

Doctorate in Professional Educational, Child  
and Adolescent Psychology  
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Social Stories for children with Autism:  
Are they effective in changing behaviour and/or  
reducing anxiety?

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## **DECLARATION AND WORD COUNT**

I hereby declare that, except where explicit attribution is made, the work presented in this thesis is entirely my own.

Word count (exclusive of list of contents, references and appendices):

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## **ABSTRACT**

Social stories are short, personalised stories to help individuals with autism to understand a variety of social situations (Gray and White 2002) which have become increasingly popular as an intervention amongst Educational Psychologists (Ali and Frederickson 2006); however existing research into their effectiveness widely lacks rigour and focuses on behavioural change despite anxiety levels being high amongst this population (Gillott, Furniss and Walter 2001). Robust research is required into the effectiveness of social stories in changing behaviour and reducing anxiety.

The research questions posed were:

*Are social stories effective in promoting more positive behaviour and/or reducing the anxiety of children with autism?*

*Do these changes, if observed, endure over time?*

*What factors appear to be relevant to their success?*

Eight children with autism were studied over 11 months using a single case study design. Data were collected in four phases: baseline, one-to-one attention (where a fictitious story was read), intervention and post-intervention.

Observational behavioural data were gathered across phases. Participants and parents provided anxiety ratings. Teaching Assistants were interviewed pre- and post-intervention. Data were displayed and analysed graphically and statistically using the Percentage of All Non overlapping Data (PAND) technique. Interviews were analysed using thematic analysis.

Three participants' target behaviour improved and this was maintained 4 months post-intervention for 2 participants. Two participants' levels of anxiety reduced and this was maintained 4 months post intervention for one participant.

Social stories can change target behaviour and/or reduce anxiety *for some* children with autism, and this can be maintained over time. Thematic analysis indicated that factors relating to the child, the support provided and the organisation of the intervention were associated with positive outcomes. Since in this study participants' outcomes were variable it is recommended that, in order to promote successful outcomes, EPs should consider the profile and circumstances of each child.

## **INTRODUCTION**

### **Rationale for study**

Social stories are short, personalised written stories to help individuals with autism to understand a variety of concepts, interactions and social situations (Gray and White 2002). Since social stories were first documented in the early 1990s, they have become increasingly popular as an Autism Spectrum Disorder (ASD) intervention within Educational Psychology (Ali and Frederickson 2006), and amongst teachers and parents (Howley and Arnold 2005). They have been widely recommended by researchers (Toplis and Hadwin 2006; Scattone 2008), and established professional bodies. For example, Ali and Frederickson (2006) note that a National Autistic Society (NAS) publication reported that if social stories are constructed properly,

*“they can work wonderfully for children who are having difficulties understanding social situations and managing to cope with change” (Hannah, 2001 p.83).*

Past research into the effectiveness of social stories widely contains methodological weaknesses and tends to consider behavioural change without considering changes in anxiety (see chapter 1). It is important that this dearth in the literature is addressed to ensure that EPs know whether to promote the use of this intervention in schools.

Two factors make this development in the literature particularly important for EPs. In recent years there has been a marked increase in the identification of

autism (Williams, Higgins and Brayne 2006). Also, the development of the Government's inclusion agenda has meant that many more children with autism are being taught in mainstream school settings (Special Educational Needs [SEN] and Disability Act 2001). The SEN Code of Practice (Department for Education and Skills [DfES] 2001) states that the special educational needs of children will normally be met in mainstream school settings unless their parents choose otherwise, this is incompatible with the efficient education of other children and there are no reasonable steps to overcome this. Both the elevated identification of autism and the inclusion agenda mean that many mainstream teachers need support from EPs in meeting the needs of these children.

For EPs to provide highly effective support they need to draw on research literature to inform their practice. However it is currently difficult to draw conclusions about the effectiveness of social stories from the existing literature due to methodological limitations (see chapter 1).

## **Research aims**

This study aims to provide a rigorous series of single case studies which investigate the effectiveness of social stories as an intervention for creating behavioural and/or affective change for children with a diagnosis of autism. Also of interest is whether any changes are sustained over time and the factors which may relate to the success of the intervention. It is hoped that this high quality exploration will support EPs, schools and parents to make an informed decision about whether to employ the social story approach as an intervention to support children with autism.

The research questions to be specifically investigated are as follows:

- 1. Are social stories an effective\* intervention for creating behavioural change and/or reducing levels of anxiety in children with a diagnosis of autism?*
- 2. Do these changes, if observed, endure over time?*
- 3. In the cases when social stories are effective, what factors appear to be relevant to their success?*

The third research question is an ancillary question which will be inferred and deduced from the results.

\*effectiveness is defined as creating a reduction in anxiety and/or bringing about behavioural change in the desired direction.

## **Structure of the thesis**

The thesis will begin with the definition and prevalence of autism. Social stories will then be defined, their theoretical underpinnings explored and factors relating to their use described.

Chapter 1 will present a review of the existing literature into the effectiveness of social stories with children and young people. Research relating to changing behaviour will be considered first, followed by research into the reduction of anxiety. The review of research will be organised by methodology to highlight the variations in methodology and quality of the studies. A critical stance will be taken to examine methodological weaknesses which reduce the reliability and

validity of the studies. The chapter concludes with a summary of the limitations of previous research.

Chapter 2 presents the methodology of the research. The research is designed to overcome the methodological weaknesses of previous research by providing a series of eight robust single case studies with methodological features which have previously been lacking. The method is described according to four phases of the study.

Chapter 3 presents the results. The quantitative results relating to each participant will be considered in turn. Both visual and analytic data are provided. Thematic analysis is used to analyse interview data collected from the Teaching Assistants (TAs) who delivered the intervention.

Chapter 4 presents the discussion. This begins with a critique of the methodology. This is followed by consideration of research questions one and two in relation to the results. Consideration is then given to the factors relating to successful intervention outcomes. This then enables the third research question to be examined. Finally, implications for the practice of EPs are explored and suggestions for future research are proposed.



## **CHAPTER 1: LITERATURE REVIEW**

### **1.1 Autism**

This chapter will consider the nature of autism and the theoretical underpinnings of social stories. The extant social story literature will then be reviewed.

#### **1.1.1 Definition**

The syndrome of autism is widely defined as a spectrum of neuro-developmental conditions characterised by a triad of impairments across three areas. These are: social interaction, communication and imagination. Baron-Cohen and Bolton (1993) highlight that although the difficulties of children with autism lie across these three areas, the nature and extent of the difficulties vary largely between individuals.

The Diagnostic and Statistical Manual of Mental Disorders 4<sup>th</sup> edition (DSM IV, American Psychiatric Association, 1994) and the International Classification of Diseases 10<sup>th</sup> edition (ICD-10, World Health Organisation, 1992) are internationally used diagnostic references for autism. Both references require that at least six developmental and behavioural characteristics relating to the triad of impairment are present. Difficulties must be evident before the age of three, and symptoms must not be attributable to other disorders.

#### **1.1.2 Causation**

In a recent seminar on autism Levy, David and Schultz (2009) highlighted that autism spectrum disorders are highly genetic, with twin studies indicating that about 90% of variance is attributable to genetic factors (O’Roak and State

2008). Levy et al. note that genetic and neurobiological evidence point to a good causal model of the disorder whereby there may be genetically mediated abnormalities of synaptic maturation and connectivity.

Levy et al. also highlight that autism is multifactorial, with many risk factors acting together. It is thought that there may be toxic environmental factors or epigenetic factors (such as experiencing stress or exposure to biochemically active compounds) which alter gene functions, in turn altering neural tissue, although no environmental or epigenetic mechanisms have been identified. The authors note that there is no biological treatment available which ameliorates all symptoms of autism.

### **1.1.3 Prevalence**

There has been a marked increase in the identification of autism in recent years. Throughout the 1990s researchers widely believed there were five cases of classic autism per 10,000 people (Fombonne 1999). Baird et al. (2006) have recently argued that the prevalence of autism is now higher than this, with one in a hundred children affected.

The reason for this rise in identification has been debated. It is possible that there is greater awareness of the symptoms of autism, the definitions of this impairment may have broadened, or there may be a real increase in the incidence (Gillberg 1998, Wing and Potter 2002). With this rise in identification many “treatments” and “interventions” have been developed to target this group, although many of these are not substantiated by robust research.

## **1.2 Social stories**

### **1.2.1 Definition**

Howley and Arnold (2005) highlight that the development of socially appropriate behaviour is central to one's ability to access many of life's events. Social stories were developed by Gray in 1991 and were documented by Gray and Garrand (1993) with the aim of helping people with autism to develop this. They can also be used to inform, reassure, instruct, console, support, praise and correct (Gray and White 2002). Social stories which focus on changing behaviour typically describe the events of a particular situation, why other people behave as they do, and how the participant should behave. They therefore provide the essential contextual social information which many children with autism may be lacking. Social stories were designed to be written by any adult who works or lives with a child with autism.

### **1.2.2 Theoretical underpinnings**

Happé, Ronald and Plomin (2006) proposed that a combination of cognitive weaknesses in three areas can create the core aspects of behaviour seen in autism. These are: Theory of Mind (ToM) (Baron-Cohen, Leslie and Frith 1985), central coherence (Frith 1991) and executive function (Ozonoff, Pennington and Rogers 1991).

Firstly, children with autism may have deficits in ToM. Research in this area investigates children's understanding of themselves and other people as mental beings, that is, as people who have beliefs, desires, emotions and intentions, and whose actions and interactions can be interpreted and explained by taking

account of these mental states (Milligan, Astington and Dack 2007). Children with autism often fail false belief tests of ToM (Baron-Cohen, Leslie and Frith 1985), and children who show difficulty with standard laboratory false belief tasks have been found to have difficulty with mindreading skills in everyday social situations (Peterson, Garnett, Kelly and Attwood 2009). A limited ToM may therefore make the environment unpredictable and confusing, leading to inappropriate behaviour.

Secondly, children with autism may have weak central coherence. Frith and Happé (1994) describe central coherence as the normal tendency to integrate individual elements into a coherent whole. Children with autism have an inability to integrate incoming stimuli alongside an enhanced tendency to process detail (Frith 1989). The theory of central coherence has been supported empirically by Pellicano, Maybery, Durkin and Maley (2006) who demonstrated that children with autism can outperform typically developing children on tasks where a local processing bias is beneficial, and underperform where tasks place demands on global processing. They did, however note that individual differences in central coherence abilities existed amongst children with autism.

Thirdly, children with autism may have deficits in executive function. This covers a multitude of higher cognitive capacities including impulse control and inhibition of irrelevant responses. This hypothesis has been used to explain the behavioural symptoms of autism. For example impairments in planning may underlie repetitive behaviours and difficulties adapting to new situations (Ozonoff, Pennington and Rogers, 1991), as might impairments in working

memory (Bennetto, Pennington and Rogers, 1991) and set-shifting difficulties (Hughes, Russell and Robbins, 1994).

Pellicano (2010) investigated the longitudinal relations between the three cognitive atypicalities. It has previously been suggested that the three domains are largely independent (Happé et al. 2006), however Pellicano indicates that executive function and central coherence abilities potentially contribute to the emergence of ToM in children with autism.

There has been some suggestion in the social story literature that social stories may support children with autism who experience difficulties across the three domains (Smith 2003). Gray (1998) suggests that social stories can support children who have difficulties with ToM by providing missing information about the perspective of others, which in turn may make the environment more predictable. Furthermore Gray suggests that social stories may reduce the impact of weak central coherence because they provide missing information about relevant social cues, helping to clarify the whole social picture, enabling the child to integrate the information into a more meaningful whole. Smith (2003) suggests that social stories may also support children with executive function difficulties since they outline an appropriate behaviour in a given situation thus supporting the replacement of impulsive behaviour.

The researcher believes that social stories may support children in understanding the expectations of a given social situation. They may, for example, support a child in planning their behavioural response to a predictable situation as described in the social story. Nevertheless the researcher believes

that overall social stories would provide limited support surrounding the three cognitive domains, due to the complexity of behaviour and social situations, and the multi-faceted nature of the three theoretical areas.

### **1.2.3 Factors to consider when designing and implementing social stories**

#### **Identifying the functions of behaviour**

Gray (1998) emphasised that a complete understanding of the situation in which the target behaviour arises is needed to determine the information that is important to include in a story. The term “target behaviour” is used in this thesis to refer to each participant’s specific behaviour to be addressed through the intervention.

Repp and Horner (1999) indicate that a functional assessment of behaviour can be made through interviewing staff who know the child well and through direct observation of the child over time in a variety of situations. Smith (2003) argues that developing an understanding of the child’s behaviour is fundamental to the construction of social stories if positive results are to be gained.

#### **The structure of social stories**

The construction of social stories has evolved over time. Gray (1994, 1998) describes three types of sentences that could be used in social stories: descriptive, perspective and directive sentences:

- Descriptive sentences objectively outline what is happening in a social situation, where the situation occurs, who is involved, what they are doing and why
- Perspective sentences describe the reactions and responses of others in the target situation, including the reasons for these
- Directive sentences provide information about what a person should do to be successful in a target situation

Gray (1994, 1998) believes that a particular ratio of sentence types should always be used. This “social story formula” involves using two to five descriptive and perspective sentences for every zero to one directive sentence.

Gray (2000b) has since recommended three further sentence types that may be used for “advanced social stories” for more cognitively able individuals:

- Control sentences which identify strategies to recall the social story at appropriate times
- Cooperative sentences which identify what assistance will be provided by those around the child to help to develop the new skill
- Partial sentences which encourage the child to make guesses regarding the next step in the situation

Gray’s “advanced social story ratio” includes 2 to 5 descriptive and perspective sentences to every directive, control, cooperative or partial sentence.

## **An example of a social story**

(from Gray, C, 2000a)

# What should I do when the teacher is talking?

I go to school almost every Monday, Tuesday, Wednesday, Thursday, and Friday.

There are many other children at school. In my classroom, the children usually sit at their desks.

When the teacher is talking to the class, the children are usually quiet. When someone wants to say something, they usually raise their hand and wait for the teacher to call on them.





When the teacher is talking to the class, I will try to be quiet and listen.

When I want to say something or answer a question, I will try to remember to raise my hand and wait to see if the teacher calls on me.

Sometimes the teacher may ask another child to answer a question. Sometimes the teacher will give another child a chance to talk. I may be called the next time.

The teacher will be happy if I try to be quiet and listen.

The teacher will be happy if I learn to raise my hand before I talk.

## **Individualising the social story**

Gray (1998) believes that in order for social stories to be effectively individualised, the author must consider the child's interests (as this may enhance their motivation) and the child's developmental age. It is acceptable for social stories to be presented in a range of different forms such as picture or text booklets, or using a tape recording or computer. The social story should be presented in a form which considers the child's preferred learning style (Howley and Arnold 2005).

## **The use of visual cues**

It is widely believed that children with autism often have a visual learning style (e.g. Howley and Arnold 2005; NAS, 2010b). Howley and Arnold comment that visual interventions for autism such as PECS [Picture Exchange Communication System] (Bondy and Frost 1994) are widely recognised to be successful, and they use this to justify the value of visual cues in social stories. However, Preston and Carter (2009) reviewed the PECS literature and found the quality of research to be highly variable. Even when rigorous randomised control trials were conducted and staff were thoroughly trained in PECS, outcomes were modest and did not generalise across different areas of communication (Howlin, Gordon, Pasco, Wade and Charman, 2007). Throughout the literature it appears that visual cues are embedded within large-scale interventions and are not investigated systematically.

Similarly, there are no known systematic investigations of the value of visual cues in social stories. A recent literature review of 18 studies indicates that

overall social stories were more effective when visual cues were included (Kokina and Kern 2010), however positive effects may have been created by other factors within the studies.

### **The layout and design of the text**

Gray (1998) emphasises the need to highlight important and relevant information in social stories to address weak central coherence. Writing in conjunction with Gray, Howley and Arnold (2005) indicate that this can be achieved through considering: font type, font size, colour of font, use of lower and upper case letters, underlining, italics and embolding (*sic*) to draw the individual's attention to the key information such as directive and perspective sentences. The authors do not provide any further explanation of how these features address central coherence. The researcher recognises that it may be of value to direct attention towards particular information, however this is unlikely to address weaknesses in central coherence since these features in the text do not target global processing of the social story.

### **Procedure for delivering the social story**

Gray (1998) and Gray and White (2002) advised that the social story should be placed on an empty table in front of the child, to ensure there are minimum distractions. The adult should explain when the story will be read, how often and by whom. The story can be read by an adult to the child or the child can read it themselves, depending on their learning needs. Gray recommends reading the social story once per day, prior to the target situation.

## **Fading**

Once a social story has been successful, it can be read less frequently and faded from use. Fading could also take place through reducing the number of directive sentences or reducing any verbal prompting while reading the social story (Gray 1998).

### **1.3 Previous social story research: Changing behaviour**

This section provides a comprehensive overview of the extant social story literature regarding behaviour, and then anxiety. It begins with a summary of literature review studies, and from these the rationale for many methodological features of this thesis is developed. A range of studies are then considered in detail. There are many published studies on social stories, and therefore due to space limitations an exhaustive review is not provided. Instead the researcher provides a cross-section of the literature to enable the reader to see a variety of different designs and methodologies previously used and the strengths and weaknesses associated with these. This overview will contribute to the rationale for the design of the thesis.

#### **Studies which review the literature**

To date, there are six known studies which have reviewed the social story literature. The most recent of these was a meta-analysis by Kokina and Kern (2010). These authors reviewed 18 studies, based on rigorous selection criteria, such as demonstration of experimental control through a reversal or multiple baseline design and graphically displayed baseline and intervention data to enable Percentage of non-overlapping data [PND] to be calculated (Scruggs,

Mastropieri and Casto 1987 – see section 2.10 for further information). The participants all had a primary diagnosis of Autism Spectrum Disorder and social stories were used as the sole intervention.

It was found that overall, social stories had low to questionable effectiveness. Findings of interest were that social stories were more effective when they were: used for singular simple behaviours rather than complex behaviours, when they contained illustrations, when checks of the participant's comprehension of the social story were made, and when social stories were read immediately prior to the target situation. A limited proportion of participants in the studies were described as having “delayed cognitive skills” and the authors therefore were not able to draw clear conclusions regarding cognitive ability and outcomes. They emphasised the need for future research to investigate outcomes for children with significant intellectual disabilities.

Prior to this study, Ali and Frederickson (2006), Rust and Smith (2006), Reynhout and Carter (2006), Nichols, Hupp, Jewell and Ziegler (2005) and Sansosti, Powell-Smith and Kincaid (2004) published literature reviews of social story studies. Across the reviews, the authors have criticised past research on methodological grounds for a lack of experimental control, lack of clear measures for identifying behavioural change, a lack of maintenance data and limited participant description leading to difficulties in identifying who social stories are suitable for.

The current study was designed to address many of the issues raised in Kokina and Kern's recent literature review. To support successful outcomes, social

stories were based on simple, singular behaviours and contained illustrations. Participant comprehension was checked, and social stories were read in the hour prior to the target behaviour. Participants with limited cognitive skills were included in the study to investigate whether the intervention was suitable for these children.

In response to the earlier literature reviews, the researcher will enhance experimental rigour by providing a systematic means of measuring behaviour (see section 2.9.1), collecting maintenance data over 4 months (see section 2.9.4) and providing detailed participant description to support understanding of whom social stories are suitable for (see Table 1 and Appendix 3).

### **The use of single case study designs**

Ali and Frederickson (2006) note that the majority of studies which provide the current evidence base are single case study designs. Barker, Pistrang and Elliott (2002) perceive this method as advantageous since individual uniqueness can be considered without being averaged out across a group. Ali and Frederickson (2006) observed that the two main types of single case study designs: descriptive case studies and single case experiments have both been employed in social story research. Descriptive case studies tend to focus on narrative accounts of events including change over time or responses to the intervention, although rating scales and other structured processes are also used. They describe single case study experiments as being characterised by repeated measures in each phase of the study and involve the experimental manipulation of the intervention.

