

What is the effectiveness of Social Stories on reducing challenging behaviour in students with autism?

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Clinical Scenario: Social Stories were created by Carol Gray in 1991 and use a specifically defined format to describe a situation in terms of relevant social cues, in order to relay accurate social information (The Gray Centre, 2010). Social Stories are most commonly used to assist individuals with autistic spectrum disorders (ASD).

There is limited research to support the use of Social Stories as an evidence-based approach for individuals with autism (Sansosti, Powell-Smith & Kincaid, 2004). Current research highlights their benefit in improving social interactions but few address their effectiveness for reducing challenging behaviours. In New Zealand 1 in every 100 children are affected by ASD's (Autistic Association of New Zealand, 2010) indicating a need for practical evidence that reports the effectiveness of Social Stories as an intervention to target specific social situations that are a trigger for challenging behaviour.

Focused Clinical Question: What is the effectiveness of Social Stories on reducing challenging behaviour in students with autism?

Summary of Search, 'Best' Evidence' Appraised, and Key Findings:

Despite employing a number of searches of relevant sources including databases, internet sites and literature relevant to the subject area, the search for evidence was challenging as there is limited existing research that is specific to the focused clinical question. Most of the research articles searched were quantitative in design and highlighted only small scale studies. Key findings of the articles were that the effectiveness of Social Stories as an intervention to reduce challenging behaviours remains questionable, although under specific conditions there are positive outcomes.

Articles pointed to the need for Social Stories to be properly constructed according to Gray's guidelines (1998) in order to have the best effect on reducing target behaviours (Ozdemir, 2008; Scattone, Tingstrom & Wilczynski, 2006; Crozier & Tincani, 2007). All

the studies pointed to a need for further research to provide quality evidence for Social Stories intervention (Sansosti, Powell-Smith & Kincaid, 2004; Ozdemir, 2008; Crozier et al., 2007; Scattone et al., 2006).

Clinical Bottom Line: Under specific conditions there is suggestion that Social Stories can be used to some success as an intervention to reduce challenging behaviour in students with autism.

Limitation of this CAT: This critical appraisal has been peer reviewed by one lecturer as part of an assignment.

Search Strategy: An electronic search of databases was undertaken to identify relevant articles. These included CINAHL, PubMed, ProQuest, Cochrane Library and OT Seeker. The following keywords were used: Social Stories, autism, autistic spectrum disorders, behaviour, children and students. In addition a hand-search was completed of relevant books related to autism, and an internet search for articles through Google Scholar.

Inclusion and Exclusion Criteria:

Inclusion:

- Research published in English.
- Participants in the study had a diagnosis of autism/ASD.
- Participants in the study were students between the ages of 5 and 16 years.
- Social Stories used as the sole intervention method.
- Aim of intervention was to reduce challenging behaviour

Exclusion:

- Aim of intervention not deemed appropriate to the clinical question.
- Studies including children with diagnoses other than autism/ASD.
- Studies not involving Social Stories as an intervention.
- Studies not highlighting any specific target behaviour.

Results of Search: A total of 41 studies were located across the 5 databases. Six were considered best evidence for critical appraisal and categorised in Table 1 (Appendix A: levels of evidence).

Table 1: Summary of Study Designs.

Study Design/ Methodology of Articles Retrieved	Level	Author (Year)
Systematic Review: Meta-analysis	Ia	Kokina & Kern (2010)
Quantitative – Case Study	III	Ozdemir, S (2008)
Quantitative – single-case experimental	IIb	Crozier & Tincani (2006)
Quantitative – multiple baseline across participants	IIb	Scattone, Tingstrom & Wilczynski (2006)
Research Synthesis	III	Sansosti, Powell-Smith & Kincaid (2004)
Quantitative – single-case experimental	IIb	Scattone, Wilczynski, Edwards & Rabian (2002)

BEST EVIDENCE:

1. Scattone, Wilczynski, Edwards and Rabian (2002)

This article was considered best evidence as it was one of few articles located that focused specifically on the use of Social Stories with children to decrease challenging behaviour.

