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A Review of the Effectiveness of Social Stories Among Children and Adolescents with Autism Spectrum Disorders

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A Review of the Effectiveness of Social Stories™ Among Children and Adolescents
with Autism Spectrum Disorders

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A Master's Thesis submitted to the Department of Psychology in partial fulfillment of
specialist degree requirements for the School Psychology Program at the State
University of New York at Plattsburgh

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Abstract

This paper explores Gray's Social Stories when used with children and adolescence with Autism Spectrum Disorders when considering different components in the Social Story™ package. Social Stories™ have been utilized in many settings over the years to help individuals learn desired behavior when encountering new or difficult situations. In particular, this behavioral intervention is frequently used within the ASD population to address their difficulty with Theory of Mind or understanding and interpretation of situations, or others thoughts, feelings, or emotions. The literature pertaining to these peer-reviewed published articles is reviewed. Overall findings of effectiveness, contributions of different Social Story™ components, directions for future research, and considerations for future implementation are discussed.

A Review Of The Effectiveness Of Social Stories™ Among Children And Adolescents
With Autism Spectrum Disorders

According to Social Story™ developer, Carol Gray, “A Social Story™/Social Article accurately describes a situation, skill, or concept according to 10 defining criteria. These criteria guide Story/Article development to ensure an overall patient and supportive quality, and a format, ‘voice’, and relevant content that is descriptive, meaningful, and physically, socially, and emotionally safe for the audience” (Gray, 2010). These stories describe a scenario in which a social skill is expected in relation to situational cues given by others. The goal of a Social Story™ is to present proper social information while being patient and reassuring of the skill. In addition, they are aimed to not simply change the individual’s behavior, but rather help them understand the situation resulting in behavior change (The Gray Center for Social Learning and Understanding, 2013). Carol Gray is president of The Gray Center and a former consultant to students with autism spectrum disorders (ASD). Originally a teacher of students with ASD, she defined the term Social Stories™ in 1991, which has become a worldwide practice for working with all ages of ASD (The Gray Center for Social Learning and Understanding, 2013). While Social Stories™ are not strictly beneficial to the ASD populations, this particular community’s profit from Gray’s intervention is thought to be due to their absence of theory of mind and a weak central coherence system (Baron-Cohen, Leslie, & Frith, 1985; Happé, 1997).

Baron-Cohen et al. (1985) describe theory of mind as an individual’s inability to represent mental states. This, in turn, influences their ability to correctly perceive or judge situations as well as others’ thoughts, feelings, or reactions. Furthermore, an

individual with ASD's weak central coherence system leads to difficulty extracting context clues to infer meaning or understand the bigger picture (Happé, 1997).

Implementing Gray's Social Stories™ as a component to a behavioral intervention, allows for an explanation of social situations, different contexts, as well as help with prediction.

The present paper is intended to review the existing literature pertaining to the implementation of Social Stories™ with children and adolescents. Articles are organized according to the different approaches to presenting Social Stories™, as well as identifying the effectiveness of the different components that can be included within the delivery of the Social Stories™ package. It is important to the author of the social story to note that each child is different within his or her development of social skills; therefore, it is important to note each child's developmental level and needs when developing an effective Social Story™. The purpose of the present paper is to determine the overall effectiveness of Social Stories™ with children and adolescents as well to consider the use of different components of the package when implementing.

Method

This research will be conducted to better understand the effectiveness of Social Stories™ when used with children and adolescents. Article search procedures will be conducted using (a) electronic academic databases including EBSCOHOST, ProQuest Research Library, PsychInfo, and Psychology & Behavioral Science Collections. Search terms included will be: Gray's social stories, social stories, adolescent, children, and autism. Only children or adolescents diagnosed with Autism will be targeted within this

literature review. In addition, the search will be restricted to documents published from 2003 to 2013.

Results

Social Stories™ have been utilized to improve many types of social interaction behaviors but offer variation in the ways in which they are implemented.

Written

Gray first described the written form of Social Stories™ in 1991. Gray (2010) breaks down the composition of a Social Story™ into the following ten criteria points: The first thing to establish is the goal. As stated before, a Social Story™ goal should, "...share accurate information using format, "voice", and relevant content that is descriptive, meaningful, and physically, socially, and emotionally safe for the audience" (Gray, 2010). Therefore, the reasoning behind the writing of a Social Story™ should be beneficial to the individual receiving it as well as not harmful to anyone else who may be involved in carrying out the intervention. The next criterion is the Two-Step Discovery. Within this step, it is important to gather information to better understand the role of other individuals in the skill, concept or situation, as well as analyze and identify specific themes and types of information to include in the story. Criterion number three is to clearly compose a title, an introduction identifying the topic(s), a body that adds detail to the topic(s), then follow with a conclusion that emphasizes and encapsulates all information. Criterion four, is the simple step to clarify all information and strengthen the significance for the individual receiving the intervention. Criterion five is to define voice and vocabulary when delivering and writing a Social Story™. Gray (2010) says this can be done by including five factors: 1) Exclusive use of first-and/or third person

perspective statements 2) positive and patient tone 3) past, present, or future tense 4) literally accurate 5) accurate meaning. The next criteria is to address and answer relevant “wh” questions. This type of information helps to include context, time-related information, relevant people, important cues, basic activities, behaviors, or statements, and the logic behind them. The next criteria is the descriptive sentence types the Social Story™ should be constructed with. These sentences are comprised of Perspective, three that that identify suggested responses (Sentences That Coach), Affirmative, and Partial sentences. Gray (2010) suggests making sure each Social Story™ describes more than directs by using the following Social Story™ Formula:

$$\frac{\text{Descriptive + Perspective+ Affirmative Sentences= DESCRIBE}}{\text{Sentences that Coach= COACH}} \geq 2$$

*If number for Sentences that Coach is 0, use 1 in denominator.

