The effectiveness of social stories™ to develop social interactions with adults with characteristics of autism spectrum disorder

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Accessible summary
• Social Stories™ were used to help three adults with autism and one with Prader–Willi syndrome to change their behaviour.
• The Social Stories were helpful for each person for a short time.
• The adults and staff helpers enjoyed using the Social Stories.

Summary
Most research into the effectiveness of Social Stories has focused on children with Autism Spectrum Disorders (ASD). This study examines the use of Social Stories with four adults with learning disabilities and social communication impairments characteristic of ASD. This study employed an N = 1 multiple-baseline, across-participant, AB design with fade and maintenance probe stages. Each participant was involved in two Social Story interventions. The intervention and data collection was carried out by support staff who knew the participants. Results found that all target behaviours showed positive change during at least one phase of the study, although data indicated a return towards baseline levels across all behaviours into the probe phase. Social Stories had positive effect on improving social interaction in adults with social interaction impairments, even though this effect was short-lived. As the behaviours targeted were long standing, longer intervention which is context-specific may enable more permanent changes to occur.

Keywords Adults, autistic spectrum disorder, clinical research, Prader–Willi syndrome, social stories

Introduction

Autism spectrum disorder in adulthood

Autism spectrum disorder (ASD) is a life-long developmental disability with a neurological basis (Frith 2003). It is characterised by a range of impairments in social functioning, with social interaction difficulties forming one of the main diagnostic criteria, alongside communication difficulties and lack of imagination or flexible thinking.

Research into the experiences of young adults with social interaction difficulties has highlighted the increasing array...
of social situations faced as individuals aim for greater independence (Department of Health 2009; Howlin 2003). While the development of social interaction skills is a key to successful inclusion in social settings, impairments in nonverbal communication and social reciprocity have been noted to persist into adulthood in ASD (Howlin 2003; Shattuck et al. 2007). Difficulties with verbal comprehension, naming skills, understanding noncontextual language and pragmatic language deficits, including inference and humour, may remain significant barriers to social inclusion (Lewis et al. 2008; Lyons & Fitzgerald 2004). Understanding social rules and the ability to interpret social situations also continue to be a challenge for adults with ASD. Shattuck et al. (2007) suggest the impaired social interaction is the most central and persistent of the core characteristics of ASD. Society’s expectations of the behaviour of a young adult are different to that of a child. This can be difficult for people with ASD to understand, particularly, if socially inappropriate behaviours have been overlooked as the young person has grown up. Interaction styles that are accepted in childhood can be less acceptable in adulthood (Howlin 2003).

A fundamental problem for people with ASD in attempting to develop rules to guide social interaction is that social behaviours are not governed by formal or explicit rules. People with ASD do not appear to have the inborn sense of what is or is not acceptable in different situations, or the ability to recognise that social demands change, even when the people and the setting appear the same. However, the acquisition of social understanding is crucial for the ability to accept and follow rules of social acceptability, and this need increases in adulthood.

People with Prader–Willi syndrome (PWS) exhibit similar cognitive processes to people with ASD. Perseverative speech, mental rigidity, lack of inhibition, stereotyped behaviour, impulsivity, exaggerated emotional reactions to frustration are all cited as being common across the two conditions (Dimitropoulos & Schultz 2007, Dykens et al. 1996 Jauregi et al. 2007). Steinhausen et al. (2004) suggest that these features increase with age, interfering with quality of life for young adults with PWS.

Social stories

Social stories are based on the premise that people with ASD have an impaired ability to ‘read’ and understand social cues and situations and the perspectives of others. Social Stories were first developed by Carol Gray in 1991, as a strategy for developing social understanding in children with ASD, by sharing information about a variety of concepts, interactions and situations in a meaningful and accurate way (Rust & Smith 2006; Smith 2003; Test et al. 2011). The aim is to explain confusing or problematic social situations through text and (if required) visual support. Social Stories are personally tailored, brief and written from the perspective of the person using them. Stories may describe who is involved and the sequence of events that need to occur to successfully navigate a social situation. They may describe the thoughts and feelings of others in the setting. In addition, they often offer suggestions concerning how to respond in the situation. Gray (2004) suggests that Social Stories can improve the ability of a person to see things from another’s perspective and help integrate information into a more meaningful form.

Social stories differ from direct social skills instruction by offering of explanations to support understanding and interpretation of what is expected within a specific environment (Ivey et al. 2004). Clements (2003) notes that while a Social Story may coach an individual to manage effectively in a specific situation, it will not necessarily generalise to other similar situations. This is an important consideration when evaluating the success of the intervention.

As a process that may support an adult to acquire new skills with which to approach a situation, Social Stories share common themes with other strategies already recognised as having positive outcome for people with ASD in increasing social skills, for example written scripts (Krantz and McCl-annahan, 1998) and priming strategies (Zanolli et al. 1996), because they ‘prime’ the appropriate responses to a given social situation just before the social situation takes place.

