

The effectiveness of Social Stories™ in changing behaviour for children with Autism Spectrum Disorder

Prepared by: Paula Brown

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Clinical scenario:

Autism Spectrum Disorder (ASD) is characterized by impairments in social interaction and communication, as well as restricted repertoires of behaviour (American Psychiatric Association, 2000). These impairments commonly results in problem behaviour which can negatively affect a person's ability to participate in family and community life and to access educational opportunities.

The social story strategy is a common intervention used to address behaviour and social skills. Social Stories are carefully designed for each individual capitalizing on visual learning strengths of students with ASD (Crozier & Tincani, 2005). Awareness of the efficacy of social stories in changing behaviour will supplement occupational therapy with an evidence-based individualised intervention.

Focussed clinical question:

For children with Autism Spectrum Disorder, are social stories an effective intervention to change behaviours?

Summary of search, 'best' evidence' appraised, and key findings:

Databases, library catalogues, and references were searched to find the best articles in order to answer the clinical question. As a result of my search six studies were found that were both relevant to the clinical question, and fitted the exclusion/inclusion criteria. These included: a literature review, a systematic review and various forms of quantitative studies.

These studies showed that the social stories intervention is lacking evidence, particularly in improving social skills. However, these studies did show improvement in behaviour when using the intervention of social stories (Kokina & Kern, 2010).

Clinical bottom line:

There is preliminary evidence to suggest that social stories are effective in changing singular simple target behaviour for children with ASD if implemented in a way suitable to the child's age, interests and comprehension level.

Limitation of this CAT:

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

Search strategy:

In order to identify relevant articles, a search of PubMed, CINAHL, OT Seeker, and the University of Otago library catalogue was conducted. The search terms "autism" AND "social stor*" were used and presented a good range of results. A manual search of the references of those articles that fitted the inclusion/exclusion criteria was also carried out.

Inclusion and exclusion criteria:

Inclusion criteria:

- Diagnosis of participants was ASD
- Intervention aimed at changing behaviour
- Focuses on children aged 5-18 years (school aged)
- Articles less than 10 years old
- Article is available on database
- Social stories was the intervention

Exclusion criteria:

- Aim of intervention was not behaviour
- Articles over 10 years old
- Article has not been peer reviewed
- Publication not available in English

Results of the search:

Study design/methodology of articles retrieved	Level	Author (year)
Systematic Review (meta-analysis) *	1	Kokina & Kern (2010)
Quantitative – non randomised experimental study	3	Scatone, Wilczynski, Edwards & Rabian (2002)
Quantitative – non randomised experimental study	3	Ozdemir (2008)
Quantitative & Qualitative	NA	Adams, Gouvousis, VanLue & Waldron (2004)
Quantitative single subject experimental design *	3	Lorimer, Simpson, Myles & Ganz (2002)
Qualitative study	5	Smith (2001)

* = articles selected for this appraisal

Best evidence:

Two studies were selected for appraisal as they best fitted the clinical question. They were a systematic review by Kokina & Kern (2010) and a single subject quantitative experimental design by Lorimer, Simpson, Myles & Ganz (2002). They were chosen as they presented two distinct forms of evidence; a systematic review and a quantitative experimental design. They were also both peer-reviewed.

Summary of best evidence:

1. Kokina & Kern (2001)

Objective of the systematic review:

The aim of this review was to examine the overall effectiveness of social story interventions as well as describing ways in which social stories were used in research studies. Kokina & Kern (2001) also hoped to examine the role of a comprehensive set of moderator variables including intervention and participant characteristics on the effectiveness of social stories.

Study design:

Systematic review – meta-analysis

Search strategy:

Kokina and Kern (2010) used PsychInfo and ERIC databases to search for peer reviewed documents. The terms 'social story intervention', 'children' and 'autism' were used. The Pro Quest Dissertations electronic database was also searched in order to find unpublished work, and an ancestral search was conducted of reference lists found through the database searches. The authors also conducted a manual search of several journals published in 2008-2009. This resulted in the identification of 64 studies, of these 18 studies met the inclusion criteria for this analysis.