2. Kokina & Kern (2010)

This article was considered best evidence as it was the only meta-analysis piece found with content relevant to the clinical question. The requirements for this critical review meant that different types of evidence must be used which ruled out using two quantitative research studies.

SUMMARY OF BEST EVIDENCE

Description and appraisal of: Scattone, D., Wilczynski, S. M., Edwards, R. P., & Rabian, B. (2002). Decreasing disruptive behaviours of children with autism using social stories. *Journal of Autism and Developmental Disorders*, 32(6), 535-543.

Critiqued using guidelines from: Taylor, M. C. (2007). *Evidence based practice for occupational therapists* (2nd ed.). Oxford: Blackwell Publishing Ltd.

Study Purpose: The aim of the study was to explore how effective properly constructed Social Stories were in reducing disruptive behaviours of three children with autism in a classroom environment.

Study Design: Quantitative: multiple baseline design across participants. The intervention is administered in a staggered fashion to each participant after baseline behaviours have been recorded.

Setting: The study took place across two schools (one primary and one secondary) located in the southern region of the United States.

Participants: Three male participants were included in the study (aged 7, 7, 15 years respectively). Inclusion and exclusion criteria is not described in detail however all participants had an existing diagnosis of autism, communicated via speech and were pupils in self-contained special education classrooms. No justification is provided but it can be assumed that purposive sampling is used as all participants have previously had clinical intervention from an author involved in the research article. This suggests some bias as the authors may have selected specific children who would most likely achieve a positive outcome for the study. In terms of ethics procedures informed consent was sought from parents prior to the study.

Method: The occurrence of challenging behaviours, both pre and post intervention, was recorded for each participant by graduate and undergraduate students over a 20-minute observation period 3 times per week. A 10-second cued partial interval recording system was used by the observers during this period. In order for interobserver agreement to be confirmed, both observers had to agree that the behaviour had either occurred or not.

Results: Results of the Social Stories intervention were analysed across three key areas and interpreted as percentages (see Table 2 below).

	Kenny	Howard	John
Interobserver Agreement	100%	100%	93% (range = 89-100%)
Treatment Integrity	100%	100%	91%
Reduction in Disruptive Behaviour (from baseline to intervention)	33% (mean)	10.9% (mean)	48.6% (mean)

Original Authors Conclusions: The study succeeded in both replicating and extending the literature of research into the use of Social Stories and found that properly constructed social stories may decrease the disruptive behaviours of some children with

autism. In addition the study concluded that Social Stories can be used successfully in isolation to target challenging behaviours without any additional planned systematic behavioural interventions such as token economies.

CRITICAL APPRAISAL

Validity:

Did the study address a clearly focused issue?

The purpose of the study is clearly stated: to explore the use of Social Stories composed within the limits reported in Gray's guidelines (1998), for reducing the challenging behaviours of children with autism. The article further refined the purpose of the study by stating that the effectiveness of Social Stories as a sole intervention strategy would be investigated.

Is the literature review appropriate?

The article presents a short review of background literature and research into the use of Social Stories to reduce disruptive behaviours which is in line with the purpose of the current study. It does indicate a synthesis of previous research into the subject area and provides some discussion around how Social Stories are implemented to tackle specific traits of autism. However, the review of the literature, although descriptive, is minimal and no indication is given about how extensive the search for research articles was. The author's do highlight a gap in knowledge that there is a lack of experimental studies with strong internal validity to support the use of Social Stories.

Were ethical issues considered?

The study has ethical merits in that the intervention does not have to be withdrawn at the conclusion of the research and can continue to be used with participants to reduce disruptive behaviour.

Interpretation of Results:

Were the methods of analysis appropriate, clearly described and justified?

The data analysis is described in the article in terms of the dependent variables (behaviours) and how these were assessed and recorded. A clear description is given about how the effect of the Social Story on reducing challenging behaviour is assessed by measuring the percentage of instances of the behaviour during 20-minute observations. The author's definition of participants disruptive behaviours appears very objective;

although the target behaviour is clearly defined the limits of these are quite inflexible for the participants e.g. Howard's shouting is defined as raising his voice above the typical level but no clarification is given as to what is an acceptable level of noise in this setting.