Social Stories have a key set of features that are generally presented as a checklist (Gray 2004) (see Table 1). Within this, there will generally be a Social Story formula (Gray 2004; Howley & Arnold 2005) (see Table 2). The formula is an important feature to protect the Social Story from developing into a list of instructions or orders.

To date, Social Stories have been used predominantly with children with ASD (e.g. Ganz et al. 2008; Sansosti et al. 2004). Studies have demonstrated positive change in a wide range of social skills, although variability in design and recording makes it difficult to draw direct comparisons between published studies. AB designs have measured

<table>
<thead>
<tr>
<th>Table 1 The six sentence types in social stories</th>
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<tbody>
<tr>
<td>Descriptive</td>
</tr>
<tr>
<td>Perspective</td>
</tr>
<tr>
<td>Cooperative</td>
</tr>
<tr>
<td>Directive</td>
</tr>
<tr>
<td>Affirmative</td>
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<tr>
<td>Control</td>
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(Gray 2004).
Table 2 Social stories: defining criteria and guidelines

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<table>
<thead>
<tr>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Meaningfully shares social information with a patient and reassuring quality</td>
</tr>
<tr>
<td>2</td>
<td>Has an introduction that clearly identifies the topic, a body that adds detail and a conclusion that reinforces and summarises information</td>
</tr>
<tr>
<td>3</td>
<td>Answers ‘Wh’ questions</td>
</tr>
<tr>
<td>4</td>
<td>Is written in the first or third person</td>
</tr>
<tr>
<td>5</td>
<td>Uses positive language</td>
</tr>
<tr>
<td>6</td>
<td>Contains descriptive sentences, with an option to include any one or more of the five remaining sentence types (perspective, cooperative, directive, control and or affirmative sentences)</td>
</tr>
<tr>
<td>7</td>
<td>Describes more than directs, following the social story formula: Describe &gt; 2 Direct 1 For every directive sentence, there should be at least two from describing, perspective, cooperative, affirmative or control</td>
</tr>
<tr>
<td>8</td>
<td>Has a format that is tailored to the abilities and interests of its audience and is usually literally accurate</td>
</tr>
<tr>
<td>9</td>
<td>May include individually tailored illustrations that enhance the meaning of the text</td>
</tr>
<tr>
<td>10</td>
<td>The title of the social story meets all applicable criteria</td>
</tr>
</tbody>
</table>

(Gray 2004).

baseline behaviour (A), followed by introducing a story (B), then measuring any impact, while ABAB designs have measured the baseline (A), introduced a story (B), then withdrawn it (A) and reintroduced the story (B) before measuring any impact (e.g. Kuttler et al. 1998; Lorimer et al. 2002; Swaggart et al. 1995). Some multiple-baseline designs have also been adopted (e.g. Hagiwara & Myles 1999; Sansosti & Powell-Smith 2008; Scattone et al. 2002, 2006; Soenksen & Alper 2006; Thiemann & Goldstein 2001). The majority of studies to date do not report maintenance or generalisation data (Test et al. 2011), and ABAB designs receive criticism because they withdraw the intervention (Kennedy 2005). Three studies (Chalk 2003; Delano & Snell 2006; Reichow & Sabornie 2009) contained a fading phase rather than withdrawal of the Social Story after a period of intervention. Sansosti et al. (2004) recommended that research should extend beyond the intervention stage to assess the longer term benefits of the Social Story. To date, only five studies have included follow-up phases in their designs (Crozier and Tincani 2007; Kalyva & Agaliotis2009; Sansosti & Powell-Smith 2008; Soenksen & Alper 2006; Thiemann & Goldstein 2001), with follow-up phases carried out between a month and 6 weeks after the end of the intervention. Studies showed variable longer term impacts: Thiemann & Goldstein (2001) found a decrease in the use of pro-social targets, while Soenksen & Alper (2006) reported positive maintenance data. Reduction in specific challenging behaviours, such as chair tipping (Sansosti & Powell-Smith 2008), showed stronger longer term impact. Test et al. (2011) identified a number of design weaknesses in the studies they reviewed. They suggest that the current evidence does not yet support Social Stories being used as evidence-based practice and recommend that a range of further research is required to strengthen the claims of this approach to intervention.

The only published study located, which details the use of Social Stories with an adult with ASD, is a single case study by Chalk (2003). This study gives general descriptions of reduction in behaviours, but did not provide specific information. Moore (2007), in his evaluation of Social Story use, comments on the lack of research into the use of Social Stories with adult with ASD. He suggests ‘cautious borrowing’ of the evidence from child and adolescent studies (Moore 2007, p 46).