Setting:

The authors are based at the special education department at Lehigh University.

Method of review:

Each study was summarised and information was then coded into three broad categories: study methodology, intervention characteristics and participant characteristics, and then organised into a table. The first author, Kokina, was the primary coder, and two other independent raters (doctoral students in special education) were used to code a random sample of five of the 18 studies, and then calculated PND scores. Any disagreement surrounding the interpretation of data was resolved through discussion.

To determine whether study characteristics were associated with higher intervention effectiveness, PND scores were calculated. PND is a non-parametric approach to summarising research which determines magnitude of behaviour change. This is done by calculated percentage of overlap between data in those phases, and is in the form of a percentage. Scruggs and Mastropieri (1998, as cited in Kokina & Kern, 2010) states that PND scores above 90 signify a highly effective intervention, those scores between 70-90 signify an effective intervention, those scores between 50-70 show that outcomes are questionably low, and finally PND scores lower than 50 determine an ineffective intervention.

Results:

The results show that in general use, the effectiveness of social stories as an intervention with children with autism is questionably low (according to Scruggs and Mastropieri's interpretation of PND scores). However when looking at the intervention characteristics there is strong disparity between the effectiveness of this intervention in improving appropriate social behaviours (PND = 56%), and reducing inappropriate behaviours (87%). There was also a significant difference in the results of effectiveness when the social stories

were read by teachers (71%) , parents (55%) or target students themselves (95%). Another feature in the results from the intervention characteristics was the difference in effectiveness when singular simple target behaviour (87%), social routine behaviours (59%), or non-social routine behaviours (24%) were addressed. For the participant characteristics, the results showed that social stories are more effective for children with autism (83%), than children with aspergers syndrome (33%).

Original Authors' Conclusions:

The author concluded that social stories had “low to questionable overall effectiveness” (p.2) however they concluded that this intervention was more effective when addressing inappropriate behaviour than when teaching social skills. The authors also noted that there seemed to be improved effectiveness when the social stories were implemented in a general education setting and with the target children as their own intervention agent.

Validity/trustworthiness of the results:

Taylor (2007) provides a framework of questions that allows the appraiser to make judgements on an article's validity. Kokina and Kern (2010) clearly established a focused issue, they make clear that the important relevant studies were sought out to be included in the review, and the authors clearly established inclusion and exclusion criteria for the identified studies. This vigorous inclusion and exclusion criteria compensated for their relatively small sample size. The results of the review clearly stated when the results had been combined, but also stated where they hadn't been combined and why it was not appropriate to do so. The authors carefully considered the methodology of each study, and this was clearly stated under the heading 'study methodology'.

Taylor (2007) also suggests two other dimensions involved when critically appraising a systematic review. These are appraising the results, and finally Taylor suggests that the appraiser considers the how the results will help them work with their own clients. The results presented in this review were very clearly described and the tool used to form these results (PND) was clearly justified. Due to Kokina and Kern's (2010) clear layout of the results, the reader would easily be able to apply these findings to their own practice and clients, by finding the corresponding intervention and participant characteristics. The authors did not take into consideration the cost-benefit relationship involved with the social stories intervention.

Summary/Conclusion:

The results of this review are valid, and there is great clinical value in the results. The results can be applied to various settings due to the clear descriptors in the intervention, participation, and study variables. Kokina and Kern (2010) summarise that social stories are more effective in a general education environment with the child leading their own intervention and this is of particular relevance for OT's practicing today.

2. Lorimer, Simpson, Myles & Ganz (2002)

Objective of this study:

The aim of this study was to determine the efficacy of social story intervention implemented in a home setting to decrease precursors to tantrum behaviour in a five year old boy with autism spectrum disorder (ASD).

Study design:

This study was a non randomised single subject experimental study

Setting:

This study was conducted in Gregg's home, using his parents and therapists as program implementers.

