories™ literature (Ali & Frederickson, 2006; Reynhout & Carter, 2006). Twenty-five of the 32 published treatment studies deviated from Gray's guidelines, for more than half of their participants (see Table 1, Column 6, shown on page 16). Although many of these studies deviated from more than one of Gray's guidelines, only one deviation per study was noted. Four of the 25 studies presented stories in novel formats, such as through music or audiovisual means (i.e., Hagiwara & Myles, 1999; Pasiali, 2004; Sansosti & Powell-Smith, 2008; Scattone, 2008). Five of the 25 studies included stories that did not conform to the *Social Stories Formula* (i.e., Choi & Nieminen, 2008; Crozier & Tincani, 2005; Kuttler et al., 1998; Rogers & Myles, 2001; Swaggart et al., 1995). Four of the 25 studies included stories that did not emphasize positive language and/or utilize the first or third person perspective (i.e., Adams, Gouvousis, VanLue, & Waldron, 2004; Dodd et al., 2008; Quilty, 2007; Scattone et al., 2002). Five of the 25 studies introduced more than one story at a time or several stories in short succession (i.e., Barry & Burlew, 2004; Bernad-Ripoll, 2007; Delano & Snell, 2006; Lorimer et al., 2002; Norris & Dattilo, 1999). Finally, seven of the 25 studies permitted or even required participants to read or hear

their stories more than once per day (i.e., Agosta et al., 2004; Bledsoe, Myles, & Simpson, 2003; Moore, 2004; Okada, Oshtake, & Yanagihara, 2008; Reynhout & Carter, 2007; Sansosti & Powell-Smith, 2006; Thiemann & Goldstein, 2001). All these studies are unable to make conclusions on the effectiveness of Social Stories™ since they did not investigate standardized Social Stories™, but rather various modified versions of this treatment (Meltzoff, 1998).

Methodologically Sound Studies of Social Stories™. In total, only 3 of the 32 studies in Table 1 (shown on page 16) avoided all three of the serious methodological shortcomings mentioned above.

The first study, by Brownell (2002), utilized an ABAC/ACAB counterbalanced design, where A was the baseline (or return to baseline) condition, B was the standardized Social Story™ intervention, and C was a musical adaptation of the standardized Social Story™ intervention. Five days of data collection took place for each condition. The participants were 4 boys, between the ages of 6 and 9, with a primary diagnosis of autism. The behaviours targeted for intervention were delayed echolalia (participant 1), difficulty following directions (participant 2), and the use of a loud voice (participants 3 and 4). The study was conducted at the boys' elementary school in eastern Iowa. Visual inspection and statistical analyses for all participants indicated that the standardized and musical Social Story™ conditions were significantly more effective than the baseline condition ($p < .05$) in reducing challenging behaviours. By contrast, a difference between the two intervention conditions was "sometimes minute and difficult to detect…, and only achieved significance in one case" (p. 140). In this case, the musical

Social Story™ was significantly more effective (*p* < .05) in reducing challenging behaviour than the standardized Social Story™.

The second study, by Crozier and Tincani (2007), utilized an ABAB/ABCACBC design, where A was the baseline (or return to baseline) condition, B was the standardized Social Story™ intervention, and C was the standardized Social Story™ intervention plus the addition of verbal prompts. Between 2 and 8 days of data collection took place for each condition. The participants were three boys, between the ages of 3 years 9 months, and 5 years 1 month, with a primary diagnosis of ASD (participants 1 and 2) or high functioning autism (participant 3). The behaviours targeted for intervention were sitting appropriately during circle time (participant 1), talking with peers during snack time (participant 2), and playing appropriately and inappropriately in the classroom's block centre (participant 3). The study was conducted at the boys' preschool. An ABAB design was used for participants 1 and 3. Visual inspection for these participants revealed that prosocial behaviours (i.e., sitting appropriately and playing appropriately) increased and challenging behaviours (i.e., playing inappropriately) decreased when the Social Story™ intervention was implemented. An ABCACBC design was used for participant 2 because the Social Story™ intervention alone was not successful in altering the target behaviour. Visual inspection for this participant revealed that prosocial behaviour (i.e., talking with peers during snack time) increased when the Social Story™ intervention plus the addition of verbal prompts was implemented.

The third study, by Kuoch and Mirenda (2003), utilized an ABA/ACABA design, where A was the baseline (or return to baseline) condition, B was the standardized Social

Story^{TM} intervention, and C was an attention control condition. The attention control condition involved reading the participant a children's storybook entitled *Barry's Big Bread* (World Books, 1989), and verbally reminding him how to behave appropriately before he entered the situation where his challenging behaviour typically occurred. Between 5 and 13 days of data collection took place for each condition. The participants were 3 boys, between the ages of 3 years 10 months, and 6 years 4 months, with a primary diagnosis of ASD. The behaviours targeted for intervention were challenging behaviours when sharing, such as aggression, crying, and yelling (participant 1), challenging behaviours when eating, such as making sounds, throwing up food, and touching genitals (participant 2), and challenging behaviours when game playing, such as cheating, moving another player's game piece, touching another player, and making negative comments about losing (participant 3). The study was conducted in a different setting for each participant (i.e., at home for participant 1, at preschool for participant 2, and at school for participant 3). An ABA design was used for participants 1 and 2. An ACABA design was used for participant 3. Visual inspection for all participants revealed that challenging behaviours decreased when the Social Story^{TM} intervention was implemented. Furthermore, for the third participant, the Social Story^{TM} intervention was more effective than the attention control condition. This lends support to the assertion that the Social Story^{TM}, rather than the accompanying adult attention, results in therapeutic change.

The studies by Brownell (2002), Crozier & Tincani (2007), and Kuoch & Mirenda (2003) provide empirical evidence for the effectiveness of Social Stories^{TM}. Although

Story™ intervention, and C was an attention control condition. The attention control condition involved reading the participant a children's storybook entitled *Barry's Big Bread* (World Books, 1989), and verbally reminding him how to behave appropriately before he entered the situation where his challenging behaviour typically occurred. Between 5 and 13 days of data collection took place for each condition. The participants were 3 boys, between the ages of 3 years 10 months, and 6 years 4 months, with a primary diagnosis of ASD. The behaviours targeted for intervention were challenging behaviours when sharing, such as aggression, crying, and yelling (participant 1), challenging behaviours when eating, such as making sounds, throwing up food, and touching genitals (participant 2), and challenging behaviours when game playing, such as cheating, moving another player's game piece, touching another player, and making negative comments about losing (participant 3). The study was conducted in a different setting for each participant (i.e., at home for participant 1, at preschool for participant 2, and at school for participant 3). An ABA design was used for participants 1 and 2. An ACABA design was used for participant 3. Visual inspection for all participants revealed that challenging behaviours decreased when the Social Story™ intervention was implemented. Furthermore, for the third participant, the Social Story™ intervention was more effective than the attention control condition. This lends support to the assertion that the Social Story™, rather than the accompanying adult attention, results in therapeutic change.

The studies by Brownell (2002), Crozier & Tincani (2007), and Kuoch & Mirenda (2003) provide empirical evidence for the effectiveness of Social Stories™. Although

these studies do not contain the serious methodological shortcomings found in the bulk of the Social Stories™ research, they still have their own set of limitations.

First, all three studies used single-case designs with very few participants ($N = 3$ to 4). This makes it difficult to generalize the results (Meltzoff, 1998). One solution is to use group designs; however, this may not be practical or desirable. Conducting a group design lasting weeks would be difficult in the absence of significant funding and institutional support. More importantly, the results of a group design would not be readily applicable for practicing clinicians since group designs do not characterize changes in individuals (Barlow & Hersen, 1984b). "In ignorance of the responses of individual patients to treatment, the clinician does not know to what extent a given patient is similar to patients who improved or perhaps deteriorated within the context of an overall group improvement" (Barlow & Hersen, 1984b, p. 16). An alternative solution is to use single case experimental designs with more participants (Brownell, 2002). The confidence in consistent findings will increase as the number and diversity of acceptable studies accumulates (Ali & Frederickson, 2006).

Second, all three studies used reversal designs. A reversal design involves the repeated introduction and removal of the experimental condition for one individual (Kazdin, 1982). A treatment is considered to be effective if the participant's behaviour improves when the treatment is introduced, and reverts to baseline levels when the treatment is removed. When this pattern occurs, a reversal design can provide strong evidence that the intervention was responsible for the change (Kazdin, 2001). When this pattern does not occur, problems in interpretation emerge. Although all three studies demonstrated that the participants' behaviour improved when the treatment was

introduced, none of the studies demonstrated that the participants' behaviour reverted to baseline levels when the treatment was removed. Kuoch and Mirenda (2003) interpreted this pattern as evidence of maintenance in treatment gains, a desirable outcome in clinical work. Alternative explanations, however, are equally plausible (Kazdin, 1982; Kazdin, 2001). For example, changes in the participants' home situations may have occurred coincidentally when the Social Stories™ were introduced, and remained in effect after they were withdrawn. Kuoch and Mirenda (2003) suggested that future researchers use multiple baseline designs rather than reversal designs. Multiple baseline designs involve the introduction of the experimental condition across different individuals, at different points in time (Kazdin, 1982). The treatment is considered to be effective if each individual's behaviour changes after receiving the treatment and not before. Eleven of the 32 studies in Table 1 (shown on page 16) employed multiple baseline designs; however, these studies were not methodologically sound in other ways (e.g., Delano & Snell, 2006; Sansosti & Powell-Smith, 2006; Scattone et al., 2002; Thiemann & Goldstein, 2001).

Third, all three studies had at least one participant with highly variable baseline data. Excessive variability, which is assumed to stem from confounding variables, makes it difficult to interpret the effects of the intervention (Cooper, Heron, & Heward, 2007; Kazdin, 2001). A purely scientific solution is to wait for a stable rate of performance in one condition before moving onto the next condition. From an applied standpoint, this strategy may not be feasible or appropriate. Some confounding variables may be beyond the researcher's capability or resources to isolate and/or control (Cooper et al., 2007). Furthermore, intra-individual variability is common in some population groups, including infants, young children, and individuals with brain-related disorders, such as

Schizophrenia, Attention Deficit Hyperactivity Disorder, and ASD (Geurts et al., 2008; MacDonald, Nyberg, & Backman, 2006; van Geert & van Dijk, 2002). In addition, participants or their caregivers may be unwilling to wait out extended baseline conditions and may drop out of the treatment study, implement their own behaviour change tactics, or pressure the researcher to start the treatment protocol prematurely (e.g., Agosta et al., 2004). Participants or their caregivers may even be unwilling to participate in a treatment study of indeterminate length. Finally, "ethical concerns do not permit the repeated measurement of certain behaviors (e.g., self-injurious behavior) under an experimental condition in which there is little or no expectation for improvement" (Cooper et al., 2007, p.150). It is recommended that researchers balance tight experimental control with practical and ethical considerations (Cooper et al., 2007).

Finally, two of the three methodologically sound studies (i.e., Brownell, 2002; Kuoch & Mirenda, 2003) deviated from one of Gray's guidelines (i.e., emphasize positive language) for one of their three or four participants. Specifically, the study by Brownell (2002) contained a Social Story™ that told the reader (participant 2) what he should not do. For example, "I'll try not to talk about TV when I'm at school" (p. 128). Similarly, the study by Kuoch and Mirenda (2003) contained a Social Story™ that made disapproving comments about the reader's (participant 1) challenging behaviour. For example, "Sometimes Andrew doesn't feel like sharing. Sometimes Andrew hurts people when they touch his toys. This is not okay" (p. 227).

The Question of Receptive Language. In addition to serious methodological shortcomings, the Social Stories™ research contains limited information on participants' cognitive and language levels. Furthermore, there appears to be a discrepancy between

the cognitive and language levels of children the intervention was originally intended for and the cognitive and language levels of children it has been tested on. Gray and Garand (1993) stated that "Social stories are most likely to benefit students functioning intellectually in the trainable mentally impaired range or higher who possess basic language skills" (p. 2). Many researchers, however, have used Social Stories™ with children described as having moderate to profound mental retardation and extremely limited language skills (e.g., Moore, 2004; Thiemann & Goldstein, 2001). Presently, there is no clear evidence identifying the minimum cognitive and language levels required to benefit from Social Stories™.

Receptive language is the cognitive and language skill most needed to benefit from Social Stories™. Receptive language refers to the ability to understand spoken words and phrases (Fenson et al., 1994). In typically developing children receptive language proceeds and is more advanced than expressive language, that is, the ability to produce spoken words and phrases. By contrast, in children with ASD receptive language often follows and is more delayed than expressive language (Abbeduto & McDuffie, 2007). Parents, clinicians, and researchers who are unaware of this developmental difference may overestimate the receptive language levels of children with ASD; therefore, it is especially important to formally assess the receptive language levels of these children.

Only nine of the 32 Social Stories™ studies assessed their participants' receptive language levels. Two of the studies relied on "expert opinion" (i.e., Lorimer et al., 2002; Moore, 2004). Moore's (2004) participant's receptive language was assessed by an educational psychologist with no mention of a standardized test, whereas Lorimer et al.'s

(2002) participant's receptive language was judged informally by the authors. Seven of the studies used assessment measures. Kuttler et al. (1998) used the *Callier-Azusa Scale* (Stillman, 1978). Kuoch and Mirenda (2003) and Thieman and Goldstein (2001) used the *Peabody Picture Vocabulary Test-Revised* (Dunn & Dunn, 1981). Hutchins and Prelock (2006), Reynhout and Carter (2007), and Scattone et al. (2002) used the *Peabody Picture Vocabulary Test: Third Edition* (Dunn & Dunn, 1997). Crozier and Tincani (2007) used the *Mullen Scales of Early Learning* (Mullen, 1995).

Participants' receptive language levels across the nine studies ranged from 14 to 80 months. Their chronological ages ranged from 45 to 180 months. Participants in the nine studies benefited from Social Stories™; however, only two of the nine studies were methodologically sound (i.e., Crozier & Tincani, 2007; Kuoch & Mirenda, 2003). Based on these two studies, it appears that Social Stories™ can benefit children with receptive language levels at or above the 31-month level. None of the nine studies examined the minimum receptive language level required to benefit from Social Stories™; however, this receptive language level may be estimated by reviewing the literature on receptive language development.

The earliest receptive language skill to emerge is word comprehension (Golinkoff & Hirsh-Pasek, 1999). Its precise onset, however, is subject to debate. Word comprehension has been detected by 9 to 10 months in observational studies, but no earlier than 12 to 13 months in laboratory studies (Halle & de Boysson-Bardies, 1996). Oviatt (1980) found that children under 12 months are able to learn the meanings of some words, but that it takes considerable time and repetition by parents and is limited to very salient objects and activities. Oviatt taught 30 infants, 9 to 17 months, the common name

of a novel object and action, and then probed for recognition. Recognition rates were 40% in 9 to 11-month-olds, 80% in 12 to 14-month-olds, and 90% in 15 to 19-month-olds. She concluded that word comprehension becomes consolidated by 12 to 14 months.

The next significant receptive language skills to emerge are the realization that words work together to create meaning, the understanding that names for known objects may be applied to new representations of these objects, and the detection of small, unstressed grammatical elements (e.g., with). The realization that words work together to create meaning appears by 13 to 15 months (Golinkoff & Hirsh-Pasek, 1999). This skill is sometimes referred to as basic sentence knowledge. The understanding that names for known objects (e.g., live rabbit) may be applied to new representations of these objects (e.g., picture of a rabbit) appears by 18 months (Oviatt, 1982). Finally, the detection of small, unstressed grammatical elements appears by 28 months (Golinkoff & Hirsh-Pasek, 1999).

By 36 months, children's receptive language is quite advanced. Their understanding of word order; however, is still incomplete. Bever (1970) found that three-year-olds tend to interpret any noun-verb-noun sequence as actor + action + object. This results in errors of interpretation for reversible passives, such as *Mommy was kissed by Daddy* (interpreted as *Mommy kissed Daddy*), and cleft sentences, such as *It's the girl that the boy kisses* (interpreted as *The girl kissed the boy*). These errors disappear by age five. At this point in time, adult-like strategies appear to be in place (Bever, 1970).

In order to understand a story, children require (a) word comprehension, (b) basic sentence knowledge, and (c) the understanding that names for known objects may be applied to new representations of these objects. The literature on receptive language

development indicates that these three skills are mastered by the middle of the second year of life. Accordingly, Social Stories™ may be expected to benefit children with receptive language at or above the 18-month level.

Effectiveness Studies versus Efficacy Studies. The Social Stories™ research literature has a significant strength that is not often seen in treatment outcome research (Kazdin, 1999; Seligman, 1995). Specifically, the Social Stories™ research literature includes many effectiveness or community-based studies, which test treatments under "real world" conditions, as opposed to efficacy studies, which test treatments under tightly controlled conditions (e.g., in a laboratory, with homogenous participants, using manualized therapies). Although effectiveness studies are more prone to confounding variables than efficacy studies, they offer more external validity (Chambless & Hollon, 1998; Cooper et al., 2007; Kazdin, 1999; Seligman, 1995).

Thirty of the 32 studies listed in Table 1 (shown on page 16) tested Social Stories™ in natural settings, such as the child's home or classroom (e.g., Bledsoe et al., 2003; Delano & Snell, 2006; Dodd et al., 2008; Moore, 2004). Nineteen of the 32 studies used participant-interventionists to deliver the Social Stories™ treatment (e.g., Quilty, 2007; Sansosti & Powell-Smith, 2006; Scattone et al., 2006). Thirteen of the 32 studies used participant-observers to measure participants' target behaviours (Brownell, 2002; e.g., Kuoch & Mirenda, 2003; Pasiali, 2004). Participant-interventionists and observers are laypeople (e.g., parents, teachers, and aides), who are already present in the settings where the treatments are delivered and the participants' behaviours typically occur (Hartmann, 1984). The use of participant-interventionists and observers in Social Stories™ research is important with regards to external validity because this treatment is

frequently used by laypeople (Agosta et al., 2004; Gray, 2004). Furthermore, the use of participant-interventionists and observers is more convenient and less intrusive than the use of independent observers (Hartmann, 1984).

Despite the advantages of using participant-interventionists and observers, concerns have been raised that laypeople are less effective and more prone to biases when implementing treatments and measuring target behaviours than professionally trained clinicians and researchers (Bibby, Eikeseth, Martin, Mudford, & Reeves, 2002; Hartmann, 1984). Although some research studies comparing parent-directed early intensive behavioural intervention (EIBI) with clinic-directed EIBI have supported this contention, they have also shown that laypeople can employ correct treatment procedures and effect significant behavioural change (e.g., Bibby et al., 2002; Smith, Buch, & Gamby, 2000). In addition, Social Stories™ studies that have used laypeople as interventionists and assessed treatment integrity, have found that parents and educators can adequately follow experimental procedures (e.g., Sansosti & Powell-Smith, 2006; Scattone et al., 2002; Scattone et al., 2006). Similarly, Social Stories™ studies that have used laypeople as observers and assessed measurement reliability, have found that parents and educators can adequately measure target behaviours (e.g., Hagiwara & Myles, 1999; Kuoch & Mirenda, 2003; Lorimer et al., 2002; Quilty, 2007).

