Critical Review:
Are social stories effective at decreasing maladaptive behaviours in children with autism?

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Social stories are short stories written in the first person for children with autism that feature a socially productive script for managing a social situation in which the child has demonstrated challenging behaviour in the past (Gray & Garand, 1993). Speech-language pathologists, teachers, and other professionals write and implement social stories to reduce problem behaviours in children with autism who possess basic language skills. The five studies described below show a moderate level of support for social stories as an effective tool for decreasing problem behaviours in children with autism. Each of the reviewed studies has limitations suggesting further research is still needed.

Introduction

According to the Centers for Disease Control and Prevention (2012), it is estimated that 1 in 88 children has been identified as having autism. The American Psychiatric Association (2000) describes communication, social development, and emotional regulation as core features of autism. These challenges can put this population of children at an increased risk of developing maladaptive behaviours to express their feelings. These problem behaviours may be reinforced by the attention they receive, leading the child with autism to continue to use them as they know no other way to get their needs met and anxiety reduced.

Problem behaviours in an educational setting can interfere with the learning of the child demonstrating the behaviour as well as that of other children witnessing the behaviour (Scattone et al., 2002). Maladaptive behaviours, therefore, put children with autism at risk of loosing their inclusive placements at school. Teaching social skills is a crucial component in educating children with autism (Krantz, 2000).

Social stories, were developed by Carol Gray in 1991, and revised in 1998, with the purpose of incorporating knowledge of social cognition in autism into how social behaviour is taught to children with autism (Gray & Garand, 1993; Gray, 2012). The short stories written from the child's perspective discuss a social situation that has the potential to be difficult for the child, providing social information to aid understanding of the situation, and a suitable response in an effort to teach new academic and social skills (1993). By teaching valuable social skills to a population that experiences challenges in that area, social stories promote the participation and inclusion of children with autism in school and in the community.

Objectives

The primary objective of this paper is to critically evaluate existing literature regarding the effectiveness of the use of social stories to decrease maladaptive behaviours in children with autism.

Methods

Search Strategy

Computerized databases, including Scopus, PsycINFO, PubMed, and Google Scholar, were searched using the following search strategy: (autism) OR (ASD) AND (social stories) AND (disruptive) OR (challenging) AND (behavior) OR (behaviour) AND (children). The search was limited to articles written in English between 2000 and 2013.

Selection Criteria

Studies selected for inclusion in this critical review were required to investigate the effectiveness of the use of social stories to decrease inappropriate behaviours in children with autism.

Data Collection

The results of this literature search yielded the following five articles that met the aforementioned selection criteria for inclusion in this review. These include five single subject designs.

Results

Single-Subject Designs

Studies utilizing a single-subject design are appropriate for testing hypotheses regarding the challenging behaviours associated with autism as it involves a heterogeneous population with wide variation in skills and level of support needed. Individual participant characteristics and small sample size must be

considered when interpreting the results of studies using a single-subject design.

Scattone et al (2002) used a single-subject, multiple-baseline design across participants to examine the effectiveness of social stories for decreasing disruptive behaviours in three male children, aged 7 to 15, with existing diagnoses of autism. In order to use each participant as a control for the others, the intervention was introduced using staggered entry across three different series. An 8 to 9 page social story, following Gray's 1998 guidelines (Gray, 2012), was created specific to each child. Social stories were written to discourage chair tipping, staring at girls, and shouting at the teacher.

Throughout the study, the teacher was told to respond to each child's disruptive behaviours in the same way as before the study. At intervention, the teacher read each child their social story and comprehension questions. Each child answered all their comprehension questions accurately after one reading. Assessment of treatment integrity, the consistency of the intervention presentation, revealed that participant 1 read his social story at least once per day, participant 3 was read his social story at least once per day, and participant 2 read his social story on 91% of the days during intervention. Trained university students used a cued 10-second partial interval system to track disruptive behaviours for 3 periods of 20-minutes each week. Inter-observer agreement was calculated for 30% of the observation data; it was 100% for participants 1 and 3, and 93% for participant 2.