Participants:

Gregg was the subject of the study, and is a five year old boy who was diagnosed at age 3 as having mild to moderate autism. Gregg had an average to above-average cognitive ability, which meant he could communicate his wants and needs similar to students at this age. Gregg displayed some characteristics of hyperlexia and he demonstrated splinter skills in mathematical ability. Gregg exhibited many challenging behaviours at home; including tantrums characterized by screaming, hitting kicking, and throwing objects. Prior to this study, a number of strategies were used to teach Gregg alternatives to tantrum behaviour however they all failed to consistently decrease his tantrums.

Method:

Using an ABAB design, two social stories were presented to the subject and then withdrawn. The first and third phases were baseline conditions. During the second and fourth phases the social stories were read to Greg each morning by his parents and by the therapist at the beginning of each therapy session. Gregg was also read a story prior to when an adult was to have a conversation with another adult in Gregg's presence, or when Gregg was going to be required to wait

The researchers hypothesized that by reducing ineffective and inappropriate interrupting verbalizations, Gregg's tantrums would decrease. Therefore, two social stories were written for Gregg addressing these precursors ("Talking with Adults" and "Waiting"). The stories were presented with line drawings paired with written text, which corresponding to Gregg's reading ability. Gregg's parents and therapists, view Carol Gray's (1995, as cited in Lorimer et al, 2002) videotape presentation on social story methods prior to the intervention.

An event recording system was used to record the frequency of Gregg's precursors to tantrum behaviour. Data was also recorded from the therapy sessions, and the implementers were trained to reliably identify and measure these two target behaviours. Data was collected by the parents and reliability checks were made by the researchers.

Results: (as reported by Lorimer et al, 2002)

As shown in figure 1, tantrums occurred on five of the seven days during the initial baseline period. With the introduction of the social stories, there was a dramatic decrease in this behaviour (a tantrum occurred on one day of the seven). During the second baseline period Gregg had tantrums on two out of three days. The second intervention phase was similar to the initial phase (Gregg only had one tantrum in the seven days).

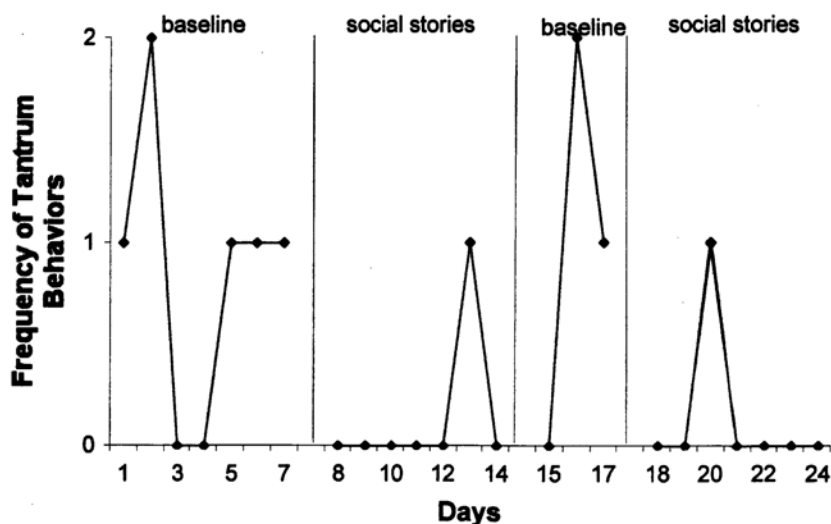


Figure 1 (Lorimer et al, 2002, p.58)

Changes were also noted in Gregg's precursor behaviour. These behaviours occurred several times a day during baseline period, but began to decrease as the social stories were introduced (See Figure 2).