The next criterion given by Gray (2010) is to fine-tune the Social Story™ to accommodate the individual’s learning style, attention span, and if possible, interests.

The last criterion that must be met when writing a Social Story™ is proper revision (if needed), and application of the intervention. This can be done following 10 guidelines:

1) Edit ,2) Plan for Comprehension, 3) Plan Story Support, 4) Plan Story Review, 5) Plan a Positive Introduction, 6) Monitor, 7) Organize the Stories, 8) Mix & Match to Build Concepts, 9) Story Re-Runs & Sequels to Tie Past, Present & Future, and 10) Recycle Instruction into Applause or “recycling” a story used for skill building into one that “applauds” their proficiency in that area. Each of the above mentioned criterion form to

make a properly developed Social Story™ (Gray, 2010). After the Social Story™ has been properly written, the implementation is where it may vary.

Story. Adams, Gouvousis, VanLue, and Waldron (2004) implemented a Social Stories™ intervention with a 7-year-old boy in order to decrease the amount of inappropriate behavior while doing homework at home, using just the presentation of the Social Story™ itself. Using an ABAB design, the intervention targeted the amount of times the child threw himself in his chair with force or had a falling episode. During each episode, the following behaviors were counted: crying, falling, hitting, and screaming. During the first implementation of intervention crying, hitting, and screaming failed to decrease in frequency but instead increased. When returning to baseline, crying behaviors increased, screaming behaviors varied, falling frequency with the initial intervention implementation phase, and hitting decreased in frequency. In the second implementation of the intervention, although they did not disappear, all inappropriate behaviors decreased. Adams et al. hypothesized that the spike of inappropriate behaviors in the first implementation of intervention may be due to a few factors including the student adjusting to having the social story in his homework schedule, parent learning of proper implementation, and the mentioning of the specific behaviors within the Social Story™.

Beh-Pajooh, Ahandi, Shokoohi-Yektah, and Asgary (2011) also implemented Social Stories™ in attempt to decrease challenging behaviors of three young boys. Their intervention resulted in minimized behaviors in two of the three children, as demonstrated through the use of a multiple baseline across participants design. After interviews and direct observations, a target behavior was identified for each student and

included the following: crying, wandering in the classroom, and laying down on the desk. Students with the target behavior of crying or wandering in the classroom, demonstrated a decrease in target behaviors. The third student's behavior of laying down on the desk did decrease from baseline; however, Beh-Pajooch et al. concluded that the reduction in this behavior may not have been due to the implementation of the Social Story™ as the targeted behavior had already somewhat decreased during baseline data collection.

Delano and Snell (2006) utilized Social Stories™ to help teach three young boys (ages 6-9) learn to appropriately seek attention, initiate conversation, request, and make contingent responses in an attempt to increase the duration and frequency of social appropriate engagement. The children had their personalized Social Story™ read to them, were verbally asked comprehension questions, and participated in multiple 10-minute play sessions. Two fade periods (A and B) were also implemented to measure maintenance. Fade A initially began only when the following criteria were met: after at least 15 training sessions and 40% duration growth was seen from baseline to intervention, for four of the last six data collection points. This resulted in the story only being read to the child every other session for six sessions. Before Fade B began, the child had to continue to demonstrate 40% duration growth from the baseline for four of six sessions. When Fade A criteria were met, Fade B began. Fade B included no reading of the Social Story™ at all. These fading conditions were implemented with the contingency of the mastery of the criteria. If any of the students were unable to meet the designated criteria, they were regressed back to the prior phase. Generalization was measured during baseline, intervention, and phase periods through probes or observations of each child in their natural education setting. Within each generalization situation, the

participant was given no Social Story™ and was placed in a general education setting with a general education novel peer for a 10-min play session. Overall, duration of behavior increased for all three participants following the intervention. For two of the three boys, generalization of the skills to their general education classroom was observed, closing the gap with their nondisabled peers. Delano and Snell (2006) hypothesized that the lack of generalization in the third participant might be due to the lack of similarity between the intervention setting and the generalization classroom conditions. Although all three improved their social behavior frequencies during the intervention, only two of the three participants maintained the behavior in the general education classroom.