For participant 1, chair tipping averaged 50% (range 48-60%) of intervals during baseline and 4.6% (range 0-17%) of intervals during intervention. For participant 2, staring averaged 66.9% (range 50-85%) of intervals during baseline and 18.3% (range 0-58%) of intervals during intervention. For participant 3, shouting averaged 16% (range 0-40%) of intervals during baseline and 5.1% (range 2-10%) of intervals during intervention. All three children demonstrated a marked decrease, although less dramatically for participant 3, in disruptive behaviours from baseline to intervention.

Despite the decrease in disruptive behaviours, a suitable alternative behaviour was not always seen. For example, participant 2 pulled his sweater over his head during several observations. It may have been helpful to include in his story suggestions for where to look instead of staring at girls, and/or to decrease awareness of being observed by having regular school staff collect the data.

The results indicate the use of social stories was associated with a decrease in disruptive behaviours for the children and suggest social stories may be effective at reducing disruptive behaviour even when not carried out with 100% integrity. The use of a multiple baseline across participants design added to the study's internal validity by decreasing the opportunity for alternative explanations for the observed changes. The study does not provide an explanation for why less of a change was seen for participant 3. He was the only participant who did not read his story independently. This may be an area warranting future research. Although unplanned, the teachers were observed providing verbal prompts (directly related to the social stories) occasionally, it is unclear whether or not this played a role in decreasing disruptive behaviours. The study was completed over 22 sessions with interventions beginning on sessions 5, 9, and 16. It may be worthwhile for future studies to look at longer-term maintenance of the behavioural changes associated with social stories.

Agosta et al (2004) used a single-subject (ABCA) design to examine the effects of social stories on the challenging behaviours, more specifically screaming during special education classroom activities, of a 6-year-old boy with a medical diagnosis of autism. Two social stories were created for the child following the guidelines outlined by Gray and Garand (1993) with the addition of Boardmaker Picture Communication Symbols (Mayer-Johnson, 1981-2003). The first social story, presented as Treatment 1 on day 9, incorporated a tangible reinforcement system, while the second social story, presented as Treatment 2 on day 19, did not. Screaming behaviour was measured through observation, and was considered to have occurred when loud, disruptive sounds were heard during a 15 second interval. Data was recorded on a data chart by trained observers during 20 minutes of circle time activities over 36 days. Baseline data was collected in 15 second intervals over 20 minutes across 9 mornings. For Treatment 1, the boy's teacher introduced the social story and tangible reinforcement system involving 5 minutes of quiet sitting earned verbal praise and "happy face" pins which could later be exchanged for candy bears. The child did not show interest in the candy bears, so Treatment 2 was designed with verbal praise as the only reinforcement. A return-to-baseline phase involved verbal reminders and verbal praise without the use of social stories.

During baseline, the child demonstrated a mean of 21.2 screams (range 11-40) and a mean length of time between screams of 4.8 minutes (range 2.8-6.5). During Treatment 1 including a social story and reinforcement system, the child demonstrated a mean of 7.4 screams (3-19) and a mean length of time between screams of

9.5 minutes (range 2.5-16.3). During Treatment 2 including a social story without the reinforcement system, the child demonstrated a mean of 6.8 screams (range 1-16), and a mean length of time between screams of 8.8 minutes (range 4.8-18.3). During return-to-baseline with the social story removed, the child demonstrated a mean of 9 screams (range 1-19), and a mean length of time between screams of 12 minutes (range 6.5-21.5). Across Treatment 1, Treatment 2, and return-to-baseline, the overall number of screams remained below 50% of what was observed at baseline. The length of quiet sitting between screams increased across Treatment 1, Treatment 2, and continued to increase at the return-to-baseline phase.

The results showed that the child's disruptive behaviour was reduced with the use of a social story. The ABCA study design allowed researches to confirm that the observed behavioural changes did not require reinforcement, as they remained stable once reinforcement was removed from the social story in Treatment 2. Some limitations to the present study are that there was only one study participant and interobserver agreement was not evaluated.