## **Descriptive case studies**

Descriptive case studies have been widely conducted and published in the social story literature for some time. This may be due to their ease of conduct. Recently, O'Connor (2009) published a descriptive case study which considered the value of using social story DVDs alongside turn-taking games to address the issue of turn-taking difficulties in a child with a dual diagnosis of autism and learning disability. The boy found turn-taking particularly problematic in swimming lessons. The author provides a rich descriptive account of the boy's aggressive behaviour in turn-taking situations and how the duration and intensity of this decreased over time when the intervention was employed. This did not generalise to other PE activities. Although the anecdotal account makes interesting reading, limited specific behavioural data were provided, and the study therefore does not provide rigorous support for the use of social stories.

Another example is provided by Rowe (1999). She discusses a single participant, age 6 who refused to enter the dinner hall to eat lunch with other pupils. A social story was used over a 12 week period and the author comments that after the first reading of the social story the boy's TA reported "an immediate change in his behaviour." The TA reported that the boy continued to have "happy lunchtimes" over the 12 weeks.

Sansosti et al. (2004) note that descriptive case study designs tend not to report specific behavioural outcomes. They rely on anecdotal information and do not provide detailed information regarding methodology making it difficult to determine any level of experimental control.

## **Examples of studies using an AB design**

Studies using an AB design involve gathering baseline data before the intervention (phase A) and further data during the implementation of the intervention (phase B). This design appears to have been widely used in the 1990s and has decreased in popularity in recent years.

Norris and Dattilo (1999) used an AB design to investigate the use of social stories with an 8 year old girl with autism to target her social interactions during lunchtime. School staff used one of three social stories daily. The aim of this was to increase the girl's understanding and attention. Overall there was a 48% decrease in inappropriate social interactions within the intervention phase, however the level of appropriate social interactions did not change significantly after the introduction of the intervention. Since three different social stories were used to address a single behaviour, the effectiveness of using a single social story cannot be assessed.

Swaggart et al. (1995) used an AB design with multiple participants. Social stories were used by school staff with 3 children aged 7-11 years to reduce inappropriate greeting, touching, aggression and ignoring in the first child, and to increase sharing and parallel play in the second and third participants while decreasing screaming, aggression and grabbing. The participants had moderate to severe autism. The social stories were read at the beginning of each day. Staff members used verbal prompts and reinforcers throughout the school day to encourage application of the skills taught in the social story. All behaviours were reported to change in the desired direction.



Due to the use of prompting and reinforcement, it is unclear how effective the social stories were as a sole intervention in this study. Sansosti et al. (2004) note that Swaggart et al. (1995) did not assess the level of treatment integrity or the social validity (perceived acceptability) of the social stories when they were implemented by school staff.

Kazdin (1982) argues that studies implementing AB designs are pre-experimental because the effects of the intervention are not replicated. AB studies therefore do not permit the assumption of functional relationships. It is possible that a coincidental factor may be responsible for any change observed. This may explain the decline in use of this design in recent years.

### **ABAB designs**

Reversal designs appear to have increased in popularity in recent years. Crozier and Tincani (2007) used social stories with 3 pre-school children. For two participants an ABAB design was used, and for one, an ABACBC design was implemented whereby verbal prompts were introduced when the social story alone was found to be ineffective. The social stories were read approximately 3 times per week over 4 weeks to target behaviours such as sitting during circle-time, keeping hands to self and encouraging conversation during snack time. Data were presented graphically, and indicated that social stories were beneficial for two children. The third child did not show an increase in talking during snack time until verbal prompts were included.

This study has many strengths, such as measurements of inter-rater reliability, participant comprehension, treatment integrity and social validity. Nevertheless,

weaknesses include limited maintenance data (3 weeks post study), and a lack of consideration of whether the effects seen were due to the one-to-one nature of the intervention or the social story content.

Earlier studies using ABAB designs tended to have less rigorous methodologies. For example, Kuttler, Myles and Carlson (1998) used an ABAB design to implement and withdraw two social stories over a 19 day period to reduce the tantrum behaviours of a 12 year old boy with autism. The social stories were paired with visual timetables, a token economy system and verbal and physical prompts by staff. Although this study indicated positive outcomes when social stories were introduced, Sansosti et al. (2004) raise concerns that Kuttler et al. (1998) observed immediate changes in behaviour for each participant after starting and removing social stories, however gains in skill acquisition were not maintained, suggesting that social stories may need to be continually implemented to create long-term change. Sansosti et al. also note that Kuttler et al. employed other interventions alongside social stories, preventing the effectiveness of social stories being evaluated. The study did not include measures of treatment integrity or social validity.

### **Multiple baseline across settings designs**

Studies employing this design are rare in the extant social story literature, and there is limited evidence for the generalisation of skills across settings. For example in one study, Hofstra (2004) used this design with 5 participants with autism aged 5-7. A visual inspection of the data indicated that for 4 of the 5 participants an improvement of one or more target behaviours was evident. Of

the 14 behaviours targeted, 7 improved. There was evidence of generalisation across settings for one participant.

Hagiwara and Myles (1999) used a multiple baseline across settings design with 3 participants, two aged 7 and a 9 year old. Computer based social stories were used. The aim of the social story for the first two children was to teach them to wash their hands more independently across three school settings. For the third child the aim was to increase on-task behaviour such as reading aloud, making eye contact with teachers and making task related comments across three settings within school. The first participant's hand washing improved across all three settings and he showed generalisation of the newly acquired skill in one setting. The second participant showed improvements in newly acquired independent hand washing in two settings. The third participant showed partial improvements in his on-task behaviours in two settings.

This study is problematic because social stories were used alongside verbal prompting and physical assistance. This means the impact of social stories alone cannot be examined. Furthermore the participants' comprehension of the social stories was not assessed. It is therefore unclear whether the participants did not fully understand the content of the social stories or whether the social stories had limited effectiveness in some settings due to other factors.

### **Multiple baseline across behaviours designs**

This design is now widely used in social story research. For example, Scattone (2008) used a multiple baseline across behaviours design to investigate whether social stories could enhance the conversational skills of a boy with

Asperger's Syndrome. The social stories were combined with video modelling. The intervention involved the boy watching video-taped social stories that included two adults modelling targeted conversational skills. This was followed by 5 minute social interaction sessions, in which the boy's eye-contact, smiling and initiations were recorded. PND were calculated for each target behaviour. PND for eye contact was 100%, PND for smiling was 32% and PND for initiating interactions was 100%. Clearly, outcomes across behaviours were highly variable. Strengths of this study include consideration of the boy's comprehension of the social stories and the employment of inter-rater reliability measures. The main weaknesses are that it is not possible to determine the effectiveness of social stories as an intervention in isolation, and the use of a single participant with limited description restricts insights into the importance of participant profiles on outcomes.

The use of multiple interventions is common within the extant literature. Theimann and Goldstein (2001) combined the use of social stories with video feedback to increase the social communication skills of 5 participants aged 6 to 12 years with autism. The participants were each paired with two typically developing peers to form triads for comparison. Multiple baselines were taken across two to three social communication skills per participant. These included securing attention, initiating comments, initiating requests and contingent responses. Following treatment 13 raters consistently reported improvements in reciprocal social behaviours between the target children and their peers. Although this is an encouraging outcome, it provides limited support for social stories due to the employment of multiple treatments without examining the

effects of each independently. Furthermore the participants' comprehension of the social stories was not explored.

### **Multiple baseline across participants designs**

Schneider and Goldstein (2010) conducted a multiple baseline across participants design with 3 participants to target on-task behaviour during circle time for 2 participants and behaving appropriately during a lesson transition for one participant. A social story was read daily with each participant for a duration of 2 to 6 weeks, immediately prior to the target situation. No other interventions were used alongside the social story. Participants had a diagnosis of autism and a measure of social behaviour and expressive and receptive language were taken. The participants displayed “delayed to significantly delayed” skills in the areas assessed. The authors used the Percentage of All Non-overlapping Data (PAND) technique (Parker, Hagan-Burke and Vannest 2007 – see section 2.10) to statistically investigate behavioural change. It was concluded that the social stories had “modest effects.” Outcomes were variable between participants, although this is attributed to the behaviours studied rather than participant profiles. It was found for one participant that the effect of the social story could be enhanced marginally through the addition of a visual schedule, although this effect was not investigated in isolation, nor was it replicated.

This study rigorously advances previous multiple baseline across participant designs which employ parallel interventions, uncontrolled exposure to social stories (e.g. Scattone, Wilczynski, Edwards and Rabian 2002), and focus solely on “high functioning” participants (e.g. Ozdemir 2008). Nevertheless, some

weaknesses remain. Participant description was limited in this study, for example, Schneider and Goldstein did not provide any indication regarding the extent of the participants' autism. Furthermore no maintenance data were provided beyond the initial investigation. The researcher intends to advance this study by considering these two features in this thesis.

### **Group designs**

Group designs are rare within the extant literature. In their review paper, Rust and Smith (2006) called for designs which allow for the testing of behavioural change in terms of statistical significance, comparing samples of children who receive and do not receive a social story intervention.

Recently, Quirnbach, Lincoln, Feinberg-Gizzo, Ingersoll and Andrews (2009) advanced the literature by conducting a pre-test post-test repeated measures randomised control group design. This study compared the effect of two experimental conditions: stories constructed from only directive sentences and standard social stories following Gray's ratios of sentence types. Forty-five participants were recruited and matched on IQ, verbal comprehension and level of autism. They were randomly assigned to the two experimental groups and a control group who received a fictitious story. The experimental stories targeted game playing social skills. Stories were read 10 times over 2 days. Analysis of Variance indicated that standard and directive social stories were equally effective in developing social skills.

This study is an exciting development in the literature since it provides the largest known study, and indicates that social stories can be effective across

many children with autism. Nevertheless, due to the use of group means, individual differences in outcomes cannot be observed. In addition, maintenance data were only gathered one week post intervention.

In summary, when considering the most appropriate design, it is apparent that descriptive case studies and AB design lack experimental control. Reversal designs may not be ethically sound since they limit participant exposure to the intervention and involve a high level of change for staff and participants.

Although group designs can provide parametric data and generalisable findings, it can be difficult to meaningfully match participants across groups, and the data of the individual is lost. Therefore to capture individual differences in an ethical, experimental design, a multiple baseline design may be preferable.

## **1.4 Previous social story research: Reducing anxiety**

### **A single AB study**

There appears to have only been a single study which has investigated the effectiveness of social stories in reducing anxiety. In an unpublished dissertation Cullain (2002) used an AB design to investigate whether social stories could reduce excessive behavioural expressions and anxiety in 5 children aged 6 to 10 years with autism. Three participants were in the school setting and two were in the home setting. Each child had a social story read to them twice per day for 5 days by either a parent or the researcher. The children's comprehension of the social stories was not assessed. The excessive behaviours examined were: clinging to one friend, ignoring requests, verbal complaints, refusal to play, throwing objects and touching peers. Each

participant completed the Revised Children's Manifest Anxiety Scale [RCMAS] (Reynolds and Richmond 1985) pre- and post-study to measure their anxiety. This was used as a measure of generalised anxiety. A visual analysis and Wilcoxon matched pairs test revealed a decrease in frequency of all excessive behaviours and a smaller 20-30% decrease in anxiety levels for the children.

Although this study suggests that social stories may be of some value in reducing children's anxiety, clear conclusions cannot be drawn due to the simplistic design of the study, the absence of comprehension measures and limited participant description.

### **The importance of investigating whether there is a reduction in anxiety**

It is widely accepted that there are higher rates of anxiety amongst children with autism than typically developing children in terms of both generalised anxiety (Gillott et al. 2001), and levels of phobias about specific situations (Evans, Canavera, Kleinpeter, Maccubbin and Taga 2005). Children with autism are therefore at an increased risk of developing anxiety disorders in childhood compared to neuro-typical children (Kopelioff 2009). Furthermore, amongst the population with autism, anxiety difficulties appear to persist into adulthood (Gillott and Standen 2007).

White, Albano, Johnson, Kasari, Ollendick, Klin, Oswald and Scahill (2010) propose that there is a bi-directional cyclical relationship between anxiety and social skills difficulties whereby anxiety may augment social impairment and poor social functioning may contribute to anxiety. White et al. claim that there are no interventions that treat both social difficulties and the associated



problems with anxiety. They advocate the use of Cognitive Behavioural Therapy to reduce anxiety and social difficulties, however in practice this may only be beneficial for very cognitively able children and adolescents who are able to engage in the meta-cognition required for this intervention.

In this thesis the researcher aims to question the view of White et al. (2010) by investigating whether social stories can provide a widely accessible means of reducing specific undesirable social behaviour and anxiety.

It has been suggested by Ali and Frederickson (2006) that EPs have the necessary skills to find meaningful ways of investigating anxiety change, thus contributing a new dimension to the social story literature. The strong association between autism and anxiety in the literature suggests this insight could be a widely beneficial outcome of the current study.

Both changes in generalised and specific anxiety were investigated. It was predicted that specific anxiety relating to the target situation would reduce because the content of the social story would increase the predictability of events occurring in this situation. It is surprising yet encouraging at the same time that Cullain (2002) found a 20-30% reduction in generalised anxiety following an intervention designed to address a specific target behaviour. Since Cullain was the first author to investigate and demonstrate this effect, replication is required. Based on Cullain's findings, the researcher predicted that social stories would reduce generalised anxiety.

## **1.5 Further issues arising from previous research**

Further issues are highlighted in this section to support the reader in understanding the rationale for the methodology of the thesis.

### **One-to-one attention as a confounding variable**

The methodological weaknesses of previous research made it difficult to determine whether social stories effectively change target behaviour and/or reduce anxiety. It was unclear whether social stories lead to positive behavioural outcomes because of the content of the story or whether the effect was due to the child receiving one-to-one regular, supportive adult attention. The only known investigation into this was by Kuoch and Mirenda (2003). They found that reading a fictitious story book was less effective than reading a social story. However this design was only used with one participant, so needed to be robustly demonstrated.

### **The severity of autism: Who are social stories suitable for?**

Gray and Garrand (1993) originally indicated that social stories were only suitable for cognitively able pupils with autism who possess basic language skills. Since this time there appears to have been an increase in the belief that social stories are suitable for children with moderate to severe autism. Authors providing guidance on writing social stories have been vague about who they were suitable for, but tended to focus on the importance of adapting them to suit the individual's developmental age and attention span (Howley and Arnold 2005; Smith 2003). The NAS (2010a) has advised that:

*“There is research to suggest that individuals with ASD who experience greater difficulties and associated learning difficulties may also benefit from the use of social stories” (from webpage: ‘Social stories and comic strip conversations’ on NAS website).*

They then cited research by Swaggart et al. (1995) in support of this.

Swaggart et al. (1995) combined the use of social stories with a traditional social skills training programme with 3 children with moderate to severe autism to target sharing, aggression and greeting behaviours. Standardised assessments were not used and there was no clear system used for rating the severity of the participants’ autism. An AB design was used and all targeted behaviours moved in the desired direction. Maintenance of skills, inter-observer reliability and treatment integrity were not reported. Due to the simple design of this study and methodological weaknesses, the study did not provide robust support for the use of social stories for children with moderate to severe autism.

Thieman and Goldstein (2001) indicated that positive outcomes could be achieved when participants had moderate to severe autism, however video feedback was provided alongside the social story, so clear conclusions could not be drawn.

Since the literature indicates that there is limited understanding of whether social stories are effective for moderate to severe autism the researcher addressed this in her thesis. The researcher ensured that children with contrasting levels of autism were selected to participate. The Childhood Autism Rating Scale [CARS] (Schopler, Reichler and Renner 1988) was used to ensure

this is achieved. This measure was used to provide an indication of participants' severity of autism. The researcher predicted that social stories would be more effective for mild to moderate autism due to the difficulties with cognitive skills and sense of self which tend to accompany severe autism.

### **Inadequate participant description**

Inadequate participant description appears to be a confounding issue throughout existing social story research. In a review of 16 studies Reynhout and Carter (2006) commented that in most studies only a diagnostic label of autism or ASD was provided. Only three of the studies (Feinberg 2002; Hagiwara and Myles 1999; Thiemann and Goldstein 2001) provided standardised data indicating the position of the participants on the autistic spectrum. Seven studies referred to the cognitive abilities of the participants (Bledsoe, Myles and Simpson 2003; Feinberg 2002; Lorimer, Simpson, Myles and Ganz 2002; Norris and Dattilo 1999; Pettigrew 1998; Scattone et al. 2002; Thiemann and Goldstein 2001). Nevertheless, only four of these provided information based on the results of standardised tests (Bledsoe et al. 2003; Feinberg 2002; Scattone et al. 2002; Thiemann and Goldstein 2001). Reynhout and Carter (2006) commented that as the participant description provided in many studies consisted of little more than a diagnostic label, it was effectively impossible to determine if any specific participant characteristics are associated with intervention effectiveness. Since uneven developmental profiles are well documented in autism (Frith 2003) it was important to consider participants' abilities across a range of areas.

The researcher used several cognitive measures to develop the literature by providing a profile for each participant. The British Ability Scales II [BAS II] (Elliott 1996) was used. Specifically visual memory, auditory memory and reading ability were examined. The Wechsler Individual Achievement Test II [WIAT II] (Harcourt Assessment 2005) was used to investigate listening comprehension skills. These measures were chosen as it is predicted that skills in these areas may support children's understanding and ability to remember the social story, thus enhancing positive outcomes. The measures were selected due to their ease of availability, individually interpretable subtests and sound levels of reliability and validity. It was not possible to make predictions based on literature since when positive outcomes have been demonstrated when standardised measures were taken, other interventions have been used simultaneously (e.g. Scattone 2002; Thieman and Goldstein 2001).

There has been very little consideration of the relationship between social skills and intervention outcomes in the extant literature. One exception was Crozier and Tincani (2007), who used a participant's low social motivation score (as indicated on a standardised assessment) to explain his reluctance to initiate conversation in snack time even when his social story was presented. It is therefore predicted that a moderate level of social motivation and existing social skills are needed to benefit from social stories, since participants will be required to engage in new social behaviours. Social skills were measured using the Social Responsiveness Scale [SRS] (Constantino and Gruber 2005), to clarify whether social skills impact on outcomes. This measure was selected

due to its good reliability and validity levels, its availability and its ease of completion.

The extant literature has not considered whether ToM is relevant to outcomes. The researcher predicted that children who could pass false belief tasks may have been more likely to benefit from social stories. This is because from the work of DeLoache (1991) on dual orientation, it could be inferred that children need to engage in a level of pretence, or meta-representation to understand that the character in the social story represents themselves. If they have not made this connection, they will not be equipped to change their behaviour in accordance with the social story. The Sally Ann False Belief Task (Wimmer and Perner 1983) and the Strange Stories task (Happé 1994) were used as two widely established assessments of ToM, each with different levels of difficulty to suit participants' skills.

It was predicted that a warm and trusting relationship between the TA delivering the intervention and the participant would enhance positive outcomes as would positive TA and participant attitudes towards the intervention. Although this had not been considered in the social story literature, these predictions arose from literature into psychological therapies (e.g. Orlinsky, Grave and Parks 1994). These factors were gauged in interviews with TAs.

### **The maintenance of acquired skills**

Across the research literature there has been an absence of investigation into any longer term benefits of social stories. For example, many studies did not examine the maintenance of the skills after the initial study was conducted

(Lorimer et al. 2002; Swaggart 1995; Scattone et al. 2002; Toplis and Hadwin 2006). A minority of studies considered maintenance of skills for a few weeks beyond the initial study (Crozier and Tincani 2007; Kuoch and Miranda 2003).

