

# **The effectiveness of using social stories to modify inappropriate behaviours in children with autism**

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## **CLINICAL SCENARIO**

Children with autism experience difficulties in interpreting social or environmental cues therefore often their behaviours are not appropriate for the situation (Brownell, 2002). Social stories attempt to help a child to accurately interpret the social cues for a given setting (Gray, 1998 cited in Ozdemir, 2008), by using individualised written stories, which often also include photographs of the child (Ozdemir, 2008). Social stories have a “strong practical rationale” and are positively accepted by parents and teachers (Kokina & Kern, 2010, Introduction section, para. 1) however as this is a relatively new intervention there is limited research evaluating the effectiveness of using social stories to modify behaviours in children with autism.

## **FOCUSED CLINICAL QUESTION**

Are social story interventions effective in modifying inappropriate behaviours of children with autism?

## **SUMMARY OF SEARCH, ‘BEST EVIDENCE’ APPRAISED, AND KEY FINDINGS**

There is limited research evidence addressing the effectiveness of social stories on modifying behaviours of children with autism. The majority of studies found related to the clinical topic were non-randomised experimental. A systematic review was sourced, which included a meta-analysis of 18 non-randomised experimental studies. The second research article appraised was a study evaluating the effectiveness of social stories in reducing disruptive behaviour of three children with autism. The key findings were that social stories are effective in modifying behaviour in children with autism. However the level of evidence is insufficient for therapists to use as a basis for making decisions around intervention. Therefore more rigorous research is required to further support the use of social story interventions in modifying inappropriate behaviours of children with autism.

## **CLINICAL BOTTOM LINE**

Social stories are an effective intervention for modifying inappropriate behaviours of children with autism, however occupational therapists should be cautious about

changing their practice as a result of this appraisal because the amount of evidence is limited and more rigorous research is required.

### **LIMITATION OF THIS CAT**

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

### **SEARCH STRATEGY**

A database search of CINAHL, ProQuest Central and PubMed was conducted using a combination of the terms 'social stories', 'autism' and 'behaviour'. The search produced a manageable amount of articles therefore limiting the search using other search words was not required. A manual search of reference lists in relevant articles was also conducted.

### **INCLUSION AND EXCLUSION CRITERIA**

#### Inclusion criteria

- Published in the English language
- Children aged 3 - 15 years old
- Diagnosis of Autism
- Included social stories as the sole intervention
- A change in behaviour as the outcome
- Articles published between 2000 and present

#### Exclusion criteria

- Studies that did not have a change in behaviour as an outcome

## RESULTS OF THE SEARCH

Study design/Methodology of Articles Retrieved	Level	Author (Year)
Systematic Review with meta-analysis	1	Kokina & Kern (2010)
Single-subject, multiple baseline design	3	Ozdemir (2008)
Single-subject, multiple baseline design	3	Scattone, Wilczynski, Edwards & Rabian (2002)
Single-subject, ABAB design	3	Lorimer, Simpson, Myles & Ganz (2002)
ABAC reversal design	3	Crozier & Tincani (2005)

## BEST EVIDENCE

### 1. Kokina & Kern (2010)

This article was considered 'best evidence' as it includes a meta-analysis of current research that has investigated the effectiveness of using social stories with children with autism. This was the only systematic review found related to the clinical topic.

### 2. Ozdemir (2008)

This article was considered 'best evidence' because the social stories used were constructed using Grey's (1998) guidelines (original developer of social stories) therefore the main focus of the study was on remediating disruptive behaviour rather than on the type of social story used (i.e. musically adapted).

## **SUMMARY OF BEST EVIDENCE**

**Title of Article:** Social stories interventions for students with Autism Spectrum Disorders: A meta-analysis.

**1.**

**Aim** – The aim of this review was “to examine the overall effectiveness of Social Story interventions; to describe the ways in which Social Stories were used in research studies and to examine the role of a comprehensive set of moderator variables, including the intervention and participant characteristics, on the effectiveness of Social Stories” (Introduction section, para. 10).