What are the key findings?

The article sets out the results in an easy to comprehend style for the reader, splitting these up into three key areas (see Table 2). Interobserver agreement data was found to be high and this was collected once a week over the 9 weeks of the study and represented 30% of the observations. Treatment integrity involved the completion of a daily checklist to indicate whether or not the Social Story was read that day at the specified time. Again, there was excellent adherence to this during the study period. Finally the results showed that all participants demonstrated a drop in their instances of challenging behaviour after the intervention had been introduced (Figure 1, Appendix C.).

Conclusion: The study revealed that the participants demonstrated a reduction in challenging behaviour following the application of Social Stories. This is relevant in terms of the school setting as the intervention is unobtrusive and the least disruptive to the class. A major limitation identified in study is the extent to which the teacher used additional prompts to refer to the Social Story in warning the participant not to exhibit a particular behaviour. This limits the certainty that Social Stories could be used effectively as a sole intervention. Finally the study suggests that the guidelines for Social Stories design (Gray, 1998) need to undergo experimental investigation to ensure that validity and confidence can be sourced from using these.

SUMMARY OF BEST EVIDENCE

Description and appraisal of: Kokina, A., & Lee, K. (2010). Social story interventions for students with autism spectrum disorders: A meta-analysis. *Journal of Autism and Developmental Disorders*, (published online ahead of print <http://www.ncbi.nlm.nih.gov/pubmed/20054628>).

Critiqued using guidelines from: Taylor, M. C. (2007). *Evidence based practice for occupational therapists* (2nd ed.). Oxford: Blackwell Publishing Ltd.

Aim of the Meta-Analysis: The authors specify three objectives of the meta-analysis; 1.) to examine the overall effectiveness of Social Story interventions, 2.) to illustrate the ways that Social Stories were used in research studies, and 3.) to scrutinise the role of a comprehensive set of moderator variables on the usefulness of Social Stories.

Study Design: Meta-analysis: systematic review.

Search Strategy: A combination of the following terms was used in the search: “Social Story interventions”, “children” and “autism”. Several databases were searched electronically including PsycInfo, ERIC and ProQuest Dissertations. An ancestral search of the reference lists of located experimental studies and reviews of the literature in order to identify additional references was undertaken. Finally, a hand search of several recent journals (2008-2009) was completed.

Selection Criteria: Inclusion criteria for the study were:

- Single-subject design studies demonstrating the experimental control.
- Baseline and intervention data represented graphically.
- Participants with a diagnosis of ASD.
- Social Stories as the sole intervention.

Studies excluded were those that:

- Did not contain quantitative data.
- Adopted non-experimental AB designs or their variations.
- Used Social Stories alongside other interventions.
- Participants had a disorder other than ASD.
- Had “floor” or “ceiling” effects in baseline.

From the 54 studies located, 18 were included in the meta-analysis based on the selection criteria.

Methodological Quality of the Studies: The authors evaluated how Social Stories are used in research, by summarising and coding the information taken from each study under three categories: 1.) study methodology, 2.) intervention characteristics and 3.) participant characteristics. Median PND scores (percentage of non-overlapping data.) were calculated from each of the graphs (see Table 3) to determine the extent of behaviour change from baseline to intervention.

Table 3

PND Score	Interpretation of Score
>90	Highly effective intervention
70 – 90	Effective intervention
50 – 70	Outcomes are questionable or low
<50	Ineffective intervention

The small sample size lends itself more to descriptive analyses so statistical analysis is not included. Finally methodological quality of the study was ensured by having only one author act as primary coder. Two independent raters were used to code a random sample of studies and calculate their PND scores. The article indicates good inter-rater reliability for coding the studies at 94%, with 100% agreement on the PND scores.

Results: The authors report that according to interpretation of the PND scores across the 18 studies, the total median and mean scores of 62% and 60% respectively place Social Stories in the category where effectiveness is considered questionable or low. However, the authors provide extensive information relating to the great inconsistency in PND scores for individual outcomes (ranging from 22-95) that may point to the effectiveness of using Social Stories in specific situations.