Summary of the Social Stories™ Research. Social Stories™ research is still in its infancy. Presently, the effectiveness of Social Stories™ is difficult to ascertain because the current literature contains three serious methodological shortcomings: (1) not using experimental research designs, (2) not isolating Social Stories™ as the sole independent variable, and (3) not following Gray's guidelines for writing and presenting Social

Stories™ (Ali & Frederickson, 2006; Nichols et al., 2005; Reynhout & Carter, 2006; Sansosti et al., 2004). Furthermore, the minimum cognitive and language levels required to benefit from Social Stories™ are difficult to determine because the current literature does not adequately assess and describe participants' cognitive and language skills. Three relatively methodologically sound studies (i.e., Brownell, 2002; Crozier & Tincani, 2007; Kuoch & Mirenda, 2003) suggest that Social Stories™ may be effective for some participants. The literature on receptive language development suggests that Social Stories™ may be expected to benefit children with receptive language at or above the 18-month level. A significant strength of the Social Stories™ research literature is that it includes many studies that test Social Stories™ in natural settings, using laypeople as interventionists and/or observers. Studies that test treatments under "real world" conditions are more applicable to practicing clinicians than studies that test treatments under tightly controlled conditions (Kazdin, 1999; Seligman, 1995).

Purposes and Hypotheses of the Present Study

The primary purpose of the present study was to evaluate the *effectiveness* of Social Stories™ for children with ASD, by beginning to address the serious methodological shortcomings found in previous studies. Effectiveness was defined as significantly decreasing challenging behaviours or increasing prosocial behaviours. Effectiveness was assessed for each participant using visual inspection. Based on studies by Brownell (2002), Crozier and Tincani (2007), and Kuoch and Mirenda (2003), it was hypothesized that Social Stories™ would be effective for at least some children with ASD. In these three studies, Social Stories™ significantly decreased various challenging behaviours and increased various prosocial behaviours.

The secondary purpose of the present study was to examine the minimum receptive language level required to *benefit* from Social Stories™, by comparing the responses of participants with a range of receptive language levels to this treatment. Benefit was also defined as significantly decreasing challenging behaviours or increasing prosocial behaviours. Benefit was also assessed for each participant using visual inspection. Based on research regarding receptive language development, it was hypothesized that Social Stories™ would benefit children with receptive language at or above the 18-month level. At this level, children understand individual words, recognize that words work together to create meaning, and apply words for known objects to new representations of these objects (Golinkoff & Hirsh-Pasek, 1999; Oviatt, 1980; Oviatt, 1982).

To reiterate, the purposes and hypotheses of the present study were as follows:

Purpose #1:   To evaluate the effectiveness of Social Stories™ for children with ASD.

Hypothesis #1: Social Stories™ would be effective for at least some children with ASD.

Purpose #2:   To examine the minimum receptive language level required to benefit from Social Stories™.

Hypothesis #2: Social Stories™ would benefit children with receptive language at or above the 18-month level.

These purposes and hypotheses were tested in natural settings, using laypeople as interventionists and observers. Thus, this study, like most Social Stories™ studies, is an effectiveness or community-based study.

Chapter II: Method

Participants

This study was open to children living in Windsor and Essex County, Ontario, Canada with (a) diagnoses of ASD made by qualified psychologists or physicians, and (b) receptive language age equivalent scores between 12 and 60 months. Twenty-six children (24 boys and 2 girls) were screened using the *Screening Questionnaire for Social Stories Treatment Study* (Scapinello, 2006b). Seventeen of these children (16 boys and 1 girl) appeared to meet diagnostic and receptive language requirements and were accepted into the study, pending confirmation of these requirements. In each child's case confirmation of both requirements was obtained. Two of the 17 children (1 boy and 1 girl) did not start the treatment study. Parents of both of these children were too busy to commit to the 24 days of data collection. The remaining 15 children (all boys) started and completed the treatment study. These children were divided into four groups based on their receptive language age equivalent scores. All names are pseudonyms to protect confidentiality.

Group 1 consisted of Adam, Benjamin, Christopher, and Donovan, with a mean receptive language age equivalent score of 13.75 months (SD = 0.50 months, range = 13 to 14 months). At this receptive language level, children can understand some individual words. They also know that words work together to create meaning (Golinkoff & Hirsh-Pasek, 1999; Oviatt, 1980).

Group 2 consisted of Elijah, Francis, and Graham, with a mean receptive language age equivalent score of 24 months (SD = 3.61 months, range = 20 to 27 months). At this receptive language level, children can apply names for known objects to new representations of these objects (Oviatt, 1982).

Group 3 consisted of Ian, Jordan, Kevin, and Liam, with a mean receptive language age equivalent score of 31.50 months (SD = 3.00 months, range = 28 to 34 months). At this receptive language level, children can detect small, unstressed grammatical elements (Golinkoff & Hirsh-Pasek, 1999).

Finally, Group 4 consisted of Matthew, Nathan, Owen, and Peter, with a mean receptive language age equivalent score of 45.25 months (SD = 6.95 months, range = 37 to 51 months). At this receptive language level, children's receptive language is quite advanced, and is transitioning to an adult-like understanding of words and phrases (Bever, 1970).

Participants' individual receptive language age equivalent scores are shown in Table 2. This table also includes participants' chronological ages at the beginning of data collection, as well as their age equivalent scores on three other dimensions of cognitive functioning.

Parents were asked about their children's prior treatment experiences. Two participants had been exposed to the Social Stories™ treatment prior to the study. Specifically, Ian had received a Social Story™ about using the potty through his applied behavioural analysis program, and Liam had received a Social Story™ about turn-taking through his junior kindergarten classroom. Both Ian and Liam's mothers described the Social Stories™ treatment as beneficial to their children. All participants had been exposed to one or more other treatments. Specifically, 15 participants had received speech therapy, 10 participants had received applied behavioural analysis (ABA) at home

Table 2

Participants' Ages and Cognitive Functioning

Participant	Age	Visual Reception AES	Fine Motor AES	Receptive Language AES	Expressive Language AES
		Group 1			
Adam	72	26[f]	36[f]	14[f]	28[f]
Benjamin	54	29[a]	24[a]	14[a]	12[a]
Christopher	27	21[c]	20[a]	13[a]	17[b]
Donovan	45	16[a]	17[a]	14[a]	7[a]
M	49.50	23.00	24.25	13.75	16.00
		Group 2			
Elijah	58	30[a]	40[a]	27[a]	28[a]
Francis	40	29[b]	22[a]	25[a]	28[a]
Graham	32	17[a]	21[a]	20[b]	14[a]
M	43.33	25.33	27.67	24.00	23.33
		Group 3			
Ian	56	54[c]	49[c]	34[a]	39[a]
Jordan	40	34[c]	21[a]	28[b]	36[c]
Kevin	44	34[c]	39[c]	30[b]	24[a]
Liam	70	52[b]	53[c]	34[a]	37[a]
M	52.50	43.50	40.50	31.50	34.00
		Group 4			
Matthew	73	60[f]	49[f]	37[f]	39[f]
Nathan	36	48[e]	30[b]	42[d]	46[d]
Owen	92	69[fg]	68[fg]	51[f]	45[f]
Peter	49	60[d]	40[b]	51[c]	39[b]
M	62.50	59.25	46.75	45.25	42.25
Grand *M*	52.53	38.60	35.27	28.93	29.27

Note. AES = Age Equivalent Score. Ages and AES are in months. Ages were determined at the beginning of data collection. AES were obtained from the *Mullen Scales of Early Learning* (Mullen, 1995). [a]Descriptive category = *Very Low*. [b]Descriptive category = *Below Average*. [c]Descriptive category = *Average*. [d]Descriptive category = *Above Average*. [e]Descriptive category = *Very High*. [f]Descriptive category could not be determined because child was out of the normative range. [g]The child obtained the highest age equivalent score possible.

or through a specialized program, 5 participants had received occupational therapy, and 2 participants had received physiotherapy. Also, 11 participants had attended daycare, preschool, or elementary school for typically developing children. For more detail, see Table 3.

Ethics approval for this study was obtained from the University of Windsor's Research Ethics Board. The benefits for each participating family included a number of free services, including a cognitive assessment and report, an individualized Social Story™, and training for the lead therapist on how to measure behaviour and administer the Social Stories™ treatment. In addition, each participating family received a $25 dollar gift certificate for a local toy store.

Measures

Screening Questionnaire for Social Stories Treatment Study (SQSSTS; Scapinello, 2006b). The author created the SQSSTS to screen whether potential participants met study criteria; that is, (a) had diagnoses of ASD made by qualified psychologists or physicians, and (b) had receptive language age equivalent scores between 12 and 60 months. The SQSSTS was administered to parents of potential participants over the phone. The SQSSTS was revised several times because early versions tended to overestimate potential participants' receptive language levels, thus, unnecessarily rejecting them from the study. The final version of the SQSSTS was divided into five sections (see Appendix A for a copy).

Section I was administered to parents of all potential participants. It consists of one question, "Has your child been diagnosed with ASD by a qualified psychologist or physician?" Parents who responded "yes" to this question proceeded to Section II.

Table 3

Participants' Previous Treatment Experience

Participant	Social Stories™	Speech Therapy	OT	PT	ABA (Home)	ABA (Program)	Daycare/ Preschool	School (JK–6)	Totals
					Group 1				
Adam		X	X				X	X	4
Benjamin		X				X			2
Christopher		X							1
Donovan		X	X	X		X	X		5
					Group 2				
Elijah		X			X		X	X	4
Francis		X			X				2
Graham		X			X				2
					Group 3				
Ian	X	X	X			X	X		5
Jordan		X					X		2
Kevin		X				X	X		3
Liam	X	X					X	X	4
					Group 4				
Matthew		X	X	X			X	X	5
Nathan		X				X	X		3
Owen		X				X		X	3
Peter		X	X		X		X		4
Totals	2	15	5	2	4	6	10	5	49

Note. OT = occupational therapy; PT = physical therapy; ABA = applied behavioural analysis; JK = junior kindergarten.

Section II consists of seven questions on basic demographic information (e.g., child's name). Parents' responses to the final question, "Was your child assessed with the *Mullen Scales of Early Learning* in the past six months?", determined whether they proceeded to Section III, IV, or V. Section III was for parents of potential participants of any age who had been assessed with the *Mullen Scales of Early Learning* (MSEL; Mullen, 1995) in the past six months. It consists of one question, "What was your child's age equivalent score on the Receptive Language subscale of the MSEL?" If the parent responded that the child's score was between the 12 and 60-month levels, the child was deemed eligible for the study, pending confirmation of the ASD diagnosis and required level of language skills. Section IV was for parents of potential participants 60 months of age and under who had not been assessed with the MSEL in the past six months. It consists of four questions designed to screen whether the potential participant's receptive language was equal to, or greater than, the 12-month level (e.g., "Does your child understand the word No or Stop?"). If the parent responded "yes" to the four questions, the child was deemed eligible for the study, pending confirmation of the ASD diagnosis and required level of language skills. Section V was for parents of potential participants over 60 months of age who had not been assessed with the MSEL in the past six months. It consists of the same four questions asked in Section IV, as well as five additional questions designed to screen whether the participant's receptive language was equal to, or less than, the 60-month level (e.g., "Can your child name different coins, e.g., penny, quarter, dime?"). If the parent responded "yes" to the first four questions and "no" to any of the last five questions, the child was deemed eligible for the study, pending confirmation of the ASD

diagnosis and required level of language skills. All of the questions in Sections IV and V were based on items from the MSEL's Receptive Language Scale.

Mullen Scales of Early Learning: AGS Edition (MSEL; Mullen, 1995). Mullen created the MSEL to assess the cognitive functioning of infants and young children, from birth through 68 months. The MSEL was designed to be individually administered by professionals with training and practical experience in the clinical assessment of infants and young children (e.g., clinical psychologists, speech pathologists, and special educators). It consists of a Gross Motor Scale and four cognitive scales: Visual Reception, Fine Motor, Receptive Language, and Expressive Language. The Gross Motor Scale was not used in the study and, therefore, was not described. The Visual Reception Scale consists of 33 tasks that assess visual discrimination and visual memory. Examples include looking for a toy car hidden under one of two washcloths, sorting spoons and blocks by category, and matching circles by size and colour. The Fine Motor Scale consists of 30 tasks that assess fine motor planning and control. Examples include imitating vertical and horizontal crayon lines, stringing beads, and cutting with scissors. The Receptive Language Scale consists of 33 tasks that assess auditory comprehension and auditory memory. Examples include recognizing one's own name, identifying pictures (e.g., "Show me the car. Put your finger on the car"), and following unrelated commands (e.g., "Give me the ball, then close the book"). Finally, the Expressive Language Scale consists of 28 tasks that assess speaking ability and language formation, including verbalizing concepts. Examples include naming objects, repeating two numbers (e.g., "Say 4-7"), and completing verbal analogies (e.g., "A man is big; a baby is

_____").

The MSEL provides *T* scores for the four cognitive scales (*M* = 50, *SD* = 10). It also provides percentile ranks, age equivalents, and descriptive categories (i.e., *Very Low, Below Average, Average, Above Average,* and *Very High*). The four cognitive scales can be used to compute a single composite score representing general intelligence, called the Early Learning Composite (*M* = 100, *SD* = 15). The author advised against using this score, stating that "early cognitive development is best measured by a group of cognitive abilities that are distinct and well-defined in content" (Mullen, 1995, p. 9).

The MSEL was standardized on 1,849 typically developing children from more than 100 sites in the United States. The sample ranged in age from 2 days to 69 months, and closely resembled the national population in terms of gender, race/ethnicity, and socio-economic status. Reliability measures for the cognitive scales are good. For example, the median split-half internal consistency coefficients range from .75 to .82, test-retest reliabilities range from .71 to .79 (for children 25 to 56 months), and inter-rater reliabilities range from .98 to .99 (for children 25 to 44 months). Correlations between the cognitive scales on the MSEL and the *Bayley Scales of Infant Development* (Bayley, 1969) are moderate, ranging from .53 to .59. Correlations between the cognitive scales and other measures of intellectual functioning are moderate to high, ranging from .65 to .85. For example, the Fine Motor Scale from the MSEL is correlated .75 with the Fine Motor Scale from the *Peabody Developmental Motor Scales* (Folio & Fewell, 1983). Similarly, the Receptive Language Scale from the MSEL is correlated .85 with the Auditory Comprehension Scale from the *Preschool Language Assessment* (Zimmerman, Steiner, Evatt, & Pond, 1979).

The MSEL was designed for assessing children with special needs. It is particularly well suited for assessing children with limited response capabilities, like children with ASD. This is because it minimizes extraneous demands and allows several ways of responding, such as looking, gesturing, and nodding. Most items on the Visual Reception, Fine Motor, and Receptive Language Scales do not require a verbal response. They simply require the child to manipulate objects (e.g., sort), or point to objects or pictures.

Intake Interview for Social Stories Treatment Study (IISSTS; Scapinello, 2006a). The author created the IISSTS to gather pertinent information about (a) the participants, (b) their lead therapists; that is, the individuals selected to carry out the study procedures, and (c) their target behaviours; that is, the behaviours selected to be modified by the Social Stories [TM] treatment (see Appendix B for a copy). The IISSTS was administered to parents of participants in person (when the author was in the Windsor area), or over the phone (when the author was outside of the Windsor area). Categories covered for participants include demographics, diagnoses, previous treatment, previous experience with Social Stories[TM], and personal interests. Categories covered for lead therapists include name, relation to child, age, education level, current job position, and contact information. Categories covered for target behaviours include operational definition, setting, time, measurement, and questionable instances.

Treatment Evaluation Inventory Short Form (TEI-SF; Kelley, Heffer, Gresham, & Elliott, 1989).[1] The TEI-SF is a modified version of Kazdin's (1980) *Treatment Evaluation Inventory* (TEI). The TEI is one of the earliest and most widely used self-report measures to assess parents' acceptance of treatments for children with challenging

behaviours (Finn & Sladeczek, 2001; Kelley et al., 1989). The authors of the TEI-SF

modified the TEI to (a) decrease its length from 15 to 9 items, (b) improve its readability

from 5.1 to 4.2 on the Harris-Jacobson Wide Range Readability Formula (Harris &

Sipay, 1975), and (c) simplify its rating scale from a 7-point rating scale, without

consistent anchor points, to a 5-point rating scale, with consistent anchor points.

The TEI-SF consists of nine items, which evaluate treatment acceptability and

predicted treatment effectiveness (see Appendix C for a copy). A factor analysis of this

measure, using college students, revealed a two-factor structure. Eight items loaded on

Factor 1 (Acceptability), including "I would be willing to use this procedure if I had to

change the child's problem behaviour", "I like the procedures used in this treatment", and

"I believe this treatment is likely to be effective" (Kelley et al., 1989, p. 240). The

remaining item loaded on Factor 2 (Discomfort): "I believe the child will experience

discomfort during the treatment" (p. 240). As mentioned above, responses are rated on a

5-point rating scale: 1 = *strongly disagree*, 2 = *disagree*, 3 = *neutral*, 4 = *agree*, and 5 =

strongly agree. Higher scores represent greater acceptance of the treatment in question.

Item 6 is reverse scored. The TEI-SF is internally consistent ($\alpha = .85$) and capable of

discriminating among different treatments.

Typically, the TEI-SF is administered to parents in person, before the initiation of

the treatment in question (Finn & Sladeczek, 2001; Kelley et al., 1989). In this study,

however, the TEI-SF was administered to lead therapists over the phone, following the

completion of the Social Stories[TM] treatment. To make the TEI-SF more appropriate

under these circumstances, the author changed the TEI-SF instructions and converted the

TEI-SF items to past tense (see Appendix D for a copy). The author's modified version of

the TEI-SF was named the *Treatment Evaluation Inventory Short Form Modified* (TEI-SF-M; Scapinello, 2008). Alpha reliability of the TEI-SF-M was 0.64 in this study.

Procedure

 Recruitment. The author wrote a letter of information for recruitment purposes titled *Social Stories Treatment Study for Children with Autism Spectrum Disorders* (see Appendix E for a copy). The letter contained (a) a definition of Social Stories™, (b) an explanation of the purposes of the study, (c) a list of the selection criteria, benefits, and drawbacks, and (d) the author's contact information. The letter was distributed to parents of children with ASD who were involved in autism-related organizations (e.g., The Summit Centre for Preschool Children with Autism), community events (e.g., the Autism Ontario Summer Picnic), and research studies (e.g., Autism: Count Us In). The letter was also posted on autism-related websites (e.g., http://www.uwindsor.ca/autism). Interested parents were directed to call or email the author.