Quirnbach, Lincoln, Feinberg-Gizzo, Ingersoll, and Andrews (2009) interestingly compared a Social Story™'s effectiveness in promoting game playing skills by breaking down components within the story itself. In addressing game playing skills such as greeting behaviors, requesting to play a game, asking another person what they want to play, and accepting another's choice of game, one group received the whole story, another group received only directives, and the third group was used as a control and received stories that did not consist of related social skills. This was done by utilizing a pretest posttest repeated measures randomized control group design, where participants in the control group were assigned to to directive or standard story conditions on the second day of intervention. In documenting the desired skills during each session as well as to in a generalization session a week later, Quirmach et al. (2009) found significantly higher game play skills with children who received the standard or directive intervention, with no significant difference between the standard and directive group when compared to the control group. Furthermore, generalization and maintenance data suggested that these

groups were also able to generalize and maintain the new skills acquired. In addition, Quirmach et al. (2009) also evaluated each child's verbal abilities using the Verbal Comprehension Index (VCI) of the WISC-IV. Although there was a wide range in overall Full Scale Intelligent Quotients (FSIQ) within the sample, it was found that the strongest correlation within the two thirds that improved their game play skills was their VCI scores.

Scattone, Tingstrom, and Wilczynski (2006) also chose to isolate the true effect of the Social Stories™ components by eliminating other parts, such as illustrations to increase appropriate social interactions in three students. The desired appropriate social interaction was defined by Scattone et al. (2006) as verbal, physical, or gestural initiation or response to a peer; a comment or question related to the activity or conversation; continued engagement in the same activity as the peer; a response to a peer's comment or question with a comment related to the conversation; an initiated comment or question related to the conversation; or a gesture such as nodding to indicate approval or disagreement. In a multiple baseline design across participants, the students were read their individual Social Story™ each day by their teacher and were then asked verbal comprehension questions once daily, 5 times a week. This was done in an isolated room or an area away from their classmates. The intervention was deemed effective at increasing appropriate interactions with peers for two of the three 8-13 year-old students.

Pictures. It has been found that children diagnosed with ASD tend to be visual learners (Grandin, 2006). This suggests that the effectiveness of social stories may be enhanced by providing pictures or models when presenting the intervention. Crozier and Tincani

(2007) used a simple picture icon representing each representing item (ex. a small picture of a pretzel for snack) within their Social Stories™ when working with three preschool aged children in attempt to improve their prosocial behaviors while at school. In this ABAB experimental design, the intervention was seen as effective with 2 of the 3 children, including how to sit at circle time and appropriate play. The participant with the target behavior of initiating conversation with his peers at snack required a second intervention phase in which verbal prompts were added in addition to the visual aid intervention. It was with the implementation of this phase that his intervention showed a change in behavior in comparison to baseline; however, the level at which his behavior was maintained was lower than what was seen during intervention.

Barry and Burlew (2004) similarly used pictures, but more specifically photographs, within their Social Stories™ intervention when working with lower functioning students with ASD. Students' Social Stories™ were paired with photographs of themselves or other students demonstrating appropriate interactions at stations and making an activity center choice within their classroom. Both students showed improvement in both areas and one transitioned to a less restrictive placement due to her drastic improvement in interactions with fellow students.

Ozdemir (2008) similarly used a hand made Social Story™ book with 3 second grade boys, including pictures of each child participating in the desired behavior or scenario (i.e. loud voice, chair tipping, and cutting in line). The effect of social stories on each participant's disruptive behavior was evaluated through a multiple baseline design. Baseline was collected for each child and then the intervention was implemented, followed by two periods of phasing out (A and B). Despite a slight increase in the fade

periods of the intervention, the children's disruptive behavior decreased significantly in comparison to baseline data.

Reynhout and Carter (2007) also found positive results when attempting to decrease hand tapping using a single-subject design with an 8 year old boy. Unlike the ABAB single subject design used by Adams et al. (2004), an ABC single-subject design was used, consisting of two intervention phases. The first phase of intervention included the child's teacher reading the Social Story™ before each reading session. The teacher then left the book for student to access independently. Each story was accompanied by pictures of the student demonstrating each part of the story, including undesired behaviors such as tapping of hands as well as appropriate substitute behaviors. In the second phase of intervention, the story was read as usual and then left for the student to access independently and for the teacher to review with him. Comprehension questions were also asked each time the story was reviewed. With the onset of the intervention, not only did the student's comprehension of the situation increase but the tapping movements decreased.

Picture symbols as well as a journal were used in Sansosti and Powell-Smith's (2006) study involving three elementary boys in attempt at improving sportsmanship, maintaining conversation, and joining in behavior. A journal was utilized with both the child and the parents to ensure that the stories were being implemented in accordance with Gray's guidelines as well as provide feedback with how they felt it was going. With the implementation of the intervention, the targeted social engagement skills increased in two out of the three participants; however, the social behaviors were not maintained during follow-up observations. When compared to typically developing peers, the two

participants who did demonstrate an improvement in their social behaviors reached rates that approached levels similar to their peers. Sansosti and Powell-Smith (2006) attributed the lack of effectiveness with the third participant to many factors including: inconsistency in the story being read to the child, lack of completion of the journal and not allowing for a measure of engagement with the intervention, possible poorly constructed Social Story™, poor delivery of social reinforcement, and weak reinforcement. These hypothesized causes of the lack of effectiveness with the particular child further highlight possible factors within each Social Story™ study that may contribute to an overall effectiveness of the intervention.