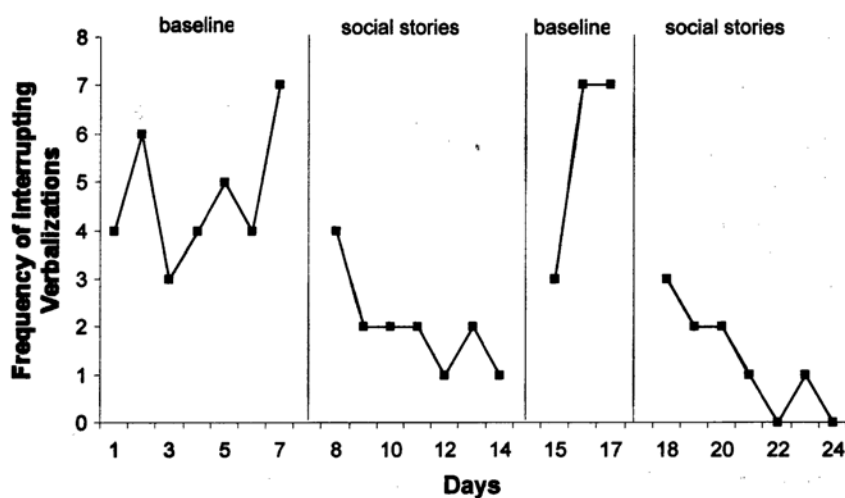


Figure 2 (Lorimer et al, 2002, p.58)

Original Author's Conclusions:

The authors concluded that the use of social stories to reduce precursors to tantrum behaviour was an effective intervention for Gregg. The authors believe that the use of social stories also appeared to increase the effectiveness of the interventions that had already been tried, such as a mini-schedule, and the use of a clock (these were both mentioned in Gregg's social story). The authors concluded that this research revealed "positive and socially valid results for a home setting program implemented collaboratively by parents and professionals" (Lorimer et al, 2002, p.59). It was concluded that there is little doubt that social stories were an effective management and structuring tool for Gregg, however suggest caution when applying these results to other children with autism. They suggest further studies using various designs will "aid in determining whether this technique is generalizable to other learners with autism" (p.59).

Validity/trustworthiness of the results:

Taylor (2007) states that the appraisal of any article should address three broad areas: are the results valid? What are the results? And how will these results help me work with my clients? This appraisal will focus on these three areas to discuss the validity and trustworthiness of this study.

Are the results valid?

The researchers clearly stated the purpose of this study, and the intervention and participant in the study were described in detail. This study's validity is severely limited due to the single subject design. Also with this one participant, the study was not randomized and both

the participant and the implementers were aware that the intervention was taking place, which in turn prevents many biases. The literature review presented at the beginning of this study was appropriate and gave clear evidence that there was a need to examine the effectiveness of this intervention. No where in this study does it discuss any consideration of ethical issues that may have been present.

What are the results?

Although the authors did mention the data collection methods used, the description was lacking detail. Lorimer et al (2002) mentioned that an event recording system was used to tally the frequency of Gregg's precursors to tantrum behaviour. The author does not specifically mention how the recorder measured what and what wasn't tantrum behaviour, or precursors to tantrum behaviour. The author does however mention that the implementers were trained to "reliably identify and measure these two target behaviours" (p.55). The study did conduct reliability checks during 33% of the observations, and the average inter-observer reliability was 96% throughout the intervention. The key findings (as described above) were clearly outlined in this study, both in the form of a graph as well as written results. The authors did not use a method that resulted in a P value, or other measurements that present the significance of the findings. The graph did show clearly the difference in tantrum behaviour between the intervention and baseline stage, allowing the reader to presume significance. All the research aims and hypotheses were addressed and concluded clearly in this study.

How will the results help me work with my clients?

The authors clearly state in their discussion, that although this study has proved social stories to be effective in reducing Gregg's tantrum behaviour it cannot be generalised to other client groups with autism. The author makes it clear that although this study is an acceptable single subject design, it lacks the rigor of other designs. This study shows the reader that social stories have positive and socially valid results for a home setting programme. However, one could question the high intensity of the intervention carried out in this study, and how realistic it is to be implemented in a busy home environment.

Summary/Conclusion:

Through looking at these three broad areas one can see that this study does not have high trustworthiness and validity, particularly due to the study design. However, as a single-subject design the validity and trustworthiness was relatively high. This study does not hold

high clinical value, however in the case that an occupational therapists has a similar aged client, with similar behavioural problems, this intervention would provide good evidence.

