There is preliminary evidence (level 4) that social stories are effective in decreasing challenging behaviours and may improve social interaction skills in children with Autism Spectrum Disorders.

CLINICAL SCENARIO:
Children with Autism Spectrum Disorder (ASD) frequently struggle to identify and interpret the behaviours and intentions of others due to the delays in their communication skills, comprehension and social development. Distress and anxiety are typical responses to confusion in social situations. These responses may be exhibited as social withdrawal or challenging behaviours such as tantrums and aggression.

Social stories are commonly used to describe and explain social situations or concepts to children in a reassuring and patient approach that is easily understood. The aim is to improve the child’s understanding of an event by increasing the awareness of expected social cues and perspectives. Furthermore, social stories are intended to help the child prepare more effective and socially appropriate responses. Awareness of the efficacy of social stories may supplement occupational therapy with an individualised intervention that promotes social participation in children with ASD.

FOCUSED CLINICAL QUESTION:
Do social stories effectively improve social interaction and decrease challenging behaviours in children with Autism Spectrum Disorder?

SUMMARY of Search, ‘Best’ Evidence’ appraised, and Key Findings:
- 21 citations were located that met the inclusion/exclusion criteria, including 2 evidence-based guidelines, 1 research synthesis and 11 single system and case series designs.
- 1 research synthesis of case-series and single subject-designs was appraised (Sansosti, Powell-Smith, & Kincaid, 2004).
- This synthesis reported that the current evidence base provides preliminary support for the use of social stories. However, the empirical support is currently limited due to lack of high quality study designs and poor treatment integrity.
- Key points for future research: employ more rigorous experimental control, examine critical components for developing social stories, examine factors related to implementation fidelity/treatment integrity, programming for maintenance and generalisation.

CLINICAL BOTTOM LINE:
Preliminary evidence suggests that social stories decrease challenging behaviours and may improve social interaction skills in children with ASD if developed and implemented according to specified guidelines in a manner suitable to the individual child’s strengths and abilities.

Limitation of this CAT: This critically appraised paper has been individually prepared as part of subject requirements, but it has not been externally peer-reviewed.
SEARCH STRATEGY:
The search strategy was aimed at locating studies of evidence at the levels defined by the Oxford Centre for Evidence-based Medicine (Phillips, Ball, Sackett, Badenoch, Straus, Haynes & Dawes, 1998). These studies include:

- Systematic reviews and meta-analyses of
  - randomised controlled trials – Level 1a
  - randomised and non-randomised controlled trials – level 2a.
- Randomised Controlled Trials - Level 1b (or 2b if poor quality)
- Controlled trials, cohort study - Level 2b
- Case control studies – level 3b
- Case-series – level 4
- Expert opinion, literature/narrative reviews, consensus statements, descriptive studies and individual case studies – level 5

Terms used to guide Search Strategy:
- **Patient/Client:** Children with Autism spectrum disorder [synonyms: Autism, autistic, autistic disorder, Asperger’s Disorder, Asperger’s Syndrome, pervasive developmental disorder]
- **Intervention:** Social Stories
- **Comparison:** none
- **Outcome(s):** social (interaction OR skills); communication; play skills; (challenging OR inappropriate) behaviour; tantrums; aggression

<table>
<thead>
<tr>
<th>Databases and sites searched</th>
<th>Search Terms</th>
<th>Limits used</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Clinical guideline Sites</strong></td>
<td>(Autism OR Autistic OR Autism Spectrum Disorder) AND ('Social stories' OR occupational therapy)</td>
<td>exact phrase ‘social stories’</td>
</tr>
<tr>
<td>- National Health and Medical Research Council</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- New Zealand Guidelines</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- National Guidelines Clearinghouse</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- UK guidelines</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Scottish Intercollegiate Guidelines Network (SIGN)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Systematic review sites</strong></td>
<td>(autism OR autistic OR Asperger’s syndrome) AND ‘social stories’</td>
<td>exact phrase ‘social stories’</td>
</tr>
<tr>
<td>Cochrane Library</td>
<td></td>
<td></td>
</tr>
<tr>
<td>OT seeker; PEDro</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>General Databases</strong></td>
<td>(autism OR autistic OR Asperger’s syndrome) AND ‘social stories’</td>
<td>exact phrase ‘social stories’</td>
</tr>
<tr>
<td>EBSCO (CINAHL,ERIC, PsycARTICLES, PsychINFO)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Illumina; Proquest; PubMed</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Google Scholar</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Springerlink</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Taylor &amp; Francis</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Specific websites</strong></td>
<td>‘occupational therapy’, research, Intervention</td>
<td>NIL</td>
</tr>
<tr>
<td>Autism Spectrum Australia (ASPECT)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
INCLUSION and EXCLUSION CRITERIA

- **Inclusion:**
  - Experimental studies that involved social stories as intervention.
  - Experimental studies that involved children diagnosed with disorder on the Autistic spectrum.
  - Reviews of experimental studies that involved the above mentioned criteria.