Kouch and Mirenda (2003) paired cartoon pictures with their individualized Social Stories™ in an attempt to address behaviors such as aggression, crying, yelling, difficult behaviors during eating, and sportsmanship in three children. Two children participated in an ABA design, exposing the children to the intervention and then returning to baseline with no implementation of a Social Story™. With each of these students, the intervention proved to be effective in reducing undesired behaviors and allowing for maintenance once the intervention was removed. The third child participated in an ABACA type design. This child received a neutral book read to him and then received a verbal prompt reminding him of the behavior desired. Data were then collected in the absence of any intervention, with the intervention, and withdrawal of the Social Story™. Kouch and Mirenda (2003) found no effect in the child's behavior when utilizing the neutral book and verbal prompts; however, in the presence of the intervention, the frequency of undesired behaviors decreased immediately as well as maintained in the removal of the intervention.

Hutchins and Prelock (2012) paired their Social Story™ intervention with Comic Strip Conversations (CSC). Working with caregivers within their home, an interpersonal conflict for each of the 17 children was identified and designated as the target behavior in which to write the Social Story™ and CSC. Each Social Story™ was presented along with drawings and the paralleling CSC was produced by each child using pencil and paper. Overall, behaviors due to interpersonal conflict decreased when presented with the intervention of a Social Story™ and CSC, as reported by parents/caregivers. This was found to be especially true with children with a minimum verbal mental age of 3 years, although no uniformity of characteristics for success were seen. Furthermore, Hutchins and Prelock (2012) saw maintenance for 100% of the children who gained skills during intervention phase.

As noted earlier by the author, it is important to write each Social Story™ to fit the needs of each individual, not exclusive to just appropriate social behaviors, but also including the education of human development and hygiene. Klett and Turan (2012) utilized the strategy of Social Stories™ in educating three young females diagnosed with ASD about sexual development and menstruation. It is important to note that this study was a proactive approach to each child's development with the requirement that all participants had not experienced the onset of menstruation, ensuring menstrual self-care had not yet been taught. Each Social Story™ was written in cooperation with each female's family to ensure the participant's understanding and exclude any offensive language, while targeting the behavior of independent completion of typical bathroom routine. The anticipated routine included changing a sanitary pad broken down into an 11-step task analysis. Each story was also accompanied by comprehension questions,

ensuring understanding of the story as well as other concepts related to puberty and menstruation, as well as visual cues such as photographs, diagrams, drawings, and individualized pictures of the participant and her mother. Each participant was also given a ‘Menstruation Checklist’ pre- and post-intervention to further evaluate their puberty and menstruation knowledge. Evaluation of each female’s success in completing the eleven steps of the task analysis, showed an increase in the percentage of correct responses given during intervention, simulation, and in vivo. In addition, each participant showed an increase in correct responses to the comprehension questions as well as the ‘Menstrual Checklist’ when compared to the pre measure. Two of the three families responded after a year check-up, reporting satisfaction with intervention, as one had begun menstruation and no longer needed the Social Story™ to successfully complete the routine. The other participant had yet to begin; however, parent feedback indicated the participant expressed no fear of the future onset due to the improved knowledge base.

Modeling. Many of the studies described above included pictures in their Social Stories™ intervention package. Chan and O’Reilly (2008) chose to exclude pictures, but rather use the students as their own models through role-play. In their study, the use of Social Stories™ was used to improve appropriate social behaviors such as hand raising, personal space awareness, and social intentions; and decrease inappropriate social behaviors such as inappropriate vocalizations with two kindergarten aged boys in their general education setting. Each child was read his Social Story™, and asked three comprehension questions; and then partook in the role-play portion of the intervention. The implementation of the intervention proved to be effective in decreasing inappropriate

vocalization, increasing positive interactions, and increasing hand raising behaviors for both students. When follow-up data were collected, all behaviors were maintained one to ten months after the intervention by both students, even when collected in new classrooms with new teachers.

Technology

Promising intervention technology such as virtual reality and computer programs have yielded encouraging results when used with individuals who have ASDs (Wainer & Ingersoll, 2011). With the ever-growing multi-media world that we live in, the merging of video modeling, computer-based presentations, and Social Stories™ has been noted to improve social communication skills in children with ASD (Sansosti & Powell-Smith, 2008). In using computers or other types of technology, Doyle and Arnedillo-Sanchez (2011) found that it not only assists in the personalization of each story to the children but also addresses developmental levels, style in which they learn, academic reading ability, attention span, and particular interests.

O'Connor (2009) chose to implement Gray's Social Story DVD within a single subject study in an attempt to reduce a student's anxiety level during PE and swimming lessons, manifesting as an issue with turn taking. By pairing the student's story with video, the student was presented with the DVD 15 minutes prior to the target settings and provided with a booklet with the same story to provide prompts if needed. In addition, the student was also made to participate in the turn taking game with a peer prior to the target setting. In evaluating the effectiveness of the intervention within the student's swimming lessons, using the DVD proved to be effective, with reduced intensity of the student's emotions and apparent learning taking place within the setting. Unfortunately,

similar results were not seen in the student's PE class. The student's level of emotional intensity did not decrease with the DVD intervention. O'Connor (2009) attributes these results to the student's sensory perceptual issues exacerbating the noise levels within the setting. The level of noise in PE caused the student to hold his hands over his ears for a significant amount of time. The learned behaviors implemented during swimming lessons did not generalize to any other settings when observed. O'Connor (2009) notes the necessity of combining strategies with Social Stories™ to further address environmental factors and other impairments such as the sensory impairment noted within their study.