 Screening. The author administered the SQSSTS (Scapinello, 2006b) to parents of potential participants. Children who appeared to meet diagnostic and receptive language requirements, based on their parents' responses to this measure, were accepted into the study, pending confirmation of the requirements and their parents' consent. The diagnostic requirement was confirmed by securing a copy of the child's diagnostic report. The receptive language requirement was confirmed by (a) securing a copy of the child's MSEL (Mullen, 1995) assessment report (if the child had been assessed by the MSEL in the past six months), or (b) completing a formal assessment of the child's language skills (if the child had not been assessed by the MSEL in the past six months). Parents' consent was obtained by having parents read and sign the appropriate consent form. Consent form

A was used for parents of children who had been assessed by the MSEL in the past six months (see Appendix F for a copy). It was given to parents prior to the intake interview. Consent form B was used for parents of children who had not been assessed by the MSEL in the past six months (see Appendix G for a copy). It was given to parents prior to the language assessment.

Assessment. The author or one female, MA-level research assistant conducted the language assessments. Both the author and the research assistant had graduate level training in psychological assessment. The assessments took place either in a single treatment room at the Summit Centre for Preschool Children with Autism, or in a small office at the University of Windsor. Each location housed a child-sized table, and three child-sized chairs (one each for the examiner, parent, and child). The assessments involved the administration of the Receptive Language Scale from the MSEL (Mullen, 1995). The children's performance on this scale was immediately scored. All children met the receptive language requirement and were given the remaining three cognitive scales from the MSEL (i.e., the Visual Reception, Fine Motor, and Expressive Language Scales). Throughout the assessments, parents were encouraged to engage their children in the tasks, and provide reinforcers if necessary (e.g., food, drinks, and toys). Some children completed the language and additional cognitive testing in one session; however, most children required two or three sessions due to limited attention spans and behavioural issues.

Intake Interview. The author administered the IISSTS (Scapinello, 2006a) to parents of official participants; that is, participants with (a) confirmed diagnoses of ASD and receptive language age equivalent scores between 12 and 60 months, and (b) parental

consent. Information gained from parents from the IISSTS about the participants was reported earlier in the *Participants'* section and Tables 2 and 3 (shown on pages 40 and 42, respectively). Information gained from parents from the IISSTS about the participants' lead therapists (i.e., the individuals selected to carry out the study procedures) and the participants' target behaviours (i.e., the behaviours selected to be modified by the Social Stories ™ treatment) is reported below.

The parents decided on the lead therapists for their children. The author encouraged the parents to pick someone actively involved in their children's care. Most of the lead therapists were the mothers of the participants. Nicholas' lead therapist was his father. Liam's lead therapist was his senior kindergarten teacher. The average age of the lead therapists was 37.07 years (SD = 5.66 years, range = 28 to 49 years). The average education level was 16.80 years (SD = 3.71 years, range = 13 to 28 years). The most common job position was homemaker. For more detail, see Table 4.

The parents decided on the target behaviours for their children. The author created and provided them with a list of example target behaviours (see Appendix H for a copy). Most of the participants' target behaviours were challenging behaviours (e.g., mouthing inappropriate objects). Elijah and Ian's target behaviours were prosocial behaviours (i.e., standing near the toilet for potty training purposes and brushing teeth independently, respectively). The goal for each participant was to decrease his challenging behaviour and/or increase his prosocial behaviour. For more detail, see Table 5.

Table 4

Participants' Lead Therapists' Demographic Information

| | | Lead Therapist | | |
Participant	Relation to Participant	Age	Education Level	Job Position
		Group 1		
Adam	Mother	35	15	Social service worker
Benjamin	Mother	39	18	Social worker
Christopher	Mother	30	15	Home-care worker
Donovan	Mother	49	14	Military worker
		Group 2		
Elijah	Father	40	17	Homemaker
Francis	Mother	28	17	Homemaker
Graham	Mother	36	15	Appraiser
		Group 3		
Ian	Mother	36	17	Retail salesperson
Jordan	Mother	36	28	Student
Kevin	Mother	36	19	Homemaker
Liam	SK Teacher	33	18	Teacher
		Group 4		
Matthew	Mother	35	14	Homemaker
Nathan	Mother	35	13	Financial officer
Owen	Mother	48	13	Receptionist
Peter	Mother	40	19	Homemaker
M		37.07	16.80	
SD		5.66	3.71	

Note. Education level is in years.

Table 5

Participants' Target Behaviours

Participant	Target Behaviour and Direction	Setting	Time Observed	Assessment Measure
		Group 1		
Adam	Coming out of the bedroom after being put down for the night (↓)	Home	Bedtime	Frequency
Benjamin	Requesting or attempting to brush teeth at inappropriate times (↓)	Home	6:30 p.m.	Frequency
Christopher	Engaging in tantrum behaviours during bath (↓)	Home	Bath time	% of time
Donovan	Mouthing inappropriate objects (↓)	Home	4:00 p.m. (approx.)	Frequency
		Group 2		
Elijah	Standing near the toilet for potty training purposes (↑)	Home	After a.m. snack	Duration
Francis	Distancing from mom when walking outdoors (↓)	Local streets	7:00 p.m. (approx.)	Duration
Graham	Getting out of booster seat (↓)	Home	Dinnertime	Frequency
		Group 3		
Ian	Brushing teeth independently (↑)	Home	After breakfast	Duration
Jordan	Coming to the bedroom door after being put down for the night (↓)	Home	Bedtime	Frequency
Kevin	Closing doors (↓)	Home	After breakfast	Frequency
Liam	Talking out in class (↓)	School	Morning circle time	Frequency

Table 5 *(Continued)*

Participant	Target Behaviour and Direction	Setting	Time Observed	Assessment Measure
			Group 4	
Matthew	Interfering behaviours during genital cleansing (↓)	Home	Bath time	Duration
Nathan	Breaking game playing rules (↓)	Home	After dinner	Frequency
Owen	Challenging behaviours when not first (↓)	Home	After dinner	Duration
Peter	Hesitating to respond appropriately to ABA therapist's greeting (↓)	Pre-school	9:00 a.m. (approx.)	Latency

Note. ↑ = goal was to increase the target behaviour; ↓ = goal was to decrease the target behaviour; ABA = applied behavioural analysis.

The setting and time of day when the target behaviours occurred varied by participant. For most participants, the target behaviours occurred at home, in the early evening. For example, Graham's target behaviour (i.e., getting out of booster seat) occurred at home, at dinnertime. Similarly, Matthew's target behaviour (i.e., interfering behaviours during genital cleansing) occurred at home, at bath time. For more detail, see Table 5 (shown on page 52).

The assessment measure used to assess the target behaviours also varied by participant. Response frequency was used for target behaviours that had "clearly discernable onsets and offsets", and were easily classified into discrete units that were equal in duration and quality (Hartmann, 1984, p. 115). Examples include coming out of the bedroom after being put down for the night, and breaking game playing rules. Response frequency was calculated by placing a check mark on a data collection sheet each time the target behaviour occurred within a specified time frame, and then totalling the check marks. Response duration, percentage of time, or latency was used for target behaviours that had "clearly discernable onsets and offsets", but were not easily classified into discrete units that were equal in duration and quality (Hartmann, 1984, p. 115). Examples include standing near the toilet for potty training purposes (duration), engaging in tantrum behaviours during bath (percentage of time), and hesitating to respond appropriately to therapist's greeting (latency). Response duration was calculated by using a stopwatch to measure the length of the target behaviour. Percentage of time was calculated by using a stopwatch to measure the length of the target behaviour (e.g., 34 seconds) and the length of the activity (e.g., 120 seconds), dividing the first value by the second value, and multiplying the result by 100% (e.g., 34/120 * 100%). Latency was

calculated by using a stopwatch to measure the time required to perform a response. For more detail, see Table 5 (shown on page 52).

Social Stories^{TM}. The author wrote an individualized Social Story[TM] for each participant (See Appendix I). Two strategies were used to maximize the readability of the stories. The first strategy involved selecting words for the story that were at or below the participants' receptive language levels. This was done by consulting Fenson et al.'s (1994) table specifying (a) the ages at which 50% of parents reported that their infants (age 8 to 16 months) understood 396 common words, and (b) the ages at which 50% of parents reported that their toddlers (age 16 to 30 months) produced 690 common words. Note: Since production follows comprehension, I subtracted five months from the identified ages for production in order to get estimates for comprehension. For example, 50% of parents reported that their children *produced* the word "fix" by 23 months; therefore, I estimated that the participants would *understand* the word "fix" by 17 months (i.e., 23 – 5 months). Five months was chosen as the time between comprehension and production because when comprehension and production data were included for the same word, they tended to be at least five months apart. For example, 50% of parents reported that their children *produced* the word "get" by 23 months, and *understood* the word "get" by 14 months. The second strategy involved soliciting feedback from the participants' parents on the language used in the stories.

The completed Social Stories[TM] contained information about the target behaviours they were designed to change and were written according to Gray's guidelines (Gray, 2000; Gray, 2004). The Social Stories[TM] consisted of 10 to 17 pages. The front page contained the title of the story, centred, in the middle of the page. The back page

contained the phrase "Created by Samantha Scapinello", centred, at the bottom of the page. The inside pages contained 1 to 5 sentences, left justified, at the top of the page. The inside pages were illustrated with Picture Communication Symbols from the Boardmaker™ program (Mayer-Johnson, 2008), a computer-based program used by special educators and speech-language pathologists to create symbol-based communication materials. For some children, the inside pages were also illustrated with photos of their favourite TV or film characters. All text was typed in black Arial font. The size of the font ranged from 18-point to 33-point, with larger fonts used for outside pages and children with lower receptive language levels, and smaller fonts used for inside pages and children with higher receptive language levels. All images were produced in colour. The Social Stories™ were printed on white card stock, laminated, and fastened together along the left margin with a black, plastic, spiral ring. They measured 7 by 7 inches or 17.8 by 17.8 centimetres.

Lead Therapist Training. Before beginning the interventions, the author or one of four, female undergraduate-level research assistants trained each participant's lead therapist. The author and research assistants had knowledge of behavioural change procedures through both university-level course work and practical experience. The training sessions took place in the settings where the target behaviours occurred (usually the children's homes). First, the lead therapists were provided and familiarized with the following documents: _____'s *Target Behaviour for Social Stories Study*, *Instructions for Baseline Data Collection*, *Instructions for Social Stories Treatment*, and *Data Collection Sheet*. The first document, _____'s *Target Behaviour for Social Stories Study*, lists information about the participant's target behaviour, such as its operational

definition, setting, time, measurement, and questionable instances (see Appendix J for an example from one participant). The second document, *Instructions for Baseline Data Collection*, lists the rules for collecting baseline data (See Appendix K for an example from one participant). The third document, *Instructions for Social Stories Treatment,* lists the rules for presenting the Social Story™ and collecting treatment data (See Appendix L for an example from one participant). The final document, *Data Collection Sheet,* provides space to record measurements and make comments about the target behaviour (see Appendix M for an example from one participant).

Second, lead therapists were taught how to measure their children's target behaviours. This was done through verbal instruction and hands-on practice. Once measuring appeared to be mastered, the instructor and lead therapist independently assessed the child's target behaviour and calculated interobserver agreement. "Interobserver agreement (IOA) refers to the degree to which two or more independent observers report the same observed values after measuring the same events" (Cooper et al., 2007, 1995, p. 113). There are many different techniques for calculating IOA (Cooper et al., 2007; Hartmann, 1984). In this study, the percentage agreement, also called the marginal agreement, was used. The percentage agreement is "the ratio of the smaller value (frequency or duration) to the larger value obtained by two observers, multiplied by 100" (Hartmann, 1984, p. 127). No common standard for satisfactory IOA exists; however, recommendations range from 70 to 90% (Barlow & Hersen, 1984b). Adequate IOA was obtained for all instructor-lead therapist pairs ($M = 96.71\%$, $SD = 6.52\%$, range $= 78.57$-100%). For more detail, see Table 6, Column 2.

Table 6

Interobserver Agreement for Participants' Target Behaviours

Participant	Training	Baseline	Treatment
Group 1			
Adam	100.00	100.00	100.00
Benjamin	100.00	100.00	100.00
Christopher	100.00	94.31	99.24
Donovan	94.12	100.00	84.62
Group 2			
Elijah	78.57	91.67	73.17
Francis	100.00	100.00	91.67
Graham	100.00	100.00	100.00
Group 3			
Ian	100.00	70.00	72.09
Jordan	100.00	100.00	87.50
Kevin	85.71	100.00	100.00
Liam	92.31	81.25	100.00
Group 4			
Matthew	100.00	100.00	97.92
Nathan	100.00	83.33	100.00
Owen	100.00	100.00	100.00
Peter	100.00	91.67	100.00
M	96.71	94.15	93.75
SD	6.52	9.21	9.93

Note. All interobserver agreement values are percentages.

During lead therapist training, some participants' lead therapists voiced concern about being able to measure their children's target behaviours on a regular basis due to work and personal schedules. All lead therapists were given permission to use substitute therapists in extenuating circumstances as long as they trained their substitute therapists by (a) providing and familiarizing them with the documents for the study (e.g., *Data Collection Sheet*), and (b) teaching them how to measure their children's target behaviours. Seven lead therapists used substitute therapists for one to eight observation days. Specifically, Matthew's lead therapist used a substitute therapist (i.e., Matthew's father) for eight observation days. Adam's lead therapist used a substitute therapist (i.e., Adam's father or grandmother) for seven observation days. Christopher's lead therapist used a substitute therapist (i.e., Christopher's father) for six observation days. Donovan's lead therapist used a substitute therapist (i.e., Donovan's father) for four observation days. Ian's lead therapist used a substitute therapist (i.e., Ian's father) for two observation days. Graham and Owen's lead therapists used substitute therapists (i.e., Graham's father and Owen's father, respectively) for one observation day.

Experimental Design. A multiple baseline design across participants was used for each group of children to assess the effectiveness of Social Stories™ at various receptive language levels. In order to accomplish this, participants were randomly assigned to begin treatment at different points in time (Barlow & Hersen, 1984a). Specifically, Adam (Group 1), Elijah (Group 2), Ian (Group 3) and Matthew (Group 4) began treatment after four days of baseline. Benjamin (Group 1), Francis (Group 2), Jordan (Group 3), and Nathan (Group 4) began treatment after eight or nine days of baseline. Christopher (Group 1), Graham (Group 2), Kevin (Group3), and Owen (Group 4) began treatment

after 12 days of baseline. And, Donovan (Group 1), Liam (Group 3), and Peter (Group 4) began treatment after 15 or 16 days of baseline.

During the baseline phase, the lead therapists collected baseline data on the participants' target behaviours according to the document *Instructions for Baseline Data Collection*. During the treatment phase, the lead therapists read the Social Stories™ and collected treatment data on the participants' target behaviours according to the document *Instructions for Social Stories Treatment*. During both phases, lead therapists were strongly advised to respond to the target behaviours as they had in the past, that is, before the start of the study. They were also encouraged to call the author if they had any questions or concerns.

It is recommended that IOA be collected at least once in each phase of a multiphase behaviour-change investigation, for at least 20 to 33% of the total observations (Cooper et al., 2007; Kennedy, 2005; Poling, Methot, & LeSage, 1995). In this study, IOA was collected by the author, or one of four, female, undergraduate-level research assistants, once in each phase, for 8.33 to 11.11% of the total observations (depending on the participant). As mentioned earlier, the author and all research assistants had knowledge of behaviour change procedures, including behavioural measurement, through both university-level coursework and practical experience. Although IOA was collected less often than recommended, the assessment measures were relatively simple; the observers were well trained; there were only two phases; and the initial IOA, conducted during lead therapist training, was high. According to Cooper et al. (2007), each of these factors decreases the need for frequent IOA assessments. Adequate IOA was obtained for all author (or research assistant)-lead therapist pairs (i.e.,

for baseline: M = 94.15%, SD = 9.21%, range = 70-100%; for treatment: M = 93.75%,

SD = 9.93%, range = 72.09-100%). For more detail, see Table 6, Columns 3 and 4

(shown on page 58).

Analyses. In order to test the hypotheses, the results for each participant were

analyzed using visual inspection. Visual inspection is the most commonly used method to

evaluate the effectiveness of an intervention in single-case research (Cooper et al., 2007;

Kazdin, 1982; Kazdin, 1984). "Visual inspection refers to reaching a judgment about the

reliability or consistency of intervention effects by visually examining the graphed data"

(Kazdin, 1982, p. 232). The conditions that must be met for an intervention to be deemed

effective depend on the particular design (Kazdin, 1982). In a multiple baseline design

across participants, a performance shift must occur for each participant after treatment is

implemented. When performance shifts are sequentially observed in at least three

participants after treatment is implemented, the researcher gains confidence that it is the

intervention, rather than extraneous variables, that is responsible for the change (Barlow

& Hersen, 1984a; Cooper et al., 2007).

When interventions produce potent effects, performance shifts are obvious

(Kazdin, 1982). When interventions produce weaker effects, performance shifts are more

difficult to discern. In these cases it is important to systematically examine four

characteristics of the data: changes in mean, changes in level, changes in trend, and the

latency of change. A change in mean is synonymous with a change in the average rate of

performance across phases. A change in level refers to a *"shift or discontinuity of*

performance from the end of one phase to the beginning of the next phase" (Kazdin,

1982, p. 234). A change in trend (or slope) is illustrated when there is a switch from (a) a

trend in one phase to no trend in the other phase (i.e., horizontal line), or (b) an accelerating trend in one phase to a decelerating trend in the other phase. The latency of change has to do with the period between the onset of one phase (e.g., intervention) and behaviour change. "As a general rule, the shorter the period between the onset of the intervention and behavior change, the easier it is to infer that the intervention led to change" (Kazdin, 1982, p. 237). In addition to systematically examining changes in means, levels, and trends, and the latency of changes, it may be helpful to examine other characteristics of the data, including the variability of performance within phases and the consistency of the effect across phases or subjects, depending on the design (Cooper et al., 2007; Kazdin, 1982).

A concern regarding the use of visual inspection is that it lacks formalized rules (Kazdin, 1982). As a result, it may permit "subjectivity and inconsistency in the evaluation of intervention effects" (Kazdin, 1982, p. 239). Indeed, results from studies examining the interrater reliability of experts in the field have been discouraging. For example, DeProspero and Cohen (1979) found a mean interrater reliability of 0.61 for 108 reviewers of behavioural journals. Similarly, Jones, Weinrott, and Vaught (1978) found a mean interrater reliability of 0.39 for 11 judges, including full-time researchers, university professors, and graduate students, with 3 to 17 years of research experience in psychology. Consequently, alternative outcome metrics have been suggested as a supplement to, or replacement for, visual inspection (Kazdin, 1982; Scruggs, Mastropieri, & Casto, 1987).