Original Authors' Conclusions: The investigation served to confirm the questionable effectiveness of interventions using Social Stories for students with a diagnosis of ASD. However the authors do assert that Social Stories were more effective when used to tackle disruptive behaviours than when teaching social skills.

CRITICAL APPRAISAL

Validity:

Did the review address a clearly focused issue?

The review has an explicitly stated aim: to conduct a meta-analysis of single-subject research that explored the use of Social Stories and the part that an extensive set of variables played in the intervention outcomes. The research question allows the reader to make a reasonable assumption about what will be detailed in the article, and whether this is of relevance to them.

Were the important, relevant studies included?

A range of sources were thoroughly searched by the authors to uncover studies relevant to the research question. The search terms used were pertinent to the purpose of the review and are specified in the article. The authors extended their search to locate unpublished dissertations, reviewed the reference lists of experimental studies they had located in order to find further research articles and also hand-searched through several journals with links to autism and developmental disorders.

Interpretation of Results:

Were the methods of meta-analysis appropriate and clearly justified?

The methods required by a meta-analysis for data extraction across the range of studies were clearly defined with the authors specifically pinpointing how rigorous the methods used were for gathering relevant information. Although the process of data analysis is explained in great detail, there is little justification offered for why specific study features have been selected. The chosen methods used in the meta-analysis however are appropriate for the selected studies and the information contained in these.

What is the overall result of the review?

The meta-analysis presents an investigation of the available research and found the results to confirm the findings of previous studies, that the effect of Social Story interventions for students with ASD remains questionable. The two key areas most positively affected by Social Stories were the reduction in disruptive behaviours and improvements in social skills, which appropriately addresses the initial research question. Table 4 (Appendix B) indicates the highest PND scores in intervention variables indicating that Social Stories can range from having a questionable outcome to being a highly effective intervention under specific conditions. The statistical significance of the interventions is not explained in the article as the sample size is too small to hold any strength, meaning that interpretation of the results is mostly descriptive.

Summary/Conclusion: Conclusions drawn from the meta-analysis identify that a combination of factors can be attributed to the effectiveness of Social Stories interventions. These are: a.) targeting reductions in challenging behaviours, b.) implementation within a general education setting, c.) using children as agents of their own intervention, d.) reading story just prior to the targeted situation, e.) using story to describe a basic singular behaviour, f.) brief intervention duration, g.) functional assessment to be used to inform intervention, h.) comprehension checks to be utilised

and i.) engaging elementary-aged students with more advanced social/communication skills and lower levels of disruptive behaviours.

Limited research and small scale studies has meant that although the meta-analysis fulfils the aims of the research question, it may not necessarily provide high quality research evidence due to the lack of statistical procedures and indicates the need for larger scale studies and more robust research.

Implications for Practice, Education and Future Research:

Despite the obvious limitations highlighted in the research articles they do provide the best current evidence for using Social Stories as an intervention to reduce challenging behaviour in students with autism. The evidence that has been produced in these studies demonstrates the potential of this intervention as a highly effective strategy but without more rigorous research and larger scale studies it will not be able to move into the domain of high quality evidence based intervention.

Occupational therapists (OT) working in the field of autism will require information about how to create and use Social Stories with their clients. This will assist in maintaining the routines and predictability that are favoured by individuals with ASD's, thus reducing stress and the onset of challenging behaviours in social situations. As the development of Social Stories requires virtually no cost and consumes little time, the intervention could be considered an attractive option for OT's and the departments in which they work.

The OT could adopt a teaching role to ensure that Social Stories are properly developed using the guidelines set down by Gray (1998) in order for the intervention to have the best outcome in addressing the target behaviour. In addition OT should reinforce to parents, teachers and other professionals the importance of including in the Social Stories praise for the individuals skills or abilities that are performed well.

It is clear from the research (Scattone et al. 2002; Ozdemir, 2008) that Social Stories must be tailored to the individuals needs in order for there to be any chance of a successful outcome. Falvo (The Gray Centre, n.d.) asserts that the person writing the story for (or with) the student should adjust the vocabulary, perspective, length, and content to suit the child's comprehension level, interests, and abilities.