- **Exclusion:**
  - Studies that did not involve social stories.
  - Studies that involved children with other conditions.
  - Studies that did not target a specified behaviour outcome.
  - Studies published in other languages than English, Danish, Swedish or Norwegian.

RESULTS OF SEARCH

21 relevant studies were located and categorised as shown in Table 1 (based on Levels of Evidence, Centre for Evidence Based Medicine, 1998)

Table 1: Summary of Study Designs of Articles retrieved

<table>
<thead>
<tr>
<th>Level of Evidence</th>
<th>Study Design/ Methodology of Articles Retrieved</th>
<th>Number Located</th>
<th>Source(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1a</td>
<td>Evidence-based guidelines</td>
<td>2</td>
<td>Links appeared in: Autism Spectrum Australia website</td>
</tr>
<tr>
<td>1b</td>
<td>Systematic reviews and meta-analysis of RCTs.</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>2a</td>
<td>Systematic reviews and meta-analysis of randomised and non-RCTs.</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>RCTs</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>RCTs, controlled trials, cohort studies</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Case control studies</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Case series studies</td>
<td>12</td>
<td>Citations appeared in CINAHL (13) ERIC (8,9,12) Proquest (4,5,8,9,10,11,12) PsycInfo (4,5,6,7,10,11) PubMed (7,13,14)</td>
</tr>
<tr>
<td>7</td>
<td>Expert opinion including literature / narrative reviews, consensus statements, descriptive studies and individual case studies.</td>
<td>7</td>
<td>Citations appeared in ERIC (15,17,18,19,21) PsycInfo (16,20) PubMed (22)</td>
</tr>
</tbody>
</table>
BEST EVIDENCE
The research synthesis by Sansosti, Powel-Smith and Kincaid (2004) was identified as the ‘best’ evidence and selected for critical appraisal. Reasons for selecting this paper were:

- The primary purpose of the paper was to synthesise the limited existing research on social stories and their effectiveness for children with ASD.
- The paper highlighted and detailed limitations and strengths of individual studies.
- The paper excluded studies that didn’t target behaviour outcomes and lacked minimum expected experimental control such as .
- The individual studies in the review addressed my clinical question.
- The paper represented the overall current level of evidence available for social stories.
- Other available research at same level was addressed in the synthesis.

SUMMARY OF BEST EVIDENCE

Table 2: Description and appraisal of research synthesis by Sansosti, Powell-Smith, and Kincaid (2004).

<table>
<thead>
<tr>
<th>Aim of the Study</th>
</tr>
</thead>
<tbody>
<tr>
<td>To review and synthesise the existing research on social stories and their effectiveness for children with ASD.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Methods</th>
</tr>
</thead>
<tbody>
<tr>
<td>Data resources: PsycINFO and ERIC databases were searched. Further details of the literature review methods were not disclosed.</td>
</tr>
<tr>
<td>Designs of included studies: Single-systems designs or case series designs (level 4) were included. 2 AB designs, 2 ABAB designs, 3 multiple-baseline designs, 1 ABAC/ACAB design.</td>
</tr>
<tr>
<td>Studies excluded: Two studies were excluded as neither reported specific behaviour outcomes. No other criteria for inclusion or exclusion were reported.</td>
</tr>
<tr>
<td>Number of studies screened: 10</td>
</tr>
<tr>
<td>Number of studies included: 8</td>
</tr>
<tr>
<td>Patient population: Children from the individual studies varied between the age of 5 and 15 years old, all had a diagnosis of ASD ranging from high functioning to severe. The target behaviours included but were not limited to shouting, precursors to tantrums, social interactions, aggression, sharing, following directions, compliance and obsessive behaviours.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Concepts critiqued in each individual study included:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inter-observer agreement</td>
</tr>
<tr>
<td>Threats to internal and external validity</td>
</tr>
<tr>
<td>Lack of experimental control (i.e. AB designs)</td>
</tr>
<tr>
<td>Failure to limit alternative explanations for change in observed behaviours</td>
</tr>
<tr>
<td>Treatment integrity (i.e. unique application of treatment (musical or computer based application), over application of treatment such as three social stories for the same behaviour, non-adherence to prescribed story pattern)</td>
</tr>
<tr>
<td>Social validity</td>
</tr>
<tr>
<td>Combination of treatments, multiple treatments occurring simultaneously</td>
</tr>
<tr>
<td>Appropriateness of selected study design</td>
</tr>
</tbody>
</table>
**Intervention Investigated**