At present, there are two types of alternative outcome metrics: the percentage of non-overlapping data (PND) and statistical tests. The PND is a single non-parametric

procedure. For a review see Scruggs et al. (1987). The PND is computed by identifying the number of treatment data points that exceed the highest (or lowest) baseline data point, dividing this number by the total number of treatment data points, and multiplying the result by 100. "Scores of 90% and higher represent highly effective outcomes, scores of 70% to 90% represent fair outcomes, scores of 50% to 70% represent questionable effects, and scores below 50% suggest basically unreliable treatments" (Scruggs, Mastropieri, Cook, & Escobar, 1986, p. 262). Statistical tests include a number of parametric and non-parametric procedures, such as conventional t and F tests, time-series analysis, randomization tests, and the Rn test of ranks. For a review see Kazdin (1984). Each statistical test is computed in a different manner. Results are considered to be significant if $p < .05$.

Although the PND and statistical tests have formalized rules, they have serious limitations. The primary issue with the PND is that it cannot always accurately determine the effectiveness of an intervention (Allison & Gorman, 1993; Scruggs et al., 1987; White, 1987). For example, if there is an outlier in the baseline phase that overlaps one or more treatment data points, the PND will return a value of 0%, even if the treatment has a clear positive (or negative) effect according to a visual inspection interpretation (White, 1987). In addition to "ceiling" or "floor" effects, the PND will make erroneous conclusions in at least two other situations: (1) "when the treatment has a detrimental effect", and (2) "when trend is present in the data" (Allison & Gorman, 1993, p. 622). The primary issue with statistical tests is that they rely on assumptions and conditions that can rarely be met in single-case research (Kazdin, 1982; Scruggs et al., 1987). For example, a conventional t or F test requires data to be independent, a time-series analysis

requires extended baseline and treatment phases, a randomization test requires performance to change rapidly across conditions, and the Rn test of ranks requires participants to have similar baseline scores (Kazdin, 1982; Kazdin, 1984). A secondary issue with statistical tests is that they do not fit the goals of single-case researchers. Specifically, statistical tests detect slight changes in performance and increase the likelihood of making a Type I error (i.e., a false positive), when single-case researchers are interested in variables that produce potent, reliable effects (Cooper et al., 2007; Kazdin, 1982).

Twenty-seven of the 32 published Social Stories™ treatment studies used visual inspection. The remaining five studies either did not include numerical data (i.e., Choi & Nieminen, 2008; Moore, 2004; Rowe, 1999) or lacked a baseline phase (i.e., Rogers & Myles, 2001; Smith, 2001). Four of the 27 studies supplemented visual inspection with the PND (i.e., Reynhout & Carter, 2007; Sansosti & Powell-Smith, 2008; Scattone et al., 2006; Scattone, 2008). Two of the 27 studies supplemented visual inspection with a statistical test (i.e., Brownell, 2002; Pasiali, 2004). The author of the present study decided to rely exclusively on visual inspection to analyze the participants' results since (a) this is the norm in the Social Stories™ research literature, and (b) the alternative outcome metrics (i.e., the PND and statistical tests) have serious limitations. The author systematically examined all relevant characteristics of the data and only considered clear changes in means, levels, trends and/or variability to be meaningful in order to decrease subjectivity and increase consistency. This strategy may have increased the likelihood of making a Type II error (i.e., a false negative; Cooper et al., 2007). This was considered to

be a minor concern given that single-case researchers are interested in variables that produce potent, reliable effects (Cooper et al., 2007; Kazdin, 1982).

Social Validity. "Social validity refers to the degree that behavior-change efforts impact favorably upon consumers" (Carr, Austin, Britton, Kellum, & Bailey, 1999, p. 223). Wolf introduced the concept of social validity in 1978. Since this time, social validity has been an important component of single-case research methodology (Carr et al., 1999; Finn & Sladeczek, 2001; Kazdin, 1982). According to Wolf (1978), the social validity of a study should ideally be evaluated on at least three, related levels: (1) the social significance of the treatment goals, (2) the social appropriateness of the treatment procedures, and (3) the social importance of the treatment outcomes. Two broad methods for assessing social validity exist: subjective evaluation and social comparison (Carr et al., 1999; Kazdin, 1982).

Subjective evaluation involves having people close to the participants (e.g., parents and teachers) make judgements about the intervention via questionnaires or interviews. It typically addresses the social appropriateness of the treatment procedures and/or the social importance of the treatment outcomes, depending on the specific questions asked. Social comparison involves comparing the behaviour of participants before and after treatment to some normative standard, such as the behaviour of typically developing peers (Finn & Sladeczek, 2001; Kazdin, 1982). It addresses only the social importance of the treatment outcomes (Kazdin, 1982). Of these two methods, subjective evaluation is the most frequently used, and the one chosen to assess social validity in this study (Cooper et al., 2007).

The author attempted to contact all the participants' lead therapists by phone, 3 to 30 months after their children had completed the baseline and treatment phases. The author successfully reached 13 of the 15 participants' lead therapists (i.e., 87.67%). She reminded the lead therapists of their earlier participation in the study and asked if they would be willing to complete a brief questionnaire. All 13 lead therapists agreed. The author then proceeded to administer the TEI-SF-M (Scapinello, 2008). Following the completion of this measure, the lead therapists were given the opportunity to provide additional feedback and were thanked for their time.

Chapter III: Results

The study ran for 24 observation days for each participant. Baseline data were collected for 4 to 16 days, and treatment data were collected for 8 to 20 days, depending on the participant's position in the multiple baseline design. For example, baseline data were collected for 4 days, and treatment data were collected for 20 days, for participants in the first position (i.e., Adam, Elijah, Ian, and Matthew), whereas baseline data were collected for 12 days, and treatment data were collected for 12 days, for participants in the third position (i.e., Christopher, Graham, Kevin, and Owen). Seven of the participants had complete data sets (i.e., Elijah, Ian, Kevin, Liam, Matthew, Nathan, and Peter). The other eight participants were missing between 2 and 6 data points. According to Kazdin (1982), each phase should consist of 3 to 5 data points. All participants met or exceeded this requirement.

Group 1

Adam. Figure 1 depicts the number of times Adam came out of his bedroom after being put down for the night, over a 45-minute observation period, across design phases. During the baseline phase, the mean frequency of coming out of the bedroom was high, and the data were variable ($M = 18.00$ times, $SD = 7.00$ times, range = 11-25 times). After the Social Story™ was introduced, the mean frequency of coming out of the bedroom decreased dramatically, and the data became more stable ($M = 4.17$ times, $SD = 2.41$ times, range = 0-8 times). Furthermore, after the Social Story™ was introduced, there was an immediate, notable downward shift in level.
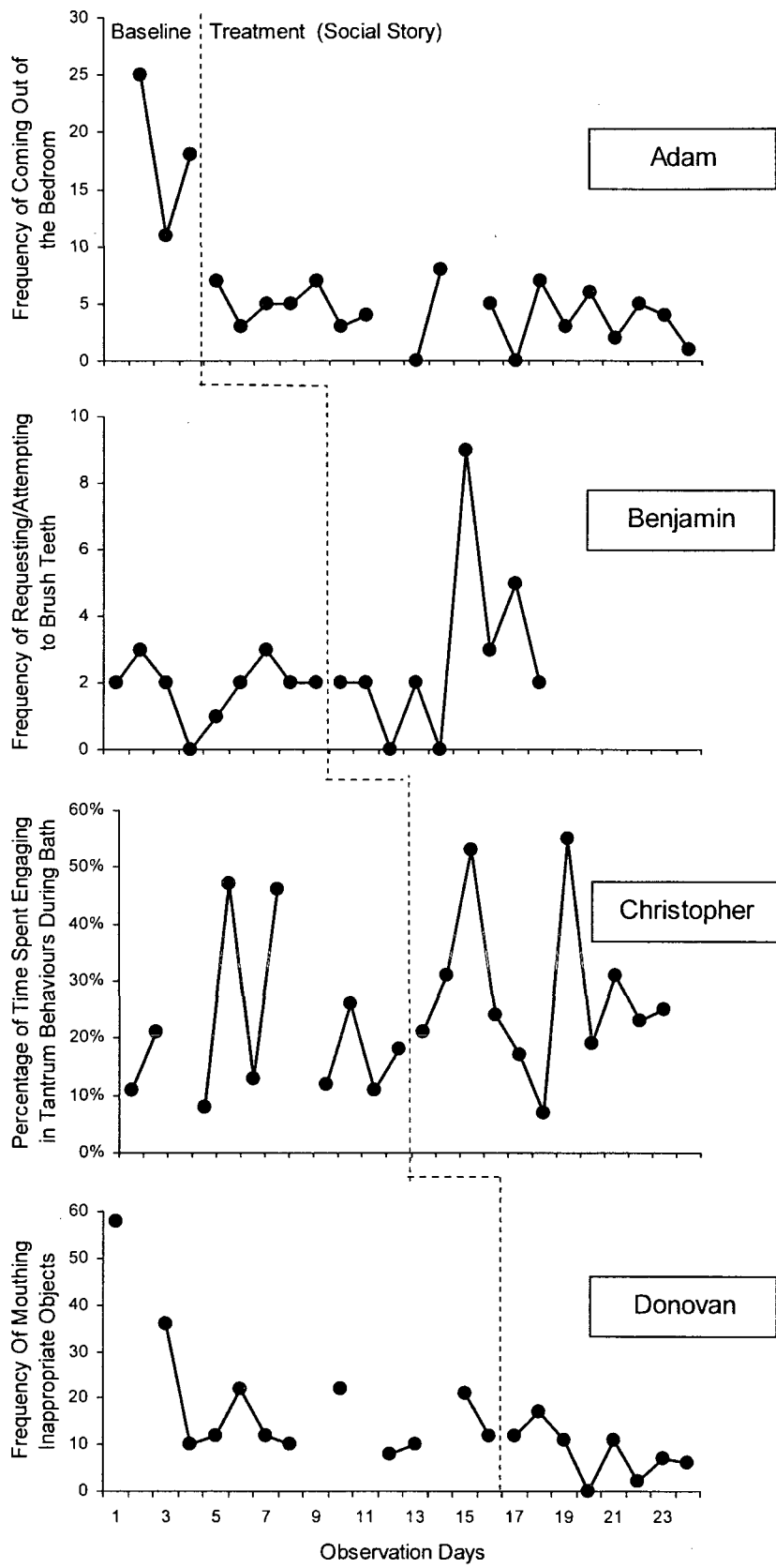
Figure 1: Results for Group 1.

Benjamin. Figure 1 also depicts the number of times Benjamin requested or

attempted to brush his teeth at inappropriate times, over a one-hour observation period,

across design phases. During the baseline phase, the mean frequency of requesting or

attempting to brush teeth was 1.89 times (SD = 0.93 times, range = 0-3 times). After the

Social Story^{TM} was introduced, the mean frequency of requesting or attempting to brush

teeth increased marginally to 2.78 times (SD = 2.77 times, range = 0-9 times). On the

sixth day of treatment (i.e., observation day 15) the frequency of requesting or attempting

to brush teeth was unusually high. The lead therapist explained that she and Benjamin

spent most of the observation periods in the kitchen or family room, but, on this

particular day, they spent the observation period upstairs near the washroom where

Benjamin's toothbrush was located. Following the sixth day of treatment, there was a

slight upward shift in level in the counter-therapeutic direction.

Christopher. Figure 1 depicts the percentage of time Christopher spent engaging

in tantrum behaviours during his bath, across design phases. During the baseline phase,

the mean percent of tantrum behaviours was high, and the data were variable (M =

21.30%, SD = 14.33%, range = 8-47%). After the Social Story^{TM} was introduced, the

mean percent of tantrum behaviours remained high, and the data remained variable (M =

27.82%, SD = 14.54%, range = 7-55%). No clear change in trend or level occurred

between the phases.

Donovan. Finally, Figure 1 depicts the number of times Donovan mouthed

inappropriate objects, over a 30-minute observation period, across design phases. During

the baseline phase, the mean frequency of mouthing inappropriate objects was 19.42

times (SD = 14.59 times, range = 8-58 times). After the Social Story^{TM} was introduced,

the mean frequency of mouthing inappropriate objects decreased to 8.25 times (SD = 5.60 times, range = 0-17 times). At the beginning of the baseline phase, a decelerating trend occurred. Midway through the baseline phase, it flattened out. This decelerating trend was responsible for the change in mean that occurred between the baseline and treatment phase (noted above). No other clear change occurred between the phases.

Summary. Adam demonstrated a significant change in the desired direction in his target behaviour following intervention. By contrast, Benjamin, Christopher, and Donovan demonstrated no significant changes in the desired direction in their respective target behaviours following intervention. Since a performance shift was observed in only one participant, this shift cannot be reliably attributed to the intervention (Barlow & Hersen, 1984a). Taken together, these results suggest that the Social Stories™ treatment was not effective for participants with receptive language age equivalent scores between 13 and 14 months.

Group 2

Elijah. Figure 2 depicts the duration in seconds that Elijah stood near the toilet (for potty training purposes), during "after morning snack" toileting, across design phases. During the baseline phase, the mean duration spent standing near the toilet was 33.50 seconds (SD = 9.57 s, range = 25-47 s). After the Social Story™ was introduced, the mean duration spent standing near the toilet increased marginally to 40.15 seconds (SD = 7.47 s, range = 28-51 s). A change in trend from a decelerating trend to no trend occurred between the phases; however, there was still considerable overlap between the baseline and treatment data. Furthermore, no clear change in level or variability occurred between the phases.
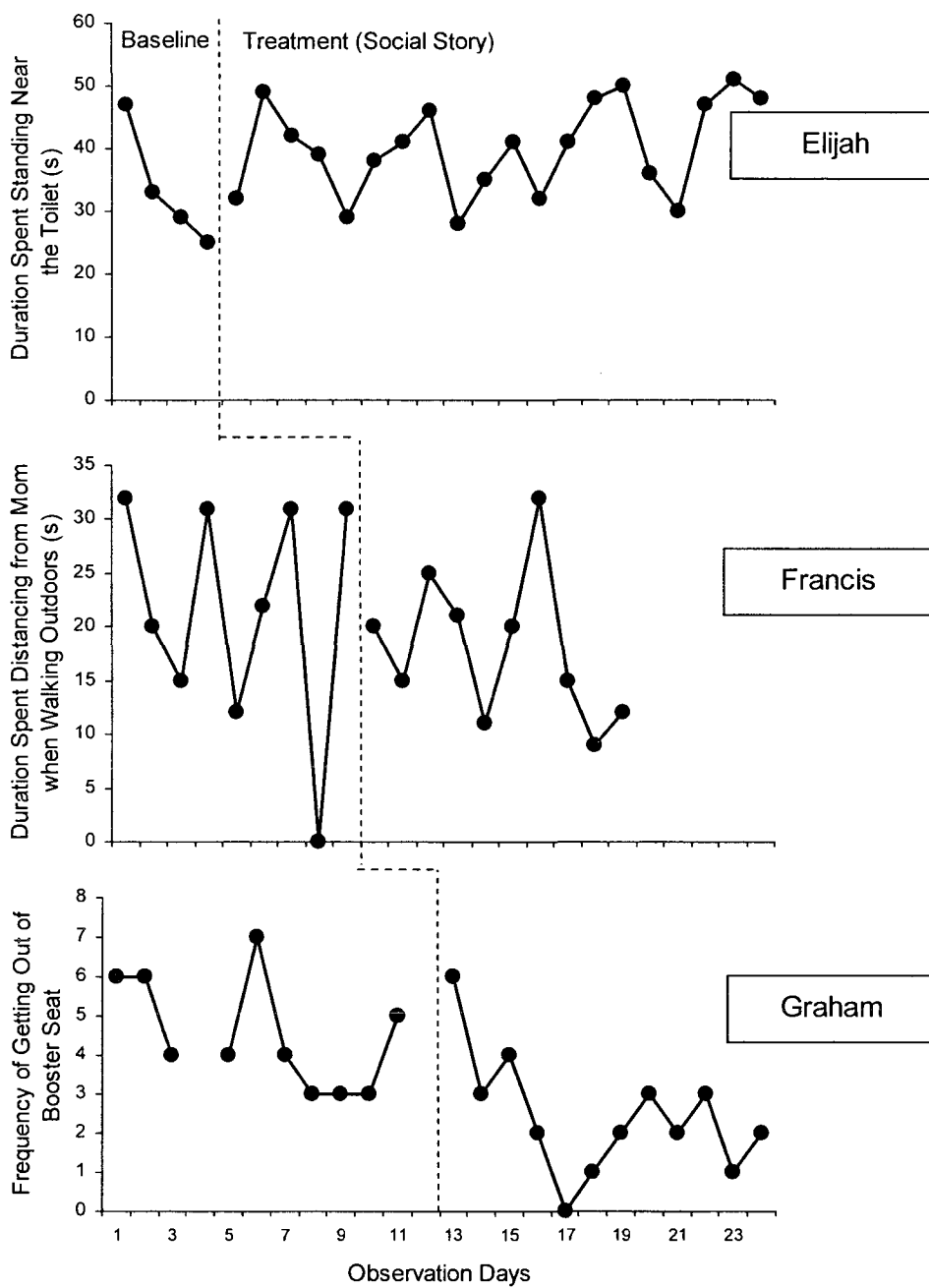
Figure 2: Results for Group 2.

Francis. Figure 2 also depicts the duration in seconds that Francis spent distancing from his mother when walking outdoors, over a 20-minute observation period, across design phases. During the baseline phase, the mean duration spent distancing was high, and the data were variable (M = 21.56 s, SD = 11.06 s, range = 0-32 s). After the Social Story™ was introduced, the mean duration spent distancing remained high, and the data remained variable (M = 18.00 s, SD = 7.04 s, range = 9-32 s). No clear change in trend or level occurred between the phases.

Graham. Finally, Figure 2 depicts the number of times Graham got out of his booster seat, over a 10-minute observation period, across design phases. During the baseline phase, the mean frequency of getting out of the booster seat was 4.50 times (SD = 1.43 times, range = 3-7 times). After the Social Story™ was introduced, the mean frequency of getting out of the booster seat decreased to 2.42 times (SD = 1.56 times, range = 0-6 times). A change in trend from no trend to a decelerating trend occurred between the phases. The new trend began on the second day of treatment (i.e., observation day 14), and continued until the fifth day of treatment (i.e., observation day 17), before flattening out. The end result was a change in level from the baseline phase to the last section of the treatment phase.

Summary. Graham demonstrated a significant change in the desired direction in his target behaviour following intervention. By contrast, Elijah and Francis demonstrated no significant changes in the desired direction in their respective target behaviours following intervention. Since a performance shift was only observed in one participant, this shift cannot be reliably attributed to the intervention (Barlow & Hersen, 1984a).

Taken together, these results suggest that the Social Stories™ treatment was not effective for participants with receptive language age equivalent scores between 20 and 27 months.