Further utilizing newer forms of technology, Vandermeer, Beamish, Milford, and Lang (2013) implemented their intervention targeting focus and on-task behavior using iPad-presented Social Stories™. Prior to the intervention, the iPad was used to photograph each child demonstrating the targeted behavior and the pictures were then uploaded to the application. The autism-specific application, *Stories2Learn*, developed individual stories for each student using photographs of the child as well as the first author's photographs and corresponding audio messages to the story text (Vandermeer et al., 2013). The children were able to access each sentence within the story by tapping on the corresponding photo and then tapping an arrow to move to the next sentence and corresponding photo. Overall data from this study suggest that iPad-presented Social Stories™ given to children with prior experience with the technology can increase their level of on-task behavior during the period of intervention. Although, long-term results were only maintained by one of the three children, Vandermeer et al. (2013) notes the positive implications for teachers when using an iPad to deliver the intervention. Not

only did the students positively respond to the audio-visual and touch screen components, using an iPad allowed for better organization and accumulation of required components of a Social Story™.

Video Modeling. Scattone (2007) evaluated the use of video modeling in improving eye contact, smiling, and conversation initiations with a nine-year-old boy with his peers at school. Three different Social Stories™ were developed and implemented in a staggered fashion, beginning with the first to address strictly eye contact, then to address eye contact and smiling with the second, and the final, the implementation of eye contact, smiling, and initiation. The wording of each story was first shown on the video and narrated by adults, who then modeled the target skill(s) during a 5-minute video taped conversation. Presenting the child with the Social Story™ as well as video modeling proved to be an effective way to improve his conversational skills.

Sansosti and Powell-Smith (2008) found similar results when studying communication skills of 3 young boys diagnosed with ASD. More specifically, stories were written to address the skills of conversation initiation and maintenance. Each child was an active participant, pressing start and watching the story and models unfold through a powerpoint presentation. The target child was exposed to his social story each day before the target time of recess and was prompted by teachers upon entering the playground. After intervention fading, overall target communication skills had improved from baseline data within the two-week follow-up.

iPads have also deemed effective in the are of teaching children play dialogue. Murdock, Ganz, and Crittendon 's (2013) multiple baseline across participants design aimed to improve play dialogue and ultimately increase novel utterances when working

with four preschool aged boys. Each child received the same story using an iPad called Keynote. Murdock et al. (2013) describes this application as similar to PowerPoint. Each slide contained pictures of toy figures and was accompanied by audio recordings. Each student received their story and were then put in a similar play scenario with a typically developing. A measure of their play dialogue and structural utterances were taken within each session. The number of novel utterances was also recorded. Overall, the Social Story™ via delivery of iPad increased play dialogue in three of the four children with 61% of the utterances being recorded as novel. One of the four children did not progress behaviorally with the intervention. Murdock et al. (2013) attributed this to his general non-compliance to the intervention.

Discussion

Based on the results of the available literature, Social Stories™ have proved to be effective in targeting and improving many different types of behaviors when working with children and adolescents diagnosed with Autism Spectrum Disorder. Social Stories have been delivered in many forms including using the simple story itself (Adams et al., 2004; Beh-Pahjoon et al, 2011; Okada, Ohtake, & Yanagihara, 2010), pairing with pictures (Crozier & Tincani, 2007; Barry & Burlew, 2004, Ozdemir, 2008; Reynhout & Carter, 2007), pairing with modeling (Chan & Reilly, 2008), using technology assistance in the presentation of story (Chan & O'Reilly, 2008; Vandermeer et al, 2013), and providing video modeling (Scattone, 2007; Sansosti & Powell-Smith, 2008).

Within a literature synthesis, Sansosti et al. (2004) concluded that research on Social Stories™ when working with people with ASD is still very limited. One such

limitation of the literature noted by Sansosti et al. (2004) is the absence of evaluation of separate components of Social Stories™.

Kouch and Mirenda (2003) further examined literature regarding the structure of each Social Story™, concluding that the majority of stories in which they included in their research did not follow Gray's guidelines but still generally yielded positive effects. As discussed above, Gray (2003) noted ten specific guidelines when constructing a story. This format is set to clarify content and enhances meaning of the story for the audience by guiding them through situations and helping them to exhibit appropriate reactions to them (Gray, 2010). Although Gray's developed guidelines yield limited empirical or theoretical basis (Kuoeh & Mirenda, 2003), certain components, such as sentence types, within the story may contribute to positive behavior modifications (Reynhout & Carter, 2006; Tarnai, 2011). For example, Reynhout and Carter (2006) noted a positive correlation between the number of consequences sentences within a story and the story's overall effectiveness within their single-subject meta-analysis. Tarnai (2011) further examined Gray's (2010) sentence ratio and its necessity within the Social Story™ package and was able to provide some empirical evidence for Gray's suggested ratio by yielding results consisting of fewer trials to desired behavioral criterion, as well as better consistency in maintained behavior when compared to interventions omitting Gray's story structure requirements; however, noting the other effective components with the package. Okada, Ohtake, & Yanagihara (2008) took note of the specificity, contingency, and likeability within the perspective sentence; using specific names, a likeable perspective holder, and perspective occurring as a result of the target behavior. Within

this literature review, all but two (Adams et al., 2004; Crozier & Tincani, 2005) constructed their Social Stories™ in accordance to Gray's (2003) guidelines.