The current study advanced the literature by providing a longer term investigation into outcomes. This was important since the work of EPs is rooted in the values of the Government's white paper "Every Child Matters" (Department for Children, Schools and Families [DCSF] 2003). This framework aims to support children to have long term positive outcomes. Therefore if social stories are to be promoted by EPs they need to have long term benefits.

It is clear from the literature review that the effectiveness of social stories cannot easily be established due to the range of methodological weaknesses and lack of maintenance data. The methodology of this study sought to develop the research base.

## **CHAPTER 2: METHODOLOGY**

### **2.1 Aim**

This thesis endeavours to investigate the following research questions:

- 1. Are social stories an effective intervention for promoting more positive behaviour and/or reducing the anxiety of children with a diagnosis of autism?*
- 2. Do these changes, if observed, endure over time?*

In consideration of the results a third research question will be added:

- 3. In the cases when social stories are effective, what factors appear to be relevant to their success?*

The third research question an ancillary question which will be inferred and deduced from the results.

### **2.2 The context**

The research takes place in an outer London Local Authority (LA) where education for children with SEN is provided either within a mainstream or special school. Education within mainstream schools is encouraged for the majority of children with SEN in accordance with Government legislation and guidance (e.g. Education Act 1993; SEN Code of Practice DfES, 2002).

Children who attend a special school usually do so following parental request for this provision, however in practice children in special schools also tend to have a lower cognitive ability. Children who enrol at a special school must have



a Statement of SEN. This is a legal document that describes a child's SEN and specifies objectives and other provision relating to these needs. [See SEN Code of Practice chapter 8 for further information.]

In this study the participants (described in Appendix 3) attend one of two provisions: a mainstream school or a special school.

The mainstream school is a large junior school which has been rated by OFSTED (Office for Standards in Education) as being good with outstanding aspects (May 2010). Approximately 17% of pupils have SEN, which is similar to the national average. There are below average levels of pupils entitled to free school meals. The pupils are mainly white British.

The special school is a provision for children with moderate learning difficulties. The school is rated as outstanding by OFSTED (July 2009). The school caters for children with a range of complex needs including language difficulties and autism. The pupils are mainly white British and there is an average number of children entitled to free school meals according to school type.

The two schools were identified through the guidance of the Social Communication Service (SCS) and the Principal Educational Psychologist (PEP). The SCS are a LA based service who provide support for schools and families when children have social and communication difficulties.

A special school and a mainstream school were chosen to potentially provide valuable information about the effectiveness of social stories in relation to existing abilities. The two schools provided very different cohorts of participants, with the mainstream participants being more cognitively able than the special

school participants. It was also considered to be potentially valuable to observe any differences in staff attitudes to the intervention in the different settings as this appears not to have been previously explored.

To support the researcher in selecting the schools the SCS provided a list of all known pupils with a diagnosis of autism in the borough and the schools they attended. Schools with the highest numbers of pupils with autism were shortlisted. The PEP then identified from this list schools which were likely to be interested in participating in the research from his knowledge of the headteachers and Special Educational Needs Coordinators (SENCOs).

The first mainstream school which initially agreed to participate in the study was unable to identify a sufficient number of pupils who were not undergoing an existing social intervention programme (see Seeking consent section 2.3).

Therefore this school had to withdraw from the study and a second mainstream school was approached.

The researcher initially approached headteachers. In both schools the headteachers delegated the primary responsibility for the research to the SENCOs, who became the main point of contact within the schools.

A meeting was held between the SENCO and the researcher in each school to explain the rationale and purpose of the study, the time scale, methodology, involvement of TAs and parents, and potential outcomes. The effect of using self-selected schools in the study is commented on in the Discussion chapter (section 4.1).

## **2.3 Seeking consent**

The potential participants were identified by each school's SENCo. The researcher requested that participants should have: a diagnosis of autism, a behavioural and/or anxiety difficulty which impacts on them at school and the ability to sit and look at a book for at least 10 minutes. They should also not be undergoing any other social intervention programmes.

Following the identification of potential participants consent forms were completed by parents (Appendix 1) and then by participants (Appendix 2).

## **2.6 Design of the study**

This study involved a multiple baseline across participants single case experiment design whereby the effectiveness of social stories was examined on a case by case basis. Each child participating in the study formed "a case." Elements of a traditional case study approach were also taken, as described by Robson (2002). These were empirical investigation within a real life context, and the use of qualitative data and multiple sources of evidence.

A multiple baseline across participants design (see section 1.3 – Literature Review) was viewed to be more ethically sound than a reversal design due to the lower level of disruption to daily routines. This design was also chosen due to the heterogeneous nature of the participants. Four phases were used in the study to enable the effectiveness of social stories to be examined. These were:

*The pre-social story (baseline) phase* – to gather information about each participant's existing abilities, behaviour and anxiety.

*The one-to-one attention phase* – to endeavour to ensure that any changes in behaviour and/or anxiety are due to the effect of the intervention, not the receiving of individual attention from an adult.

*The social story (intervention) phase* – to see whether the intervention changes the participants' behaviour and/or anxiety levels.

*The post social story phase* – to assess whether the intervention creates long term changes in behaviour and/or anxiety, if changes occur.

## **2.7 Measures used to create participant profiles**

A wide range of measures was chosen to build a profile of each participant's abilities (outlined below). The participants' level of autism, cognitive abilities, social skills and ToM skills may all relate to their ability to benefit from the social story intervention. The researcher chose a broad range of measures so that any differences in outcomes of the study can be explained with a high level of accuracy.

- **Childhood Autism Rating Scale [CARS]**

This is a 15 item behavioural rating scale which distinguishes children with autism in the mild to moderate range from those with autism who are in the moderate to severe range. The CARS was used to provide information regarding the severity of participants' autism. It was selected due to its ease of use and good levels of reliability and validity (Schopler et al.1988).

- **British Ability Scales II [BAS II]**

This is a contemporary psychometric model of human ability with British norms (Hill 2005). This standardised assessment was selected to provide baseline information about participants due to its individually interpretable subtests and high levels of reliability and validity (Elliott 1996). The subtests of current interest were word reading and memory tasks (recognition of pictures to assess visual memory and recall of digits to assess auditory memory). These skills were assessed as they were deemed likely to impact on the outcome of the intervention.

- **The Wechsler Individual Achievement Test II [WIAT II]**

This is an individually administered standardised assessment for children age 4 to 16. It can be used to test a broad range of academic skills or only to test in the area of need. It has good levels of reliability and validity (Harcourt Assessment 2005) and it is standardised on British children.

The listening comprehension sub-test was selected for use to provide a measure of the participants' understanding of language. This assessment consists of three sub-tests: receptive vocabulary, expressive vocabulary and sentence comprehension. These skills are likely to be important in enabling participants to process the content of their social stories.

- **Performance levels (P-levels) (DCSF 2009)**

P-levels are a set of descriptions for recording the achievements of pupils with SEN who are working towards the first level of the National Curriculum. The P

scales are split into eight different levels with P1 being the lowest and P8 the highest. Level P8 leads into national curriculum level 1. See DCSF (2009) for further information.

P-levels were chosen to provide more detailed information about the abilities of special school participants who scored on the 1<sup>st</sup> percentile on standardised assessments. P-levels relating to reading, attention and speaking and listening were deemed to be most relevant to the intervention outcomes.

- **Social Responsiveness Scale [SRS]**

This is a 65 item questionnaire covering a range of dimensions relevant to autism spectrum disorders. These include: social awareness, social cognition, social communication and social motivation.

The SRS was chosen due to its availability and good levels of reliability and validity (Constantino and Todd 2000). Since this tool provides a broad social profile it may provide useful information about who benefits from social stories.

- **The Sally Ann false belief task (Wimmer and Perner 1983)**

This measures a person's ability to attribute false beliefs to others. Participants' ToM skills were examined since skills in this area may be related to the outcomes of social story use. The Sally Ann task was used as a widely accepted, basic measure of ToM for all participants. The visual nature of the Sally Ann task made it a suitable tool for the special school participants.

- **Advanced Test of ToM (Happé 1994)**

A minority of individuals with autism pass first order and second order ToM tests while remaining socially impaired (Happé 1994). This led Happé (1994) to devise an advanced test of ToM called “strange stories” which provides a battery of more naturalistic, complex stories which are more contextually embedded. The stories cover a wide range of areas of understanding such as: lie, white-lie, joke, pretend, misunderstanding, persuasion, appearance/reality, figure of speech, sarcasm, forgetfulness, double bluff and contrary emotions.

A sample of the strange stories was used with the more cognitively able mainstream participants to gauge levels of social understanding. This tool was selected as it is likely to access the more advanced cognitive skills of the mainstream participants. It may provide additional information regarding the level of ToM skills of those participants who pass the Sally Ann false belief task. Similar advanced ToM tests have good levels of reliability and validity (Hughes et al. 2000).

- **The Beck Anxiety Inventory for Youth (BAI-Y) from the Beck Youth Inventories, second edition (Beck, Beck, Jolly and Steer 2005)**

The Beck’s anxiety inventory (BAI-Y) sub-test is a questionnaire which can be used to measure a range of anxiety symptoms such as: anxious cognitions and emotions, somatic symptoms, social anxiety symptoms, concerns about physical and psychological integrity and specific fears and phobias. It also provides an overall generalised anxiety score and an associated category of clinical significance.

The BAI-Y was of particular interest to the current study because it provided a simple measure of anxiety that was accessible to the more cognitively able participants (parents completed the BAI-Y on behalf of the less cognitively able participants). This tool was selected due to its high levels of reliability and validity (Beck et al. 2005). It was considered preferable to the RCMAS as used by Cullain (2002). This was because the BAI-Y has a continuum for recording changes in anxiety, therefore it is likely to be a more sensitive tool.

### **Assessing social validity**

- **Intervention Rating Profile [IRP-15] (Martins, Witt, Elliott and Darveaux 1985)**

This tool has been used as a quantitative measure in social story research to assess teacher acceptability, or social validity of the intervention (Scattone et al. 2002). Unless researchers consider this, no amount of scientific rigour and documented effectiveness will result in the adoption of the intervention (Limb and Chance 2006).

The IRP-15 is a 15 item scale which assesses the acceptability of a given treatment. Scores can range from 15 to 90. Higher scores indicate greater acceptance. Scores above 52.50 are considered acceptable (Von Brock and Elliot 1987). The measure has good levels of reliability and validity (Martins et al. 1985). In the current study TAs completed the IRP-15 at the end of the social story intervention phase. The IRP-15 was chosen since it may provide valuable insight into staff perceptions of social stories.



## **2.8 Participants**

In total eight children participated in the study. At the time of the intervention they were in Key Stage 2 (ages 7 to 11 years) and had an independent clinical diagnosis of childhood autism according to DSM-IV or ICD-10 criteria. Four participants were in mainstream and four were in special school. Since the participants attending the special school were of lower cognitive ability than those in the mainstream school some amendments were made to the methodological approach used. For example, the less cognitively able participants received short, simple social stories, they reported their anxiety by selecting pictures of faces, rather than using a Likert scale and their parents completed the BAI-Y on their behalf. The impact of this is commented on in the discussion chapter (section 4.1).

The participants who were selected complied with the previously stated selection criteria (see section 2.3).

## **2.9 The four phases of the study**

The following section contains details of actions taken within the four phases of the study.

### **2.9.1 Phase 1: The pre-intervention (baseline) phase**

Unstructured non-participant observation

Over a one month period the researcher conducted non-participant observation of each participant on at least a weekly basis, in a range of settings during the school day to familiarise herself with the nature of the children. The researcher

recorded informal narrative accounts of observed events and behaviour. This also enabled the participants and staff to recognise the researcher and feel comfortable with her presence in the school before the study began.

### ***Search of pupil records***

The researcher developed her knowledge of the participants by reading through each participant's file within the EPS. Notes were recorded regarding diagnoses, early development, educational placements, behaviour, cognitive and social abilities. The researcher used this information to begin to form participant profiles (Appendix 3).

### ***Creation of non-participant observation record sheet***

The researcher developed eight non-participant observation record sheets (one for each participant) to provide a simple, structured, reliable means for the researcher and TAs to record data (see Appendix 4 for examples). The contents of the sheet varied according to the behaviour being observed. They typically contained: the participant's name, the date, the study phase, the target behaviour, and examples and non-examples of this behaviour. Below this a table was printed whereby the duration or frequency of the target behaviour could be recorded in a tally chart during ten minute blocks of time. Columns were also created to add up total frequencies and record any relevant comments during the observation.

### ***Designing the Likert scale***

The researcher designed a ten point Likert scale ranging from one to ten (one=low anxiety, ten=high anxiety) to provide a measure of anxiety suitable for

the more cognitively able participants. This was chosen as similar ten-point scales have previously been used successfully in research with children with learning difficulties (Male 1996). The scale currently used was annotated with the words “not worried” and “worried” at either end of the scale. The phrase “a bit worried” was placed at the mid-point of the scale. Corresponding calm and anxious faces were also presented at each end of the scale to support children who found reading difficult (see Appendix 5).

### ***Designing the faces sheet***

A faces sheet was designed as a simple measure of anxiety for the less cognitively able participants who could not understand the concept of a Likert scale. A sheet showing four faces was created using the website: [www.howitis.org.uk](http://www.howitis.org.uk) (Marchant and Cross 2002). Each face showed an emotion. These were: happy, sad, worried and angry. Each picture was of equal size and all four were printed on an A4 sheet of paper (Appendix 6). These four emotions were chosen because in previous studies children with autism have been shown to understand these emotions and the events which may elicit them (Baron-Cohen 1991; Dennis, Lockyer and Lazenby 2000; Rieffe, Meerum-Terwogt and Stockman 2000).

### ***Semi-structured interviews with TAs***

The researcher interviewed the TAs who worked closely with the participants. (It was these TAs who read the social stories with the participants in the intervention phase.) The semi structured interview format is presented in Appendix 10. The interviews occurred on a one-to-one basis in a quiet room in

the school. They lasted for 15-20 minutes each and were recorded onto tape with the TAs' permission. The aim of the interviews was to gather information regarding the frequency, duration and impact of the participants' difficulties. The TAs rated the intensity of the participants' target behaviour and anxiety on a scale from 1 (low) to 10 (high).

The functions underlying the behaviour were also discussed. These interviews were designed to develop the researcher's knowledge of each participant.

The researcher was able to use the information gathered from the unstructured observations, the EPS file reading and the interviews to identify each participant's potential behaviour and situation to be targeted by the social story. Decisions regarding the target behaviours and situations were then finalised in collaboration with the relevant TA (see Appendix 9 for target behaviours).

### ***Piloting of faces sheet, Likert scale and the observation record sheet***

Following the designing of the tools, the researcher piloted them. It was not feasible to run a pilot of the whole study due to the single case study design which involved collecting data over an 11 month period.

The social stories were not piloted with the participants due to the view that it was likely to influence the outcome of the study. Due to the idiosyncratic nature of the target behaviours it was perceived to be of little value to pilot the social stories with other children with autism. Prior to implementation the social stories were examined by staff who worked with the participants and by an experienced member of the SCS. Adaptations were made to the wording and

order of sentences within the social stories according to the individual needs of participants.

The researcher piloted the observation record sheets over two 10 minute observations with each participant. This ensured that the selected examples and non-examples of the target behaviour accurately reflected behaviours which were likely to occur during the observation period.

The anxiety Likert scale was piloted to check that participants understood the rating system. The mainstream participants were each given two contrasting fictitious scenarios, one about an anxious child and the other about a calm child (Appendix 7). The scenarios were read to the participants, who were then asked to place the fictitious character on the scale.

The pilot was useful in identifying which children were able to understand the concept of a Likert scale. It became apparent that this tool was not suitable for all mainstream participants, since one participant, Lewis M, was unable to accurately use the continuum. He therefore used the faces sheet instead. The three remaining mainstream participants used the Likert scale. Not all participants were familiar with the word “anxious,” so “worried” was used on the scale instead.

A faces sheet was piloted with the special school participants and Lewis M to ensure they had at least a basic understanding of emotions. Short, simple scenarios were acted out for each participant using soft toy characters (Appendix 8). The participant was then asked to identify which emotion the character was likely to be feeling by identifying it on the sheet. Two scenarios

were presented at random for each emotion to provide a stringent test of understanding.

Following the pilot the happy picture was adapted. The original showed a character jumping for joy. However this action proved distracting for one participant who focussed on the jumping action rather than the associated emotion. It was replaced by a picture showing only a happy face. The pilot revealed that Sebastian and Lewis M could identify emotions with complete accuracy. Although the three remaining participants (Emma, Harriet and Bailey) could distinguish positive from negative emotions, they showed some confusion between sad, worried and angry. Therefore in the study a record was taken of whether participants selected a positive or negative emotion, rather than recording the specific emotion chosen.

### ***Training TAs in the use of the observation record sheets***

Following the agreement of the target situations, the researcher provided all TAs with copies of the observation record sheet for their participant and explained how to use them. The researcher ensured the TAs knew what constituted examples and non-examples of the target behaviour. This was to enable inter-rater reliability to be assessed.

### ***Structured non-participant observation***

The researcher carried out structured non-participant observation using the observation record sheets in the chosen situations. The frequency or duration of behaviours was recorded for 10 minutes. A stop-watch was used for duration recordings.

The researcher aimed to observe each participant twice each week for approximately 20 minutes (two 10 minute recordings of data). In practice this was not always possible – see Discussion section 4.3.

The only exceptions to this were for Lewis M and Connor. The researcher did not observe Lewis M during trips to the toilet as this was deemed to be distracting for him and ethically unsound. Therefore the TA recorded the frequency of Lewis M's willingness to go to the toilet by himself throughout the school day on approximately 3 days of the week, and the number of times he requested an adult to accompany him. The percentage of times he requested an adult to accompany him was calculated.

Similarly Connor's TA recorded the duration of his target behaviour in approximately three maths lessons per week. The length of periods of distress were recorded using a wall clock in minutes. (A stop-watch may have altered Connor's behaviour as the TA was sitting with him so this would have lacked discretion.) Use of the TA to record data was necessary because of the sporadic nature of Connor becoming distressed. The behaviour in question was unlikely to be observed within a 20 minute observation. The use of the TA enabled data to be recorded across the hour of the maths lesson, thus increasing the likelihood of capturing the behaviour. The length of the lesson was also recorded in minutes to enable the researcher to calculate the percentage of time Connor spent distressed per maths lesson.

The aim of the non-participant observation was to establish stable baseline recordings of the frequency or duration of behaviours. This would allow any

later effect of the intervention to be identified. This need had to be balanced against other work demands which restricted the number of observations possible.

The researcher positioned herself at least 3 metres from the participant during the observation. Participants were aware from their consent forms that they were going to work with the researcher, and that the researcher would be observing the class, nevertheless, they were not aware that the researcher was observing them specifically (see section 2.3 for further information about consent). Parents and teachers were asked not to inform the child that they were being observed to reduce the observer's influence on the child's behaviour.

### ***Inter-rater reliability***

In the cases of Emma, Luke and Bailey, TAs co-observed their participant alongside the researcher on approximately 10% of occasions across all phases to enable inter-rater reliability to be assessed. This was possible when the TAs had supervisory roles. These TAs recorded their observations using the record sheets designed for the relevant participant.

Where this was not feasible during a lesson (due to TAs leading groups or teaching individual pupils) the TA was asked to examine the researcher's data at the end of the lesson to gauge agreement on its accuracy. This took place for approximately 10% of the total number of lessons. This method was used for: Lewis J, Harriet and Sebastian. Since the TAs for Connor and Lewis M gathered data for these participants, the researcher co-observed approximately



10% of these sessions to provide a measure of inter-rater reliability (this figure was slightly lower for Lewis M due to the limited availability of the researcher for whole day observations).