Group 3

Ian. Figure 3 depicts the duration in seconds that Ian spent brushing his teeth independently, during morning brushing, across design phases. During the baseline phase, the mean duration of brushing teeth independently was 10.50 seconds (SD = 2.38 s, range = 9-14 s). After the Social Story™ was introduced, the mean duration of brushing teeth independently increased dramatically to 41.95 seconds (SD = 23.51 s, range = 10-85 s). A change in trend from no trend to an accelerating trend occurred between the phases. The new trend began on the sixth day of treatment (i.e., observation day 10) and continued until the thirteenth day of treatment (i.e., observation day 17), before flattening out. The end result was a change in level from the baseline phase to the last section of the treatment phase.

Jordan. Figure 3 also depicts the number of times Jordan came to his bedroom door after being put down for the night, over a 30-minute observation period, across design phases. During the baseline phase, the mean frequency of coming to the bedroom door was 7.88 times (SD = 2.17 times, range = 5-10 times). After the Social Story™ was introduced, the mean frequency of coming to the bedroom door decreased marginally to 5.00 times (SD = 1.10 times, range = 4-7 times). A slight decrease in variability occurred between the baseline and treatment phase. No clear change in trend or level occurred between the phases.
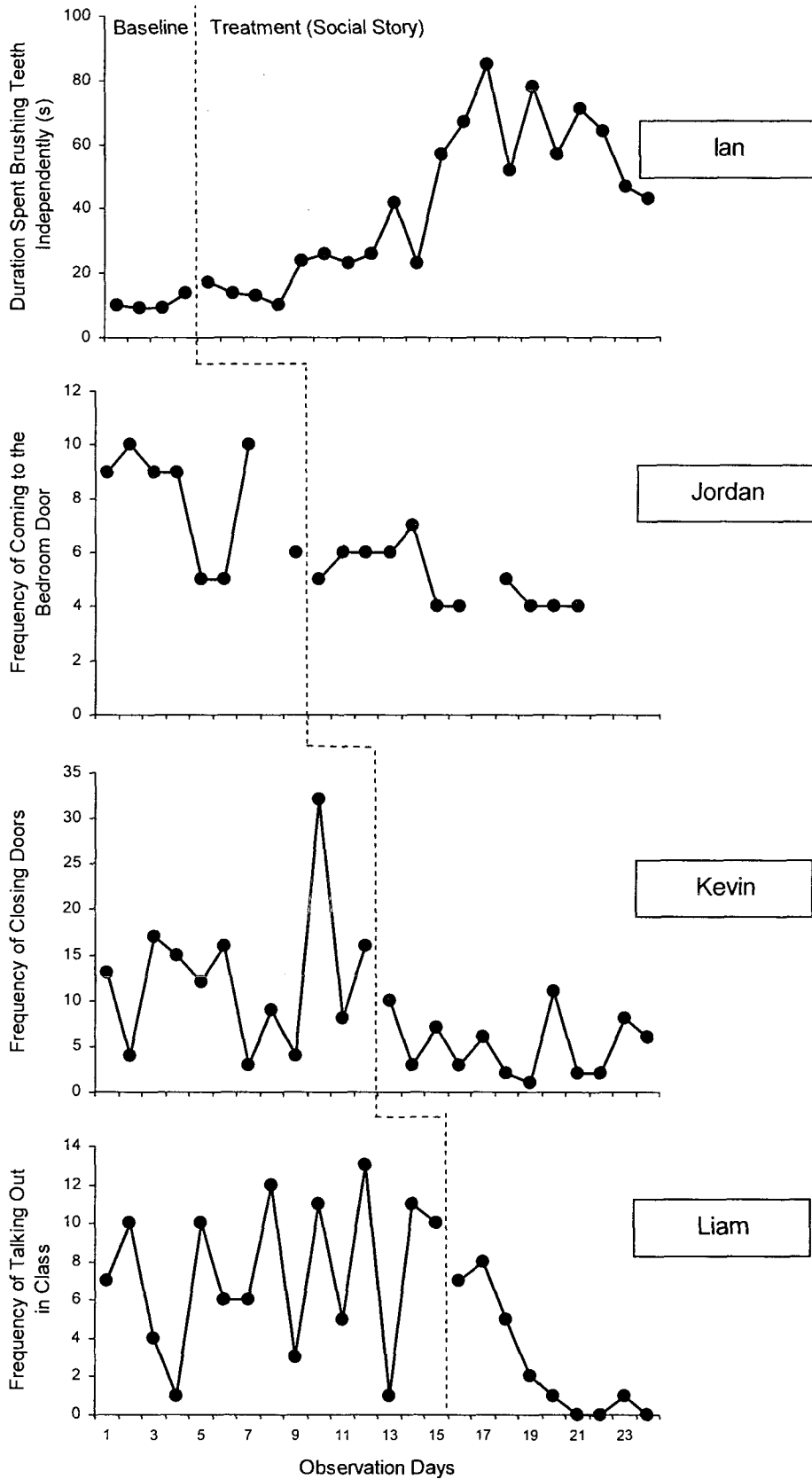
Figure 3: Results for Group 3.

Kevin. Figure 3 depicts the number of times Kevin closed doors in his home, over a 30-minute observation period, across design phases. During the baseline phase, the mean frequency of closing doors was 12.42 times (*SD* = 7.97 times, range = 3-32 times). After the Social Story™ was introduced, the mean frequency of closing doors decreased to 5.08 times (*SD* = 3.40 times, range = 1-11 times). On the tenth day of baseline (i.e., observation day 10) the frequency of closing doors was unusually high. This outlier was responsible for the change in mean that occurred between the baseline and treatment phase (noted above). No other clear change occurred between the phases.

Liam. Finally, Figure 3 depicts the number of times Liam talked out in class, over a 20-minute observation period, across design phases. During the baseline phase, the mean frequency of talking out was 7.33 times (*SD* = 3.98 times, range = 1-13 times). After the Social Story™ was introduced, the mean frequency of talking out decreased to 2.67 times (*SD* = 3.16 times, range = 0-8 times). A change in trend from no trend to a decelerating trend occurred between the phases. The new trend began on the second day of treatment (i.e., observation day 17) and continued until the occurrences of the target behaviour reached zero (i.e., observation day 21).

Summary. Ian and Liam demonstrated significant changes in the desired direction in their respective target behaviours following intervention. By contrast, Jordan and Kevin demonstrated no significant changes in the desired direction in their respective target behaviours following intervention. Since performance shifts were observed in only two participants, these shifts cannot be reliably attributed to the interventions (Barlow & Hersen, 1984a). Taken together, these results suggest that the Social Stories™ treatment

was not effective for participants with receptive language age equivalent scores between 28 and 34 months.

Group 4

Matthew. Figure 4 depicts the duration in seconds that Matthew spent engaging in interfering behaviours during genital cleansing, across design phases. Matthew's mother explained that her son's routine for genital cleansing changed on observation day 22. Specifically, he was encouraged to pull back his foreskin and become an active participant in his personal hygiene versus standing still for his parents. These new behaviours were not targeted in Matthew's Social Story[TM]; therefore, the data from observation days 22 to 24 were not included in the analyses. During the baseline phase, the mean duration of interfering behaviours was high ($M = 78.75$ s, $SD = 21.75$ s, range = 51-104 s). After the Social Story[TM] was introduced, the mean duration of interfering behaviours decreased dramatically ($M = 42.71$ s, $SD = 9.56$ s, range = 28-62 s). Furthermore, after the Social Story[TM] was introduced, there was an immediate, notable downward shift in level.

Nathan. Figure 4 also depicts the number of times Nathan broke a game playing rule, during the "Down at the Corner" game, across design phases. During the baseline phase, the mean frequency of breaking game rules was 5.50 times ($SD = 0.76$ times, range = 5-7 times). After the Social Story[TM] was introduced, the mean frequency of breaking game rules decreased to 3.19 times ($SD = 0.75$ times, range = 2-4 times). Similar to the graphed data for Matthew, a change in level occurred from the end of the baseline phase to the start of the treatment phase, suggesting an improvement in behaviour.
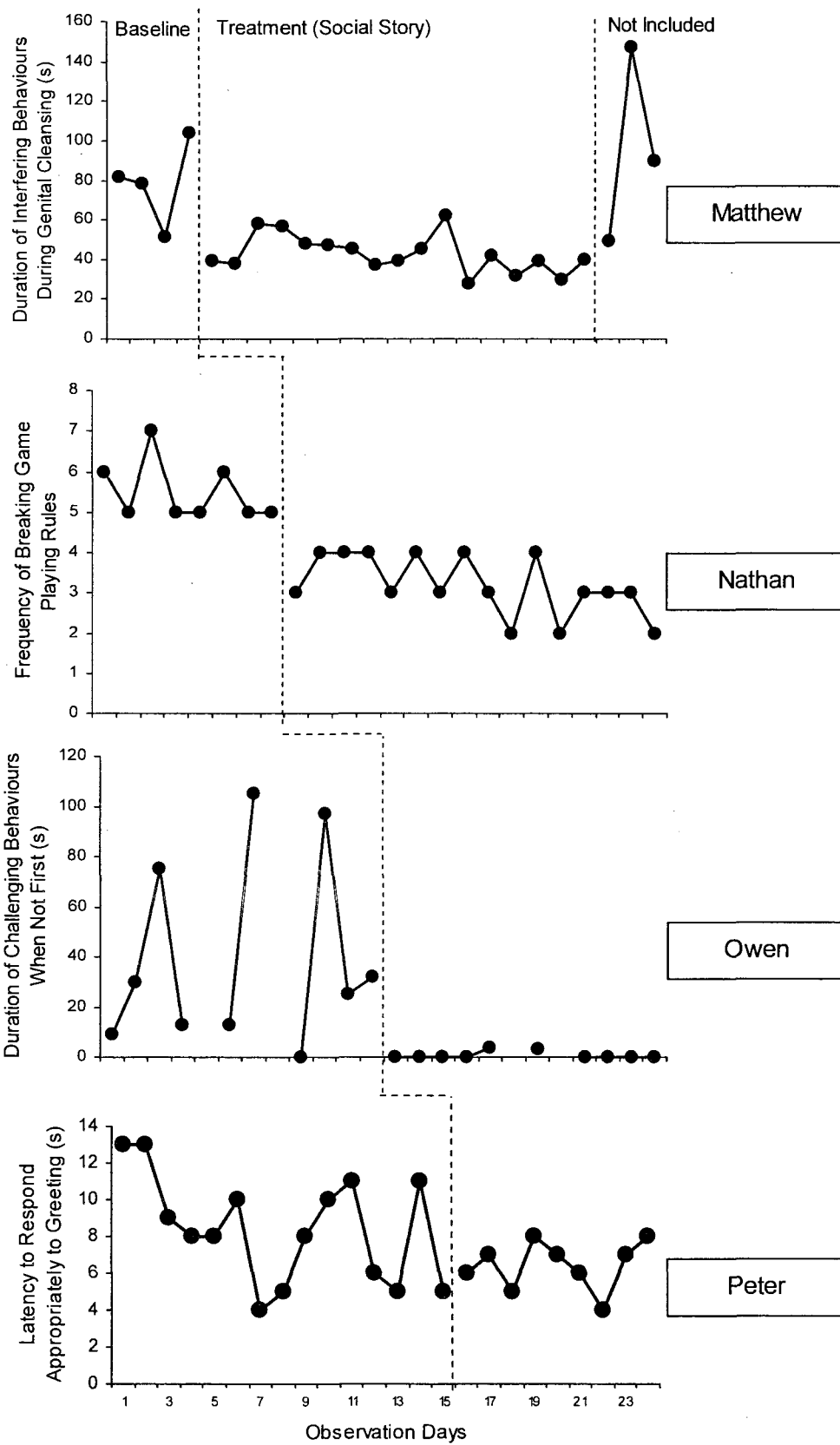
Figure 4: Results for Group 4.

Owen. Figure 4 depicts the duration in seconds that Owen spent engaging in challenging behaviours when not allowed to go first, during a common childhood game (e.g., Go Fish or Yahtzee), across design phases. During the baseline phase, the mean duration of challenging behaviours was high, and the data were variable ($M = 39.90$ s, $SD = 38.16$ s, range = 0-105 s). After the Social Story™ was introduced, the mean duration of challenging behaviours approached zero ($M = 0.70$ s, $SD = 1.49$ s, range = 0-4 s). Remarkably, after the Social Story™ was introduced, Owen displayed challenging behaviours on only 20% of the observation days. Even then, these behaviours were extremely short-lived (i.e., less than 5 s).

Peter. Finally, Figure 4 depicts the latency in seconds that Peter took to respond appropriately to his therapist's greeting, when arriving to preschool, across design phases. During the baseline phase, the mean latency to respond appropriately was 8.40 seconds ($SD = 2.95$ s, range = 4-13 s). After the Social Story™ was introduced, the mean latency to respond appropriately decreased marginally to 6.44 seconds ($SD = 1.33$ s, range = 4-8 s). A slight decrease in variability occurred between the baseline and treatment phase. No clear change in trend or level occurred between the phases.

Summary. Matthew, Nathan, and Owen demonstrated significant changes in the desired direction in their respective target behaviours following intervention. By contrast, Peter demonstrated no significant change in the desired direction in his target behaviour following intervention. Since performance shifts were observed for three of the four participants, these shifts can be reliably attributed to the interventions (Barlow & Hersen, 1984a). Taken together, these results suggest that the Social Stories™ treatment was

effective for most participants with receptive language age equivalent scores at or above 37 months.

Social Validity of Social Stories^{TM}

Thirteen of the 15 participants' lead therapists completed the TEI-SF-M (Scapinello, 2008). These lead therapists were mostly parents (i.e., 11 mothers, 1 father, and 1 teacher). Their total scores on the TEI-SF-M, which assesses treatment acceptability, ranged from 32 to 43. The highest possible total score is 45, with higher scores indicating greater treatment acceptability. Their scores on item 5 of the TEI-SF-M, which examines treatment effectiveness, ranged from 2 to 5. The highest possible score on item 5 is 5, with higher scores indicating greater treatment effectiveness. For more detail, see Table 7.

Table 7

Participants' Lead Therapists' Scores on the TEI-SF-M (Scapinello, 2008)

Participant	Relation to Participant	Total Score	Score on Item 5
		Group 1	
Adam	Mother	39	5
Benjamin	Mother	34	2
Christopher	Mother	39	4
Donovan	Mother	–	–
M		37.33	3.67
		Group 2	
Elijah	Father	32	2
Francis	Mother	40	4
Graham	Mother	35	3
M		35.67	3.00
		Group 3	
Ian	Mother	41	5
Jordan	Mother	–	–
Kevin	Mother	39	4
Liam	SK Teacher	39	4
M		39.67	4.33
		Group 4	
Matthew	Mother	43	4
Nathan	Mother	32	4
Owen	Mother	42	5
Peter	Mother	39	4
M		39.00	4.25
Grand M		38.00	3.85

Note. TEI-SF-M = Treatment Evaluation Inventory Short Form Modified.
Item 5 examines treatment effectiveness.

Chapter IV: Discussion

Effectiveness of Social Stories^{TM}

The primary purpose of this study was to evaluate the effectiveness of Social Stories^{TM} for children with ASD. It was hypothesized that Social Stories^{TM} would be effective for at least some children with ASD. In line with this hypothesis, Social Stories^{TM} were found to be effective for Matthew (Group 4), Nathan (Group 4), and Owen (Group 4). All three participants demonstrated immediate, notable downward shifts in level in their respective, challenging target behaviours following intervention.

Adam (Group 1), Graham (Group 2), Ian (Group 3), and Liam (Group 3) also demonstrated performance shifts in the desired direction in their respective target behaviours following intervention. Their performance shifts, however, could not be reliably attributed to the Social Stories^{TM} treatment since there were less than three demonstrations of the experimental effect in their respective groups (Barlow & Hersen, 1984a). Alternative explanations for the decrease in Adam's challenging target behaviour (i.e., coming out of the bedroom after being put down for the night) were readily available. First, Adam's bedtimes during the treatment phase tended to be slightly later than his bedtimes during the baseline phase (i.e., 8:45 p.m. to 9:30 p.m. compared to 8:10 p.m. to 9:06 p.m.). This was significant because there was a definite trend with later bedtimes towards coming out of the bedroom less, and falling asleep during the measurement period, within and across phases. Second, according to his mother's comments on the *Data Collection Sheets*, Adam started to more consistently ask for and gain comfort from a new sleeping space (i.e., pillows and a blanket just inside his bedroom door) over the course of the study.

Similarly, alternative explanations for the increase in Ian's prosocial target behaviour (i.e., brushing teeth independently) were readily available. First, confidence in the accuracy of Ian's graphed data was lacking because of low IOA scores during both the baseline and treatment phases (i.e., 70.00% and 72.09%, respectively). Second, according to his mother's comments on the *Data Collection Sheets*, Ian received unplanned verbal prompts reminding him to follow the directions in his Social Story[TM]. Children receiving unplanned verbal prompts are probably the norm, rather than the exception (Scattone et al., 2002; e.g., Scattone et al., 2006).

Crozier and Tincani (2005) investigated verbal prompts as a source of variability using an ABAC reversal design, where A was the baseline (or return to baseline) condition, B was the modified social story intervention, and C was the modified social story intervention plus the addition of verbal prompts. The modified social story included a comprehension check and deviated from the *Social Story Formula* (Gray, 2004). Crozier and Tincani's (2005) participant's challenging target behaviour (i.e., talking out in class) decreased during both intervention phases, but to a greater degree in the C phase. The authors suggested that the modified social story alone was less effective than the modified social story plus the addition of verbal prompts. They acknowledged, however, that additional replications (i.e., ABACBC) were needed to make this determination with any certainty.

No obvious alternative explanations for the decrease in Graham's target behaviour (i.e., getting out of booster seat), or the decrease in Liam's target behaviour (i.e., talking out in class) were readily available. Given Graham's young age (i.e., 32 months),

maturation may have been a factor. Other influences not assessed in this study may have also been factors.

The findings in this study were consistent with the findings in the three relatively methodologically sound treatment studies (i.e., Brownell, 2002; Crozier & Tincani, 2007; Kuoch & Mirenda, 2003), in that Social Stories™ were effective for some children with ASD. Consistent positive results among acceptable studies help to support the use of Social Stories™ to change behaviour. This is especially important since Social Stories™ have a number of strengths.

First, Social Stories™ focus on improving social interaction, which is seen as (a) the core deficit in ASD, and (b) related to the other deficits: impaired communication and narrow repetitive behaviours and interests (Olley & Gutentag, 1999; Wing, 1988). Second, Social Stories™ emphasize some of the relative strengths often found in children with ASD, including visual-perceptual skills and a propensity for following rules and routines (Lincoln, Courchesne, Kilman, Elmasian, & Allen, 1988; Quill, 1997; Scattone et al., 2002). Third, Social Stories™ can be written by almost anyone with very little guidance and are relatively inexpensive to produce (Gray, 2004; Kuoch & Mirenda, 2003). Fourth, Social Stories™ can address various challenging and prosocial target behaviours (Delano & Snell, 2006; Gray, 2004). Fifth, Social Stories™ are a relatively nonintrusive intervention, and "ethically, the least intrusive intervention that effectively changes behavior is the best choice" (Scattone et al., 2002, p. 540).