When considering the child individually, Vandermeer et al. (2013) attributes the behavioral maintenance of only one child within their study as a result of the effectiveness of the intervention itself in comparison to others, suggesting that Social Stories™ may only be effective with certain children under certain conditions. This further contributes to the idea that when choosing an intervention or writing a specific Social Story™, the child's characteristics, needs, complexity of the skill, as well as other environmental variables should be considered. These may include intelligence, level of verbal communication, relationships with individuals involved in the intervention, experience with intervention tools, etc. The idea of considering the individual can also be applied in the questioning of the necessity of each component within the Social Story™ package discussed above. Although there is limited research in the area, Pop et al. (2013) evaluated the delivery of the story in comparing different types of technology, revealing more buy-in and interest to the story when social robots were utilized as compared to the usual visual and audio. This further suggests that effectiveness of the intervention may be more beneficial when considering the strengths and interests of the child.

Although some findings suggest greater effectiveness when the child is his or her own "intervention agent" (Kokina & Kern, 2010), the child for whom the Social Story™ is written for is more often not the only individual assisting in implementing the intervention. Many times parents, paraprofessionals, or teachers are utilized to assist in reading each story as well as helping to deliver comprehension questions to ensure the child's understanding of the concept or situation (Klett & Turan, 2011; Quilty, 2007;

Reynhout & Carter, 2009). The Social Story™ intervention is reported to be chosen above others due to its ease in construction and implementation, as well as requiring limited resources (Kokina & Kern, 2010; Reynhout & Carter, 2006). Teachers also reported satisfaction in the effectiveness when used with a variety of behaviors. Quilty (2007) provided support for paraprofessionals and their ability to also write and create effective Social Stories™, resulting in the decrease of their students' target behaviors. Overall, Social Stories™ are perceived as a positive and inherently attractive intervention to use within the classroom; however, concerns of maintenance, generalization, and efficacy are also noted (Ali & Frederickson, 2006; Reynhout & Carter, 2009). After the discontinuation of the intervention, it is important for the child to continue to have access to the story in order to assist with the aforementioned concerns even when the skill has been mastered (Crozier & Tincani, 2007; Kinkaid, 2004; & Santosti, Powell-Smith).

In the review of literature utilizing the intervention of Social Stories™, it is still difficult to determine the true effectiveness of the story itself. Consistent pairing with other interventions throughout the literature (prompting, pictures, modeling, technology, etc), provide positive and negative results, making it difficult to identify which element within the intervention is most effective within each case or study. It is also important to note the lack of experimental control including small sample sizes within many studies. In addition to the confounding variables mentioned above, not all stories were written in accordance with Gray's (2010) guidelines nor is control consistently occurring when including individuals outside of the study team.

Despite inconsistencies in the intervention implementation, as well as the varying components that can be used, Social Stories™ should be considered a noteworthy

intervention when working with the ASD population due to the personalization of its nature. Each child diagnosed with ASD display many unique and personalized characteristics. Whether each story is written or paired with other interventions, utilizing Social Stories™ allows for individuality with the components that are included by considering skill level, behavioral difficulty, and particular interests with each child or adolescent. Additionally, the intervention is conducive to many different types of target behaviors in many different settings, again, contributing to the novelty of each story. While the variation within the intervention can be considered a strength, it can also be considered a weakness. Varying paired approaches as well as child characteristics allow for inconsistencies in the implementation as well as lack of experimental control. This requires each study to be evaluated individually and does not permit a blanket statement of overall effectiveness.

Based on the analysis within this literature review as well as considering the ever-advancing world of technology and its part in everyday lives, further research should be done to evaluate the effectiveness of different types of technology components when paired with Social Stories™. While current studies show promise in this area of intervention pairings, further research should be done to better understand its role within the intervention package. In addition, further exploration into the necessity of Gray's prescribed written component may sway future studies to firmly follow her recommendations or allow for more novelty each time. Due to varying results with each written type, one cannot definitely conclude that one is more effective than the other. Future research may also consider breaking down the Social Story™ package by each component to better isolate and analyze the effectiveness. There are many factors that

contribute to overall effectiveness when considering this intervention. Although research is still emerging within the area of Social Stories™, past and present studies offer encouraging insight to future intervention advancements when working with individuals diagnosed with ASD.