The intervention under investigation was the ‘social stories’ invented by Carol Gray. ‘Social stories’ are individualised short stories that may be used to help individuals with ASD understand and a difficult, confusing or unfamiliar situation. Each story should be meaningful to the child. It should be positive and written with consideration for the child’s level of comprehension. The story provides information and descriptions of normative behaviour in a given situation. The story may help identify and explain significant social cues as well as a script of what to do or say in certain situations (Sansosti et al., 2004). Each story follows a specific design and includes a descriptive, a directive, a perspective and an affirmative sentence. For further information about ‘social stories’ see appendices A and B.

The included studies used the social stories as the main intervention for improving social interaction skills as well as decreasing challenging or inappropriate behaviour. Some studies involved additional intervention strategies.

**Outcome Measures**

- Frequency of social interactions (i.e. number of interactions during the lunch break)
- Duration of social interactions (minutes or seconds)
- Frequency of inappropriate social interactions or behaviours (occasions per day)
- Frequency and duration of challenging, obsessive or disruptive behaviours (i.e. duration of tantrum on each occasion during a school day).
- Duration of on-task behaviour (minutes or seconds)

**Results** *(as reported in Sansosti et al., 2004)*

<table>
<thead>
<tr>
<th>Study</th>
<th>n</th>
<th>Ages</th>
<th>Design</th>
<th>Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>Norris</td>
<td>1</td>
<td>8</td>
<td>AB</td>
<td>48% decrease in inappropriate social interactions No change in social interactions</td>
</tr>
<tr>
<td>Swaggart</td>
<td>3</td>
<td>11,7,7</td>
<td>AB</td>
<td>10-65% decrease in aggressive behaviours 22 to 50% increase in appropriate social behaviours</td>
</tr>
<tr>
<td>Lorimer</td>
<td>1</td>
<td>5</td>
<td>ABAB</td>
<td>‘Significant reduction’ in tantrum behaviours*</td>
</tr>
<tr>
<td>Kuttler</td>
<td>1</td>
<td>12</td>
<td>ABAB</td>
<td>Challenging behaviour ↓ from 15 to 0 occurrences daily.</td>
</tr>
<tr>
<td>Brownell</td>
<td>4</td>
<td>6-9</td>
<td>ABAC/ ACAB</td>
<td>Decrease in target behaviour*</td>
</tr>
<tr>
<td>Scattone</td>
<td>3</td>
<td>7,7,15</td>
<td>Multiple baseline</td>
<td>45% decrease in disruptive behaviour 48.7% decrease in inappropriate behaviour 11% decrease in shouting behaviour</td>
</tr>
<tr>
<td>Theiman</td>
<td>5</td>
<td>6,7,8,11,12</td>
<td>Multiple baseline</td>
<td>Increased social communication skills*</td>
</tr>
<tr>
<td>Hagiwara</td>
<td>3</td>
<td>7,8,10</td>
<td>“</td>
<td>Small or inconsistent changes for all*</td>
</tr>
</tbody>
</table>

* No measurements or descriptions provided for individual.
Original Authors’ Conclusions

The scientific support for social stories is currently limited. Most studies demonstrated positive tendencies but several areas of improvements are still needed for the effectiveness of ‘social stories’ to be fully acknowledged. In many studies social stories were implemented with variations to the prescribed application, such as using music or video feedback. In other studies the recommended implementation of ‘social stories’ were disregarded. For example, using multiple stories concurrently and providing additional prompting during the trial time. Generally, no effort was made to control or maintain the stability of other interventions the individual children were receiving simultaneously with the ‘social story’. Such limits to internal and external experimental control may alter the effect of social stories. Thus, ‘social stories’ cannot in the current studies be determined as being exclusively responsible for behavioural change.

There is some support for the ongoing use of ‘social stories’ in the current research base, however, they should not be the only social skills interventions used for children with ASD (Sansosti, Powell-Smith & Kincaid, 2004).