Implications for Practice, education and future research:

The two articles reviewed concluded that there is currently minimal high quality evidence to support or refute whether social stories are an effective intervention in changing behaviour. The meta-analysis by Kokina & Kern (2010) compartmentalised intervention characteristics, participant characteristics and study methodology to compare and contrast the effectiveness of social stories throughout these variables. Lorimer et al (2002) took a more specific approach, by using one single subject design to test the effectiveness of social stories. When looking the specific results presented in Lorimer et al (2002) with those studies analysed in the meta-analysis that also looked at behaviour, the results were complementary of each other. That is, that the effectiveness of using social stories when changing behaviour was seen to be significant. This shows practitioners that Kokina & Kern's findings can be easily applied to practice. Of particular mention is the significant difference in the effectiveness of social stories implemented by the child themselves (if their reading level allows) rather than the parent, teacher or therapist.

Another area of relevance to occupational therapy practice was the difference between effectiveness of social stories written about singular simple target behaviour in comparison to lower significance in social stories written about social routine behaviours, or non social routines. Both studies highlighted this need for well written social stories that took into consideration the child's age, interests and comprehension needs. Relevant to occupational therapy practice, this shows the importance of education provided to paediatric occupational therapists in how to write social stories, and the best way to implement them.

Although the experimental design in Lorimer et al(2002) had highly significant results applying these findings to practice are limited due to the study only being implemented on one child. This shows that there is a need for high level research such as random control trials. Due to the long intervention used in Lorimer et al (2002), there is a need for more research into the effectiveness of social stories with a less intense intervention time, particularly if being implemented by busy family members.

Reference List:

- Adams, L., Gouvousis, A., VanLue, M. & Waldron, C. (2004). Social story intervention: Improving communication skills in a child with an autism spectrum disorder. *Focus on Autism and other Developmental Disabilities*, 19(2), p. 87-94.
- Ali, S. & Frederickson, N. (2006). Investigating the evidence-base of social stories. *Educational Psychology in Practice*, 22 (4), p.355-377.
- American Psychiatric Association. (2000). *Diagnostic and statistical manual of mental disorders* (4th ed., text rev.). Washington, DC: Author.
- Crozier, S. & Tincani, M. (2005). Using a modified social story to decrease disruptive behaviour of a child with autism. *Focus on Autism and other Developmental Disabilities*, 20 (3), p. 150-157.
- Kokina, A. & Kern, L. (2010). Social story interventions for students with autism spectrum disorders : A meta analysis. *Journal of Autism and Developmental Disorder*. Retrieved May 10, 2010, from <http://pbi/sagepub.com>.
- Lorimer, P., Simpson, R., Myles, B. & Ganz, J. (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), p. 53-60.
- Ozdemir, S. (2008). The effectiveness of social stories in decreasing descriptive behaviours of children with autism: Three case studies. *Journal of Autism and Developmental Disorder*, 38, 1689-1696.
- Rappolt, S. (2003). The role of professional expertise in evidence-based occupational therapy. *American Journal of Occupational Therapy* 57(5), 589-593
- Sackett, D., Richardson, W., Rosenberg, W., Hayes, R. (1997). *Evidence-based Medicine: How to Practice and Teach EBM*. New York: Churchill Livingstone.
- Scatone, D., Wilczynski, S., Edwards, R. & Rabian, B. (2002) Decreasing disruptive behaviour of children with autism using social stories. *Journal of Autism and Developmental Disorder*, 32 (6), p. 535-543.
- Smith, C. (2001). Using social stories to enhance behaviour of children with autism spectrum difficulties. *Educational Psychology in Practice*, 17 (4), p.337-345.

Taylor, M. (2007). *Evidence-based practice for occupational therapists*. (2nd ed.). Oxford: Blackwell Publishing Ltd.

Upton, D. (1999). Clinical effectiveness and EBP 2: attitudes of health-care professionals. *British Journal of Therapy and Rehabilitation* 6(1), 26-30.