**Study Design** – Systematic review with meta-analysis

**Search Strategy** – PsycInfo and ERIC databases were searched using the terms ‘Social Story intervention’, ‘children’ and ‘autism’. ProQuest Dissertation electronic database was also search to locate unpublished dissertations. A manual search of reference lists was also undertaken and as well as a hand search of several relevant journals. 64 articles were identified from this search. These articles were then reviewed in relation to inclusion/exclusion criteria. As a result 18 relevant articles were chosen.

**Setting** – The authors are researchers from the College of Education at Lehigh University in Bethlehem, Pennsylvania.

**Articles reviewed** – 18 studies (single-subject design) were included in the review (15 articles and 3 dissertations). The authors recognised that due to the rigorous selection criteria this was a relatively small sample.

**Method of review** – The articles were reviewed by the first author of the study, who was the primary coder and two other independent raters. Each study chosen was summarised and this information was coded into three broad categories; study methodology, intervention characteristics and participant characteristics. The information was further coded under these categories. The meta-analysis involved a descriptive analysis of the selected studies. A median percentage of non-overlapping data (PND) was calculated for each study to summarise the results and to obtain the estimate of the effectiveness of each of the study features. These figures were then combined and discussed under the categories mentioned above.

**Results** – The average PND score for this study was 60%, under the 70% or above needed for intervention effectiveness. 24 of the participants had PND scores at or above 70% (highly effective/effective), 21 participants had PND scores below 50% (ineffective) and only 2 participant's scores fell in the "questionable" range between 50 and 70%. In relation to the intervention variable it was found that Social Stories are more effective when used to address inappropriate behaviours (PND 87%) than when teaching social skills (PND 56%). It was identified that one or a combination of factors appeared to be associated with increased effectiveness of social story interventions. Some of the factors discussed are; implementation in an education setting; brief duration of intervention; and social stories read immediately prior to the targeted situation.

**Original Authors' Conclusions** – The author concludes that the overall effectiveness of social story interventions for students with autism is variable, which supports previous findings. The author suggests that the findings are preliminary and more research is required to explore the critical variables that correlate with intervention effectiveness.

## **2. Critical Appraisal**

### **Validity/Trustworthiness of the Results**

Taylor (2007) suggests that three main areas are addressed when appraising a systematic review. These are discussed in detail below.

#### *Are the results valid?*

The review addresses a clearly focused issue and the reasons for needing the review were justified and clearly established parameters were outlined. The most relevant and important studies were included in this review. A thorough search of databases was conducted, including a search for unpublished dissertations and a manual search of relevant journals. Clear inclusion/exclusion criteria are described however it is not clear whether one or both of the authors were involved in the inclusion/exclusion screening process. Therefore biases may not have been avoided during this process. Methodological quality was assessed at the selection stage. Studies that had non-experimental designs, included social stories as part of a treatment package or had 'floor' or 'ceiling' effects in baseline measurements were excluded. It is unclear how these criteria were established or if more than one person was involved in assessment of methodological quality. It was reasonable for the results to be combined using PND calculations as the studies reviewed have some important similarities. They all used

single-subject designs and social stories were the interventions used in all of the studies.

*What are the results?*

The process of data extraction and analysis (descriptive) was clearly described and justified. The authors identified that they used descriptive analysis because the research did not have enough power for statistical analysis. The results of the review addressed the original aim. It was found that overall the effectiveness of Social Stories with students with autism was questionable (PND of 60%) and more specifically that social stories are more effective in modifying behaviour than teaching social skills. And that a one or a combination of variables appeared to be associated with higher effectiveness of using social stories.

The authors based their conclusions and recommendations on the results of the review. Any recommendations emerged from the review findings, no unsupported conclusions were made by the authors.

*How will these results help Occupational Therapist's work with their clients?*

The participants from the reviewed studies are from a specific client group therefore the results are only relevant to a select number of occupational therapists. This review analysed a number of outcomes that represent the majority of studies done. However the focus of this review is on outcomes of behaviour change. As the outcomes are listed in table with the article details, the reader can draw on those that are relevant to their clients. However the authors do not discuss the cost-benefit relationship of using the intervention.