For the co-observed sessions a high level of agreement was reached (i.e. in excess of 85%). A 100% agreement was reached when the TAs examined the researcher's data for agreement. Calculations of inter-rater reliability can be found in Appendix 11.

### ***Participants' rating of anxiety***

The researcher aimed to ask the participants about their feelings in the target situation approximately twice each week. The anxiety Likert scale or the faces sheet was used as appropriate according to the cognitive ability of the participant. Where language and cognitive skills permitted the participant was asked to justify their chosen rating or picture qualitatively by describing any bodily sensations or other relevant information associated with the emotion and informal notes were made on the Likert and faces sheets. This was used to increase the validity of the ratings.

This procedure differed for Lewis M and Connor, whereby the TAs gathered this anxiety data from these participants. Lewis M's TA was provided with a faces sheet for Lewis to record his feelings prior to going to the toilet. Connor's TA asked him to record his level of worry on a Likert scale during the independent task in the maths lesson. The impact of variations in methodology between participants is considered in the Discussion chapter, section 4.1.

***Administration of standardised assessment measures and introduction of social story concept to participants***

The researcher worked individually with each participant in a quiet area of the school to complete baseline assessments over two or three sessions.

The following areas were assessed:

- Cognitive abilities using subtests of the BAS II and the WIAT II. Specifically visual memory, auditory memory, reading ability and listening comprehension were examined.
- ToM using the Sally-Ann false belief task alone (less cognitively able participants) or followed by Happé's Advanced Test of ToM (more cognitively able participants).

The proposed use of social stories was also outlined to participants during these sessions. The participants were shown a social story and were told that social stories are short stories which can be used by children to help them with particular situations. The participants were informed which lesson their social story would relate to, who would read it, where it would be read and the frequency of reading it. The participants were asked to choose their preferred form of presentation. They were able to select either a booklet, an audio means of presentation, or presentation on the computer. All participants selected a booklet, other than Connor who selected the computer.

***TAs completed the CARS and SRS to provide background information regarding:***

- Level of autism using the CARS.
- Social awareness, social cognition, social communication and social motivation using the SRS.

***Teachers in special schools provided P-level information for:***

- Participants who scored on the 1<sup>st</sup> percentile across the standardised assessments.

***Profiles of each participant were written***

The information gathered contributed to the creation of a profile for each participant (Appendix 3). The researcher proposes a high degree of confidence in the accuracy of these profiles due to the multiple sources that informed them.

***Drafting and agreeing social story content with staff and cognitively able participants***

Following the completion of the information gathering the researcher wrote a draft version of a social story for each participant. Gray's ratios of sentence types were adhered to. The social stories largely consisted of basic sentence types. Some advanced sentence types were also used for the more cognitively able participants (Luke, Connor, Lewis M and Lewis J). To increase a sense of ownership these participants were asked for their own ideas regarding strategies which may support them in their target situation (Appendix 12).

The teacher and TAs were consulted during the writing process to ensure that the story suitably addressed the area of need and was matched to the child's comprehension ability. Each social story focussed on only one social situation. They were approximately 100-200 words long, with the length varying according to the participant's developmental level (see Appendix 13 for an example of a social story). Each social story was examined by a professional within the LA from the SCS who was highly experienced in writing social stories, to enhance face validity.

The participants had the opportunity to illustrate their social stories with a few drawings relating to text. Due to time constraints the majority of pictures were printed. Simple black and white symbol pictures were used mainly for the special school participants, and more complex colour pictures were used mainly for the mainstream participants. Two computer programmes were used to generate pictures: "Ispeak" (coloured pictures) (Dixon 2004) and "Writing with Symbols 2000" (black and white pictures) from Widgit Software Limited.

Directive sentences were presented on a single page to draw attention to them. Font size was increased and words were made bold to draw attention to directives. The social stories had a title page which summarised the central question or issue to resolve. Social story booklets consisted of A4 pages collated in a document file. At the end of all of the social stories two or three comprehension questions were provided for the TAs to ask the participants. The quantity and difficulty of these varied according to the cognitive levels of the participants. Due to Connor's age and cognitive ability he was provided with

four different sets of two questions, enabling him to chose a different set to answer each day to maintain his interest.

Each booklet contained a summary sheet for TAs reminding them of the procedure for reading the social story. A treatment integrity checklist was provided at the back of the booklet for the TA to complete whenever the social story was read (Appendix 14). This enabled the researcher to identify when the social story had been read and the given procedure had been adhered to. The TA indicated on the sheet whether the comprehension questions had been understood.

### ***Reliability and validity***

#### ***Threats to reliability in phase 1 of the study were:***

1. Observer bias during frequency and duration data recording.
2. High levels of variability of data points within the phase

#### ***These were addressed through the following methodological features:***

1. The use of observation record sheets with specific criteria regarding what constituted the target behaviour.

The use of inter-rater reliability for 10% of observations using recordings of data from the researcher and TAs where possible.

2. Sufficient observational data were gathered to ensure that the data patterns were reasonably stable within each phase of the study. This meant that any changes created by the intervention could more accurately be identified.

***Threats to validity in phase 1 of the study were:***

1. Participants with learning difficulties being unable to report their anxiety accurately.
2. The use of invalid measures.
3. The writing of poor quality social stories.

***These threats were reduced through the following methodological features:***

1. Two anxiety measures were used to match the cognitive capabilities of the participants. Both were piloted to ensure that the participants could use the measures accurately. This was triangulated with qualitative descriptions of participants' feelings where feasible. Further triangulation occurred through the use of the BAI-Y.

2. The published measures were all selected due to their sound levels of validity and reliability. These are as follows:

CARS: Internal consistency .94, Inter-rater reliability .71, test-retest reliability .88

SRS: Internal consistency .93-.97, test-retest reliability .85

BAI-Y: Internal consistency .89, test-retest reliability .77-.90

WIAT II: Internal consistency .98, test-retest reliability .98, inter-rater reliability .94

BAS II: test-retest reliability 0.79-0.98, internal consistency 0.85-0.92

Concurrent validity was enhanced through triangulating the data from classroom observations with interview data.

3. The social stories were reviewed by a member of the SCS. This enhanced the face validity of the study.

### ***Ethical considerations in phase 1:***

#### ***Integrity***

The researcher sought to establish high quality relationships with staff and participants through regular contact and taking an interest in the pupil's development and achievements.

#### ***Respect***

The researcher upheld the rights and dignity of the participants through anonymising pupil profiles and asking participants if they would like to complete standardised assessment measures. The individual needs of the participants were considered during this process, for example, assessments were conducted over several sessions to make the process more enjoyable for participants with limited concentration spans. Sessions were rearranged as necessary to prevent the participants missing appointments such as speech and language therapy.

Permission was sought from TAs for their completion of the CARS and SRS, and for their involvement in the interviews and for the tape-recording of these sessions. TAs were informed that they could request the recording of the interview to cease at any stage.

## 2.9.2 Phase 2: The one-to-one attention phase

### ***Ordinary story read to/with each participant by their TA***

The one-to-one attention phase was designed as a control condition to enhance the credibility of any observed changes in target behaviour and/or anxiety in the intervention phase. This phase enabled the researcher to gauge whether the receiving of individual adult attention created changes in target behaviour and/or anxiety. This will indicate whether changes seen in the intervention phase are due to the social story content or the individual attention received during the reading process.

During phase 2 a TA sat with the participant for 10 minutes each day over a one week period while the participant read the same story aloud prior to their target situation. In cases where participants were non-readers, the TA read the story. The story was unrelated to the child's behaviour. The TA and participant sat at a desk in a quiet area of the classroom, or outside the classroom if possible. After reading the story the participant was asked two comprehension questions relating to the story chosen by the TA. The procedure of this phase was designed to match that of the intervention phase, albeit without the social story content.

### ***Non-participant structured observation of target situation***

The researcher used the structured observation record sheets to observe the participants approximately twice during this phase of the study, recording their behaviour in their target situation. The TAs recorded data for Connor and Lewis M.



### ***Participants rate anxiety using Likert Scale or faces sheet***

On each occasion the researcher asked the participants to report their feelings using the anxiety Likert scale or the faces sheet as appropriate. The TAs gathered this data from Connor and Lewis M.

### ***Pupil or parent completion of the BAI-Y***

The more cognitively able participants (Luke, Connor and Lewis J) met individually with the researcher to complete the BAI-Y. The researcher explained the scale, read the items aloud and for each item the participant indicated their response. This provided a measure of anxiety prior to the implementation of the intervention.

The five less cognitively able participants were unable to understand the rating scale on the BAI-Y. In these cases parents completed the scale on the participant's behalf by post. Parental rather than TA completion was deemed most appropriate since the scale included an item on sleeping patterns. The measure was amended to be written in the third person before parental completion.

### ***Participants informed of imminent social story reading***

On the last 2 days of the one-to-one attention phase the participants were told by the TA that as of the following week they would be reading their social story with the TA on a daily basis for 5 weeks. They were reminded about when and where it would be read. This enabled the social story intervention phase to be as predictable as possible for the participants.

## ***Reliability and validity***

### ***Threats to reliability in phase 2 of the study were:***

1. Observer bias during the frequency and duration data recording.
2. Lack of data stability.

*(See phase 1 for explanation of how these threats were addressed through methodological features).*

### ***A threat to validity in phase 2 of the study was:***

1. Participants with learning difficulties being unable to report their anxiety accurately.

*(See phase 1 for explanation of how this threat was addressed through the methodology).*

## ***Ethical considerations in phase 2:***

### ***Responsibility***

This principle requires psychologists to recognise their responsibilities to participants and avoid causing harm. The one-to-one phase had a high level of ecological validity since the majority of participants read with a TA regularly or had previous experience of doing so. This phase was therefore familiar and predictable for participants. The decision to inform the participants about the imminent social story phase also helped to increase the predictability of the next phase of the study. This is particularly important for children with autism who can find a change in routine unsettling.

### **2.9.3 Phase 3: The social story intervention phase**

#### ***Social story procedure explained to TAs***

The researcher met with the TAs to explain the procedure for reading the social stories with the participants. The TAs were asked to read the social story to their assigned participant on a daily basis, within the hour prior to the target situation over a 5 week period. (There were two exceptions to this: Luke's social story was read daily even though his target situation of PE occurred twice per week; Lewis M's social story was read at the beginning of the school day due to the unpredictable timing of his toileting requests.) If the participant was a confident reader (Connor and Luke) they could read the social story to the TA. The TAs were asked to find a quiet place where the TA and participant could sit down at a desk. This could either be in a quiet area of the classroom or in a separate room if the participant found the classroom distracting. The TAs were asked to put the social story in front of the participant so it was clearly visible. Since Connor had requested to have his social story presented on the computer, his TA was asked to sit at the computer with Connor whilst he read the social story aloud. The TA was provided with a memory stick containing the social story, which could be used on different computers as appropriate.

All TAs were asked to read aloud the comprehension questions at the end of each reading session and complete a treatment integrity checklist. They were asked not to prompt the participants in their target situations beyond their usual levels of behaviour management. A summary sheet outlining the procedure was provided. The TAs were given the researcher's contact details to enable them to

discuss any concerns that may arise on a day when the researcher was not present in the school.

### ***Social stories read to/with the participants***

Each participant had their social story read to/with them by the TAs using the methodology outlined above. Within each school a multiple baseline across participants design was used. This meant that each participant within the same school began to read their social story for the first time on different days. A 2 day gap was left between participants to provide a staggered start to the intervention. This procedure increased the researcher's confidence that any initial changes in behaviour and anxiety levels were due to the intervention rather than to the circumstances occurring in the classroom on that day.

It was intended that the social stories would be read daily over a 5 week period. The timing of the study was arranged to ensure that this condition was provided without being interrupted by school holidays.

### ***Structured non-participant observation and participant rating of anxiety***

The researcher carried out structured non-participant observation using the observation record sheets once or twice per week for approximately 30 minutes in total during the target situation. The procedure for this was the same as that described in phases 1 and 2.

Where possible the researcher asked the participants to rate their anxiety during these sessions (see phase 1 of procedure for further information on rating anxiety and for adapted methodology relating to Connor and Lewis M.

The researcher increased the observation of Connor when his social story was

introduced to monitor his response to the intervention as he appeared to have a strong negative reaction).

### ***TAs rate the intensity of participants' behaviour and anxiety***

The TAs rated the current intensity of their participant's behaviour and anxiety on a scale from 1 (low) to 10 (high).

### ***Fading of social stories***

In the final week of the social story intervention phase the social stories were faded from use by reducing reading to 3 alternate days. Just prior to the final week participants were informed of the fading process and the planned cessation of social stories at the end of the following week.

### ***Reliability and validity***

#### ***Threats to reliability in phase 3 of the study were:***

1. Observer bias during frequency and duration data recording.
2. TAs' poor adherence to the procedures for reading social stories.

#### ***These threats were minimised using the following methodological procedures:***

1. (See phase 1 for explanation of how this threat was addressed through methodology).
2. TAs were provided with guidance on the procedure for using the social stories. They were asked to complete a treatment integrity checklist to allow the use of the social stories to be monitored.

***Threats to the validity of the study in phase 3 were:***

1. Participants with learning difficulties being unable to report their anxiety accurately.
2. Confounding variables creating changes in data which may be misconstrued as changes caused by the social stories. These would include: the effect of individual adult attention, use of prompting, changes in the classroom environment or daily routine.
3. History effects whereby events unduly influence the outcome of the intervention.

***These threats were minimised using the following methodological procedures:***

1. (See phase 1 for explanation of how this threat was addressed through methodology).
2. Confounding variables were controlled for as far as possible. The potential effect of individual attention was assessed using the one-to-one attention phase. Staff were also asked not to prompt the participants beyond the usual levels of behaviour management within the classroom.
3. The use of mixed methods meant that observed changes in the quantitative data could be explored qualitatively with staff to investigate factors influencing the change.

### ***Ethical considerations in phase 3***

#### ***Responsibility***

To reduce potential distress, participants were informed in advance of when the social stories were to be read and when they would be faded from use.

Several existing social story studies have employed reversal designs. Unlike many reversal designs, the current multiple baseline across participants design provided the participants with a significant period of exposure to the social story. This is more likely to ensure that an effective intervention is not withdrawn before the new skills have been consolidated. It was also simpler for schools to implement. The design provided a high level of predictability for participants because it did not involve frequent withdrawal of the intervention.

A high level of professional conduct was upheld throughout the research. The researcher established good rapport with schools, TAs and participants to encourage openness and honesty. Informal conversations were held regularly with staff and pupils to resolve any issues as they arose. The researcher maintained a flexible stance and adapted to the changing requirements of the classroom as necessary.

#### ***Competence***

This principle states that psychologists should maintain high standards of competence and recognise the limits of their knowledge, skill and experience. This principle was upheld through the researcher engaging in reflection and supervision to resolve challenges as they arose.

#### **2.9.4 Phase 4: The post social story phase**

##### ***Structured non-participant observation and participant rating of anxiety***

*(One week post intervention)*

The researcher carried out structured non-participant observation using the observation record sheets once or twice per week for approximately 30 minutes in total during the target situation. The procedure for this was the same as that described in phases 1, 2 and 3.

The researcher asked the participants to rate their anxiety during these sessions. (See phase 1 of procedure for further information on rating anxiety. Also see phase 1 for adapted methodology relating to the observation and anxiety ratings of Connor and Lewis M. The researcher increased the observation of Connor to daily observations this week to closely monitor his behaviour due to his extreme reaction to the intervention.)

##### ***Semi-structured interviews with TAs***

Once the social stories had been withdrawn TAs were re-interviewed individually using semi-structured interviews. During the course of the intervention phase, two new TAs were involved in delivering the social stories for Lewis M and Lewis J due to staffing rearrangements. These new TAs were trained in the delivery of social stories. All four TAs who delivered the intervention for Lewis J and Lewis M were interviewed individually post intervention.



The tape-recorded interviews took place in a quiet room and lasted for approximately 15-20 minutes each. The researcher aimed to explore each TA's experience of reading the social story, how effective the TA perceived the intervention to have been and the TA's views on social stories as an intervention (see Appendix 15 for interview structure).

***TAs rate the intensity of participants' behaviour and anxiety***

The TAs rated the current intensity of their participant's behaviour and anxiety on a scale from 1 (low) to 10 (high).

***TA completion of the IRP-15***

At the end of the interview session the TAs completed the IRP-15 (Appendix 18). This was used to provide a formal measure of the social validity. Data from the IRP-15 were triangulated with that provided by the interviews.

***Completion of BAI-Y by parent/pupil***

*(One week post intervention)*

The more cognitively able participants (Luke, Connor and Lewis J) met individually with the researcher to complete the BAI-Y. This provided a measure of anxiety after implementation of the intervention.

Parents completed the scale by post for the remaining 5 less cognitively able participants.

### ***Opportunistic conversations with participants***

Two weeks post intervention an opportunity arose to discuss the intervention with the participants individually at the mainstream school. This enabled the researcher to explore the participants' experiences of reading the social stories and to find out their views on the intervention and any improvements that could be made. These discussions were held in a quiet room and field notes were recorded.

### ***Structured non-participant observation and participant rating of anxiety***

*(Four months post intervention)*

Maintenance data were collected 4 months post intervention. The researcher aimed to enhance the extant literature by gathering data beyond 3 weeks of the intervention ceasing. Four months was deemed sufficient to observe any changes in behaviour as a result of the social story.

The researcher carried out structured non-participant observation using the observation record sheets of participants of interest: Luke, Lewis M, Sebastian and Connor. The first 3 participants listed had this additional data collected because they had successful outcomes (according to significance values) and the researcher was interested in whether these were maintained. Connor was also included because it was potentially valuable to see the impact of his extreme negative reaction to the intervention on his later behaviour and anxiety. These observations took place over approximately 4 weeks. The observations lasted for approximately 30 minutes and took place during the target situation.

The researcher asked the participants to rate their anxiety during these sessions (see phase 1 of procedure for further information on rating anxiety).

### ***Completion of BAI-Y by parent/pupil***

*(Four months post intervention)*

This was completed by Luke and Connor. The parents of Sebastian and Lewis M completed it on their behalf (see paragraph above for explanation as to choice of participants followed up after 4 months).

### ***Brief summary report offered to SENCOs, TAs, parents and the SCS***

The researcher created a brief summary report outlining the study, its outcomes and implications. This was offered to SENCOs, TAs, parents and the SCS to promote effective practice following the research. The head of the SCS requested additional input for the SCS team. The researcher therefore discussed the research in greater detail in a SCS team meeting.

### ***Reliability and validity***

#### ***Threats to reliability in phase 4 of the study were:***

1. Observer bias during frequency and duration data recording.
2. Lack of data stability.

*(See phase 1 for explanation of how these threats were addressed through methodological features).*

***Threats to the validity in phase 4 of the study were:***

1. Limited external validity, or the ability to generalise the findings to other cohorts due to the case study design.
2. Maturation effects.

***These threats were reduced through the following methodological features:***

1. The use of rich description:

Lincoln and Guba (1985) caution that in naturalistic research the researcher's task is not to provide an index of transferability, rather researchers should provide sufficiently rich data for the reader to determine whether transferability is possible. This was achieved currently through the use of interviews with staff alongside detailed profiles of each participant.

2. Although maturational effects cannot be entirely overcome, the follow-ups after the use of the social stories occurred within 4 months rather than over a longer time span as was originally considered.

***Ethical considerations in phase 4***

***Respect***

The researcher ensured the dignity and rights of the TAs were upheld through the interviewing process. Consent was sought from the TAs to conduct and record the interviews.

## **2.10 Data analysis: Quantitative data**

### ***Visual analysis***

The quantitative target behaviour data generated from the non-participant observations are presented on line graphs with each phase of the study colour coded for clarity. An individual graph is presented for each participant. The anxiety data for the 3 participants who completed Likert scales are also presented in this way. The mean of the data was calculated within each phase, as were the associated standard deviations (SDs). The anxiety data frequencies for the participants who selected positive or negative faces pictures are presented on graphs to enable patterns to be identified.