Purpose of the study

The purpose of this study was to explore the use of Social Stories with four young adults (three with ASD and one with PWS who had behaviours characteristic of ASD), to develop effective social interaction skills in specific situations. The study applies Gray’s (2004) guidelines in the development of eight Social Stories. The study focussed on the key areas of Social Story use: socially inappropriate behaviours and pro-social skills. It investigated the extent to which Social Story use reduced these behaviours and were replaced with more socially appropriate behaviours, where no other behavioural management systems were in place.

Method

Design

The study used an $N = 1$ design, where each of four service user participants served as their own control (Pring 2005). A multiple-baseline across-participants approach was used to assess changes in socially inappropriate behaviours and social communication skills of the four participants. The study used an AB design with a fading stage rather than withdrawal of the social stories and a longer term follow up phase 1 month after the end of the last week of intervention, to identify whether any changes in the target behaviour had been maintained. Additional qualitative data were collected through informal opportunities for support staff to record their observations and reflections as part of routine data collection. Observations and reflections were not a mandatory part of data collection; no specific guidance was given to staff on what reflections should be included. Additional information was recorded during team meetings with support teams involved with each participant during the course of the study.

Ethics

Consent for this research was gained from the authors’ University Ethics Committee.
Participants

Service user participants

Service user participants were four men aged between 17 and 32 years, with a diagnosis (3) or characteristics (one man who has PWS) of ASD. They were supported by a residential organisation that is specialised in supporting adults with challenging behaviour. While formal diagnosis of ASD is not a criterion for residence, 30% of residents have a diagnosis of ASD, and many other individuals have pervasive challenging behaviours characteristic of ASD and are cared for as if they do have this diagnosis. At the time of the study, the mean age for people supported by the organisation was (23.2 years) range (17–32).

Staff participants

Twenty five staff employed as support workers by the organisation agreed to carry out the Social Story intervention and complete data collection forms as part of their normal working day.

Procedure

Staff recruitment

Prior to the beginning of the study, staff were invited to participate in data collection. They were given information on the purpose of the study and how the data they collected would be used and the duration of their involvement. No incentive was offered to secure their participation. All staff included were regular members of the support team, employed on a full-time basis. Written consent was obtained from all staff involved in data collection. Staff participants (subsequently referred to as ‘staff’) had been in post for between 3 months and 10 years. The mean length of time in post was 6 years and 6 months.

Service user participant recruitment

Potential service user participants (subsequently referred to as ‘service users’) were identified through discussion with the support teams working with a range of people across the organisation. Service users were invited to be involved, following discussion with the core support team and manager. Inclusion criteria were as follows:

- People currently supported by the organisation, who had social interaction problems typical of ASD. A formal diagnosis of ASD was not necessary (see service user participants mentioned earlier);
- behaviours not currently being targeted through any other intervention;
- able to give informed consent to participate in the study;
- have functional verbal communication;
- able to understand sentences containing: at least two pieces of information; basic question words; simple negative constructions and conjunctions.

Participant information is shown in Table 3.

Each service user had the study explained to them, using accessible materials, and each gave informed consent to be involved. Continuing consent was checked and confirmed at each stage of the intervention.

Communication assessment

Prior to the intervention, each service user was assessed to ensure they met the criteria set for communication skills. The Pragmatics Profile of Everyday Communication Skills in Adults: Others Report. (Dewart & Summers 1996) was used with support staff. This is an interview-based assessment widely used across a range of communication disorders, for example by Adams (2002). The Test for Reception of Grammar (TROG2) (Bishop 2003) gave baseline information on receptive language skills. The TROG2 has constructs to capture adult receptive language and has been used in other ALD research to collect baseline information on

Table 3 Service user participant information

<table>
<thead>
<tr>
<th>Age</th>
<th>Diagnosis</th>
<th>Living situation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monty</td>
<td>22</td>
<td>ASD, with significant social withdrawal.</td>
</tr>
<tr>
<td>Patrick</td>
<td>32</td>
<td>ASD</td>
</tr>
<tr>
<td>Stephen</td>
<td>20</td>
<td>ASD</td>
</tr>
<tr>
<td>Tony</td>
<td>17</td>
<td>Prader-Willi syndrome and characteristics of ASD.</td>
</tr>
</tbody>
</table>

NB: all names are pseudonyms and details are anonymised.
ASD, autism spectrum disorders.
language structures (e.g. Jones et al. 2006; Stansfield et al. 2011). All the service users fulfilled the language inclusion criteria.

**Materials**

Materials for the development of the Social Stories were Gray’s Social Stories™ formula (Gray 2004) and Board Maker™ colour symbols (Mayer-Johnson 2008). Materials for the research for each service user included:

- Social Story™ formula;
- the developed Social Story;
- training materials for staff involved in intervention and data collection;
- recording schedules for target behaviours.