References

- Ali, S., & Fredrickson, N. (2006). Investigating the evidence base of social stories. *Educational Psychology in Practice, 22*, 355-377.
- Barry, L. M., & Burlew, S. B. (2004). Using social stories to teach choice and play skills to children with autism. *Focus on Autism and Other Developmental Disabilities, 19*(1), 45-51.
- Beh-Pajooch, A., Ahmadi, A., Shokoohi-Yekta, M., & Asgary, A. (2011). The effect of social stories on reduction of challenging behaviours in autistic children. *Procedia Social and Behavioral Sciences, 15*, 351-355.
- Benish, T. M., & Bramlett, R. K. (2011). Using social stories to decrease aggression and increase positive peer interactions in normally developing pre-school children. *Educational Psychology in Practice, 27*(1), 1-17.
- Chan, J. M., & O'Reilly, M. F. (2008). A social stories™ intervention package for students with autism in inclusive classroom settings. *Journal of Applied Behavior Analysis, 41*, 405-409.
- Crozier, S., & Tincani, M. J. (2005). Using a modified social story to decrease disruptive behavior of a child with autism. *Focus on Autism and Other Developmental Disabilities, 20*(3), 150-157.
- Crozier, S., & Tincani, M. J. (2007). Effects of social stories on prosocial behavior of preschool children with autism spectrum disorders. *Journal of Autism and Developmental Disabilities, 37*, 1803-1814.
- Delano, M., & Snell, M. E. (2006). The effects of social stories on the social engagement of children with autism. *Journal of Positive Behavior Interventions, 8*(1), 29-42.

Doyle, T., & Arnedillo-Sanchez (2011). Using multimedia to reveal the hidden code of everyday behavior to children with autistic spectrum disorders (ASDs).

Computers & Education, 56, 357-369.

Hutchins, T. L., & Prelock, P. A. (2012). Parents' perceptions of their children's social behavior: The social validity of social stories™ and comic strip conversations.

Journal of Positive Behavior Interventions, 13(3), 156-168.

Klett, L. S., & Turan, Y. (2012). Generalized effects of social stories with task analysis for teaching menstrual care to three young girls with autism. *Sexuality and*

Disability, 30, 319-336.

Kokina, A., & Kern, L. (2010). Social story interventions for students with Autism Spectrum Disorders; A meta-analysis. *Journal of Autism and Developmental*

Disorders, 40, 812-826.

Kouch, H., & Mirenda, P. (2003). Social story interventions for young children with autism spectrum disorders. *Focus on Autism and Other Developmental*

Disabilities, 18(4). 219-227.

Murdock, L. C., Ganz, J., & Crittendon (2013). Use of an iPad play story to increase dialogue of preschoolers with autism spectrum disorders. *Journal of Autism and*

Developmental Disorders, 43, 2174-2189.

O'Conner, E. (2009). The use of social story DVDs to reduce anxiety levels: a case study of a child with autism and learning disabilities. *Support for Learning, 24*(3). 133-

136.

- Ozdemir, S. (2008). The effectiveness of social stories on decreasing disruptive behaviors of children with autism: Three case studies. *Journal of Autism and Developmental Disorders, 38*, 1689-1696.
- Pop, C. A., Simut, R., Pintea, S., Saldien, J., Rusu, A., David, D., Vanderfaeillie, J., Lefeber, D., & Vanderborght, B. (2013). Can the social robot probio help children with autism to identify situation-based emotins? A series of single case experiments. *International Journal of Humanoid Robotics, 10*(3). 1-24.
- Quilty, K. M. (2007). Teaching paraprofessionals how to write and implement social stories for students with autism spectrum disorders. *Remedial and Special Education, 28*(3). 182-189.
- Quirnbach, L. M., Lincoln, A. J., Feinberg-Gizzo, M. J., Ingersoll, B. R., & Andrews, S. M. (2009). Social stories: Mechanisms of effectiveness in increasing game play skills in children diagnosed with autism spectrum disorder using a pretest posttest repeated measures randomized control group design. *Journal of Autism and Developmental Disorders, 39*, 299-321.
- Reynhout, G., & Carter, M. (2007). Social story™ efficacy with a child with autism spectrum disorder and moderate intellectual disability. *Focus on Autism and Other Developmental Disabilities, 22*(3). 173-182.
- Reynhout, G., & Carter, M. (2009). The use of social stories by teachers and their perceived efficacy. *Research in Autism Spectrum Disorders, 3*, 232-251.
- Sansosti, F. J., & Powell-Smith, K. A. (2004). A research synthesis of social story interventions for children with autism spectrum disorders. *Focus on Autism and Other Developmental Disabilities, 19*(4), 194-204.