Visual analysis is a widely accepted approach in single case study research, with approximately 90% of studies between 1978 and 2003 using this approach alone (Busk and Marascuilo 1992; Kratochwill and Brody 1978; Parker and Brossart 2003). The advantages of visual analysis are as follows: It enables the quick identification of patterns and changes in data, it is highly accessible to the reader, it requires little technology or training and makes few underlying theoretical assumptions (Parsonson and Baer 1992). The researcher would like this thesis to be accessible to lay readers who work or live with children with autism. Visual analysis was therefore deemed appropriate.

### ***Statistical analysis: Percentage of All Nonoverlapping Data***

Despite the strengths of visual analysis, its employment as the sole method of data analysis is problematic due to the unreliability of visual judgements (Brossart, Parker, Olson and Mahadevan 2006). Parker et al. (2007) advocate

the combined use of visual and statistical analysis for the following reasons: to provide an objective summary of the data, to enhance measurement precision when results are not large or obvious, to improve the credibility of single case research in the eyes of other research traditions, and to inform high stake decisions such as the use of treatments and interventions. This thesis aims to provide a rigorous evaluation of the effectiveness of social stories. The researcher believes that the combined use of visual and statistical data analysis methods contributes to this aim.

The “Percentage of Nonoverlapping Data” (PND) was created by Scruggs et al. (1987) as a data analysis technique whereby PND is the percentage of phase B data that are more extreme (in an improvement direction) than the single most extreme phase A data point. PND has the advantages of being easy to calculate, it is applicable to any single case design and it has gained acceptance amongst visual analysts (Parker et al. 2007). Although the vast majority of existing social story research studies rely on visual analysis alone (with means and SDs), PND has been applied to conduct a meta-analysis of social story research (Reynhout and Carter 2006), and, in one known study, to assess social story effectiveness for a single participant across phases of data (Scattone 2008). PND has several limitations: it does not produce an effect size so needs its own interpretation guidelines, p values and confidence intervals cannot be calculated as it has unknown reliability and lacks a sampling distribution. It also ignores all phase A data except for one data point, which because of its extremity is likely to be the most unreliable (Parker et al. 2007).

The “Percentage of All Nonoverlapping Data” (PAND) was proposed by Parker et al. (2007) as a non-parametric method which overcomes many of the weaknesses of PND. PAND also reflects data non-overlap between phases but, unlike PND, it uses all data from both phases and can be translated to Pearson’s Phi, which is a widely accepted effect size. Phi has known sampling distributions so p values are available, statistical power can be estimated and confidence intervals (CIs) can be included to indicate effect size reliabilities (Cohen 1988; Fleiss 1981). Parker et al. (2007) comment that the data requirements for PAND are minimal. A minimum of 20 data points are needed and the parametric assumptions of equal variance and normality do not apply.

The current study provides the one of the first known applications of PAND to social story research. The researcher calculated PAND by hand for each participant’s behaviour observation data, comparing the baseline phase to the intervention phase, then the baseline phase to the 4 months post intervention phase. PAND was also used to analyse the anxiety data of the 3 participants who used the Likert scale across these same phases. PAND was calculated using the method outlined in Appendix 17. The PAND data were then entered into SPSS (Statistical Package for the Social Sciences) to compute significance values using the cross-tabulations command. Confidence intervals were calculated using the interactive website created by Pezzullo (2009): <http://statpages.org>.

### ***Intensity Ratings***

The TAs' intensity ratings of participants' anxiety and behaviour are presented in tabular form in the Results section.

### ***BAI-Y Questionnaire data***

The BAI-Y data were summed to provide raw score totals. These were then converted to T-scores using the tables provided in the manual. The manual was also used to indicate the overall clinical severity level of the anxiety and the subtypes of anxiety experienced.

### ***IRP-15 questionnaires***

The IRP-15 questionnaire data provided a rating from one (low agreement) to six (high agreement) for each item. The totals were summed, thus providing an IRP-15 score for each TA. The cut-off point of 52.50 provided by Von Brock and Elliot (1987) was used to indicate whether each TA regarded the intervention to be acceptable or unacceptable.

## **2.11 Data analysis: Qualitative data**

### ***Thematic analysis - Interview data from the TAs***

The qualitative data from the interviews with the TAs were analysed using thematic analysis, as described by Braun and Clarke (2006) and Boyatzis (1998). Braun and Clarke describe thematic analysis as a widely used qualitative analytic method within psychology, which can be used for identifying, analysing and reporting patterns within the data.



Thematic analysis was viewed as an appropriate method since it can be applied across a range of theoretical and epistemological approaches (Braun and Clarke 2006 p.78). It can also be applied flexibly to the data. A method of interest is outlined by Boyatzis (1998). He demonstrates that participants can be divided into sub-samples, from which themes can be identified and compared (p.86). This approach is useful in the current research as it enables comparisons to be made between interview material relating to participants for whom the intervention was effective and those for whom it was ineffective (according to significance values). This approach enables the researcher to use thematic analysis to consider the third research question: *“What factors appear to be relevant to the success of social stories?”*

Thematic analysis was also chosen because it is consistent with the researcher’s preferred stance regarding the process of analysis. The researcher recognises that she has an active role in identifying patterns in the data, and prefers not to view themes as *emerging passively* from the data as described in accounts of grounded theory approaches (Marshall Egan 2002; Walker and Myrick 2006). Thematic analysis was also considered preferable to Interpretative Phenomenological Analysis (IPA) as IPA is not usually used to test hypotheses or evaluate interventions, but instead attempts to describe in detail the content and structure of participants’ consciousness (Kvale 1996). An IPA approach was therefore considered less appropriate to the aims of the current research.

### ***The process of thematic analysis***

At the end of each interview brief informal field notes were written to record any relevant information which would not have been detected on the tape recordings, such as non-verbal communication, and comments made once the tape recorder had been turned off.

To facilitate a high level of familiarity with the material, the researcher listened to each interview in full and then transcribed the material herself. Relevant non-verbal communication (such as sighs and laughter) were recorded in the transcriptions. The transcribed notes were then checked against the tape recordings for accuracy and amended as necessary.

A data-driven, inductive approach was taken to code the data whereby each sentence in the entire data set was coded systematically. The researcher created a table with two columns. The interview transcription was entered into the left hand column and the right hand column was used to systematically summarise this data into codes. This was carried out for both pre-intervention and post-intervention interviews. This data-driven approach was chosen as it leads to a richer description of the data overall compared to theoretical thematic analysis (Braun and Clarke (2006)).

All of the codes for each interview were given a colour code so that they could later be easily identified according to TA and participant being discussed. Every interview therefore had its own colour.

Each set of codes were organised into the following subsamples:

- Pre- intervention interviews regarding participants for whom the intervention was successful.
- Pre-intervention interviews regarding participants for whom the intervention was unsuccessful.
- Post- intervention interviews regarding participants for whom the intervention was successful.
- Post- intervention interviews regarding participants for whom the intervention was unsuccessful.

Success is defined as a statistically significant or reported change in target behaviour and/or anxiety in the desired direction. Therefore participants with successful outcomes were: Sebastian, Luke and Lewis M. Participants with unsuccessful outcomes were: Harriet, Bailey, Emma, Lewis J and Connor. 'Successful' outcomes for Connor and Emma were excluded from the successful category as the researcher is confident that the changes seen in the desired direction for these participants were not a consequence of the intervention (see Discussion chapter for further consideration).

The researcher cut out each piece of coded data. Each subsample was considered in turn by spreading out the codes on a large table and grouping the codes into initial themes. For each of the four subsamples a list of initial themes was drawn up. The colour codes were used to make a tally of the number of pieces of code relating to each participant under each theme. This enabled the

researcher to identify overarching themes and avoid what Bryman (1988) has referred to as “anecdotalism” – where one or a few instances of a phenomenon are reified into a theme when they are actually idiosyncratic.

The themes were then reviewed. Overlapping and similar themes were collapsed into each other and themes with limited supporting data were removed from the analysis. The remaining themes were compared to the original data set as a validity check. Themes were then compared across the four subsamples. The themes which were felt to distinguish between the participants who had successful and unsuccessful outcomes were listed (Appendix 18) and will contribute to the consideration of research question 3 in the Discussion chapter. Each theme was then defined using the characteristics outlined by Boyatzis (1998). This involved giving the themes: a label, a definition, a description of how to know when the theme occurs, any relevant qualification or exclusions to the identification of the theme and positive and negative examples of the theme occurring (Appendix 18).

A validity check was conducted with a colleague who examined four of the differentiating themes selected at random. The theme definitions were given to the colleague; along with four interviews. He initially examined the codes alongside the original interview transcripts, to check that he agreed with the codes generated. He then examined the codes across the four interviews to consider whether he agreed with their inclusion in the given themes. A discussion was held regarding the selection of themes which were considered to distinguish between participants who had successful and unsuccessful outcomes. An agreement level of above 90% was reached on both tasks. An

important discussion point which arose regarded the differing length of interview question responses and the impact this would have on the number of codes recorded. It was therefore deemed necessary to examine the proportion of codes within each theme, when looking for differentiating themes.

It is acknowledged that different researchers both bring valid perspectives to thematic analysis, which may differ. This validity process was adopted not so both researchers would gain identical thematic outcomes, but to ensure that the reasoning behind the analysis could be understood.

### **CHAPTER 3: RESULTS**

The chapter will begin with a summary table of each participant's profile to support the reader in linking these variables to outcomes. Participants with successful outcomes are highlighted in green. More detailed participant profiles can be found in Appendix 3. Each participant's results will then be presented in turn, consistent with the single case study approach. Within each participant's section, data will be presented relating to behaviour and then anxiety. The TA's intensity ratings for behaviour and anxiety will also be presented. Following this, the thematic analysis themes will be presented. The chapter will end with the presentation of the TAs' IRP-15 data.

Table 1

*Summary of participant profiles*

Feature of profile	Participant							
	Connor	Luke	Lewis M	Lewis J	Bailey	Sebastian	Harriet	Emma
School type	Mainstream	Mainstream	Mainstream	Mainstream	Special	Special	Special	Special
Cognitive ability	Higher	Higher	Lower	Higher	Lower	Lower	Lower	Lower
Able to answer social story comprehension questions accurately	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No
ToM ability: Sally Ann False belief task	Passed	Passed	Passed	Passed	Failed	Passed	Failed	Failed
Happé's strange stories task	Understood: pretend, lie, joke, white lie, figure of speech, double bluff, persuasion, irony	Understood: pretend, lie, joke, white lie, double bluff, persuasion	Understood: pretend, figure of speech	Understood: Pretend, lie, joke, white lie	N/A	N/A	N/A	N/A
CARS rating	Mild	Mild	Moderate	Mild	Moderate	Severe	Moderate	Severe
SRS: level of impairment	Normal/ mild	Mild	Moderate /severe	Mild /moderate	Moderate /severe	Moderate /severe	Moderate /severe	Moderate /severe
Nature of target behaviour	Distress in maths lessons when needs help	Touching other children during PE lessons	Fear of going to toilet alone	Seeking TA's reassurance in maths lessons	Touching other children during play time	Wandering around classroom / not sitting on chair	Calling out in lessons	Smacking adults and children in assembly
Outcome: Reduction in target behaviour	No	Yes	Yes	No	No	Yes	No	No
Outcome: Reduction in anxiety	No	Yes	No	No	No	Yes	No	No
TA attitude pre-intervention	Positive	Positive	Positive	Negative – "social story not needed"	Positive	Positive	Positive	"social stories do not suit Emma"
Participant attitude to intervention	Negative	Positive	Positive	Positive	Positive	Positive	Positive	Positive
Distractions present during social story reading	Yes	No	No	Yes	Yes	No	Yes	Yes
Frequency of times social story was read	6	22	21	10	19	13	16	19

### 3.1 Participants' results

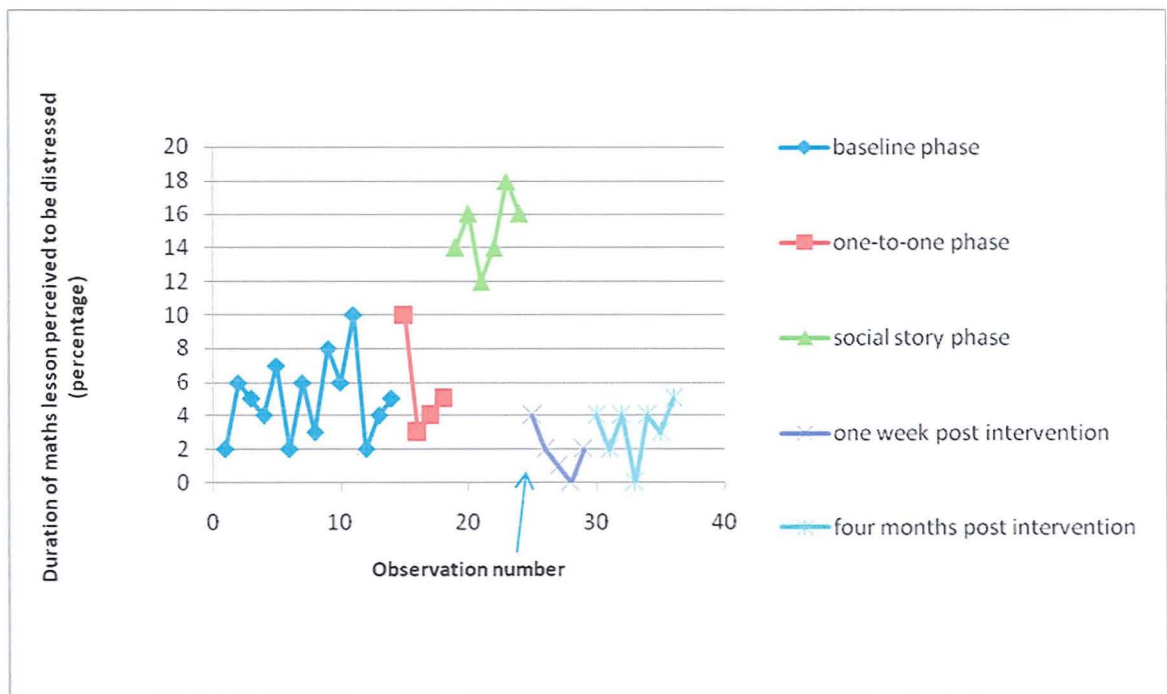
#### 3.1.1 Connor

##### *Behaviour*

The graph below (and all following behaviour graphs) shows the non-participant observational data across study phases. In this graph (and future graphs) the behaviour is referred to as the “target behaviour.” In Connor’s case this was the duration of time he was perceived to be distressed during maths lessons.

Figure 1

*Connor’s duration of target behaviour across the study phases*



(Arrow indicates point at which TA withdrew from working with Connor in the classroom – see Discussion chapter).

The mean and SD for each phase of the data are presented in



Table 2.

Table 2

*Means and SDs of Connor's target behaviour*

Phase of study	M	SD
Baseline	5.0	2.4
One-to-one attention	5.5	3.1
Social story intervention	15.0	2.1
One week post intervention	4.4	1.5
Four months post intervention	3.1	1.7

The data show that there was little change in Connor's behaviour from the baseline phase (mean: 5.0, SD: 2.4) to the one-to-one attention phase (mean: 5.5, SD: 3.1), indicating that the process of reading a fictitious story had little impact on the amount of time Connor appeared distressed in maths lessons.

During the social story intervention phase Connor showed an increase in the amount of time he was distressed (mean: 15.0, SD: 2.1). PAND was calculated to compare the baseline to the social story intervention phase and indicated a non-significant difference:  $\phi = .29$ ,  $p = .201$ , (CIs: -0.07 to 0.60).

During the one week post social story phase Connor was observed to be much less distressed than during the intervention phase (mean: 4.4, SD: 1.5). This was slightly lower than in the baseline phase, and this was maintained at 4

months post intervention (mean: 3.1, SD: 1.7). The difference between baseline and 4 months post intervention was non-significant:  $\phi = .36$ ,  $p > 0.05$  (CIs: 0.19 to 0.50).

Connor's TA rated the intensity of his distressed behaviour throughout the study from 1 (low) to 10 (high). These ratings are presented in Table 3.

Table 3

*TA's intensity ratings regarding Connor's behaviour*

Participant	Baseline phase	Intervention phase	One week post intervention	Four months post intervention
Connor	7	10	6	6

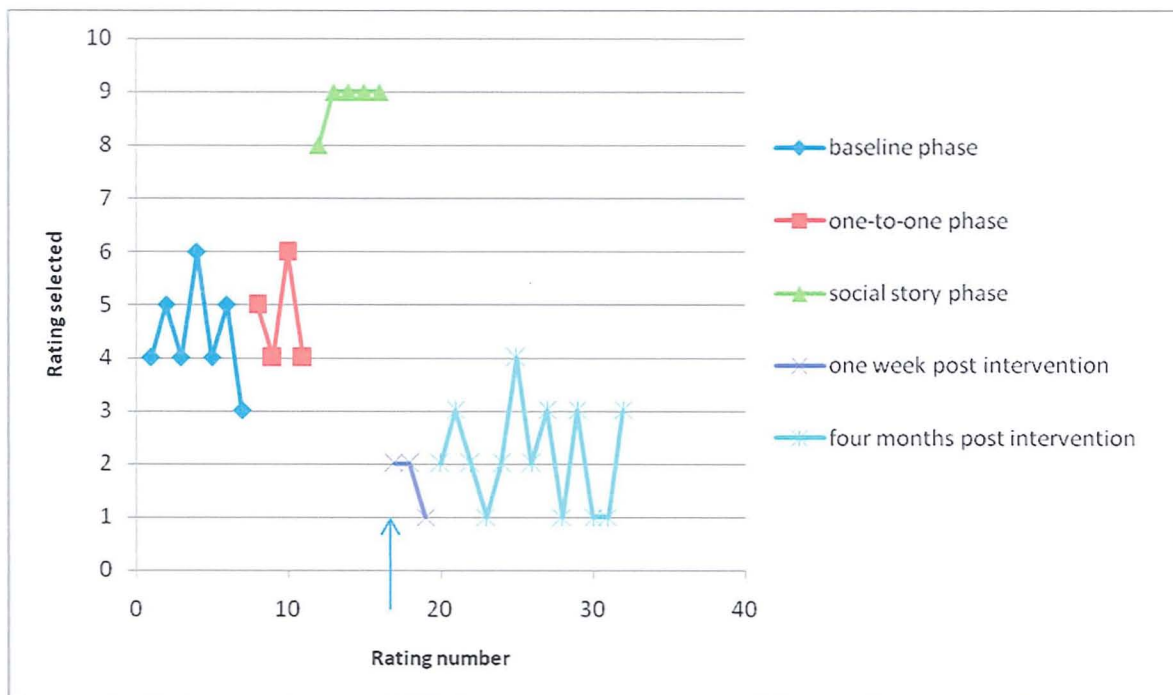
Connor's TA perceived the intensity of his behaviour to increase over the intervention period, then decrease to below the baseline level. This was maintained after 4 months.

### ***Anxiety***

Figure 2 presents the anxiety ratings which Connor made on the Likert scale throughout the different phases of the study.

Figure 2

*Connor's anxiety ratings across the study phases*



(Arrow indicates point at which TA withdrew from working with Connor in the classroom – see Discussion chapter).

The mean and SD for each phase of the data are presented in Table 4.

Table 4

*Means and SDs of Connor's anxiety ratings*

Phase of study	Mean	SD
Baseline	4.4	1.0
One-to-one attention	4.8	1.0
Social story intervention	8.8	0.4
One week post intervention	1.7	0.6
Four months post intervention	2.2	1.0

Figure 2 indicates that Connor perceived his anxiety levels to be similar in the baseline phase (mean: 4.4, SD: 1.0) to the one-to-one attention phase (mean: 4.8, SD: 1.0). He rated his anxiety as higher in the social story intervention phase (mean: 8.8, SD: 0.4). PAND calculations could not be conducted to compare the baseline to intervention phase statistically, since insufficient anxiety ratings were made by Connor in the intervention phase due to his limited cooperation at this time.