**Creation of the social stories**

Staff collaboration in identifying social interaction and problem behaviours was important in choosing the most appropriate areas to target. Group discussion with support staff revolved around identifying areas of possible intervention.

Eight Social Stories were developed, two for each service user. The stories were written to meet with Gray’s (2004) criteria (see Table 2 earlier), including a control sentence along with directive and perspective sentences. Service users collaborated in the production of their own stories. Stories were written using point 16 comic sans font, because the letter formation is easy for service users to recognise. Where symbols were required or requested, Board Maker™ version 6 colour symbols (Mayer-Johnson 2008) were used. These images have been widely used in research and clinical settings (e.g. Murphy & Cameron 2008; Stansfield et al. 2011). All service users were familiar with the symbols, as the images were used to support their schedules and personalised information on a regular basis. Social Stories can be written in the 1st or 3rd person (Gray 2004). The process of developing and consulting with each service user led each to choose a 3rd person format. However, all chose to have their own name featured heavily throughout the text.

Stories varied in length between 6 and 12 chunks of information, according to the topic and the information load each service user could manage. Table 4 gives brief information about content of the stories. The full stories are available from the authors on request.

**Staff training**

To ensure that support staff fully understood the use of the Social Story, a training session was given, addressing the following areas:

- Rationale behind the use of Social Stories with people with ASD;

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**Table 4** Description of baseline behaviours and planned change following intervention

<table>
<thead>
<tr>
<th>Baseline behaviour (Dependent measure)</th>
<th>Definition</th>
<th>Planned change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monty story 1</td>
<td>Greeting co-tenant</td>
<td>Verbal or nonverbal greeting to co-tenant’s when he returned to the house.</td>
</tr>
<tr>
<td>Monty story 2</td>
<td>Making references to poisoning food and drinks</td>
<td>Telling co-tenant that his food was poisoned at mealtimes</td>
</tr>
<tr>
<td>Patrick story 1</td>
<td>Going near to or touching children when out with staff</td>
<td>Episodes of Patrick deviating from route to walk towards young children or touching young children</td>
</tr>
<tr>
<td>Patrick story 2</td>
<td>Breaking social conventions on offensive language</td>
<td>Using offensive language directly to staff</td>
</tr>
<tr>
<td>Stephen story 1</td>
<td>Hands placed in underwear</td>
<td>Putting hands in underwear during 1:1 activity periods. (SLT, video editing, cooking session)</td>
</tr>
<tr>
<td>Stephen story 2</td>
<td>Unauthorised videoing</td>
<td>Videoing people without asking permission.</td>
</tr>
<tr>
<td>Tony story 1</td>
<td>Bossy talking</td>
<td>The use of a loud voice and interrupting the speaker after school</td>
</tr>
<tr>
<td>Tony story 2</td>
<td>Bossy talking</td>
<td>The use of a loud voice and interrupting the speaker in the morning</td>
</tr>
</tbody>
</table>
• the goal of the Social Story;
• the role of repetition and consistency of use.

Recording procedure

Quantitative data collection.

Event recording was used in all phases of the study. Data collection was limited to specific settings, situations and times. An individual recording procedure was designed for each Social Story. The recording involved:
• date;
• person recording;
• whether story had been read;
• recording of each episode of the target behaviour;
• additional space for observations from support staff.
This recording format followed through from baseline to the probe phase.

Because data were collected during everyday activities, it was agreed with staff that recordings may have to be carried out shortly after the event, so as not to make recording conspicuous. Using familiar people as data collectors helped control for an observer effect on the service users.

Qualitative data collection.

Qualitative information was collected informally, with staff being invited to comment on how an individual had managed any incidents. The aim of this was to allow support workers the freedom to write what they felt relevant at the time.

Baseline phase.

Baseline data were collected for each service user for 2 weeks prior to the introduction of their story. The focus of the baseline data was agreed through discussion with each staff group. Recorded baseline behaviours noted occurrences of specific described behaviours on the recording sheet while no other intervention was in place. Initial frameworks for the stories were discussed with staff during the baseline observations, and then at the end of the baseline recording, stories were developed with each service user, prior to the intervention stage.

Intervention phase.

The intervention stage was initiated after 2 weeks of baseline information gathering. During the intervention stage, each service user read his story with a member of his support team. Staff recorded each time the Social Story was read prior to an activity where data was collected. This was recorded along with any incidences of the target behaviour.

Gray (2004) suggests that the timing of the presentation of the Social Story should be closest to the time the information is needed. In this study, not all stories could be read immediately prior to the event; however, they were read as closely as feasible to be clearly related to the event in question.

Fading phase.