Ozdemir (2008) used a single-subject, multiple-baseline design across participants to evaluate the effectiveness of social stories at decreasing disruptive behaviours in 3 male children, aged 7 to 9, with medical diagnoses of autism. Similar to Scattone et al. (2002), this intervention was introduced through staggered entry across three different series. A 7 to 9 page social story was constructed for each child following Gray's 1998 guidelines (Gray, 2012). The social stories were unique in that they incorporated pictures of the participant children. The stories were created to reduce using a loud voice, chair tipping and cutting in line. Participants met the following criteria for inclusion: current autism diagnosis, ability to communicate orally, some reading skills, and daily interactions with age-matched peers in an inclusive general education setting. Teachers taught and interacted with the children in the same way throughout the study as they had before.

Baseline data collection began at the same time for all participants. When the average target behaviours for all participants were above 40%, the intervention was started for participant 1. When increasing data trends lasted 1 week for participant 1, intervention was started for participant 2, when increasing data trends lasted 1 week for participant 2, intervention was started for participant 3. During intervention, participants 1 and 3 were read their stories by the teacher's aid at least once per day and participant 2 read his story with teacher assistance at least once per day. Treatment integrity was calculated for 50% of sessions and was 100% for all

participants. Fading was initiated after 27 intervention sessions and when disruptive behaviours were 40% lower than baseline for 4 of the last 6 observations. Fade A involved reading the rewritten story without the directive sentence, for 5 sessions. Fade B involved reading the rewritten story every other session. A no story condition followed for 5 sessions.

A 15 second cued partial interval tracking procedure was used to observe behaviours for 20 minutes each day. Data were collected by the primary researcher and a trained graduate student. Inter-rater reliability was 100% when calculated for 30% of the observations.

For participant 1, using a loud voice averaged 62.9% (range 42.5-85%) of intervals during baseline, 11.5% (range 6.25-21.25%) of intervals during intervention, 20.5% (range 15-23.75%) of intervals during Fade A, 27.75% (range 23.75-31.25%) of intervals during Fade B, and 29.36% (range 28.75-31.25%) during No Story. For participant 2, chair tipping averaged 55.4% (range 45-57.5%) of intervals during baseline, 18.62% (range 10-23.75%) of intervals during intervention, 21.75% (range 17.5-22.5%) of intervals during Fade A, 21.5% (range 20-22.5%) of intervals during Fade B, and 20.93% (range 16.25-23.75%) during No Story. For participant 3, cutting in line averaged 60% (range 50-66.25%) of intervals during baseline, 7.68% (range 0-11.25%) of intervals during intervention, 15.75% (range 12.5-18.75%) of intervals during Fade A, 17.81% (range 16.25-20%) of intervals during Fade B, and 20.31% (range 18.75-21.25%) during No Story. Following social story introduction, all 3 participants showed a marked drop in disruptive behaviour compared to baseline. During Fade A, all 3 participants showed a slight increase in disruptive behaviour, but remained quite low. During Fade B, participants 1 and 3 showed a slight increase in disruptive behaviour, but remained low, while participant 2 showed a slight decrease in disruptive behaviour. During No Story, all 3 participants maintained quite low levels of disruptive behaviours compared to baseline.

The maintenance data demonstrate that all 3 participants maintained markedly lower disruptive behaviours than at baseline as the intervention faded. Overall, the results suggest that properly created visual social stories may reduce disruptive behaviours in children with autism. The small sample size of this study and the participant requirements for verbal and reading skills limit the generalizability of this study's results.

Hung & Smith (2011) used a single subject ABAB design to examine the use of a social story to decrease disruptive behaviour (loud yelling) in a 6 year old boy with a current diagnosis of autism. This study is unique

in that it was conducted in Taiwan, on an Asian child, using a social story written according to Gray's 1998 guidelines (Gray, 2012).