Critical Appraisal:

Validity (Methodology, rigour, selection, bias)

- The researchers stated the purpose of the study. The population and intervention to be studied were described in detail.
- The research could have been much more comprehensive as it included only two databases (PsycINFO and ERIC). It located 10 citations where the most recent was published in 2002. Although no further details were reported regarding search terms, strategy or triangulation of the literature review it is doubtful more studies would have been located. The research on ‘social stories’ for this CAT was wide-ranging including more than ten databases, various websites and specific journals; however it only derived a few more studies of similar quality published 2003-2004. This CAT excluded a large volume of non-experimental level 5 evidence.
- Two studies were excluded due to lack of targeted outcome behaviours and minimum expected experimental control. No predetermined criteria for inclusion were stated.
- The review reported on the following qualities and details for each study: Inter-observer agreement, threats to internal and external validity, experimental control, alternative explanations for change in observed behaviours, treatment integrity, social validity, combination of treatments or multiple treatments occurring simultaneously and appropriateness of selected study design. These findings are reflected in other available case-series designs. No predetermined strategy for establishing the quality of each study was stated.
- The studies employing a multiple baseline design and ABAB design observed higher treatment integrity, social validity and inter-observer agreement than other studies. Although it is difficult to control for external variables that may influence the child’s behaviour due to the nature of the disorder these studies were able to replicate results which indicate some effect from the intervention.
- Most individual studies were reported to show a decrease in unwanted behaviours, and some studies reported positive improvements in social skills.
• Results were presented in the text, but not clearly presented in a consistent and precise manner. For some studies, results were expressed as 'significant' without empirical support. (poor or lack of presentation of results, lack of predetermined evaluation strategies, inconsistent reporting, no analysis or results).

Results (Favourable or unfavourable, specific outcomes of interest, size of treatment effect, statistical and clinical significance; minimal clinically important difference)

• This research synthesis provided much needed information about the effectiveness of social stories as an evidence-based practice for children with ASD.
• Although the quality of each study was not evaluated in great detail, individual studies were objectively critiqued and compared. A collective conclusion was drawn about the existing level of evidence in currently available research.
• Results were presented in the text but no descriptive statistics were drawn from available data. Decrease in challenging behaviours reported to be between 10 and 100%. Increase in social interaction, choice making, and communication reported to be 22 to 50% in one study. Otherwise, no empirical results displayed.
• Various limitations of each individual study were presented and discussed in this review. Particularly the two AB designs lacked experimental control with no replications of results.
• Participants in the studies were children aged 5 to 15 years, with a diagnosis of ASD, although the disability severity varied. Treatment settings included the child’s home, special education facility or mainstream school classrooms.
• The available research reports positive outcomes of the use of social stories with children with ASD, however the evidence for the effectiveness of social stories is limited due to the lack of high quality studies and lack of empirical analysis of available data.
• It would have been useful to have all data presented in a uniform fashion, in order to contrast individual studies. Information about clinical significance of behaviour change would also have been valuable.

IMPLICATIONS FOR PRACTICE / APPLICABILITY
• Despite the limitations of this research synthesis, it presents the best available evidence for the use of social stories, with children diagnosed with ASD. Evidence for continued use of social stories is promising but preliminary, and highlights the need for more rigorous higher level research such as randomised controlled trials, into the use of social stories.
• Paediatric occupational therapists are unlikely to have received direct training in the development and use of social stories. For best outcomes, it is important to follow the comprehensive information and instructions on how to design and implement this strategy. Such instructions are readily available from the developer’s website at no cost (Gray, 2002 – see reference list). The website also provides sample social stories for common difficult situations.
• It is important that the social story is adapted to the child’s age, interests and comprehension level and written in a positive, reassuring language (Gray, 1995). Whilst it may take some practice to get the first social story right, proficiency in tailoring social stories that include the individual child’s strengths and abilities promote social integration and functional performance.
• Children with ASD typically receive various types of long-term interventions simultaneously, a fact reflected in the articles included in the synthesis. This fact makes it difficult to attribute behaviour change and social skills acquisition to social stories exclusively. Furthermore, social stories are unlikely to be implemented as the sole intervention. Evidence-based guidelines note that multiple treatment strategies lead to the most successful outcome for children with ASD (Perry & Condillac, 2003; Roberts, 2003). Therefore, social stories should be considered for specific difficult situations concurrently with other interventions. However, whenever implementing a social story, occupational therapists should obtain baseline measurements of behaviour frequency, intensity, type and duration in order to evaluate change at completion of treatment.