**Summary/Conclusion**

This systematic review was rigorous in its analysis of the studies therefore results of the review are considered valid. This review found that the effectiveness of using social stories with children with autism is variable. However in relation to behaviour change, the social story intervention was found to be more effective with a PND score of 78% than other outcomes reviewed. Overall the results of the review cannot be translated directly into practice due to the level of evidence of the studies reviewed.

**Title of Article:** The effectiveness of social stories on decreasing disruptive behaviours of children with autism.

1.

**Objective of the Study** – The purpose of this study was to evaluate the effectiveness of using social stories as a sole intervention to reduce disruptive behaviours in children with autism. And to add to the literature evaluating social stories as an intervention with children with autism.

**Study Design** – single-subject, multiple-baseline design.

**Setting** – An elementary school located in upstate New York, USA.

**Participants** – Three boys (Pic, Nathan and Aaron) aged between 7 and 9 with a current diagnosis of autism participated in this study. The article did not state how they selected the participants however a criterion for inclusion was described. Other than having a diagnosis of autism, the participants also needed to be able to communicate orally with others, demonstrate reading ability at a pre-reading or beginning reading level, and be in inclusive general education that provided opportunities for peer interaction.

**Method** – Baseline measures were conducted prior to the start of intervention, which involved observation of the children interacting in a classroom situation. Social Stories were constructed according to Gray's (1998) guidelines. They were specifically designed to the child's targeted behaviour and included the child's own pictures and a written story. The intervention phase was implemented by the participant's teacher aide and involved the participant or their teacher aide reading an individualised social story aloud at specific times during the day, proximal to the targeted behaviour. Two out of the three participants read their story aloud (Aaron and Nathan). The intervention was conducted in the participants' usual classroom.

Further measures were conducted during 20 minute observations (three times a week) for the duration of the study. Two maintenance probes were also used to fade out the intervention. Criterion was established to determine the participants' readiness to begin the fading process. The Fade A phase involved using a rewritten story that did not include the directive sentence and the Fade B phase involved the social story been read every other session. When the participants' targeted behaviour remained below

40% less than baseline, the intervention was ceased.

**Results** – All three participants “demonstrated a significant reduction of targeted disruptive behaviours compared to the baseline performance” (p. 1694). During the intervention phase Pic’s mean level of performance was 11.5%. Following the fading process, Pic’s mean level was 29.36%, lower than his baseline measure of 62.9%. The mean percentage of Nathan’s targeted behaviour baseline measure was 55.4%. During intervention, Nathan’s mean level was 18.62% and following the conclusion of the intervention, his mean level of the targeted behaviour was 20.93%. For Aaron, his mean level at baseline was 60%. During the intervention phase, his mean level was 7.68% and following the conclusion of the intervention, his mean level of performance was 20.31%.

**Original Authors’ Conclusions** – The author concludes that the findings from the study do not provide clear answers for practical solutions however “the present study replicated and extended the literature by demonstrating that properly constructed and visually presented social stories may decrease the disruptive behaviours of children with autism” (p. 1695), which adds to the puzzle of evidence already available exploring the remediation of disruptive behaviours with children with autism.

## **2. Critical Appraisal**

### **Validity/Trustworthiness of the Results**

Taylor (2007) suggests that three areas are addressed when appraising the rigour of any article. These are discussed in detail below.

#### *Are the results valid?*

A clearly focused aim is outlined, which includes the intervention, client group and outcome. However it is unclear how the participants were selected for the study. All three participants were accounted for in the results and discussion. The literature review is appropriate as it provides a thorough overview of the client group, intervention and previous studies conducted. As this is a single-subject study, the use of a control group was not appropriate. Ethical considerations of the study were not discussed by the author.

#### *What are the results?*

The author described when and where measurement of the targeted behaviour took place however the description of the assessment tool was limited to a name (15-s cued partial interval recording system). Therefore it is unclear if this assessment is a valid or

reliable tool. The process of determining inter-rater reliability was done and was found to be 100% reliable for all three participants. Both the principle researcher and a trained graduate collected observational data using a 15-s cued partial interval recording system. 30% of the observational data was coded by the trained graduate for reliability. The process of determining inter-rater reliability was done and was found to be 100% reliable over all three participants. The researcher also determined treatment integrity and social validity and described the findings in detail. The method of analysis is clearly described. Percentages of disruptive behaviour of each participant were recorded on a line graph. This method of data analysis was appropriate for the collected data as it showed the changes in behaviour over the course of the study. It is unclear if the results are significant, the author reports a significant reduction however it is unknown the percentage of change in behaviour that determines significance. The results address the aim of the study. They demonstrate a correlation between the intervention and disruptive behaviours of three children with autism.