A period of fading commenced after the 2-week intervention phase. Fading took the form of reducing the reading of the story for 2 weeks. In the first of these weeks, the story was read on each alternate occasion the targeted activity took place. In the second week, the story was read once at the beginning of the week. Data collection continued for the 2-week fading period. After this period, the Social Story was no longer read with the service users. Each story available for their own use, but no prompts to read the Social Story were given.

Follow-up probe.

Four weeks after the end of the fade stage, observations to examine the maintenance of the targeted skills began. During this phase, the Social Story remained available, but it was not reintroduced. Follow-up data were collected in the same manner as the baseline and intervention stages. The follow-up stage lasted 1 week. Data were collected only by support staff who had received the initial training.

Data analysis

Behaviours were graphed as events per observation session. Data collected during all phases of the study were visually inspected for changes in frequency of level of intervention on the dependent variables’ (behaviours) occurrence. Microsoft excel™ was used to plot frequency of each target behaviour.

Data were analysed following Kennedy’s (2005) recommendations that line graphs should be examined for the influence of the intervention on the frequency of the behaviour (dependent variable), the trend of the data (slope and magnitude) and the variability of the data. They were also examined to determine the influence of the independent variable, i.e. how quickly change occurred between changes in the frequency of Social Story reading. Qualitative data were categorised as belonging to one of the following categories:
• staff perception;
• staff reports of service user comments during activity;
• using the content of the Social Story in conversation with the service user.
Results

Quantitative results

Figures 1–4 present the outcomes of the eight Social Story interventions with the four service users in the study. Each table is structured using a multiple-baseline format, identifying baseline, intervention, fade and probe phase with the results on the same graph. The dotted line separates each phase of the study enabling a view of each intervention as it moved through each stage. Breaks in the line indicate occasions when data were not collected.

Results do not indicate any particular behaviour that was common to participants diagnosed with ASD, or which discriminate between them as a group and the participant with PWS. Individual results are reported below.

Individual results

Monty.

Monty’s first story targeting increasing interaction with his co-tenant began with a baseline measure of no recorded greetings over 7 days. Zero greetings continued during the intervention stage. During the fade stage, Monty nodded as a greeting on three of a possible 14 occasions. During the probe phase, he used a nonverbal greeting on two occasions. The second story targeted replacing his inappropriate joke with a ‘joke of the day’. Baseline data showed reference to poisoning on 27 occasions over 14 days. The intervention phase showed continuation of high levels of occurrence for 3 days, from which point episodes dropped sharply. The fade stage saw a decrease, but the probe phase showed an increase, although not to pre-intervention levels (see Fig. 1).

Patrick.

Baseline data for Patrick’s first story showed a steady occurrence of his problem behaviour on each outside trip. Following the implementation of the Social Story, there was a rapid reduction in incidence of the behaviour across eight data collection points, with no occurrence of the target behaviour on six occasions. During the fade phase, there were no recordings of problem behaviours. In the probe phase, there were four incidents over three community activities. During the course of data collection, Patrick used an alternative sentence, commenting on what children were wearing on each occasion when he did approach a child.

Patrick’s second story targeted inappropriate language during his morning routine. Baseline data showed a total of 93 incidences of the target behaviour over a 4-week period.
The intervention phase saw a rapid drop and stabilisation of the number of interactions containing swearing or racist language with 7 days when there was no incidence of the behaviour. This pattern was maintained and improved over the fade stage. The probe stage showed an increase in the behaviour, although this remained at a slightly lower level than baseline levels (see Fig. 2).

Stephen.

Figure 3 shows changes in Stephen’s behaviour over the baseline, intervention, fade and probe phases. Stephen’s first story was read with him on three occasions per week. During the fade phase, data were collected on five of a possible six occasions, and there were a total of nine episodes, with no occurrence on two occasions. During the second week of this stage, Stephen had begun to repeat his control sentence after he had put his hands in his underwear. This would prompt him to withdraw his hand without comment from anybody. Data were collected in the probe stage on two of a possible three sessions, with a total of eight episodes, four during each observation.

Baseline data for Stephen’s second story showed a wide range in the occurrence of attempting to video people without permission with a total of 28 episodes over eight activities. Stephen’s weekly schedule had two data collection points where the Social Story was read prior to going out with his video camera. During the 2 week intervention stage, there was a steady reduction in the number of times Stephen attempted to make video recordings. During the fade stage, there was a slight increase and a further slight increase in the probe stage.

Tony.

Tony’s first story focussed around after-college interactions and so was only collected on college days. Baseline data showed a total of 19 episodes of bossy talking. The intervention stage saw a reduction in the number of recorded behaviours per day, with 5 days where there were no recorded incidences. During the fade stage, the reduction was maintained. The probe data showed an increased rate; however, incidences were slightly lower than during the baseline period.