• Main implications for future research include observation of treatment integrity and implementation fidelity, generalisation of skills across various situations, rigorous experimental control such as ensuring prescribed intervention implementation and controlling for other interventions being received, concurrent to the ‘social story’.

• Writing social stories is a skill that occupational therapists can teach to parents of children with ASD so that they can address complex situations even at times when the child is not receiving direct services.

• With practice, social stories require little time to prepare and are a cost-effective alternative or complimentary social skills tool.

• The use of social stories is recommended to inform and guide the child with ASD through novel, stressful, and challenging situations.

• Implementing a social story:
  - Read to learner before the event, daily if appropriate.
  - Let the learner read the story if possible.
  - Fade story as behaviour improves.
  - Increase use if needed.
  - Review components if the social story doesn’t work

-------------------------------------------------------------

* Criteria for ‘social stories’ – See Appendix A
* Sample ‘social stories’ – See Appendix B
RELATED REFERENCES


Article critically appraised:

Related Articles (not individually appraised)

Evidence-Based Guidelines
(Information about social stories is limited to one page in each guideline).


Level 1 Evidence NIL
Level 2 Evidence NIL
Level 3 Evidence NIL
Level 4 Evidence


**Level 5 Evidence**


Appendix A: The 10 criteria that define each Social Story™ (Gray, 2002):

A Social Story™:

1) Meaningfully shares social information with a patient and reassuring quality, and at least 50% of all Social Stories™ applaud achievements;

2) Has an introduction that clearly identifies the topic, a body that adds detail, and a conclusion that reinforces and summarizes the information

3) Answers “wh” questions;

4) Is written from a first or third person perspective;

5) Uses positive language, omitting descriptions or references to negative behaviors in favor of identifying positive responses;

6) Always contains descriptive sentences, with an option to include any one or more of the five remaining sentence types (perspective, cooperative, directive, affirmative, and/or control sentences);

7) Describes more than directs, following the Social Story™ Formula;

8) Has a format that is tailored to the abilities and interests of its intended audience, and is usually literally accurate;

9) Includes individually tailored illustrations that enhance the meaning of the text.

10) Has a title that meets all applicable Social Story™ Criteria.

Appendix B: Sample Social Stories

Running

I like to run. It is fun to go fast.
It's okay to run when I am playing outside.
I can run when I am on the playground.
I can run during P.E.
It is not okay to run when I am inside, especially at school.
Running in the hallways is not safe.
Teachers worry that someone may get hurt if I run into them.
When people are inside, they walk.
I will try to walk in the hallways and only run when I am outside on the playground.

Source: Centre for Autism and Related Disorders. Retrieved August 20, 2005
http://card.ufl.edu/handouts/socialstories.html

Who is Line Leader?

My name is Andrew. I am in the first grade. Sometimes, the children in my class form (one, two, three, etc.) lines.

The children in my class stand in a line when we are getting ready to go to another part of the school.
Children do move a little when they stand in a line. Children may move to scratch, or fix their shirt, or their shoe. Sometimes, because they are standing close together, children may touch one another. Many times, it is an accident when children touch one another in line. They were not planning to touch another child.

The children in my class walk in a line to move safely in the halls. Walking in a line keeps children in order, too. If another group of students are walking in the hall going the opposite direction, the two groups can pass one another easily. That's why teachers have asked children to walk in lines for many, many years. It is a safe and organized way to move many children.

Usually, children stand and walk in lines for a short period of time. Once the children reach their destination, their teacher often doesn't need them to stay in the line anymore.

Sometimes, I may be the Line Leader. This means that the other children in my class walk behind me.

Sometimes, I may be second, or third, or fourth, or another position.

Many children in my class like to be the Line Leader. My teacher knows who should be first in line. Teachers know about being fair, and try to make sure each child is Line Leader now and then.

It's important to follow directions about who is Line Leader. My turn to be Line Leader again gets closer every time the children in my class walk in a line!


Listening to Stories

Sometimes people listen to stories.
Stories can be about things that really happened or they can be make believe.
Some stories are long and take awhile to read. Other stories are short and take only a few minutes.
Some stories have pictures and others just have words.
Sometimes I can learn new things from stories.
I can listen to stories at home and at school.
When I listen to stories I sit quietly and pay attention.
Other children listen to the stories, too. That is why I have to be quiet, so everyone can hear.

Source: More Snack. Retrieved August 20, 2005-08-21
http://ourworld.compuserve.com/homepages/mdenoncourt/Examples.htm