*How will the results help Occupational Therapists work with their clients?*

This study evaluates the effectiveness of an intervention with a specific group of clients therefore the results of this study are only relevant to a limited number of occupational therapists. The participants and specifics of the intervention are clearly described therefore therapists can more easily relate the results of this study with their clients. The author did not discuss the cost-benefit relationship of using social story interventions. However the author did discuss that there appears to be no stigma attached to children using social stories.

### **Summary/Conclusion**

The rigor of this study is questionable as the level of evidence is low. And although the aim is clearly focused and the literature review is appropriate, the selection of participants, ethical considerations and reliability of the measure are unclear. Clinically, the study can be considered valuable as it provides clear direction for using the intervention in practice. Overall, the results from the study can contribute to a clinician's understanding of using social stories to reduce disruptive behaviours in children with autism however should not be used as the only basis for decision making.

### **IMPLICATIONS FOR PRACTICE, EDUCATION AND FUTURE RESEARCH**

This appraisal has found that social stories are an effective intervention for modifying behaviour of children with autism (Kokina & Kern, 2010, Ozdemir, 2008). However the level of evidence of the research is insufficient for clinicians to use as a basis for

making decisions in relation to using social stories with their clients. The results of these studies however contribute valuable information about the use of social story interventions. There is no need for occupational therapists to change their practice as a result of this appraisal however if they wish to use social stories with their clients it is essential that they utilise their clinical judgement when considering to use social story interventions. For clinicians already using social stories as an intervention, there is no need for them to cease using this intervention as there is no evidence that proves that social stories are not effective in modifying behaviour in children with autism.

The social story intervention is not currently taught as a part of course work in the occupational therapy undergraduate degree (Otago Polytechnic). However fieldwork experiences in paediatric settings may include learning about the use of social stories as an intervention. It is not necessary that the social story interventions are taught as part of course work, as the intervention is very specific and is currently only used with a small client group. However workshops could be run for those interested in learning about the use of social stories with children with autism.

Kokina and Kern (2010) identified that methodological quality had improved however more research using more rigorous study designs is needed. They also identified that “a combination of factors may be associated with higher effectiveness of social story interventions” (p. 14) therefore they recommend that further research is needed to further analyse the correlation between the factors and higher effectiveness of the intervention (Kokina & Kern, 2010). Ozdemir (2008) suggests that further experimental research is needed to further develop the use of this promising intervention with those with autism.

## References

- Brownell, M. D. (2002). Musically adapted social stories to modify behaviours in students with autism: Four case studies. *Journal of Music Therapy*, XXXIX (2), 117 – 114.
- Crozier, S. & Tincani, M. J. (2005). Using a modified social story to decrease disruptive behaviour of a child with autism. *Focus on Autism and Other Developmental Disabilities*, 20(3), 150 – 157.
- Kokina, A. & Kern, L. (2010). Social stories interventions for students with autism spectrum disorders: A meta-analysis. *Journal of Autism and Developmental Disorders*. Retrieved May, 14, 2010 from <http://www.springerlink.com/content/q701x877334v8j25/>
- Lorimer, P. A., Simpson, R. L. Myles, B. S. & Ganz, J. B. (2002). The use of social stories as a preventative behavioural intervention in a home setting with a child with autism. *Journal of Positive Behaviour Interventions*, 4(1), 53 – 60.
- Ozdemir, S. (2008). The effectiveness of social stories on decreasing disruptive behaviours of children with autism. *Journal of Autism and Developmental Disorders*, 38, 1689 – 1696.
- Rappolt, S. (2003). The role of professional expertise in evidence-based occupational therapy. *The American Journal of Occupational Therapy*, 57(5), 589 – 593.
- 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.
- Taylor, M. C. (2007). *Evidence-based practice for occupational therapists*. Oxford: Blackwell Publishing Ltd.