Tony’s second story continued the theme of bossy talking. Results were more mixed than for the previous story, with behaviours beginning to return on more days during the fade stage and again during the probe stage. Episodes occurred on
all but 1 day. 20 days of baseline data showed 30 episodes. During the intervention stage, incidents reduced to 5 of 10 days. The fade stage showed an increase in the number of episodes. The probe stage indicated not only a return to pre-intervention levels but also an increase in percentage of days the behaviours occurred from 66% to 80% (see Fig. 4).

**Qualitative results**

Analysis of staffs’ informal observations made on the recording sheets showed a number of themes emerging. In addition, team meetings held during the study allowed data collection in the form of unsolicited observations from support workers while discussing the service users’ behaviours. Observations from data recordings and team meetings were combined, with data falling into three main categories:

Firstly, service users were reported to be heard using control sentences in the context of the setting. For example, at a sports event, Stephen was heard to say ‘ask before you film, ask before you film remember’, while prior to going swimming, Patrick was reported to say said to his support staff ‘I know what you are going to say: ‘no touching children’. Secondly, staff reported using shared vocabulary. Tony’s staff reported they used ‘bossy talking’ as a shared phrase across the team when talking about interactions with Tony, while Patrick’s support team talked about ‘not getting so stressed about the swearing’, because it did not feel so personal. Thirdly, staff reported increased confidence. For example, one staff member reported finding it easier to talk about Stephen’s ‘hands in pants’, as he knew he was saying the right words; another reported feeling less anxious meeting Tony from the bus, because she knew that Tony and she had a shared set of goals they were aiming for.

It must be noted, however, that this qualitative data were collected on an ad hoc basis, and while it reflects the reports of the staff concerned, it does not represent a rigorous attempt to collect or analyse qualitative data on the process or outcomes of the study.

**Discussion**

The aim of this study was to investigate the effect of Social Stories as an intervention to positively change problematic social behaviours and increase pro-social behaviours in a group of four young adults with learning disabilities and characteristics of ASD. As there was no indication that a diagnosis of ASD or PWS was a discriminating factor for outcomes of the intervention, these are discussed together.

To some extent, the results confirm the positive impact of Social Stories found in previous studies involving children and adolescents with ASD (e.g. Crozier & Tincani 2007; Delano & Snell 2006; Lorimer *et al.* 2002; Ozdemir 2008; Sansosti & Powell-Smith 2008) and one adult with ASD (Chalk 2003). Like other studies using a multiple-baseline...
design (Hagiwara & Myles 1999; Sansosti & Powell-Smith 2008; Scattone et al. 2002; Soenksen & Alper 2006; Thiemann & Goldstein 2001), this study demonstrated variable effects of Social Stories in an across-participant design, with more positive results tending to be found for Social Stories that aimed to reduce socially problematic behaviours. Unlike Sansosti & Powell-Smith (2008), who found maintenance of effect at near-intervention levels in their follow-up phases, this study found limited positive effect for one service user even in the intervention stage and a reduction of effect for each of the other three service users by the probe stage. It should be noted that the time between the end of the intervention and the follow-up stage was greater (4 weeks) in this study as opposed to 2 weeks in Sansosti & Powell-Smith (2008), making direct comparison difficult. Further exploration of the results below will help to examine possible reasons for the less positive effects in this study.

Analysis of the data supported findings by Kuoch & Mirenda (2003), who identified more consistency in the occurrence of behaviours, if not an actual reduction in the short follow-up period after the use of Social Stories. In the current study, although behaviours continued after a period of intervention, some stabilisation was visible. It is possible that the service users’ use of control sentences may have accounted for the stabilisation of behaviours after the intervention for the service users in this study, as suggested by Gray (2004) and Howley & Arnold (2005). The rise in all target behaviours by the probe phase reflects findings of other studies, where maintenance probes were used. These generally found an increase in behaviours after the removal of the Social Story (e.g. Chalk 2003; Ozdemir 2008; Sansosti & Powell-Smith 2008), although the results in the current study show less maintenance of change than previous studies. There are a number of possible reasons for this. Firstly, almost all the previous work has been carried out with younger service users. In adults, behaviours are likely to be more deeply embedded in a person’s repertoire and more resistant to change. Secondly, many previous studies targeted children in specific settings such as playtime or within a specific lesson. There may well have been more predictability in the settings where those Social Stories were used than is possible in an adult care setting, where changes in staffing at short notice, re-prioritisation of activities and outside influences may be more common.