In the week following the withdrawal of the intervention, Connor rated his anxiety as lower than the original baseline level (mean: 1.7, SD: 0.6). A similar level of anxiety was reported 4 months post intervention (mean: 2.2, SD: 1.0). PAND calculations indicated a significant reduction in anxiety between the

baseline phase and 4 months post intervention:  $\Phi = 0.6$ ,  $p < 0.05$  (CIs: 0.40 to 0.69).

The outcomes of Connor's BAI-Y are presented in Table 5.

Table 5

*BAI-Y data for Connor*

Stage in study questionnaire completed	BAI-Y completed			Level of anxiety indicated
	by:	Raw score	T score	
Pre-intervention (one-to-one attention phase)	Child	14	49	Average
One week post intervention	Child	5	39	Average
Four months post intervention	Child	11	46	Average

The BAI-Y data indicate that Connor's level of anxiety in all phases was within the "average range". Consistent with the Likert ratings Connor rated his anxiety as decreasing one week post intervention. Four months post intervention Connor rated his anxiety as being slightly lower than baseline, and this is consistent with his Likert data.

Table 6

*BAI-Y data for Connor according to types of anxiety reported*

	Social anxiety	Obsessive compulsive symptoms	Separation anxiety	Panic symptoms	Cognitive misattributions of somatic sensations
Baseline phase	1	3	1	0	1
One week post intervention	0	1	2	1	0
Four months post intervention	1	2	2	2	1

In terms of type of anxiety reported, Connor showed small fluctuations across the study.

Connor's TA rated the intensity of his anxiety throughout the study from 1 (low) to 10 (high). These ratings are presented in Table 7.

Table 7

*TA's intensity ratings regarding Connor's anxiety*

Participant	Baseline phase	Intervention phase	One week post intervention	Four months post intervention
Connor	7	10	6	6

The intensity of Connor's anxiety increased in the intervention phase and then reduced to slightly below the baseline level.

In summary, Connor's time spent distressed and his level of anxiety both increased with the introduction of the social story intervention and reduced when it was withdrawn. There was a high level of agreement between all measures taken. The reduction in anxiety was significant between the baseline phase and 4 months post intervention.

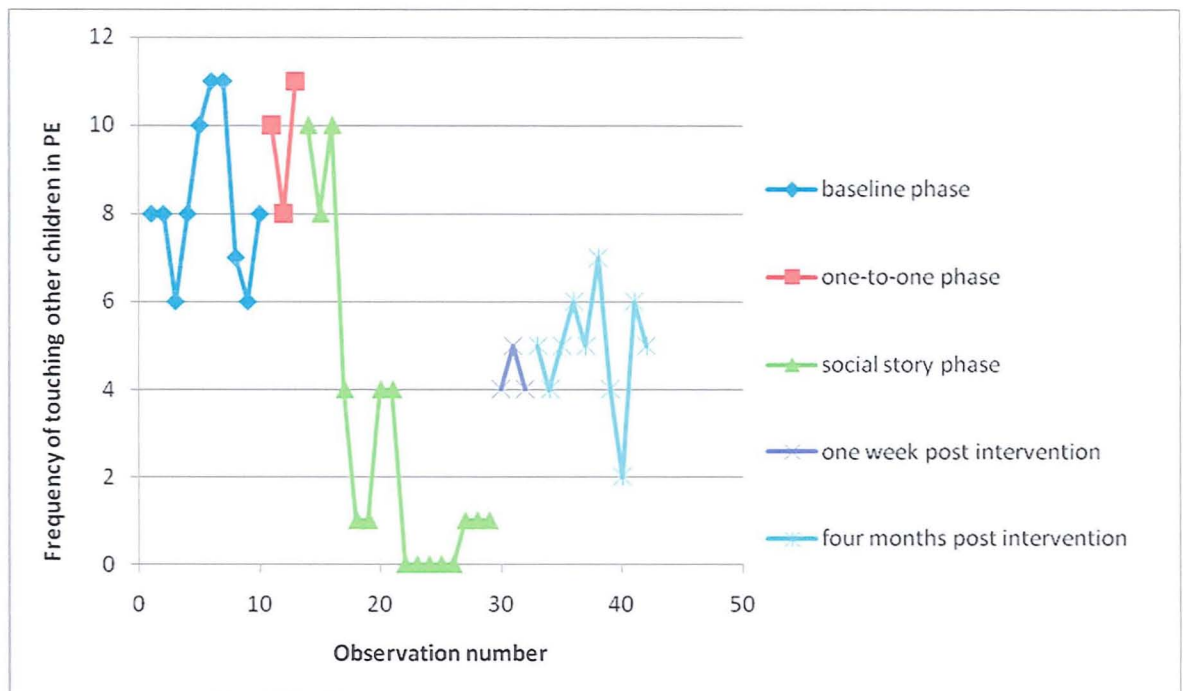
### **3.1.2 Luke**

#### ***Behaviour***

Figure 3 presents the frequency data of Luke touching other children in PE lessons.

Figure 3

*Luke's frequency of target behaviour across the study phases*



The means and SDs for each phase of the data are presented in Table 8.



Table 8

*Means and SDs of Luke's target behaviour*

Phase of study	Mean	SD
Baseline	8.3	1.8
One-to-one attention	9.7	1.5
Social story intervention	2.8	4.2
One week post intervention	4.3	0.6
Four months post intervention	4.9	1.4

There was little change in Luke's behaviour from the baseline phase (mean: 8.3, SD: 1.8) to the one-to-one attention phase (mean: 9.7, SD: 1.5), indicating that the process of reading a fictitious story had little impact on the frequency of Luke touching other children in PE.

After three data points in the social story intervention phase Luke's behaviour reduced to almost extinction, although it was somewhat variable (mean: 2.8, SD: 4.2). This reduction from baseline to the intervention phase was highly significant:  $\Phi = 0.8$ ,  $p < 0.01$  (CIs: 0.50 to 0.91).

In the one week post intervention phase the frequency of Luke's touching behaviour increased (mean: 4.3, SD: 0.6). A similar level was maintained 4 months after the intervention (mean: 4.9, SD: 1.4). Although the behaviour increased after the intervention was faded, it did not return to its original

baseline level. Luke's behaviour remained significantly lower four months post intervention than in the baseline phase:  $\Phi = 0.7$ ,  $p < 0.01$  (0.56 to 0.80).

Luke's TA rated the intensity of his touching behaviour throughout the study from 1 (low) to 10 (high). These ratings are presented in Table 9.

Table 9

*TA's intensity ratings regarding Luke's behaviour*

Participant	Baseline phase	Intervention phase	One week post intervention	Four months post intervention
Luke	8	3	3	3

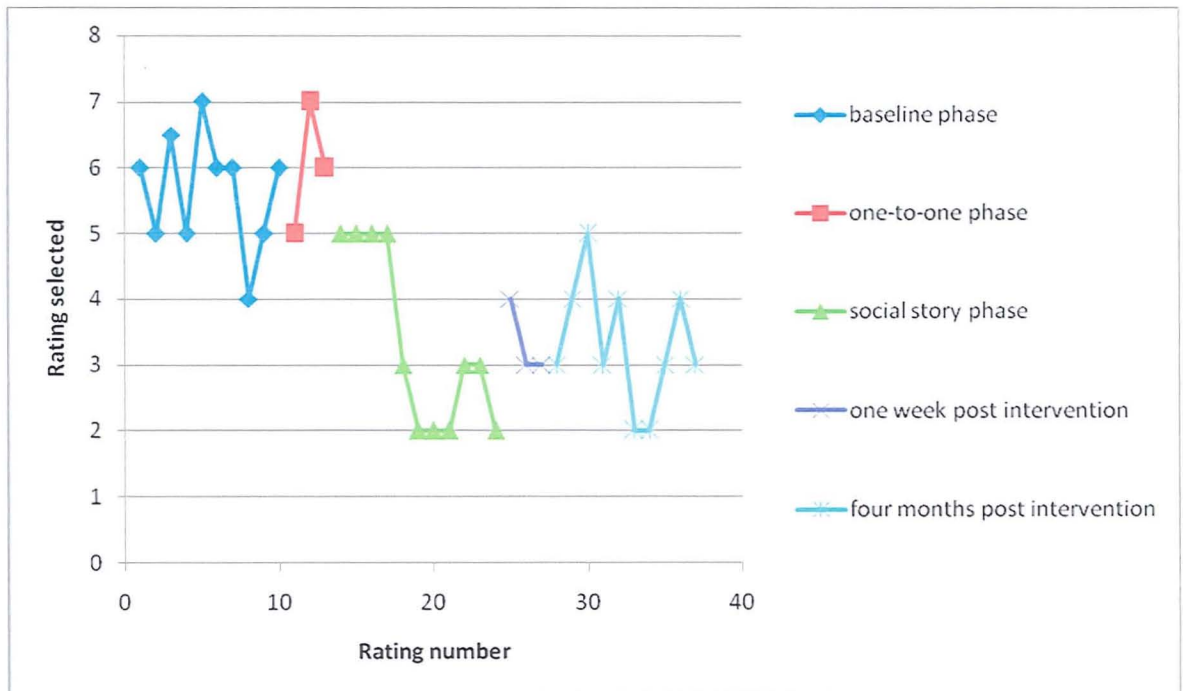
Luke's TA perceived the intensity of his touching to reduce during the intervention and this was maintained 4 months later.

### ***Anxiety***

Figure 4 presents the anxiety ratings which Luke made on the Likert scale throughout the different phases of the study.

Figure 4

*Luke's anxiety ratings across the study phases*



The means and SDs for each phase of the data are presented in Table 10.

Table 10

*Means and SDs of Luke's anxiety ratings*

Phase of study	Mean	SD
Baseline	5.7	0.9
One-to-one attention	6.0	1.0
Social story intervention	3.4	1.4
One week post intervention	3.3	0.6
Four months post intervention	3.3	1.0

Figure 4 indicates that Luke perceived his anxiety levels to be similar in the baseline phase (mean: 5.7, SD: 0.9) and the one-to-one attention phase (mean: 6.0, SD: 1.0). Overall in the social story phase he rated his anxiety as being significantly lower than in the baseline phase (mean: 3.4, SD: 1.4),  $\Phi = 0.6$ ,  $p < 0.05$  (CIs: 0.27 to 0.82).

In the week following the withdrawal of the intervention Luke rated his anxiety at a similar level to that in the intervention phase (mean: 3.3, SD: 0.6) and this level was maintained 4 months post intervention (mean: 3.3, SD: 1.0). Luke rated his anxiety as significantly lower 4 months post intervention compared to the baseline phase:  $\Phi = 0.6$ ,  $p < 0.05$  (CIs: 0.45 to 0.72).

The outcomes of Luke's BAI-Y questionnaire are presented in Table 11.

Table 11

*BAI-Y data for Luke*

Stage in study questionnaire completed	BAI-Y			Level of anxiety indicated
	completed by:	Raw score	T score	
Pre intervention (one-to-one attention phase)	Child	16	48	Average
One week post-intervention	Child	11	44	Average
Four months after intervention	Child	11	44	Average

Luke's anxiety was within the "average" range throughout the study. The data show a slight decrease in anxiety one week post intervention, and this was maintained 4 months later.

Table 12

*BAI-Y scores for Luke according to types of anxiety reported*

	Social anxiety	Obsessive compulsive symptoms	Separation anxiety	Panic symptoms	Cognitive misattributions of somatic sensations
Baseline phase	2	3	4	1	3
One week post intervention	2	1	2	1	1
Four months post intervention	2	1	2	1	1

In terms of the types of anxiety reported, Luke showed small decreases in obsessive compulsive symptoms, separation anxiety and cognitive misattributions of somatic sensations.

Luke's TA rated the intensity of his anxiety throughout the study from 1 (low) to 10 (high). These ratings are presented in Table 13.

Table 13

*TA's intensity ratings regarding Luke's anxiety*

Participant	Baseline phase	Intervention phase	One week post intervention	Four months post intervention
Luke	5	4	4	4

Luke's TA perceived the intensity of his anxiety to reduce marginally following the intervention, and this was maintained 4 months later.

In summary, Luke's touching behaviour and his anxiety were found to decrease significantly in the intervention phase, and this significance was maintained after 4 months. A reduction was reported in the intensity of his behaviour and a small reduction was reported in his anxiety.

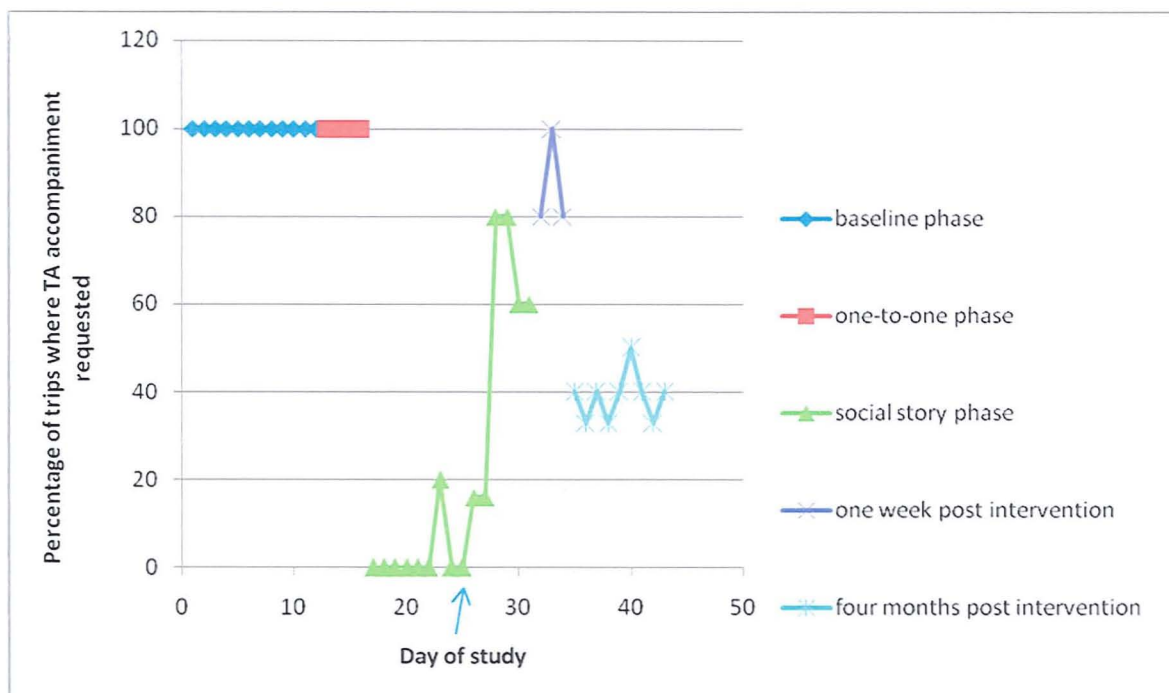
### **3.1.3 Lewis M**

#### ***Behaviour***

Figure 5 presents the percentage of daily trips to the toilet where TA accompaniment was requested across study phases.

Figure 5

*Lewis M's frequency of target behaviour across the study phases*



(Arrow indicates point at which Lewis M's TA went on Jury service and was replaced by a different TA – see Discussion chapter).

The means and SDs for each phase of the data are presented in Table 14.



Table 14

*Means and SDs of Lewis M's target behaviour*

Phase of study	Mean	SD
Baseline	100	0
One-to-one attention	100	0
Social story intervention	21.1	31.1
One week post intervention	86.7	11.5
Four months post intervention	38.7	5.1

There was no change in Lewis M's behaviour in the baseline phase (mean: 100, SD: 0) and one-to-one attention phase (mean: 100, SD: 0). These phases indicate that his behaviour pre-intervention had a very high level of stability.

Figure 5 indicates that when the social story was introduced Lewis was immediately able to go to the toilet without a TA. This new behaviour was maintained for 6 days, after which he began occasionally requesting the presence of a TA (mean: 21.1, SD: 31.1). The intervention phase shows a highly significant behavioural improvement in comparison to the baseline phase:  $\Phi = 1$ ,  $p < 0.01$  (CIs: 0.82 to 1.00), although the variability in the intervention phase was high. This is considered further in the Discussion chapter (section 4.3).

Lewis M's level of requesting a TA to accompany him to the toilet remained high in the one week post intervention phase (mean: 86.7, SD: 11.5), although this was on average lower than the baseline and one-to-one attention phases. By 4 months post intervention phase Lewis M was consistently going to the toilet by himself more frequently (mean: 38.7, SD: 5.1). This was a highly significant improvement from the baseline level ( $\Phi = 1$ ,  $p < 0.01$ , CIs: 0.95 to 1.00), although no return was made to the level of improvement seen when the social story was initially introduced.

Lewis M's TA rated the intensity of his behaviour throughout the study from 1 (low) to 10 (high). These ratings are presented in Table 15.

Table 15

*TA's intensity ratings regarding Lewis M's behaviour*

Participant	Baseline phase	Intervention phase	One week post intervention	Four months post intervention
Lewis M	6	5	5	5

The data indicate that Lewis M's TA perceived the intensity of him requesting a TA to take him to the toilet reduced marginally during the intervention phase and this was maintained 4 months later.

## Anxiety

Figure 6 presents the positive and negative face choices which Lewis M made throughout the different phases of the study.

Figure 6

*Lewis M's faces choices across the study phases*

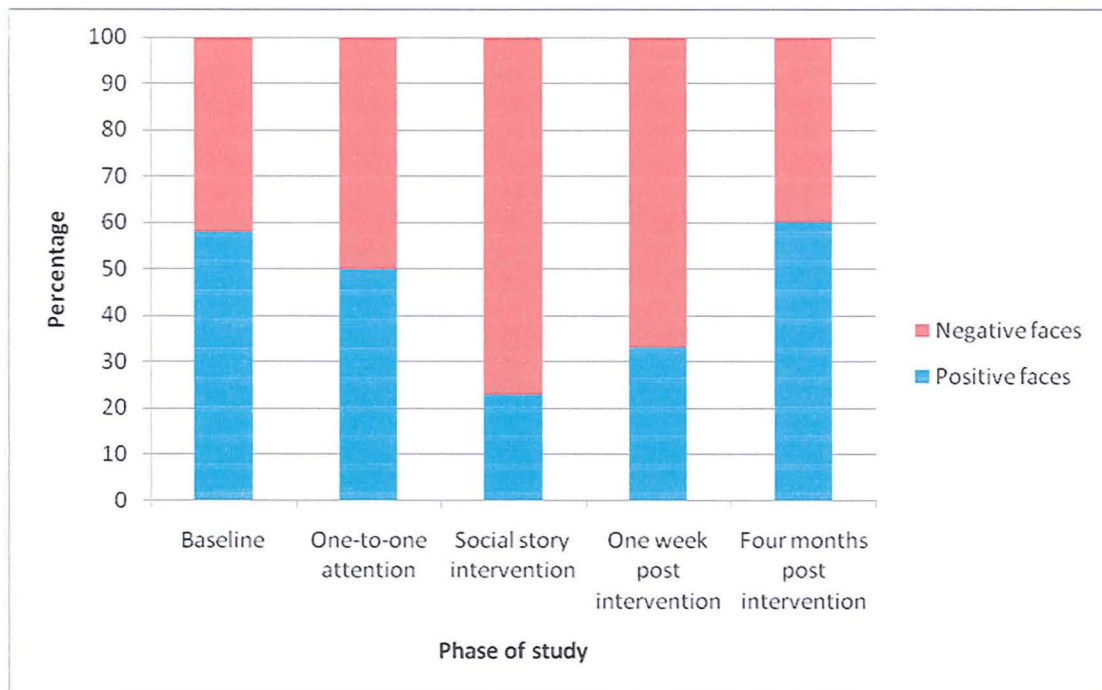


Figure 6 indicates that Lewis M's frequency of selecting negative faces was similar in the baseline phase (42%) and one-to-one attention phase (50%). His choice of negative faces increased in the social story intervention phase (77%) and then reduced slightly in the one week post intervention phase (67%). By the 4 months post intervention phase his choice of negative faces had returned to baseline level (40%).