The Question of Receptive Language Level

Currently, there is a lack of information on which participant-related variables influence the effectiveness of Social Stories™. This concern has been raised in previous

studies and reviews (e.g., Bledsoe et al., 2003; Lorimer et al., 2002; Rust & Smith, 2006; Sansosti et al., 2004). Investigation of numerous participant-related variables has been suggested, such as age, gender, intellectual skills, language skills, social awareness, motivation to change, compulsiveness, insistence on sameness, and educational experiences (Bledsoe et al., 2003; Hutchins & Prelock, 2006; Lorimer et al., 2002; Sansosti & Powell-Smith, 2006). In order to benefit from Social Stories™, children first need to understand their meaning; therefore, it seems reasonable that receptive language may be the most important participant-related variable.

The secondary purpose of this study was to examine the minimum receptive language level required to benefit from Social Stories™. It was hypothesized that Social Stories™ would benefit children with receptive language at or above the 18-month level. Contrary to this expectation, Social Stories™ benefited only most children with receptive language at or above the 37-month level (i.e., Matthew, Nathan, and Owen).

Between the 18-month and the 37-month level, children acquire the ability to detect small, unstressed grammatical elements (e.g., with). For example, Goinkoff and Hirsh-Pasek (1999) found that children can differentiate between sentences like 'Where's Mommy bending *with* Daddy?' and 'Where's Mommy bending Daddy?' by 28 months. Furthermore, between the 18-month and 37-month level, children become more proficient with regards to comprehending word order. For example, Roberts (1983) found that children between 23 and 31 months ($M = 27$ months) comprehended word order in the context of only one or two test verbs (i.e., tickle, kiss, and hug), whereas children between 28 and 31 months ($M = 29$ months) comprehended word order in the context of

all three test verbs. These advances may be necessary for children to benefit from Social Stories[TM].

This study is the only published treatment study to examine the minimum receptive language level required to benefit from Social Stories[TM]. Only nine previous studies described their participants' receptive language, and only two of these studies were relatively methodologically sound (i.e., Crozier & Tincani, 2007; Kuoch & Mirenda, 2003). Crozier and Tincani (2007) found the Social Stories[TM] treatment unsuccessful in changing the behaviour of a participant with receptive language at the 30-month level. By contrast, Kuoch and Mirenda (2003) found the Social Stories[TM] treatment successful in changing the behaviour of a participant with receptive language at the 31-month level. Both studies found the Social Stories[TM] treatment successful in changing the behaviour of participants with receptive language above the 31-month level.

The findings from this study suggest a higher minimum receptive language level required to benefit from Social Stories[TM] than the findings from the Kuoch and Mirenda (2003) study (i.e., 37 versus 31 months). Receptive language in this study was assessed using the MSEL (Mullen, 1995), whereas receptive language in the Kuoch and Mirenda study was assessed using the *Peabody Picture Vocabulary Test-Revised* (PPVT-R, Dunn & Dunn, 1981). It is likely that the age equivalent scores from the MSEL are not directly comparable to the age equivalent scores from the PPVT-R, although there are no published articles on MSEL/PPVT-R concurrent validity. As well, the 6 month discrepancy (i.e., 37 − 31 months) may be within the standard error of measurement of the two language tests.

Measures of receptive language provide only estimates surrounded by a band of error; therefore, it is more accurate to talk about a minimum receptive language range than a minimum receptive language level. It is not possible, however, to compute the band of error around age equivalent scores (Gilliam & Mayes, 2004). In this study, this limitation of age equivalent scores may be outweighed by their benefits: (1) they are helpful in communicating with parents and service providers, (2) they are comparable across children of different chronological ages, and (3) in the case of significant developmental delay, they are often the best or only scores available for expressing children's performance (Cermak, 1989; Gilliam & Mayes, 2004). Since, in this study, Social Stories™ benefited most children with receptive language at or above the 37-month level, the minimum receptive language range required to benefit from Social Stories™ can be expressed as roughly 37 months, plus or minus a few months.

Children's receptive language appears to be a reasonably good predictor of whether or not they will benefit from Social Stories™. In this study, most participants with receptive language levels at or above the 37-month level, plus or minus a few months, showed improvements in their respective target behaviours following intervention (i.e., participants in Group 4), whereas most participants with receptive language levels below the 37-month level, plus or minus a few months, did not (i.e., participants in Groups 1, 2, and 3). More research is needed to examine and confirm the minimum receptive language range required to benefit from Social Stories™. It is recommended that future researchers focus on participants with receptive language levels between 30 and 36 months since this time period appears to be crucial with regard to developing the necessary language skills to understand and benefit from Social Stories™.

In addition to receptive language, other participant-related variables not assessed in this study probably influence the effectiveness of Social Stories™ (e.g., social awareness and insistence on sameness). Behaviour-related variables, such as newly developed versus longstanding challenging behaviours, and environment-related variables, such as home versus school settings, may also be factors. It is recommended that future researchers investigate a wide range of participant, behaviour, and environment-related variables to determine which participants, behaviours, and environments are most amenable to Social Stories™.

Social Validity of Social Stories™

Thirteen of the 15 participants' lead therapists completed the TEI-SF-M (Scapinello, 2008). All 13 lead therapists (11 mothers, 1 father, and 1 teacher) considered the Social Stories™ treatment to be an acceptable treatment for their children with ASD. Specifically, all 13 lead therapists' total scores on the TEI-SF-M were at least 5 points above the total score that would be obtained by selecting the midpoint value for all questions (i.e., 27). Furthermore, 9 of the 13 lead therapists' total scores were between 39 and 43, where a total score of 45 represents a perfectly acceptable treatment.

Similarly, most of the 13 lead therapists considered the Social Stories™ treatment to be an effective treatment for their children with ASD. Specifically, 10 of the 13 lead therapists agreed or strongly agreed with item 5 on the TEI-SF-M (i.e., "I believe this treatment was effective"). Also, 5 of the 10 therapists provided additional, positive feedback regarding treatment outcomes. For example, Adam's lead therapist said, "[The] treatment was very successful." Christopher's lead therapist said, "I think it worked really well and we were really happy with it." Ian's lead therapist said, "It helped him learn a

new skill." Owen's lead therapist said, "It is a very effective way to change behaviour." And, Peter's lead therapist said, "Very good approach. If the parent can deliver the treatment consistently it will be effective."

Lead therapists' perceptions and the author's conclusions regarding treatment outcomes were consistent for Matthew (Group 4), Nathan (Group 4), and Owen (Group 4). In each child's case, the lead therapist and the author deemed the Social Story™ effective in changing the target behaviours. Similarly, lead therapists' perceptions and the author's conclusions regarding treatment outcomes were consistent for Benjamin (Group 1), Elijah (Group 2), and Graham (Group 2). In each child's case, the lead therapist and the author deemed the Social Story™ ineffective in changing the target behaviours. By contrast, lead therapists' perceptions and the author's conclusions regarding treatment outcomes were inconsistent for Adam (Group 1), Christopher (Group 1), Francis (Group 2), Ian (Group 3), Kevin (Group 3), Liam (Group 3), and Peter (Group 4). For these seven children, the lead therapists deemed the Social Story™ effective, whereas the author deemed the Social Story™ ineffective in changing the target behaviours.

As mentioned earlier, Adam (Group 1), Ian (Group 3), and Liam (Group 3) demonstrated notable performance shifts in the desired direction in their respective target behaviours following intervention. Thus, it seems logical that their lead therapists (2 mothers and 1 teacher) would deem their Social Stories™ effective. Christopher (Group 1), Francis (Group 2), Kevin (Group 3), and Peter (Group 4) did not demonstrate notable performance shifts in the desired direction in their target behaviours following intervention. There are several possible reasons their lead therapists (all mothers) deemed their Social Stories™ effective. First, their mothers may have considered even slight

performance shifts in their target behaviours to be meaningful. Second, their mothers may have liked implementing the Social Stories™ treatment so much that they answered all questions about this treatment in the positive direction. Third, their mothers' definition of "effectiveness" may have included non-measured behaviours (e.g., the child's enjoyment of the story). Fourth, their mothers may have made errors in assessment due to their expectancies that the treatment should work (Hartmann, 1984). Fifth, their mothers may have wanted to please the author.

The author did not set out to assess child participants' perceptions of Social Stories™. Nevertheless, lead therapists' comments on the *Data Collection Sheets* suggested that the child participants liked this treatment. For example, Ian's lead therapist said, "Ian really enjoys reading the story. He is already making an effort to read it on his own." Matthew's lead therapist said, "Matthew responded well to the story. You could see him literally processing everything." And, Owen's lead therapist said, "[Owen] was surprised at story of himself. Liked it!" The author's observations during the study also suggested that the child participants liked the Social Stories™. This was seen in non-verbal signals, such as paying attention, reading along, and smiling.

Based on lead therapists' comments on the *Data Collection Sheets* and the author's observations during the study, only one child participant seemed to be ambivalent about the treatment. On some days, this participant seemed to like reading his Social Story™ (e.g., "Seems to like book – about himself."). By contrast, on other days, he seemed to dislike reading his Social Story™ (e.g., "Adam became upset once I started to read the *Bedtime* book – asked for another book to read."). The reason for his ambivalence was unclear.

Limitations

This study had several significant limitations that should be considered when interpreting the results, and addressed in future research. The first significant limitation was not completely isolating Social Stories ™ as the sole independent variable for all participants. Based on casual conversations with lead therapists, observations, and a review of the *Data Collection Sheets*, it became apparent that a few of the participants were exposed to other interventions over the course of the study. For example, Donovan's mother reinforced him for not engaging in his target behaviour by giving him small pieces of hot dog. This intervention occurred once, on observation day 20, and is likely the reason for his low rate of behaviour on this day. Ian's mother provided him with unplanned verbal prompts reminding him to follow the directions in his Social Story™. It was not clear how often this intervention occurred; however, it may have been quite frequent based on Ian's mother's comments on the *Data Collection Sheets* (e.g., "Ian has been rubbing the toothbrush across his teeth much more consistently, especially when I remind him about the story."). Peter's ABA therapist encouraged him to engage in a similar target behaviour (i.e., responding appropriately to peers' greetings) by prompting his response. This intervention occurred during both the baseline and treatment phases. It did not seem to have an impact his rate of behaviour in this study.

The second significant limitation was not assessing treatment integrity. Although lead therapists were given explicit verbal and written instructions on how to implement the Social Stories™ treatment in the training sessions, they were not required to show evidence that they had followed these instructions. Adam and Ian's lead and substitute therapists' comments on the *Data Collection Sheets* indicated that they had problems

following the treatment protocol. For example, Adam's mother's comments indicated that she did not always read him the Social Story™ at the same time (e.g., "When it was time to read the *Bedtime* book, Adam said, 'No bedtime story', so we read another story; then the *Bedtime* book."). Adam's grandmother's comments indicated that she allowed him more than one exposure to the Social Story™ per night, and permitted him to read the story to himself (e.g., "After I read it, he took it and read it – appearing to track words with his finger."). Similarly, Ian's mother's comments suggested that she allowed him to take over the responsibility for implementing the treatment (e.g., "Ian reads the story now.").

In spite of these problems, observations of parents during measurement reliability checks suggested that treatment integrity was adequate. Furthermore, previous Social Stories™ studies found that laypeople are relatively good at following experimental procedures (e.g., Sansosti & Powell-Smith, 2006; Scattone et al., 2002; Scattone et al., 2006). For example, Scattone et al. (2002) found treatment integrity for three teachers to be 86%, 100%, and 100%. Similarly, Sansosti and Powell-Smith (2006) found treatment integrity for two parents to be 88% and 92%. It should be noted that treatment integrity for an additional parent in the Sansosti and Powell-Smith study could not be determined because the parent failed to complete the "social story journals" (p. 52). Also, it should be noted that treatment integrity in both studies simply involved indicating whether or not the story was read at the specified time of day.

The third significant limitation was two-fold: (1) not providing systematic, first-hand training to substitute therapists, and (2) not collecting IOA for substitute therapists. Some lead therapists needed to use substitute therapists to collect data for their children

when they were busy with other responsibilities. During lead therapist training, all lead therapists were given verbal instructions on how to train substitute therapists. Specifically, they were told to (a) provide and familiarize substitute therapists with the documents for the study (e.g., *Data Collection Sheet*), and (b) teach substitute therapists how to measure the children's target behaviours. These instructions, however, were relatively non-specific and open to interpretation. As a result, substitute therapists likely received varying levels of training.

Overall, substitute therapists collected less than 10% of the total data for this study. Specifically, substitute therapists collected 20.00% to 33.33% of the data for 4 children (i.e., Adam, Christopher, Donovan, and Matthew) and 4.55% to 8.33% of the data for 3 children (i.e., Graham, Ian, and Owen). Furthermore, all the substitute therapists were family members living in the homes where the study took place. Thus, the substitute therapists likely observed the lead therapists using the study documents and measuring the children's target behaviours before carrying out these procedures themselves.

The fourth significant limitation was not planning to wait for stable baselines before introducing the Social Stories[TM]. As mentioned in the introduction, it is recommended that researchers balance tight experimental control with practical and ethical considerations (Cooper et al., 2007). In this study, waiting for stable baselines was deemed less important than (a) providing parents with detailed information about the study (e.g., how long each condition would last), and (b) limiting the repeated measurement of target behaviours affecting the participants' social acceptance, learning, or health, under an experimental condition in which there was no expectation of

improvement. Baseline variability is a limitation of most Social Stories™ studies, including the three relatively methodologically sound studies (i.e., Brownell, 2002; Crozier & Tincani, 2007; Kuoch & Mirenda, 2003). Baseline variability in Social Stories™ studies may be unavoidable since participants belong to two groups that typically show high intra-individual variability: (1) young children, and (2) individuals with brain-related disorders (Geurts et al., 2008; MacDonald et al., 2006; van Geert & van Dijk, 2002).

Despite not planning to wait for stable baselines, baselines with little variability were obtained for most participants. Baselines with high variability were a significant problem for only 6 of the 15 children (i.e., Adam, Christopher, Francis, Liam, Owen and Peter). When the problem of baseline variability cannot wait to be solved, or when the confounding variables are simply beyond the experimenter's control, "the independent variable is introduced with the hope of producing stable responding" (Cooper et al., 2007, p. 169). The introduction of the Social Stories™ treatment produced stable responding for Adam, Liam and Owen. The remaining 3 participants, however, continued to display variable responding in the treatment condition.

The final significant limitation was not assessing treatment maintenance. Previous Social Stories™ studies that assessed treatment maintenance found mixed results (e.g., Crozier & Tincani, 2005; Crozier & Tincani, 2007; Quilty, 2007; Sansosti & Powell-Smith, 2006). In general, when the treatment was discontinued completely after the intervention phase, treatment gains were lost (see Crozier & Tincani, 2007; Sansosti & Powell-Smith, 2006; Thiemann & Goldstein, 2001). For example, Crozier and Tincani (2007) conducted two maintenance probes, 2 and 3 weeks after the intervention phase.

They found that treatment gains were lost for two participants who were no longer reading their Social Stories™. By contrast, when the treatment was continued to some degree following the intervention phase, treatment gains were maintained (see Crozier & Tincani, 2005; Quilty, 2007). For example, Quilty (2007) conducted two maintenance probes, 6 and 9 weeks after the intervention phase. She found that treatment gains were maintained for three participants who were still reading their Social Stories™ at least once or twice per week.

Currently, it is unclear how long the Social Stories™ treatment needs to be in effect before treatment gains will be maintained when it is discontinued. Gray (2000) stated that "experience indicates it may not be possible, or advisable, to fade a Social Story from use" (p. 13-9). Nevertheless, she makes the following suggestions to increase the independence of the person with ASD: (1) rewrite the Social Story™ omitting directive sentences or changing them to partial sentences to encourage the readers to recall this information on their own, and (2) review the Social Story™ on a less frequent basis over time.

Delano and Snell (2006) investigated Gray's (2000) second suggestion. Specifically, when a participant in their study reached a certain criterion, his Social Story™ was read every other session for six days. Then, as long as the participant continued to meet the criterion, his Social Story™ was read every third session for six days. Finally, as long as the participant continued to meet the criterion, his Social Stories™ was stopped. Using this fading procedure, Delano and Snell (2006) concluded that their three participants "maintained levels of engagement that were greater than their baseline performance, but each student's performance was variable" (p. 39).

It should be noted that the current study also had several minor limitations that limit the generalizability of the findings. For example, all the participants were boys with ASD. Girls may respond to the Social Stories™ treatment differently than boys. In addition, all the lead therapists were well-educated. Lead therapists with less education may implement the Social Stories™ treatment differently than lead therapists with more education. Finally, the observers were privy to the experimental conditions. Observers who are blind to experimental conditions may be less likely to develop biases based on expectations than observers who are privy to experimental conditions (Hartman, 1984).

Although this study had some limitations, the findings contribute to the Social Stories™ research base by (a) beginning to address some of the serious methodological shortcomings found in previous studies, (b) examining the minimum receptive language level required to benefit from Social Stories™, and (c) assessing the social validity of Social Stories™. Recommendations for parents, clinicians, and researchers follow.

Recommendations for Parents

Parents are encouraged to use Social Stories™ to change behaviour in their children with ASD with the following three caveats. First, parents should ensure that their children's receptive language levels are at or above the 37-month level, plus or minus a few months. Parents can determine their children's receptive language levels through an assessment by a psychologist or speech-language pathologist. Parents whose children's receptive language levels are below the 37-month level, plus or minus a few months, should delay using Social Stories™ until their children's receptive language levels increase. Parents may be able to promote their children's receptive language development by improving their children's joint attention (McDuffie, Yoder, & Stone, 2006; Murray et

al., 2008). Joint attention is defined as "the simultaneous engagement of two or more individuals in mental focus on the same external thing" (Murray et al., 2008, p. 5). Research suggests that parents can improve their children's joint attention by encouraging them to follow their gaze, look at faces, show objects, and engage in turn-taking (e.g., Schertz & Odom, 2007).

Second, parents should ensure that they are using Social Stories™ as intended. Information on how to write and present Social Stories™ is disseminated in a number of formats, including books, articles, videos, and live presentations with Carol Gray (the creator of Social Stories™) or one of her colleagues (The Gray Center, 2008). Access to the most up-to-date information on how to write and present Social Stories™ can be found on The Gray Center's website, http://www.thegraycenter.org (The Gray Center, 2008). Parents may find it helpful to request the assistance of a psychologist or speech-language pathologist when writing Social Stories™. These professionals may be able to provide guidance with respect to following Gray's guidelines (Gray, 2000; Gray, 2004). They may also help with respect to selecting appropriate words and phrases for the stories.