- Sansosti, F. J., & Powell-Smith, K. A. (2006). Using social stories to improve the social behavior of children with Asperger syndrome. *Journal of Positive Behavior Interventions, 8*(1), 43-57.
- Sansosti, F. J., & Powell-Smith, K. A., (July, 2008). Using computer-presented social stories and video models to increase the social communication skills of children with high-functioning autism spectrum disorders. *Journal of Positive Behavior Interventions, 10*(3), 162-178.
- Scattone, D. (2008). Enhancing the conversation skills of a boy with asperger's disorder through social stories™ and video modeling. *Journal of Autism and Developmental Disorders, 38*, 395-400.
- Scattone, D., Tingstrom, D. H., & Wilczynski, S. M. (2006). Increasing appropriate social interactions of children with autism spectrum disorders using social stories™. *Focus on Autism and Other Developmental Disabilities, 21*(4), 211-222.
- Tarnai, B. (2011). Establishing the relative importance of applying Gray's sentence ratio as a component in a 10-step social stories intervention model for students with ASD. *International Journal of Special Education, 26*(3), 58-79.
- Vandermeer, J., Beamish, W., Milford, T., & Lang, W. (2013). iPad-presented social stories for young children with autism. *Developmental Neurohabilitation, Early Online: 1-7*.
- Wainer, A. L., & Ingersoll, B. R. (2011). The use of innovative computer technology for teaching social communication to individuals with autism spectrum disorders. *Research in Autism Spectrum Disorders, 5*, 96-107.

Table 1 Effectiveness of Social Story™ in relation to design and package components.

Study	<i>N</i>	CA (Years)	Target Behavior(s)	Experimental Design	Measures	Mode	Findings
Adams et al. (2004)	1	7	Frustration behavior during homework	ABAB	Frequency per homework session	Story	Frustration behaviors were decreased but not completely extinguished
Beh-Pajooch et al. (2011)	3	8-9	Challenging classroom behaviors.	Multiple Baseline across participants	Frequency per session	Story	Challenging classroom behaviors decreased for two of the three children.
Delano & Snell (2006)	3	6-9	Appropriate social	Multiple-probe- across-participants	Duration per 1-min sessions	Story	During of appropriate behaviors increased for all children. Generalization was observed with two of the students.
Quirnbach et al. (2009)	45	7-14	Game play social skills	Pretest posttest repeated measures randomized control group	Repeated measures ANOVA	Story	Increased social game playing skills as well as generalization was seen with children receiving standard or directive stories as opposed to the control group.
Scattone et al. (2006)	3	8-13	Aggression, screaming, grabbing toys	Multiple-baseline design across participants	Percentage of intervals during 10-min intervals	Story	Increased appropriate interactions was seen with two of the three students.
Crozier & Tincani (2007)	3	3-5	Prosocial behavior	ABAC & ABCACBC	Duration & Frequency	Story & pictures	Two of the three children showed increased prosocial behavior.
Barry & Burlew (2004)	2	7-8	Choice making during center time & appropriate play	ABCD	Level of prompting required recorded	Story & pictures	Both students showed improvement with both behaviors, requiring less prompting and demonstrating longer appropriate play behavior.

			behavior		by teacher & duration		
Ozdemir (2008)	3	7-9	Disruptive behaviors	Single-subject, multiple-baseline across subjects	Percentage of disruptive behaviors	Story & pictures	Disruptive behaviors decreased significantly for two of the three children.
Reynhout & Carter (2007)	1	8	Tapping of hands during Reading	ABC single-subject	Percentage using partial interval recording	Story & Pictures	Child's tapping behavior decreased and comprehension of situation increased.
Sanstosi & Powel-Smith (2006)	3	9-11	Sportsmanship, conversation skills, & joining groups	Multiple-baseline across-participants	Percentage of intervals or frequency	Story & Pictures	Social engagement skills increased for two of the three participants.
Kouch & Mirenda (2003)	3	3-6	Aggression, crying, yelling, difficult behavior during eating, & sportsmanship	ABA & ABACA	Frequency	Story & Pictures	Undesired behavior decreased and maintained with the removal of the intervention.
Hutchins & Prelock (2012)	17	4-12	Appropriate social, Communicative, & behavior	Between-group & multiple baseline single-participant design across participants	Parent Ratings, t-tests, & ANOVA	Story & Comic Strip Conversations	Parents reported an overall decrease of problem behaviors and maintenance was seen with all participants.
Klett & Turan (2012)	3	9-12	Menstrual Care	Single-subject-multiple-baseline	Parent ratings	Story & Pictures	Parents reported an increase of participant knowledge of reproductive development and were able to independently care care for themselves.

Chan & O'Reilly (2008)	2	5-6	Appropriate social behavior in school	Multiple probe across behaviors	Frequency & Percentage	Story & Modeling	Appropriate behaviors increased for both participants and were maintained when checked after ten months.
O'Connor (2009)	1	Elementary	Anxiety & turn taking	Single-subject across settings	Frequency & level of intensity	Story via DVD	The child's level of emotional intensity was reduced in one of the two settings.
Vandermeer et al. (2003)	3	4	On-task behavior	Single-subject with multiple baseline across participants	Frequency	Story via iPad	The use of an iPad with the intervention was seen effective with only one of three participants
Scattone (2007)	1	9	Eye contact, smiling, & initiation	Multiple baseline across behaviors	Percentage of intervals	Story & video modeling	Improvement in the child's conversational skills were seen.
Sansosti & Powell-Smith (2009)	3	6-10	Communication skills	Multiple-baseline across-participants	Percentage of intervals	Story & video modeling	After intervention fading, overall target communication skills improved.
Murdock et al. (2013)	4	4	Play dialogue	Multiple-baseline across participants	Frequency	Story & modeling via iPad	Intervention via delivery of iPad increased play dialogue in three of the four children.