The outcomes of Lewis M's BAI-Y questionnaire are presented in Table 16.

Table 16

*BAI-Y data for Lewis M*

Stage in study questionnaire completed	BAI-Y			Level of anxiety indicated
	completed by:	Raw score	T score	
Pre-intervention	Parent	10	42	Average
One week post-intervention	Parent	13	45	Average
Four months post intervention	Parent	13	45	Average

Lewis M's level of anxiety throughout the study was in the "average" range. A slight increase in anxiety is indicated immediately following the intervention, and this was maintained 4 months post intervention.

Table 17

*BAI-Y scores for Lewis M according to types of anxiety reported*

	Social anxiety	Obsessive compulsive symptoms	Separation anxiety	Panic symptoms	Cognitive misattributions of somatic sensations
Baseline phase	2	0	4	0	1
One week post intervention	3	0	3	4	1
Four months post intervention	2	0	3	2	1

Regarding types of anxiety reported, Lewis M showed slight decreases in social anxiety and separation anxiety and an increase in panic symptoms.

Lewis M's TA rated the intensity of his anxiety throughout the study from 1 (low) to 10 (high). These ratings are presented in Table 18.

Table 18

*TA's intensity ratings regarding Lewis M's anxiety*

Participant	Baseline phase	Intervention phase	One week post intervention	Four months post intervention
Lewis M	7	7	7	7

Lewis M's TA perceived no change in the intensity of his anxiety.

In summary, a significant improvement was seen in Lewis M's toileting independence in the intervention phase in comparison with the baseline phase. Although the graph indicates that Lewis M's behaviour fluctuated, this improvement was maintained to a significant level 4 months after the intervention, in comparison to the baseline. A small increase in anxiety was recorded during the intervention phase (faces choices) and one week post intervention (BAI-Y). The intensity of his behaviour reduced slightly when the intervention was introduced. There was no change in the intensity of his anxiety.

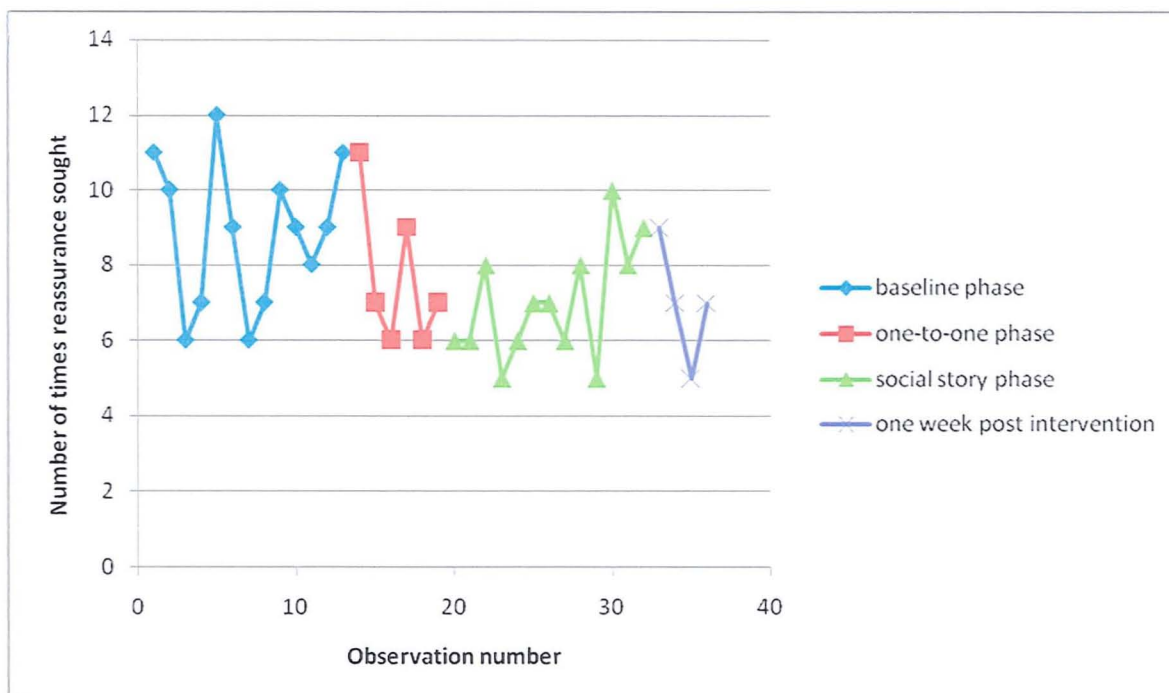
### 3.1.4 Lewis J

#### ***Behaviour***

Figure 7 presents the number of times Lewis J sought reassurance from the TA.

Figure 7

*Lewis J's frequency of target behaviour across the study phases*



The means and SDs for each phase of the data are presented in Table 19.

Table 19

*Means and SDs of Lewis J's target behaviour*

Phase of study	Mean	SD
Baseline	8.8	2.0
One-to-one attention	7.7	2.0
Social story intervention	7.0	1.5
One week post intervention	7.0	1.6

Figure 7 indicates that there was little change in the frequency in which Lewis J requested reassurance from the TA across the baseline phase (mean: 8.8, SD: 2.0), one-to-one attention phase (mean: 7.7, SD: 2.0), intervention phase (mean: 7.0, SD: 1.5) and the one week post intervention phase (mean: 7.0, SD: 1.6).

The difference between the baseline and intervention phases was non-significant (Phi= 0.2,  $p=.239$ , CIs: -0.09-0.51).

Lewis J's TA rated the intensity of his requesting reassurance from 1 (low) to 10 (high). This is presented in Table 20.



Table 20

*TA's intensity ratings regarding Lewis J's behaviour*

Participant	Baseline phase	Intervention phase	One week post intervention
Lewis J	6	6	6

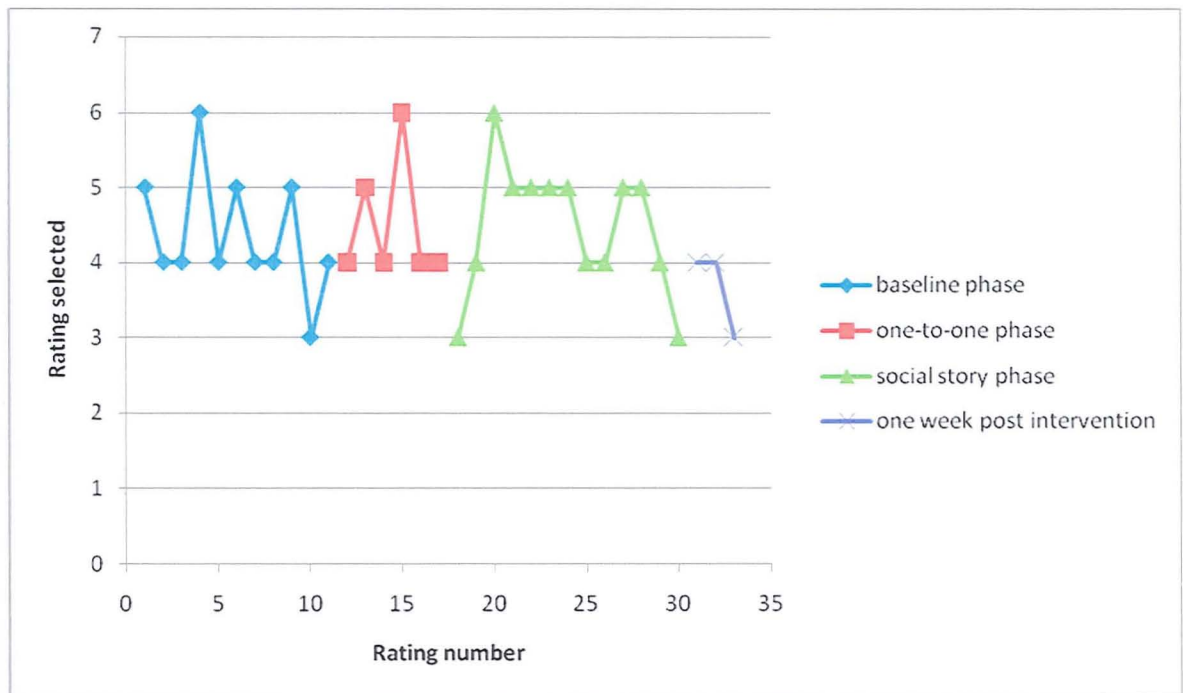
Lewis J's TA perceived no change in the intensity of his behaviour during or following the intervention.

### ***Anxiety***

Figure 8 presents the anxiety ratings which Lewis J made on the Likert scale throughout the different phases of the study.

Figure 8

*Lewis J's anxiety ratings across the study phases*



The means and SDs for each phase of the data are presented in Table 21.

Table 21

*Means and SDs of Lewis J's anxiety ratings*

Phase of study	Mean	SDs
Baseline	4.4	0.8
One-to-one attention	4.5	0.8
Social story intervention	4.5	0.9
One week post intervention	3.7	0.6

Figure 8 indicates that very little difference was seen in Lewis J's anxiety ratings across the baseline phase (mean: 4.4, SD: 0.8), one-to-one attention phase (mean: 4.5, SD: 0.8), intervention phase (mean: 4.5, SD: 0.9) and the one week post intervention phase (mean: 3.7, SD: 0.6). The change in anxiety ratings between the baseline and intervention phase was non-significant ( $\Phi = 0.07$   $p = .848$ , CIs: -0.25 -0.39).

The outcome of Lewis J's BAI-Y questionnaire are presented in Table 22.

Table 22

*BAI-Y data for Lewis J*

Stage in study questionnaire completed	BAI-Y			Level of anxiety indicated
	completed by:	Raw score	T score	
Pre-intervention	Child	30	62	Moderately elevated
One week post-intervention	Child	28	60	Moderately elevated

Lewis J's level of anxiety throughout the study was "moderately elevated."

Table 23

*BAI-Y scores for Lewis J according to types of anxiety reported*

	Social anxiety	Obsessive compulsive symptoms	Separation anxiety	Panic symptoms	Cognitive misattributions of somatic sensations
Baseline phase	2	8	7	5	7
One week post intervention	2	8	5	4	7

Regarding types of anxiety reported, small reductions were seen in Lewis J's separation anxiety and panic symptoms.

Lewis J's TA rated the intensity of his anxiety from 1 (low) to 10 (high). These are presented in Table 24.

Table 24

*TA's intensity ratings regarding Lewis J's anxiety*

Participant	Baseline phase	Intervention phase	One week post intervention
Lewis J	6	6	6

Lewis J's TA perceived no change in the intensity of his anxiety during or following the intervention.

In summary, very little change was found in Lewis J's behaviour or anxiety throughout the study.

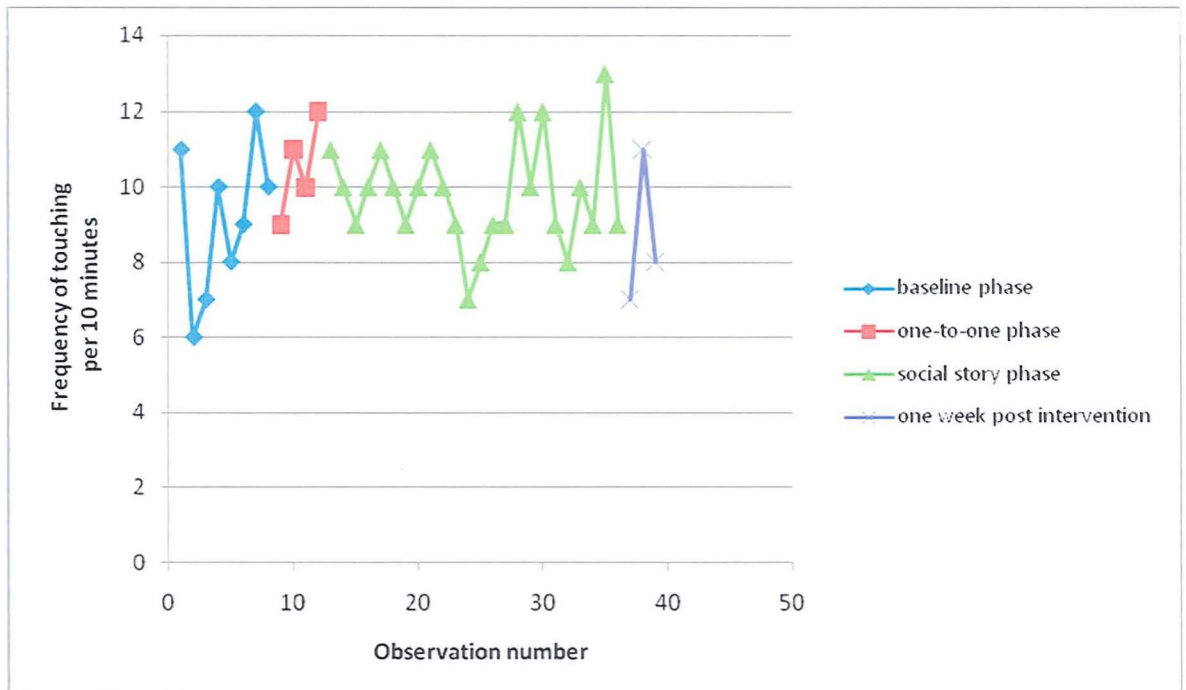
### **3.1.5 Bailey**

#### ***Behaviour***

Figure 9 presents Bailey's frequency of touching other children during playtime across study phases.

Figure 9

*Bailey's frequency of target behaviour across the study phases*



The means and SDs for each phase of the data are presented in Table 25.

Table 25

*Means and SDs of Bailey's target behaviour*

Phase of study	Mean	SD
Baseline	9.1	2.0
One-to-one attention	10.5	1.3
Social story intervention	9.8	1.4
One week post intervention	8.7	2.1

The data indicate that there was little change in Bailey's touching behaviour across the baseline phase (mean: 9.1, SD: 2.0), one-to-one attention phase (mean 10.5, SD: 1.3), intervention phase (mean: 9.8, SD: 1.4) and one week post intervention phase (mean: 8.7, SD: 2.1). The difference between Bailey's behaviour in the baseline and intervention phases was non-significant (Phi= 0.3,  $p=.059$ , CIs: 0.04 to 0.60).

Bailey's TA rated the intensity of his touching behaviour throughout the study from 1 (low) to 10 (high). These are presented in Table 26.

Table 26

*TA's intensity ratings regarding Bailey's behaviour*

Participant	Baseline phase	Intervention phase	One week post intervention
Bailey	6	6	6

Bailey's TA perceived no change in the intensity of his behaviour during or following the intervention.

### ***Anxiety***

Figure 10 presents the positive and negative faces that Bailey selected throughout the different phases of the study.



Figure 10

*Bailey's faces choices across the study phases*

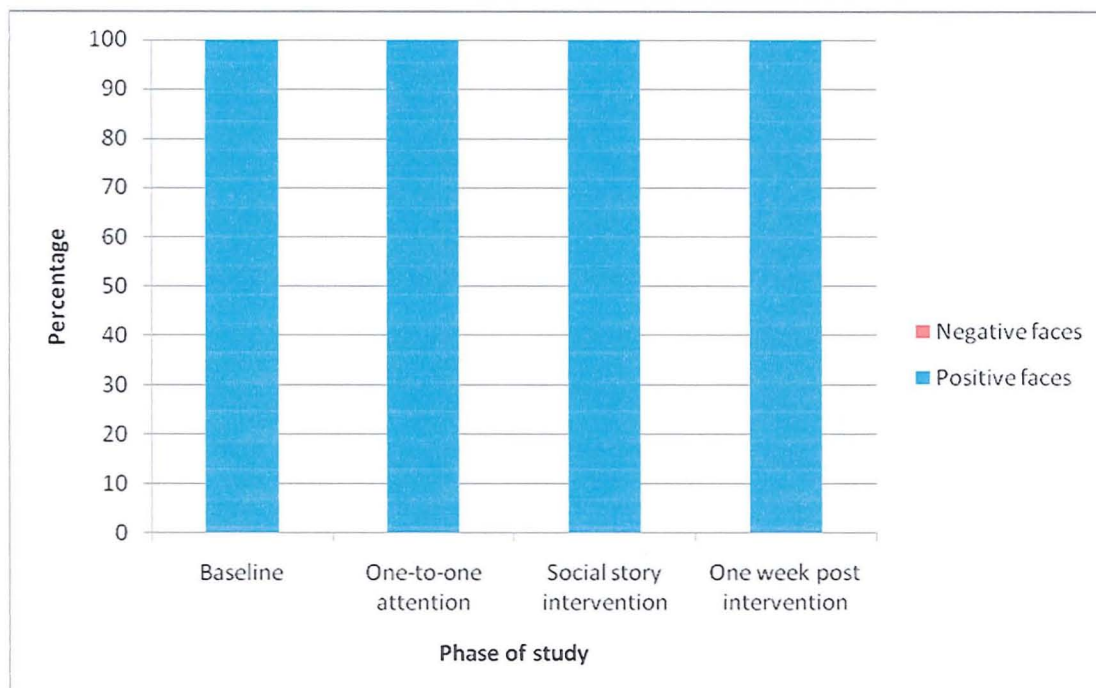


Figure 10 indicates that Bailey selected the positive face at all given opportunities.

The outcomes of Bailey's BAI-Y questionnaire are presented in Table 27.

Table 27

*BAI-Y data for Bailey*

Stage in study questionnaire completed	BAI-Y completed			Level of anxiety indicated
	by:	Raw score	T score	
Pre-intervention	Parent	13	45	Average
One week post-intervention	Parent	11	43	Average

Bailey's anxiety was within the "average" range throughout the study.

Table 28

*BAI-Y scores for Bailey according to type of anxiety reported*

	Social anxiety	Obsessive compulsive symptoms	Separation anxiety	Panic symptoms	Cognitive misattributions of somatic sensations
Baseline phase	2	3	3	0	2
One week post intervention	1	3	2	0	2

Bailey showed small reductions in social anxiety and separation anxiety according to parental reports.

Bailey's TA rated the intensity of his anxiety from 1 (low) to 10 (high). These are presented in Table 29.

Table 29

*TA's intensity ratings relating to Bailey's anxiety*

Participant	Baseline phase	Intervention phase	One week post intervention
Bailey	5	5	5

Bailey's TA perceived no change in the intensity of his anxiety.

In summary, very little change was seen in Bailey's behaviour or anxiety throughout the study.