Figure 4 Tony’s social stories 1 and 2.
Previous literature has already suggested that motivation is an important factor in the success of a Social Story (Gray 2004; Hagiwara & Myles 1999). It seems clear in this study that the Social Stories that had an outcome, which was clear and understandable for service users, were most likely to motivate and lead to success. Social Stories giving information with a concrete function provide the most readily understood source of information in adults with ASD (Clements 2003; Howlin 2003). This may explain the reduction in Stephen’s target behaviour during the intervention and fade stages. He knew he was only required to follow the social convention for specific periods of time during activities that he enjoyed and required concentration. For Patrick, the use of priming appears to have been successful, as also found by Zanolli et al. (1996). The increase in occurrences in the probe stage may be linked with Patrick’s control sentence, which possibly served to focus his attention on a child in different but equally inappropriate manner. Narrow fields of focus and difficulty shifting attention are frequently reported in people with ASD (Frith 2003). Nonetheless, the overall incidences of the target behaviour for both Patrick and Stephen remained below baseline levels, a month after the end of the fade stage.

The second set of Social Stories in this study identified and developed strategies to support the understanding of how to avoid breaching specific social conventions. Here, results showed a reduced impact of the Social Stories at the probe stage compared with those Social Stories with a concrete function. Patrick and Tony’s Social Stories targeted interactions around key routines where anxiety could be high. In Monty’s case, the Social Story targeted the mealtimes period, where he most frequently used inappropriate humour towards his co-tenant. The four stories saw a rapid reduction in the target behaviour shortly after the introduction. Patrick’s return to the use of inappropriate language during the probe stage and Tony’s return to almost pre-intervention levels of bossy language suggest that the priming effect of the Social Story at a reduced frequency may be required to maintain effect over time. The return of Monty’s inappropriate jokes by the probe stage may be a sign that Monty, despite the Social Story intervention, continued to understand and use humour only to satisfy a personal need to talk, rather than as a social exchange (Lyons & Fitzgerald 2004).

For Stephen and Tony, it may be that that attention from support staff during the reading of the story was the factor which reduced inappropriate behaviours, rather than the story itself having any effect. Both men prized staff interaction highly. The simple, positive interaction that surrounded the reading of the Social Story eliminated the need to gain and maintain staff attention through other means. The return to what was approaching baseline levels corresponded with a reduction in one to one attention. An alternative explanation is that the Social Stories targeted activities at times when a smooth transition was important for everyone in the environment to move on to the next routine of the day. Poorly developed theory of mind means people with ASD frequently have difficulty in appreciating differing views of a situation (Baron-Cohen 2008). These Social Stories needed other peoples’ perspectives to be taken into account, so that each service user could successfully engage. It seems likely that the actions identified, being more subtle changes than concrete behaviour targets, were less easy to become embedded in participants’ repertoires of behaviour. The regular reading of the Social Story through the intervention stage and into the fade stage may not have given sufficient time for the information in the story to have been fully integrated before the end of the fade stage. Gray (2004) gives advice on fading, but does not advise on the period of time this may take. While each Social Story is a highly personalised intervention, further investigation and advice on fading use would be helpful.

Concrete outcomes are well understood to be important motivators for people with ASD (Clements 2003), and as noted earlier, motivation has also been identified as a positive indicator of success in the use of Social Stories (Gray 2004; Hagiwara & Myles 1999). The limited success of the stories covering requests to video and initiating greetings gave results that might be seen as resulting from their abstraction, and therefore lack of motivating content for the service users concerned. The return almost to baseline levels of behaviour in this study is similar to results found by Bledsoe et al. (2003), Kuoch & Mirenda (2003) and Ozdemir (2008). For example, for Stephen, while the presence of the Social Story may have formed a temporary transition point between asking permission and actually taking photos, it is probable that once the story had been withdrawn, he found the concrete task of pursuing his interest in filming and taking photographs to be more powerful than the more abstract task of asking permission to film. Similarly, while he understood that this was necessary, it seems unlikely that he understood why, failing to recognise the other person’s perspective. Without the Social Story, Stephen reverted back to his prime interest. For Monty, greeting people was not a thing that he was motivated to do, as he found initiating social interaction stressful. Even so, he did move from an absent behaviour to one that was occasionally present, which for him represented a significant development. Crozier & Tincani (2007) and Soenksen & Alper (2006) found positive outcomes for appropriate attention gaining; however, their studies were aided by positive reactions from the service user’s peers: this was not available to Monty. A more effective Social Story intervention may have been to first target greetings to staff. Although greetings may still be uncomfortable for Monty, there would be likely to be a more positive response, which may have increased Monty’s willingness to attempt on effective greetings to staff, as he would elicit a response.
This study has reiterated some key issues raised in previous effectiveness evaluations (Rust & Smith 2006; Sansosti et al. 2004; Test et al. 2011). Specifically, the duration of the intervention and identifying the critical components in the development of the Social Story and its maintenance need consideration. This study used a longer intervention and fade period than other studies, whose intervention phases ranged from less than 2 weeks (Soenksen & Alper 2006) to 4 weeks (Ozdemir 2008). Using a longer intervention and continued reading during a fade stage was chosen, as literature suggests that people with ASD benefit from repetition and consistency over a period of time to change strongly held beliefs and integrate new information (Lewis et al. 2008). The use of the longer intervention period may be supported by the fact that the biggest reduction in mean occurrence of the target behaviour was for Tony. By the time the second story was introduced, he had already been focussed on the target behaviour for 2 weeks using his first story, and he then continued to spend a further 4 weeks accessing one or both Social Stories. Despite this, the reduction in behaviours was temporary. This adds weight to the argument that duration of the intervention alone is not sufficient to maintain or ensure generalisation of the behaviours after the removal of the Social Story. Long-term use of a Social Story in some capacity may ensure continued success, but variation in theme and content may be necessary to avoid reduction in motivation, as suggested by Kuoch & Mirenda (2003).