Whilst using information from the highlighted studies as evidence to support OT practice could be questioned by other professionals, it is important to recognise it as a good

starting point for further research into Social Stories interventions. The OT will need to take thorough baseline recordings of client's behaviours before any intervention is started as this will present a basis for evaluation of the success of Social Stories and add further weight to any discussion about the effectiveness of this intervention. The research evidence should not be disregarded therefore as it does present a range of hypotheses that have been tested in real-life situations to varying degrees of success, and when used alongside the OT's own experience could offer sound clinical reasoning for the Social Stories intervention.

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Appendix

Appendix A:

Grading of evidence

- Ia: systematic review or meta-analysis of randomised controlled trials
- Ib: at least one randomised controlled trial
- IIa: at least one well-designed controlled study without randomisation
- IIb: at least one well-designed quasi-experimental study, such as a cohort study
- III: well-designed non-experimental descriptive studies, such as comparative studies, correlation studies, case-control studies and case series
- IV: expert committee reports, opinions and/or clinical experience of respected authorities

Tidy, C. (Dr.). (2008). *Different levels of evidence*. Retrieved May 30, 2010, from [http://www.patient.co.uk/doctor/Different-Levels-of-Evidence-\(Critical-Reading\).htm](http://www.patient.co.uk/doctor/Different-Levels-of-Evidence-(Critical-Reading).htm)

Appendix B:

Table 4.

Intervention Variables	Condition	Median PND Score
Goal	Reduce inappropriate behaviours	87
Setting	General education	73.5
By whom read	Target student	95
When read	Immediately before target situation	65
Duration of intervention	Brief (1-10 sessions)	71
Number of Social Stories per participant	Several	75
Social Story format	Written story and illustrations	72
Length	Long (11+ sentences)	73
Types of behaviour addressed	Singular behaviour (social/non-social)	87
Use of functional assessment	Yes	86
Use of comprehension checks	Yes	65

Appendix C:

Figure 1

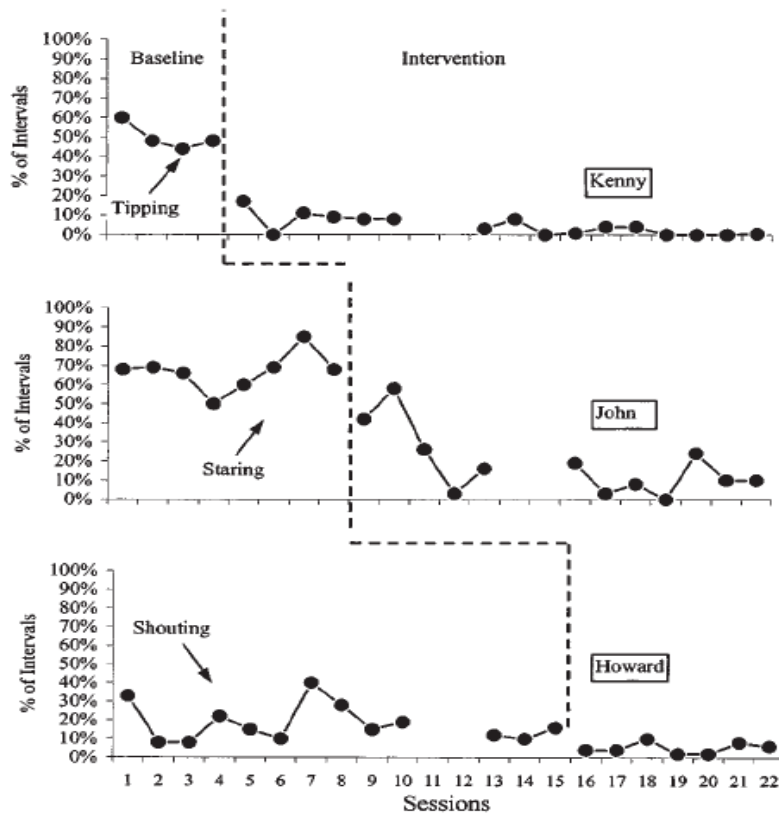


Fig. 1. Percentages of disruptive behavior for Kenny, John, and Howard.