Third, parents should ensure that the Social Stories™ treatment is having the desired effect (i.e., increasing prosocial target behaviours or decreasing challenging target behaviours). This is accomplished by regularly assessing the designated target behaviours. The specific assessment measure used will depend on the type of target behaviour (Kazdin, 2001). Response frequency is one of the most common assessment measures. Response frequency is used for target behaviours that occur in discrete units that are equal in duration and quality (Hartmann, 1984). Response frequency can be

calculated by placing check marks on a sheet of paper or depressing the knob on a wrist counter. Parents may find it helpful to request the assistance of a psychologist or behaviour therapist when deciding which assessment measures to use. These professionals may be able to provide guidance with respect to matching target behaviours to appropriate assessment measures. They may also help with respect to evaluating treatment outcomes.

Recommendations for Clinicians

Like parents, clinicians are encouraged to use Social Stories™ to change behaviour in their clients with ASD with the same caveats: (1) ensure that their client's receptive language levels are at or above the 37-month level, plus or minus a few months, (2) ensure that they are using Social Stories™ as intended, and (3) ensure that the Social Stories™ treatment is having the desired effect (i.e., increasing prosocial target behaviours or decreasing challenging target behaviours). Due to limited treatment sessions with clients and the relative simplicity of the Social Stories™ treatment; however, most clinicians are more likely to be advising parent interventionists than acting as interventionists themselves. Clinicians can and should advise parent interventionists throughout the treatment process.

First, clinicians should help parents decide if Social Stories™ are an appropriate intervention by providing them with information on their children's receptive language levels. In this study, the Receptive Language Scale from the MSEL (Mullen, 1995) was used to assess children's receptive language levels; however, clinicians can use other cognitive or language measures, as long as these measures have receptive language age equivalent scores. In addition, clinicians should help parents write Social Stories™ by

providing them with information on Gray's guidelines (Gray, 2000; Gray, 2004) and language development. Finally, clinicians should help parents determine if the Social Stories™ treatment is having the desired effect by teaching them how to measure target behaviours and evaluate treatment outcomes. In this study, parent interventionists were taught to accurately measure target behaviours in one session via verbal instruction and hands-on practice.

Recommendations for Researchers

Researchers are encouraged to expand upon this study's work. Specifically, researchers should continue to address the three serious methodological shortcomings in previous studies: (1) not using experimental research designs, (2) not isolating Social Stories™ as the sole independent variable, and (3) not following Gray's guidelines for writing and presenting Social Stories™. They should also continue to examine the minimum receptive language range required to benefit from Social Stories™, as well as begin to examine other participant, behaviour, and environment-related variables that may influence the effectiveness of this treatment.

In addition, researchers are encouraged to address this study's limitations. For example, they should train and collect IOA data for two lead therapists for each participant. They should also assess treatment integrity and treatment maintenance. Finally, they should include girls as participants, laypeople with lower education levels as lead therapists, and observers who are blind to the experimental conditions.

Conclusions

This study evaluated the effectiveness of Social Stories™, by beginning to address the serious methodological shortcomings found in previous studies. Social Stories™ were found to be effective for some children with ASD. This study also examined the minimum receptive language level required to benefit from Social Stories™. Social Stories™ were found to benefit most children with receptive language at or above the 37-month level, plus or minus a few months. Finally, this study assessed the social validity of Social Stories™. Most lead therapists considered Social Stories™ to be acceptable and effective, even for children who did not show behaviour change. It was also noted that the child participants seemed to like this treatment. Recommendations were made for parents, clinicians, and researchers.

Parents were encouraged to use Social Stories™ to change behaviour in their children with ASD with the caveats that they must ensure that their children's receptive language levels are at or above the 37-month level, plus or minus a few months; that they are using Social Stories™ as intended; and that the Social Stories™ treatment is having the desired effect (i.e., increasing prosocial target behaviours or decreasing challenging target behaviours). Clinicians were encouraged to help parents decide if Social Stories™ are appropriate interventions for their children, write Social Stories™, and assess treatment outcomes. Researchers were encouraged to expand upon this study's work and address this study's limitations.

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Appendix A

Screening Questionnaire for Social Stories Treatment Study (Scapinello, 2006b)

Screening Questionnaire for Social Stories Treatment Study

Section I

1. Has your child been diagnosed with ASD by a qualified psychologist or physician?

  ☐ Yes - For all children, go to Section II.
  ☐ No - Thank the parent for his/her time.

Section II

1. Date: _____

2. Parent's name: _____

3. Parent's phone number: _____

4. Child's name: _____

5. Child's sex: ☐ Male ☐ Female

6. Child's age: _____

7. Was your child assessed with the *Mullen Scales of Early Learning* (MSEL) in the past six months?

  ☐ Yes - For all children, go to Section III.
  ☐ No - For children 60 months and under, go to Section IV.
     For children over 60 months, go to Section V.

Appendix A (*Continued*)

Section III

1. What was your child's age equivalent score on the Receptive Language Scale of the MSEL ? _____

-- Between 12 and 60 months?
  ☐ Yes - Accept the child into the study (pending confirmation of study criteria).
  ☐ No - Thank the parent for his/her time.

Section IV

Questions for children 60 months and under:

1. Does your child understand the word "up"? ☐ Yes   ☐ No

2. Does your child understand the word "No" or "Stop"? ☐ Yes   ☐ No

3. Does your child respond with appropriate facial expressions and sounds when you say other simple words, e.g., "mama", "bottle", and "bye-bye"? ☐ Yes   ☐ No

4. Does your child respond to his/her name? ☐ Yes   ☐ No

-- "Yes" to all questions?
  ☐ Yes - Accept the child into the study (pending confirmation of study criteria).
  ☐ No - Thank the parent for his/her time.

Appendix A (*Continued*)

Section V

Questions for children over 60 months:

1. Does your child understand the word "up"? ☐ Yes   ☐ No

2. Does your child understand the word "No" or "Stop"? ☐ Yes   ☐ No

3. Does your child respond with appropriate facial expressions and sounds when you say other simple words, e.g., "mama", "bottle", and "bye-bye"? ☐ Yes   ☐ No

4. Does your child respond to his/her name? ☐ Yes   ☐ No

5. Can your child follow three unrelated commands? For example, if you asked him/her to put his/her coat on a hanger, his/her boots in the closet, and his/her bag on the floor, would he/she respond correctly? ☐ Yes   ☐ No

6. Does your child understand number concepts? For example, if you placed 10 objects in front of him/her and asked for 6, would he/she respond correctly?
☐ Yes   ☐ No

7. Can your child identify different letters? ☐ Yes   ☐ No

8. Can your child name different coins, e.g., penny, quarter, and dime? ☐ Yes   ☐ No

9. Does your child understand comparative concepts, e.g., nearest versus farthest, most versus least, and right versus left? ☐ Yes   ☐ No

-- "Yes" to the first 4 questions AND "No" to any of the last 5 questions?
    ☐ Yes - Accept the child into the study (pending confirmation of study criteria).
    ☐ No - Thank the parent for his/her time.

Appendix B

Intake Interview for Social Stories Treatment Study (Scapinello, 2006a)

Intake Interview for Social Stories Treatment Study

Demographic Information:

1. Date: _____

2. Parent's name: _____

3. Parent's phone number: _____

4. Child's name: _____

5. Child's sex: ☐ Male   ☐ Female

6. Child's age: _____; Birth date: _____

7. Languages spoken at home: _____

Diagnostic and Treatment Information:

1. Copy of diagnostic report: ☐ Yes   ☐ No

2. Specific ASD diagnosis: _____

3. Date of diagnosis: _____

4. Name of diagnostician: _____

5. Profession of diagnostician: ☐ Psychologist   ☐ Physician

6. Other diagnoses: _____

7. Previous treatment and outcome (ask about speech therapy, OT, PT, ABA/EIBI, daycare, preschool, and school):

Appendix B (*Continued*)

Social Stories Information:

1. Previous experience with Social Stories and outcome:

2. Interests (ask about favourite TV and movie characters, colours, animals, etc.):

Lead Therapist Information:

1. Lead therapist's name: _____

2. Relation to child: _____

3. Age: _____

4. Education level (in years): _____

5. Current job position: _____

6. Phone number: _____

7. Address: _____

Appendix B *(Continued)*

Target Behaviour Information:
Target Behaviour:
Operational Definition:
Setting:
Time:
Measurement:
Questionable Instances:

Appendix C

Treatment Evaluation Inventory Short Form (Kelley et al., 1989, p. 240)

TREATMENT EVALUATION INVENTORY SHORT FORM (TEI-SF)

Please complete the items listed below by placing a checkmark on the line next to the question that best indicates how you feel about the treatment. Please read the items very carefully because a checkmark accidentally placed on one space rather than another may not represent the meaning you intended.

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1. I find this treatment to be an acceptable way of dealing with the child's problem behavior.	____	____	____	____	____
2. I would be willing to use this procedure if I had to change the child's problem behavior.	____	____	____	____	____
3. I believe that it would be acceptable to use this treatment without children's consent.	____	____	____	____	____
4. I like the procedures used in this treatment.	____	____	____	____	____
5. I believe this treatment is likely to be effective.	____	____	____	____	____
6. I believe the child will experience discomfort during the treatment.	____	____	____	____	____
7. I believe this treatment is likely to result in permanent improvement.	____	____	____	____	____
8. I believe it would be acceptable to use this treatment with individuals who cannot choose treatments for themselves.	____	____	____	____	____
9. Overall, I have a positive reaction to this treatment.	____	____	____	____	____

Appendix D

Treatment Evaluation Inventory Short Form Modified (Scapinello, 2008)

TREATMENT EVALUATION INVENTORY SHORT FORM MODIFIED (TEI-SF-M)

Please answer the following questions by providing me with the number that best represents your opinion according to the following legend:

1 = Strongly Disagree
2 = Disagree
3 = Neutral
4 = Agree
5 = Strongly Agree

Please be honest in your responses. There are no right or wrong responses.

1. I found this treatment to be an acceptable way of dealing with the child's problem behaviour.

   1   2   3   4   5

2. I was willing to use this procedure to change the child's problem behaviour.

   1   2   3   4   5

3. I believe that it was acceptable to use this treatment without children's consent.

   1   2   3   4   5

4. I liked the procedures used in this treatment.

   1   2   3   4   5

5. I believe this treatment was effective.

   1   2   3   4   5

6. I believe the child experienced discomfort during this treatment.

   1   2   3   4   5

Appendix D *(Continued)*

7. I believe this treatment resulted in permanent improvement.

    1   **2**   **3**   **4**   **5**

8. I believe that it was acceptable to use this treatment with individuals who cannot choose treatments for themselves.

    1   **2**   **3**   **4**   **5**

9. Overall, I had a positive reaction to this treatment.

    1   **2**   **3**   **4**   **5**

Appendix E

Letter of Information

Social Stories Treatment Study for Children with Autism Spectrum Disorders

What are Social Stories?

Social Stories are short stories that describe social situations, like mealtime, bedtime, etc. Their goal is to provide the reader with accurate social information that he/she may be lacking. They may be used to change behaviour in children with Autism Spectrum Disorders (ASD).

What are the purposes of the study?

> To evaluate the effectiveness of Social Stories for children with ASD.
> To determine the influence of receptive language (i.e. a person's understanding of words and phrases) on the effectiveness of Social Stories.

Who can participate?

I am looking for children
- who have been diagnosed with ASD by a qualified Psychologist or Physician, AND
- who have receptive language skills between 12 and 60 months of age.

If you would like your child to participate, I would informally assess his/her receptive language by asking you a few questions over the phone. If your child's receptive language appears to fall in the necessary range, we would schedule a more formal evaluation.

What are some of the benefits?

If your child is accepted into the study, you will receive a number of free services including:
> free language, visual reception, and fine motor testing for your child;
> a free feedback session and written description of your child's results;
> free treatment meetings;
> free training on how to measure behaviours;
> free training on how to use Social Stories; and
> a free individualized Social Story for your child.

You will also receive a $25 gift certificate for *Toys 'R Us*.
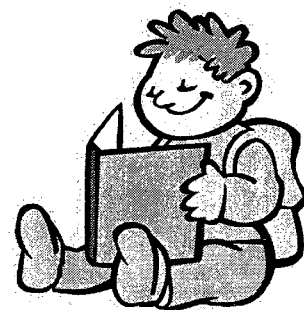
Appendix E (*Continued*)

What are some of the drawbacks?

The study will require up to 30 hours of your time over a 2-month period.

Who do I contact for more information?

Please contact the primary investigator, Samantha Scapinello, M.A., at **519-XXX-XXXX** or **scapine@uwindsor.ca**. You may also contact her supervisor, Dr. Marcia Gragg, C. Psych., at **mgragg@uwindsor.ca**.

Appendix F

Consent Form A

UNIVERSITY OF

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CONSENT TO PARTICIPATE IN RESEARCH
Title of Study: Effectiveness of Social Stories for
Children with Autism Spectrum Disorders

Your child is asked to participate in a research study. This study will be conducted by Samantha Scapinello, M.A. and supervised by Dr. Marcia Gragg, C. Psych., from the University of Windsor. Results will be used in a Ph.D. dissertation.

If you have any questions or concerns about the research, feel free to contact:

Samantha Scapinello, M.A.   OR   Marcia Gragg, Ph.D., C. Psych.
Phone: (519) XXX-XXXX   Phone: (519) 253-3000, ext. 2227
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PURPOSES OF THE STUDY

  ➢ To evaluate the effectiveness of Social Stories for children with Autism Spectrum Disorders (ASD).
  ➢ To determine the influence of receptive language level on the effectiveness of Social Stories.

Social Stories are short stories that describe social situations, like mealtime, bedtime, etc. Their goal is to provide the reader with accurate social information that he/she may be lacking. They may be used to change behaviour in children with ASD.

Receptive language is a person's understanding of words and phrases.

PROCEDURES

I am looking for children:
  • who have been diagnosed with ASD by a qualified Psychologist or Physician, AND
  • who have receptive language skills between 12 and 60 months of age.

Appendix F (*Continued*)

If your child's diagnosis is confirmed and his/her receptive language falls in the required range, I would accept him/her into the study and ask you to:

(1) Attend a meeting to:
- provide information about your child (e.g., birth date, age, sex, diagnoses, treatment history, etc.)
- decide on a target behaviour (i.e., the behaviour that will be changed)
- select a **lead therapist** (i.e., the person who will collect information on the target behaviour and read the Social Story to the child)

(2) Read a draft copy of the Social Story created for your child and make suggestions.

If you decide to act as lead therapist, I would also ask you to:

(1) Attend a meeting to learn how to collect information on the target behaviour.

(2) Collect information on the target behaviour:
- Once a day
- For 24 days

(3) Attend a meeting to learn how to read the Social Story to your child.

(4) Read the Social Story to your child:
- Once a day
- For 8 to 20 days

If you decide not to act as lead therapist, I would ask you to find someone else to fulfill this role (e.g., a relative, friend, or neighbour).

POTENTIAL RISKS AND DISCOMFORTS

You may feel disappointed if your child does not benefit from the Social Stories treatment. Everyone will be given a list of counselling resources for adults in Windsor and Essex County and a list of services for children with autism.

In rare cases, your child's Social Story may increase his/her challenging behaviour. If this is the case, we will end the Social Stories treatment. At this point, you may choose whether or not you would like to remain in the study. If you remain in the study, we will revise your child's Social Story and try again. If you drop out of the study, I will provide you with a list of other behavioural recommendations.

Appendix F (*Continued*)

POTENTIAL BENEFITS TO SUBJECTS AND/OR TO SOCIETY

You will receive:
> ➤ free treatment meetings;
> ➤ free training on how to measure target behaviours (if you are the lead therapist);
> ➤ free training on how to use Social Stories (if you are the lead therapist); and
> ➤ a free individualized Social Story for your child.

Social Stories may be used to deal with any social situation that is difficult for a child with ASD. Further, they may be written and presented by parents, siblings, teachers, etc. This research is expected to support the use of Social Stories for children with ASD. If this treatment gains support, it may become more available. In addition, this research is expected to determine the influence of receptive language on the effectiveness of Social Stories. This information may help parents decide if Social Stories will work for their children.

Participation will not affect services at the Summit Centre for Preschool Children with Autism.

PAYMENT FOR PARTICIPATION

You will receive a 25$ gift certificate for *Toys 'R Us*.

CONFIDENTIALITY

Information that can be connected with you will remain confidential. I will keep all study materials in a locked filing cabinet in Dr. Marcia Gragg's office. These materials will be destroyed after 10 years. Treatment results for your child will be reported, however, no identifying information will be released. I will use a false name or a number in place of your child's given name. Further, I will report his/her age rather than his/her birth date.

PARTICIPATION AND WITHDRAWAL

You can choose whether to be in this study or not. If you volunteer to be in this study, you may withdraw at any time without consequences of any kind. You may also refuse to answer any questions you don't want to answer and still remain in the study. The investigator may withdraw you from this research if circumstances arise which warrant doing so.

FEEDBACK OF THE RESULTS OF THIS STUDY TO THE SUBJECTS

You will be given your child's results in person or by phone (depending on your preference). Overall results will be posted on Dr. Marcia Gragg's Autism Site (www.uwindsor.ca/autism) upon completion of the study.

Appendix F (*Continued*)

SUBSEQUENT USE OF DATA

Do you give consent for the data from this study to be used in the future?
☐ Yes ☐ No

Do you give consent to be contacted for future research studies?
☐ Yes ☐ No

RIGHTS OF RESEARCH SUBJECTS

You may withdraw your consent at any time and discontinue participation without penalty. If you have questions regarding your rights as a research subject, contact: Research Ethics Coordinator, University of Windsor, Windsor, Ontario N9B 3P4; telephone: 519-253-3000, ext. 3916; e-mail: lbunn@uwindsor.ca.

SIGNATURE OF RESEARCH SUBJECT/LEGAL REPRESENTATIVE

I understand the information provided for the study *Effectiveness of Social Stories for Children with Autism Spectrum Disorders* as described herein. My questions have been answered to my satisfaction, and I agree to participate in this study. I have been given a copy of this form.

_____

Name of Subject

_____   _____

Signature of Subject   Date

SIGNATURE OF INVESTIGATOR

These are the terms under which I will conduct research.

_____   _____

Signature of Investigator   Date

Appendix G

Consent Form B

UNIVERSITY OF

WINDSOR

CONSENT TO PARTICIPATE IN RESEARCH
Title of Study: Effectiveness of Social Stories for
Children with Autism Spectrum Disorders

Your child is asked to participate in a research study. This study will be conducted by Samantha Scapinello, M.A. and supervised by Dr. Marcia Gragg, C. Psych., from the University of Windsor. Results will be used in a Ph.D. dissertation.