The role of vocabulary selection in the function of each Social Story was important in this study. Patrick identified the use of vocabulary in the Social Story as strongly related to his understanding and engagement. Stephen enjoyed the consistency of using some of the same images across each story he was involved in writing, alongside the familiar ending of ‘great job Stephen’. This reflects work by Gray (2004) and Scattone et al. (2006) suggesting that a participant’s active involvement in developing the story identifies vocabulary that is meaningful to the person and matches comprehension levels. This is an area that may warrant further investigation to establish whether there is a link between participants’ involvement in vocabulary selection and comprehension.

There are acknowledged limitations to this study. It was a small-scale study involving four service users and only eight stories. All service users had behaviours characteristic of ASD, but the inclusion of an individual who did not have a formal diagnosis of ASD may weaken the validity of the results.

The study was carried out in service users’ typical living environments, and as such, an environment with all other variables controlled was neither possible nor desirable, but this may be seen as a weakness (Test et al. 2011), as confounding influences continued. The aim, however, was to investigate the efficacy of a particular intervention on real-life behaviours in a real-life context. This meant that the presence of external triggers to anxiety, or disruption in normal routine, while being uncontrollable variables during the study, was representative of the normal experiences of service users and staff. Results, therefore, reflected typical rather than optimal responses to the intervention.

Using support staff to collect data provided the benefits of reducing the impact of a new observer, but may have limited data collection opportunities, as staff were involved in other routine tasks in addition to completing recording forms. In addition, the study did not record additional verbal prompts that support staff may have used during the intervention stages. Other studies (Scattone et al. 2002, 2006) identified the use of unintentional prompts as confounding variables. However, this study has suggested that, anecdotally, staff found the use of a shared vocabulary, with shared phrases empowering for them in their support. Again, this reflects real-life experience of staff and service users.

The study used very simple collection techniques in the form of episodic recording. It did not collect data on intensity of behaviours and tended to focus on the absence of problem behaviours rather than the presence of the alternative response identified in the Social Story. This meant that smaller changes in the target behaviours may have been overlooked. The qualitative data were made up of only brief responses from support staff. Again, this was practical in the working lives of staff, although more formal and detailed data collection could have given fuller and possibly a very different view of the process and experience for staff.

The greatest limitation of the study, however, was the short intervention period. The longest duration of an intervention and fade stage was 6 weeks. Given that all behaviours targeted were long standing and required developments in understanding of each social situation, this was a very short period of time.

Conclusion

This study has added to the body of evidence suggesting Social Stories can be an effective sole intervention in developing socially appropriate communication and behaviour for a temporary period. The N = 1 case design provides evidence that it is possible to conduct sound case design in a community-based setting. The study was unusual in using support workers to collect data. The additional qualitative data they collected as part of recording schedule were valuable, but limited, and suggests that collecting observations in a more systematic manner, which has been used in some existing Social Story research (Sansosti & Powell-Smith 2008; Scattone et al. 2002), could be more informative. Only one study using Social Stories with adults with ASD has been located, and there is wide scope for more investigation. In particular, further studies should be longer term, looking at the impact of prolonged use over time. This
could allow intervention and fade stages to be adjusted to suit the individual. In addition, differing styles of fading may be assessed. It would also be useful to identify the effectiveness of intermittently reintroducing Social Stories to maintain a long-term change in appropriate social interaction skills. This may include changing content and format to maintain interest, or to re-motivate, where interest is waning. The measure of the success of the Social Story should not be its removal, but a continued maintenance of a targeted behaviour.

Including people with learning disabilities in research is a fast developing field. Gathering the views of service users on their experiences of using Social Stories, specifically around feelings of increased control and independence, would give further insight into how Social Stories serve as aids to lifelong learning.

A final note of caution in the use of Social Stories lies in the dilemma of how many stories an individual can manage at any one time: this will vary from individual to individual. Adults with ASD have a wide range of difficulties that could be targeted. Identifying areas where a Social Story might be the most appropriate intervention is important to ensure that they are used as part of the tool kit of professionals supporting adults with ASD, along with other support mechanisms that explain, clarify and ultimately empower the person with ASD.

References