Throughout the study, the child's teacher was instructed to respond to the child's disruptive bahaviours in the same way as before the study. Data collection was done by the researchers after lunch each day over 24 days. Inter-observer agreement was calculated for 30% of observations and was 100% consistent. Following introduction to the social story, the child scored 100% on comprehension questions. The social story was then read to the child each morning as he could not read independently. Treatment integrity was calculated to be 100%, indicating the child was read the story at least once per day during intervention. After its introduction the social story was kept available to the child throughout the school day, but he never accessed it independently.

During the first baseline phase, the child yelled 61 times. During the first treatment phase, the child yelled 19 times. During the second baseline phase, the child yelled 71 times. During the second treatment phase, the child yelled 9 times. All 4 phases were 6 days long. The child demonstrated a marked decrease in yelling during each intervention phase, and a rise above initial baseline during the second baseline phase.

The results of this study suggest that social stories may improve behavioural issues in children with autism in other cultures. However, the researchers noted that they observed some prompting from the teacher throughout the study, despite being unplanned, and acknowledged this could have influenced the results. The small sample size is a limitation to the generalizability of this study's results.

Beh-Pajooh et al. (2011) used a single subject, multiple baseline design across participants to evaluate the effectiveness of social stories on reducing challenging behaviours including crying, wandering in the classroom, and laying on the desk, in 3 boys, aged 8 to 9 years, with diagnoses of autism. This study is also unique in that it took place in a special school in Tehran, Iran.

For participant 1 crying averaged 5.7 (range 4-8) times during baseline decreasing to 2.81 (range 0-6) times during intervention. For participant 2 wandering around class averaged 7.33 (range 6-10) times during baseline decreasing to 4.32 times during intervention. For participant 3 laying down on the desk averaged 2.23 (range 0-4) times during baseline to 1.67 (range 0-4) times during intervention. Although participants 1 and 2 showed marked decreases in disruptive behaviours

during intervention as compared to baseline, participant 3 showed a decrease at the end of the baseline phase and an increase at the start of the intervention phase. Considering this, along with the variability of participant 3's data, one cannot conclude that the disruptive behaviour had been reduced with the use of a social story for participant 3.

The small sample size limits the generalizability of the results of this study. The study does not include generalization or follow up measures, information on whether or not Gray's guidelines were followed in constructing the social stories, nor information on how intervention initiation time was determined, further limiting the study.

Discussion

Children with autism are a heterogeneous population, demonstrating various levels of ability, making this population particularly challenging to study. The purpose of this review was to evaluate the effectiveness of social stories for decreasing maladaptive behaviours in children with autism. Critical appraisal of current research on the topic suggests that social stories may be an effective tool for decreasing problem behaviours in children with autism and that this may also be true for children with autism in a variety of cultures. Each of the studies described above involved limitations, and so further research on the topic in order to build on the level of evidence provided thus far is still needed.

Future research on the research question posed in this paper should attempt to address the following issues:

a) Researchers should aim to include a larger sample size in their studies in order to increase statistical power and increase the generalizability of the results.

b) Studies should include measures of generalization and long-term maintenance of treatment gains.

c) Researchers should incorporate statistical analyses along with visual graph interpretation to provide a more thorough analysis of the results.

d) Researchers should extend outcome measures to include changes in language skills, social skills, quality of interactions, and self-esteem.

Conclusion and clinical Implications

Problem behaviours can arise as a form of communication in children with autism due to the many challenges they face, therefore managing these behaviours is an area of interest for speech-language

pathologists. Through reinforcement, these behaviours can become habitual and may negatively impact social and academic functioning. Evidence-based practices that facilitate the participation and inclusion of children with autism at school and in the community are therefore much needed. The reviewed articles are suggestive that social stories are an effective tool for managing maladaptive behaviours in children with autism. Due to the heterogeneity of the population, clinicians should always use caution when applying this intervention to children with autism. Considering the limitations of the research, and the impact problem behaviours can have on a child's social interactions and quality of life, more research on the effectiveness, generalization and maintenance of social stories for managing maladaptive behaviours in children with autism is needed.

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