If you have any questions or concerns about the research, feel free to contact:
Samantha Scapinello, M.A.   OR   Marcia Gragg, Ph.D., C. Psych.
Phone: (519) XXX-XXXX   Phone: (519) 253-3000, ext. 2227
Email: scapine@uwindsor.ca   E-mail: mgragg@uwindsor.ca

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Social Stories are short stories that describe social situations, like mealtime, bedtime, etc. Their goal is to provide the reader with accurate social information that he/she may be lacking. They may be used to change behaviour in children with ASD.

Receptive language is a person's understanding of words and phrases.

Appendix G (*Continued*)

PROCEDURES

If you would like your child to participate in this study, his/her receptive language will be measured. This will take approximately 15 minutes. I am looking for children:

- who have been diagnosed with ASD by a qualified Psychologist or Physician, AND
- who have receptive language skills between 12 and 60 months of age.

If your child's diagnosis is confirmed and his/her receptive language falls in the required range, I would accept him/her into the study. I would then assess his/her expressive language, visual reception, and fine motor skills and ask you to:

(1) Attend a meeting to:
- provide information about your child (e.g., birth date, age, sex, diagnoses, treatment history, etc.)
- decide on a target behaviour (i.e., the behaviour that will be changed)
- select a **lead therapist** (i.e., the person who will collect information on the target behaviour and read the Social Story to the child)

(2) Read a draft copy of the Social Story created for your child and make suggestions.

If you decide to act as lead therapist, I would also ask you to:

(1) Attend a meeting to learn how to collect information on the target behaviour.

(2) Collect information on the target behaviour:
- Once a day
- For 24 days

(3) Attend a meeting to learn how to read the Social Story to your child.

(4) Read the Social Story to your child:
- Once a day
- For 8 to 20 days

If you decide not to act as lead therapist, I would ask you to find someone else to fulfill this role (e.g., a relative, friend, or neighbour).

Appendix G (*Continued*)

POTENTIAL RISKS AND DISCOMFORTS

You may feel disappointed if:
- (a) your child is not accepted into the study.
- (b) your child is accepted into the study, but does not benefit from the Social Stories treatment.

Everyone will be given a list of counselling resources for adults in Windsor and Essex County and a list of services for children with autism.

In rare cases, your child's Social Story may increase his/her challenging behaviour. If this is the case, we will end the Social Stories treatment. At this point, you may choose whether or not you would like to remain in the study. If you remain in the study, we will revise your child's Social Story and try again. If you drop out of the study, I will provide you with a list of other behavioural recommendations.

POTENTIAL BENEFITS TO SUBJECTS AND/OR TO SOCIETY

You will receive free receptive language testing for your child. This includes immediate feedback regarding your child's results. This information may help you select words and phrases that your child can better understand, allowing you to better communicate with him/her.

If your child is accepted into the study, you will also receive:
- ➤ free expressive language, visual reception, and fine motor testing for your child;
- ➤ a free feedback session and written description of your child's results;
- ➤ free treatment meetings;
- ➤ free training on how to measure target behaviours (if you are the lead therapist);
- ➤ free training on how to use Social Stories (if you are the lead therapist); and
- ➤ a free individualized Social Story for your child.

Social Stories may be used to deal with any social situation that is difficult for a child with ASD. Further, they may be written and presented by parents, siblings, teachers, etc. This research is expected to support the use of Social Stories for children with ASD. If this treatment gains support, it may become more available. In addition, this research is expected to determine the influence of receptive language on the effectiveness of Social Stories. This information may help parents decide if Social Stories will work for their children.

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Appendix G (*Continued*)

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PARTICIPATION AND WITHDRAWAL

You can choose whether to be in this study or not. If you volunteer to be in this study, you may withdraw at any time without consequences of any kind. You may also refuse to answer any questions you don't want to answer and still remain in the study. The investigator may withdraw you from this research if circumstances arise which warrant doing so.

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Appendix G (*Continued*)

SIGNATURE OF RESEARCH SUBJECT/LEGAL REPRESENTATIVE

I understand the information provided for the study *Effectiveness of Social Stories for Children with Autism Spectrum Disorders* as described herein. My questions have been answered to my satisfaction, and I agree to participate in this study. I have been given a copy of this form.

_____

Name of Subject

_____   _____

Signature of Subject   Date

SIGNATURE OF INVESTIGATOR

These are the terms under which I will conduct research.

_____   _____

Signature of Investigator   Date

Appendix H

Example Target Behaviours

Target Behaviours used in Previous Social Stories Studies

Aggressive Behaviours
(i.e., behaviours that could harm another person)

- Physical aggression in the context of sharing
- Physical aggression in the context of not being understood and not receiving an expected response
- Verbal aggression towards sister (i.e., saying, "I don't like [name]")

Disruptive Behaviours
(i.e., behaviours that could disturb another person)

- Repeating phrases from movies and TV at school
- Using a loud voice at school
- Talking out in class
- Shouting in class
- Screaming, yelling, crying, and/or humming in class
- Staring at girls at recess
- Displaying precursors to tantrum behaviour during work and at lunchtime (i.e., inappropriate vocalizations and dropping to the floor)
- Making sounds, throwing food, and touching genitals during lunchtime
- Making odd vocalizations during dinnertime
- Rummaging in the kitchen
- Insisting that others continue an activity when they don't want to
- Using interrupting vocalizations (e.g., "Listen to me!")

Dangerous/Self-Injurious Behaviours
(i.e., behaviours that could result in self-injury)

- Chair tipping

Destructive Behaviours
(i.e., behaviours that could result in damage to property)

- Rewinding/forwarding videotapes

Appendix H (*Continued*)

Interfering Behaviours
(i.e., behaviours that could negatively affect learning and health)

- Tardiness to class
- Difficulty following directions at school
- Difficulty remaining on task
- Frustration behaviours during homework time (i.e., crying, falling, hitting, and screaming)
- Behavioural problems at bedtime (e.g., not sleeping in one's own bed)

Social Behaviours
(i.e., behaviours that could enhance acceptance)

- Making activity choices independently
- Playing appropriately with toys
- Playing appropriately with peers
- Greeting others
- Spending time with peers (e.g., going to the cafeteria for lunch)
- Securing attention in a proper manner
- Making contingent responses
- Initiating comments
- Initiating requests
- Maintaining conversations
- Joining in activities
- Showing sportsmanship (e.g., not cheating and not making negative comments about losing)
- Washing hands independently
- Spilling and wiping up when eating

Appendix I

Social Stories™ for Participants

Note. Names in italics are pseudonyms in order to protect participants' confidentiality.

Adam: "Bed time!"

Adam get bath.
Adam get toothbrush.
Adam get pajamas.
Adam get in bed.
Mommy/Daddy read book.
Lights out!
Mommy/Daddy go down stairs.
Adam go night night.
Adam sleep in bed.

Benjamin: "It's play time!"

Benjamin get toothbrush...
after breakfast,
after lunch,
after dinner,
and after bath.
Benjamin don't get toothbrush at play time.
At play time, *Benjamin* get toy.
Benjamin get book.
Benjamin get TV.
Benjamin go outside.
It's play time!

Christopher: "Bath time!"

Bath time!
Christopher get undressed.
Christopher go bathtub.
Christopher play.
Mommy wash hair.
Mommy wash nose.
Mommy wash tummy.
Mommy wash toes.
Christopher see bubbles.
Christopher see water splash.
Christopher okay.
Christopher all done.

Donovan: "Donovan's mouth."

Donovan's mouth.
Cheerios put in mouth.
Drink put in mouth.
Toothbrush put in mouth.
Chew rag put in mouth.
No hand in mouth.
Hand yucky, bad.
No toy in mouth.
Toy yucky, bad.
No gate in mouth.
Gate yucky, bad.

Appendix I *(Continued)*

Elijah: "Big boys go pee and poop in the toilet."

Babies go pee and poop in diapers.
Big boys go pee and poop in the toilet.
My name is *Elijah.*
I am learning to go pee and poop in the toilet.
My daddy is helping me.
He brings me to the bathroom.
He takes off my diaper.
He puts me on the toilet.
Sometimes I go pee.
This is good. My daddy is happy.
Sometimes I go poop.
This is good. My daddy is happy.
Sometimes I don't go pee or poop.
This is okay. I will try to go pee and poop in the toilet later.

Francis: "Going on walks."

My name is *Francis.*
I go on walks.
Sometimes I walk to the park.
Sometimes I walk to the store.
My mama usually walks with me.
Sometimes I walk far from my mama.
Sometimes I walk close to my mama.
It is a good idea to walk close to my mama.
My mama makes sure I don't get lost.
My mama makes sure I don't get hurt.
I will try to walk close to my mama.
This will make my mama happy.

Graham: "Big boys eat at the table."

Fish eat in water.
Monkeys eat in trees.
Big boys eat at the table.
Graham is a big boy.
Graham can eat at the table.
Eating at the table is good.
When *Graham* eats at the table, Mama is happy.
When *Graham* eats at the table, Dada is happy.

Appendix I *(Continued)*

Ian: "I am learning to brush my teeth."

My name is *Ian*.
I have nice, white teeth.
It is good to brush my teeth to keep them clean.
Usually, my mama helps me brush my teeth.
My mama tells me to say, "AH", so she can brush my back teeth.
My mama tells me to say, "EEE", so she can brush my front teeth.
My mama tells me to stick out my tongue, so she can brush my tongue.
When my mama is finished brushing my teeth, it is my turn. I am learning to brush my teeth by myself.
My mama gives me a toothbrush.
I will try to move the toothbrush back and forth on my back teeth.
I will try to move the toothbrush back and forth on my front teeth.
Sometimes my mouth gets full of toothpaste bubbles. I will try to spit the toothpaste bubbles in the sink.
I will try to move the toothbrush back and forth on my tongue.
When I am finished brushing my teeth, my teeth will be clean.
This will make my mama happy.

Jordan: "Sleep is good for me."

Everybody sleeps. I sleep. Mama sleeps. Nana sleeps. Baba sleeps.
Most people sleep at night.
When it is time for me to sleep, Mama says, "Time to go to bed".
When it is time for me to sleep, I usually do four things: 1: Put on my pajamas.
2: Say "Good night" to Nana and Baba.
3: Get in bed.
4: Give Mama kisses.
Mama does not sleep with me. This is okay.
Mama stays close by. Sometimes she reads in the living room.
I will try to stay in bed.
I will try to close my eyes and go to sleep.
Sleep is good for me. It helps me grow big and strong.
I will see Mama in the morning.

Appendix I *(Continued)*

Kevin: "We keep some doors closed and some doors open."

My name is *Kevin.*
In my house there are a lot of doors.
The front door and garage door are usually closed.
This keeps the house warm in the winter and cool in the summer.
The bathroom doors, the bedroom doors, and the gate doors are usually open.
This makes the house easier to walk around in.
I will try to keep the bathroom doors open.
I will try to keep the bedroom doors open.
I will try to keep the gate doors open.
My mommy and daddy like it when I keep the bedroom doors, the bathroom doors, and the gate doors open.
Sometimes people close a bedroom door, a bathroom door, or a gate door. This is okay.
My mommy or daddy will tell me when I can close a bedroom door, a bathroom door, or a gate door.
I will try to close the door gently, so it will not make a loud noise.

Liam: "Circle time."

My name is *Liam.*
I go to *Franklin* Public School.
My class sits on the floor for circle time.
At circle time, it is usually the teacher's turn to talk.
When the teacher is talking, it is good to listen. Listening helps me learn.
I can show the teacher I am listening by sitting still and staying quiet.
The teacher likes it when I sit still and stay quiet.
Sometimes the teacher asks the class a question.
People usually put up their hands if they know the answer to the question.
I can put up my hand if I know the answer too.
The teacher will pick one person to answer the question.
If the teacher picks me, I can say my answer out loud.
If the teacher picks someone else, I will try to sit still and stay quiet.
The teacher will make sure all the children get a turn.

Appendix I *(Continued)*

***Matthew*: "Washing my pee pee is a good idea."**

My name is *Matthew*.
I have a pee pee.
My mom washes my pee pee when I'm in the bathtub.
Sometimes it feels a bit funny. This is okay.
First, she says, "It's time to wash your pee pee". Then she gently pulls back the skin at the end of my pee pee and washes inside.
Washing my pee pee is a good idea. It keeps me healthy and clean.
I can help my mom wash my pee pee by doing two important things:
1. I can stand VERY straight like a soldier.
2. I can stand VERY still like a tree.
When my mom washes my brother *Jack's* pee pee, he usually stands VERY straight and VERY still.
When my mom washes my pee pee, I will try to stand VERY straight and VERY still too.
This will make my mom VERY happy.

***Nathan*: "Playing games"**

My name is *Nathan*. Sometimes, I play games with my brother *Justin*. Sometimes, I play games with other people.
Most games have two main rules. Playing games can be fun when all the game players follow the rules.
The first rule is sharing the game pieces. This means that all the game players get the same number of game pieces.
If I get one game piece, all the game players get one game piece. If I get two game pieces, all the game players get two game pieces.
Sometimes I will get the game pieces I want.
Sometimes someone else will get the game pieces I want. This is okay. No one gets the game pieces they want all the time. If this happens, I will try to pick from the other game pieces left.
The second rule is taking turns. This means that only one game player can go at a time. When it is my turn, I can go. When it is another game player's turn, they can go.
Sometimes I will go first.
Sometimes someone else will go first. This is okay. No one gets to go first all the time. If this happens, I will try to wait my turn.
Once in awhile, kids forget the rules. If I forget the rules, someone might remind me.
The rules are: (1) Share the game pieces. (2) Take turns.
When Diego and Dora play games, they try to follow the rules.
When I play games, I will try to follow the rules. This will make the other game players very happy.

Appendix I *(Continued)*

Owen: "Who will go first?"

My name is *Owen*. There are 5 people in my family: my mom, my dad, *Kristen,*
Katelyn, and Me!

Sometimes we play games together. The first step to playing a game is deciding who will
go first.

Some games have rules that tell us who will go first. Some examples are Sorry and Go
Fish.

In Sorry, the rule says that the person who rolls the highest number on the dice goes first.

In Go Fish, the rule says that the person to the left of the dealer goes first.

When games have rules that tell us who will go first, it is important to follow these rules.
This will make the other players happy.

Good guys, like Luke Skywalker, follow the rules. Bad guys, like Darth Vadar, follow
the rules. Even pirates, like Jack Sparrow, follow the rules!

When games have rules that tell us who will go first, I will try to follow the rules. My
mom and dad will help me if I forget.

Some games do not have rules that tell us who will go first. Some examples are bingo,
dominoes, basketball, badminton, and tag.

When games do not have rules that tell us who will go first, it is important that we take
turns going first. This will make the other players happy.

Good guys, like Luke Skywalker, take turns. Bad guys, like Darth Vadar, take turns.
Even pirates, like Jack Sparrow, take turns!

When games do not have rules that tell us who will go first, I will try to take turns going
first. My mom and dad will help me if I forget.

No one can go first all the time. Sometimes I will get to go first. Sometimes someone else
will get to go first. If I do not get to go first, I can think to myself, "Maybe I will
get to go first next time".

Appendix I *(Continued)*

Peter: "How to greet people."

My name is Peter. I am 4-years-old. I am learning how to greet people.

Greeting is what humans do when they see someone they know, like a family member, teacher, or friend.

Greeting involves three steps. Step 1: Facing the person you want to greet;

Step 2: Looking into the eyes of the person you want to greet; and

Step 3: Saying something friendly to the person you want to greet. In the morning, you can say, "Good morning". In the afternoon, you can say, "Good Afternoon". In the evening, you can say, "Good evening". No matter what time of day it is, you can say, "Hi" or "Hello".

I will try to greet my mommy when I wake up in the morning. I might say, "Hi Mommy" or "Good morning Mommy".

This will make my mommy very happy.

I will try to greet my teacher when I get to school. I might say, "Hello Mrs. _____" or "Good morning Mrs. _____".

This will make my teacher very happy.

Sometimes people will greet me first. They might say, "Hi *Peter*" or "Hello *Peter*".

When people greet me first, I will try to greet them back. This is the polite thing to do. I might say, "Hi" or "Hello".

People like it when I greet them. It lets them know that I care.

Appendix J

Adam's Target Behaviour for Social Stories Study

Target Behaviour:	Getting out of bed after being put down for the night.
Operational Definition:	Getting out of bed after being put down for the night will be defined as crossing the threshold from the bedroom into the hall with at least one foot.
Setting:	At home.
Time:	Bedtime (i.e., approx. 8:00 p.m.).
Measurement:	*Frequency:* Each time Adam gets out of bed we will count one event.
Questionable Instances:	Instances where Adam gets out of bed to use the toilet will not be counted.

Appendix K

Instructions for Baseline Data Collection

Adam's Instructions for Baseline Data Collection

1. Collect information on the target behaviour
    *   once per day,
    *   for 4 days.

2. Collect information on the target behaviour at the same time (i.e., bedtime) and in the same setting (i.e., the child's home).

3. Use the *Data Collection Sheets* provided to record your observations. Use a separate sheet for each day.

4. Respond to the target behaviour as you have in the past.

5. Please wait for instructions before beginning the Social Stories treatment. I will contact you.

Appendix L

Instructions for Social Stories Treatment

Adam's Instructions for Social Stories Treatment

1. Read the Social Story
    - once per day,
    - for 20 days.

2. Read the Social Story in the same setting.

3. Begin the Social Story **ten minutes** before the time period you selected for baseline data collection (i.e., bedtime).

4. Sit beside the child and slightly behind him or her or place the child on your lap.

5. Use a gentle tone of voice.

6. Ignore challenging behaviour such as yelling, crying, hitting, etc.

7. Answer questions related to the story, if asked.

8. Refrain from making additional comments regarding the story content.

9. Read the Social Story from start to finish. Hide the Social Story until the next day.

10. Collect treatment data (see below).

Instructions for Treatment Data Collection

1. Collect information on the target behaviour at the same time, and in the same setting you used during baseline data collection.

2. Use the *Data Collection Sheets* provided to record your observations. Use a separate sheet for each day.

3. Respond to the target behaviour as you have in the past.

4. Please wait for instructions after completing the 20 days of Social Stories treatment. I will contact you.

Appendix M

Data Collection Sheet

Data Collection Sheet

Your name: _____

Date: _____

Start time: _____ (Measure for a period of 45 minutes)

Baseline Data _____ **OR Treatment Data** _____ **(Check one)**

Frequency Count
(Make a "√" mark each time you observe the target behaviour)

Total Frequency Count: _____
(Add the "√" marks)

Comments

Footnotes

1. The primary author, Dr. Mary L. Kelley, granted permission to use, reproduce, and modify the *Treatment Evaluation Inventory Short From* (TEI-SF) on January 16, 2009.

Vita Auctoris

NAME:	Samantha Starr Scapinello
PLACE OF BIRTH:	Kitchener, Ontario
DATE OF BIRTH:	February 26, 1978
EDUCATION:	Grand River Collegiate Institute, Kitchener, Ontario
	1992-1997
	University of Guelph, Guelph, Ontario
	1997-2001 B.Sc.
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