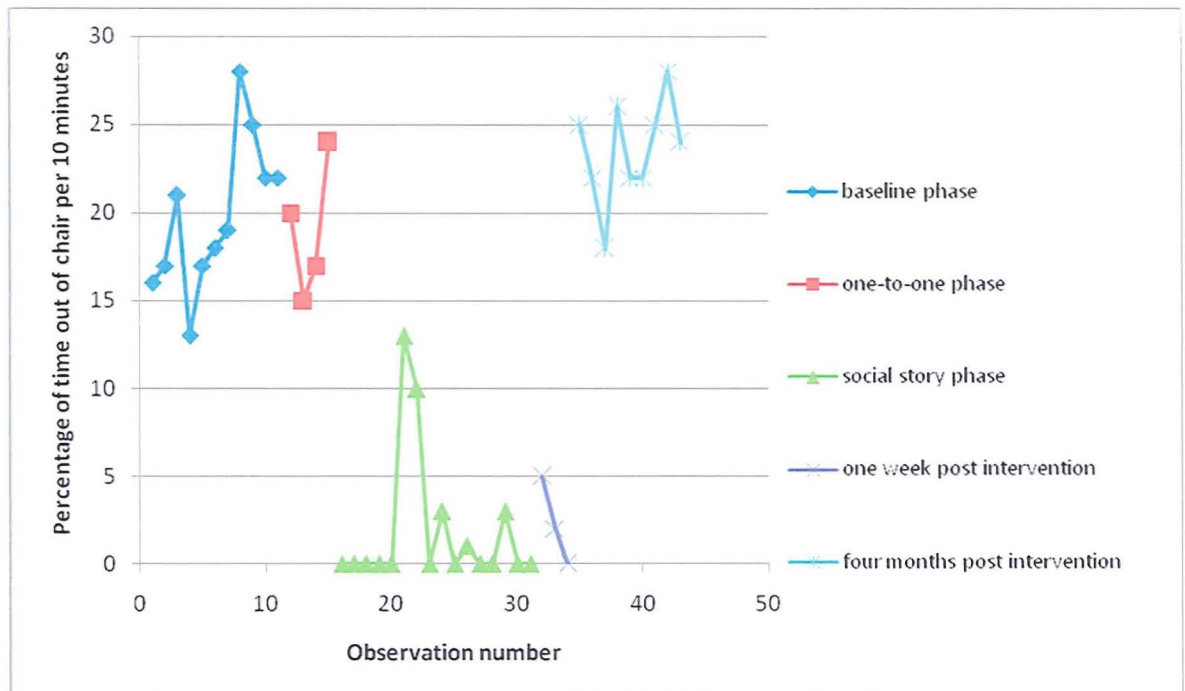
### **3.1.6 Sebastian**

#### ***Behaviour***

Figure 11 presents Sebastian's duration of time spent out of his chair during morning table-top activities across study phases.

Figure 11

*Sebastian's duration of target behaviour across the study phases*



The means and SDs for each phase of the data are presented in Table 30.

Table 30

*Means and SDs of Sebastian's behaviour*

Phase of study	Mean	SD
Baseline	19.8	4.3
One-to-one attention	19	3.9
Social story intervention	1.9	3.9
One week post intervention	2.3	2.5
Four months post intervention	23.6	2.9

There was little change in Sebastian's behaviour from the baseline phase (mean: 19.8, SD 4.3) to the one to-one attention phase (mean: 19, SD: 3.9). Sebastian's time out of his chair reduced immediately when the social story was implemented, and despite some fluctuation, his out-of-chair behaviour was significantly lower in the intervention phase (mean: 1.9, SD: 3.9) than in the baseline phase ( $\Phi = 1$ ,  $p < 0.01$ , CIs: 0.81 to 1.00). A similarly low level was maintained one week post intervention (mean: 2.3, SD: 2.5). Four months post intervention Sebastian's time spent out of his chair had increased to slightly higher than the baseline level (mean: 23.6, SD: 2.9) and this was not significantly different from the baseline ( $\Phi = 0.3$ ,  $p = .211$ , CIs: 0.13 to 0.44).

Sebastian's TA rated the intensity of his behaviour throughout the study from 1 (low) to 10 (high). These are presented in Table 31.

Table 31

*TA's intensity ratings regarding Sebastian's behaviour*

Participant	Baseline phase	Intervention phase	One week post intervention	Four months post intervention
Sebastian	5	4	4	5

Sebastian's TA perceived a small reduction in the intensity of his behaviour during the intervention. This returned to the baseline level after 4 months.

### ***Anxiety***

Figure 12 presents the positive and negative face choices which Sebastian made throughout the different phases of the study.

Figure 12

*Sebastian's faces choices across the study phases*

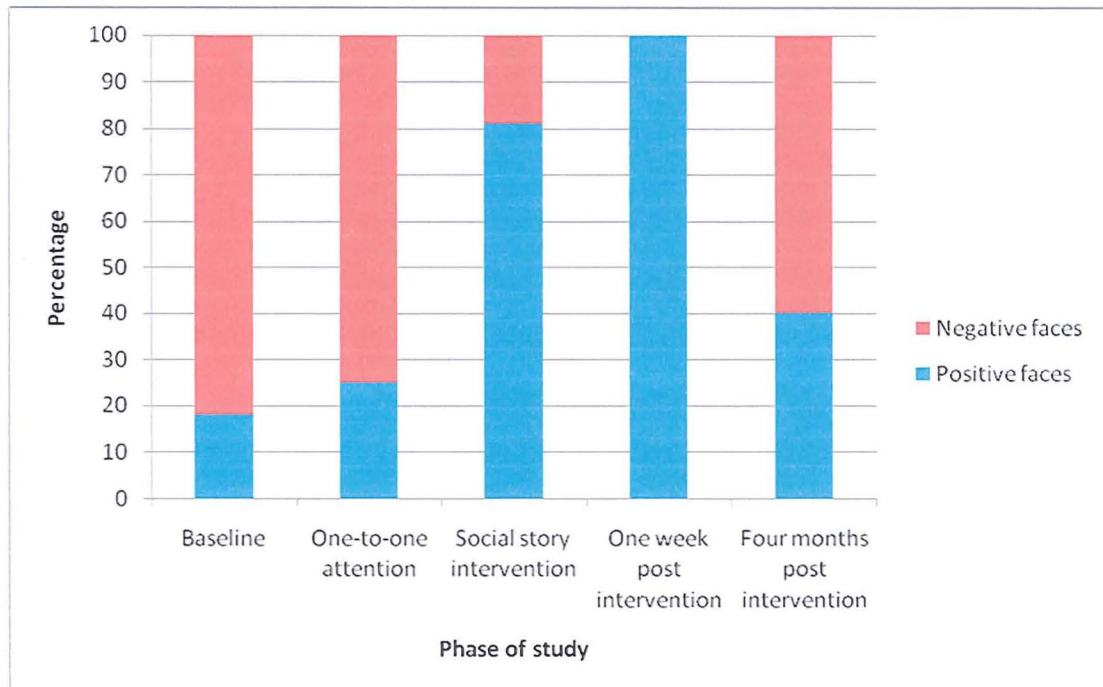


Figure 12 indicates that Sebastian's frequency of selecting negative faces was similar in the baseline phase (82%) to the one-to-one attention phase (75%). His choice of negative faces decreased substantially in the intervention phase (19%) and continued to do so into the one week post intervention phase (0%). In the 4 months post intervention phase his frequency of selecting negative faces was higher (60%), although it did not reach the original baseline level.

The outcomes of Sebastian's BAI-Y questionnaire are presented in Table 32.

Table 32

*BAI-Y data for Sebastian*

Stage in study questionnaire completed	BAI-Y			Level of anxiety indicated
	completed by:	Raw score	T score	
Pre-intervention	Parent	3	36	Average
One week post-intervention	Parent	3	36	Average
Four months after intervention	Parent	3	36	Average

Sebastian's anxiety was within the "average" range throughout the study.

Table 33

*BAI-Y scores for Sebastian according to types of anxiety reported*

	Social anxiety	Obsessive compulsive symptoms	Separation anxiety	Panic symptoms	Cognitive misattributions of somatic sensations
Baseline phase	0	0	3	0	0
One week post intervention	0	0	3	0	0

Sebastian showed no changes in types of anxiety reported.



Sebastian's TA rated the intensity of his anxiety throughout the study from 1 (low) to 10 (high). These are presented below:

Table 34

*TA's intensity ratings regarding Sebastian's anxiety*

Participant	Baseline phase	Intervention phase	One week post intervention	Four months post intervention
Sebastian	6	3	3	5

Sebastian's TA perceived a decrease in the intensity of his anxiety during the intervention. This had increased slightly 4 months post intervention.

In summary, Sebastian's behaviour of leaving his chair decreased significantly in the intervention phase, although this improvement was not maintained after 4 months. Sebastian chose fewer negative faces in the intervention phase and one week post intervention, but this was also not maintained. His TA reported a decrease in the intensity of his anxiety with the intervention. No changes in anxiety were reported by his parents.

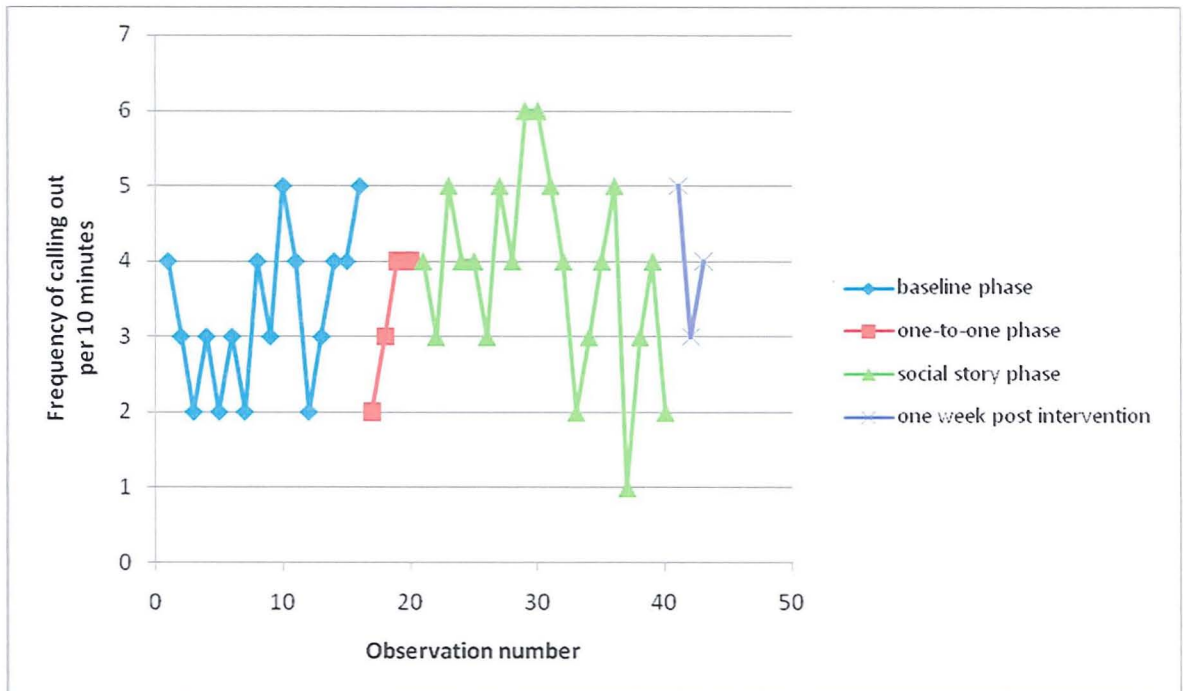
### **3.1.7 Harriet**

#### ***Behaviour***

Figure 13 presents Harriet's frequency of calling out in the classroom.

Figure 13

*Harriet's frequency of target behaviour across the study phases*



The means and SDs for each phase of the data are presented in Table 35.

Table 35

*Means and SDs of Harriet's target behaviour*

Phase of study	Mean	Standard deviation
Baseline	3.3	1.0
One-to-one attention	3.3	1.0
Social story intervention	3.9	1.3
One week post intervention	4.0	1.0

The data show that there was little change in Harriet's calling out behaviour across the baseline phase (mean: 3.3, SD: 1.0), one-to-one attention phase (mean: 3.3, SD: 1.0), intervention phase (mean: 3.9, SD: 1.3) and the one week post intervention phase (mean: 4.0, SD: 1.0). The difference between the baseline and intervention phases was non-significant ( $\Phi = 0.1$ ,  $p = .549$ , CIs: -0.17 to 0.36).

Harriet's TA rated the intensity of her calling out behaviour from 1 (low) to 10 (high). These are presented in Table 36.

Table 36

*TA's intensity ratings regarding Harriet's behaviour*

Participant	Baseline phase	Intervention phase	One week post intervention
Harriet	5	5	5

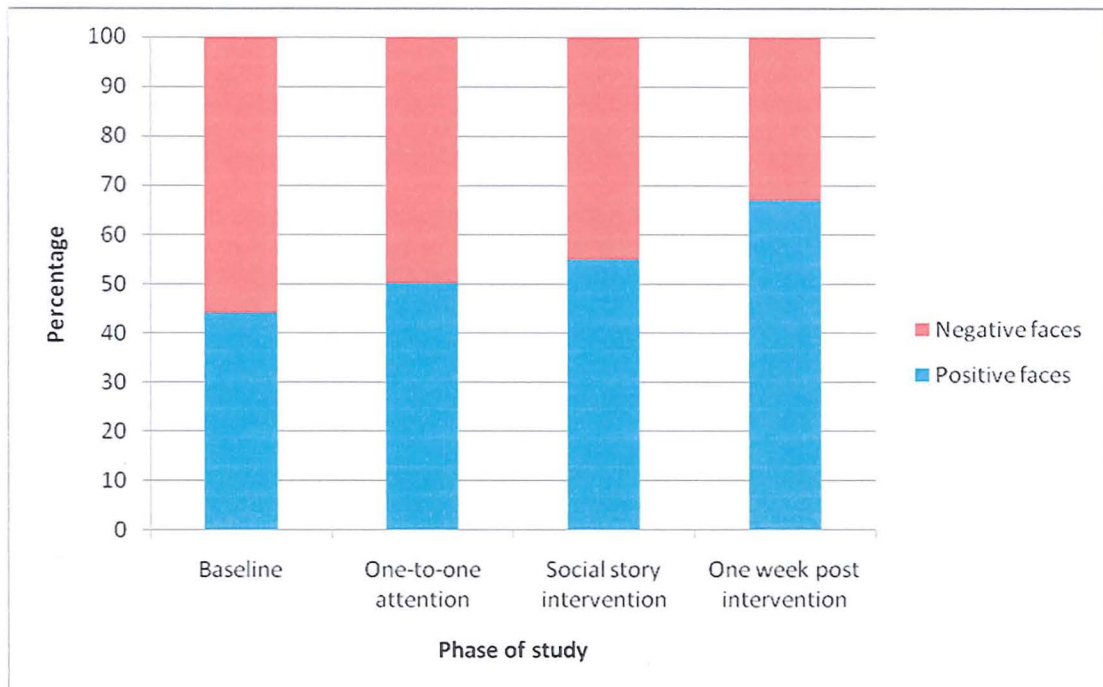
Harriet's TA perceived no change in the intensity of her behaviour.

### ***Anxiety***

Figure 14 presents the positive and negative face choices which Harriet made throughout the different phases of the study.

Figure 14

*Harriet's faces choices across the study phases*



The data indicate a small decrease in the percentage of negative faces chosen across each phase in turn: baseline (56%), one-to-one attention phase (50%), intervention phase (45%) and one week post intervention (33%).

The outcomes of Harriet's BAI-Y questionnaire data is presented in Table 37.

Table 37

*BAI-Y data for Harriet*

Stage in study questionnaire completed	BAI-Y completed			Level of anxiety indicated
	by:	Raw score	T score	
Pre-intervention	Parent	6	37	Average
One week post-intervention	Parent	3	34	Average

Throughout the study Harriet's anxiety was within the "average" range.

Table 38

*BAI-Y data for Harriet according to types of anxiety reported*

	Social anxiety	Obsessive compulsive symptoms	Separation anxiety	Panic symptoms	Cognitive misattributions of somatic sensations
Baseline phase	1	0	0	0	0
One week post intervention	1	0	1	0	0

Harriet showed very little change in the types of anxiety reported.

Harriet's TA rated the intensity of her anxiety throughout the study from 1(low) to 10 (high). These are presented below:

Table 39

*TA's intensity ratings regarding Harriet's anxiety*

Participant	Baseline phase	Intervention phase	One week post intervention
Harriet	5	5	5

Harriet's TA perceived no change in the intensity of her anxiety.

In summary, there was no significant change in Harriet's behaviour throughout the study. A very small reduction in anxiety was indicated with each phase of the study and parental completion of the BAI-Y.

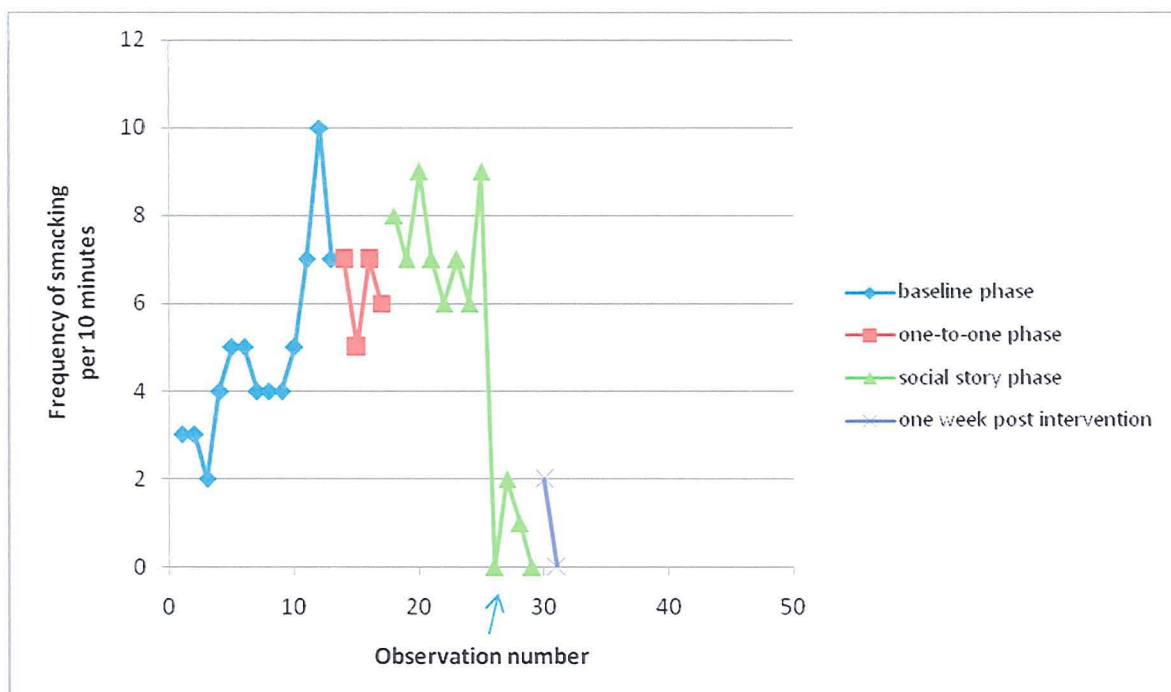
### 3.1.8 Emma

#### ***Behaviour***

Figure 15 presents Emma's frequency of smacking others in assembly.

Figure 15

*Emma's frequency of target behaviour across the study phases*



(Arrow indicates point at which structure was increased in the classroom – see Discussion chapter).

The means and SDs for each phase of the data are presented in Table 40.



Table 40

*Means and SDs of Emma's behaviour*

Phase of study	Mean	SD
Baseline	4.8	2.1
One-to-one attention	6.3	1.0
Social story intervention	5.2	3.4
One week post intervention	1.0	0.7

Figure 15 indicates that Emma's frequency of smacking was quite variable within the baseline phase (mean: 4.8, SD: 2.1). The means were similar across the baseline phase, one-to-one phase (mean: 6.3, SD: 1.0) and intervention phase (mean: 5.2, SD: 3.4). Emma's smacking decreased sharply after 8 data points in the intervention phase, and this was maintained one week post intervention (mean: 1.0, SD: 0.7). The difference between the baseline and intervention phase was non-significant ( $\Phi = 0.3$ ,  $p = .180$ , CIs: -0.05 to 0.55).

Emma's TA rated the intensity of her smacking from 1 (low) to 10 (high). These are presented in Table 41.

Table 41

*TA's intensity ratings regarding Emma's behaviour*

Participant	Baseline phase	Intervention phase	One week post intervention
Emma	7	7	5

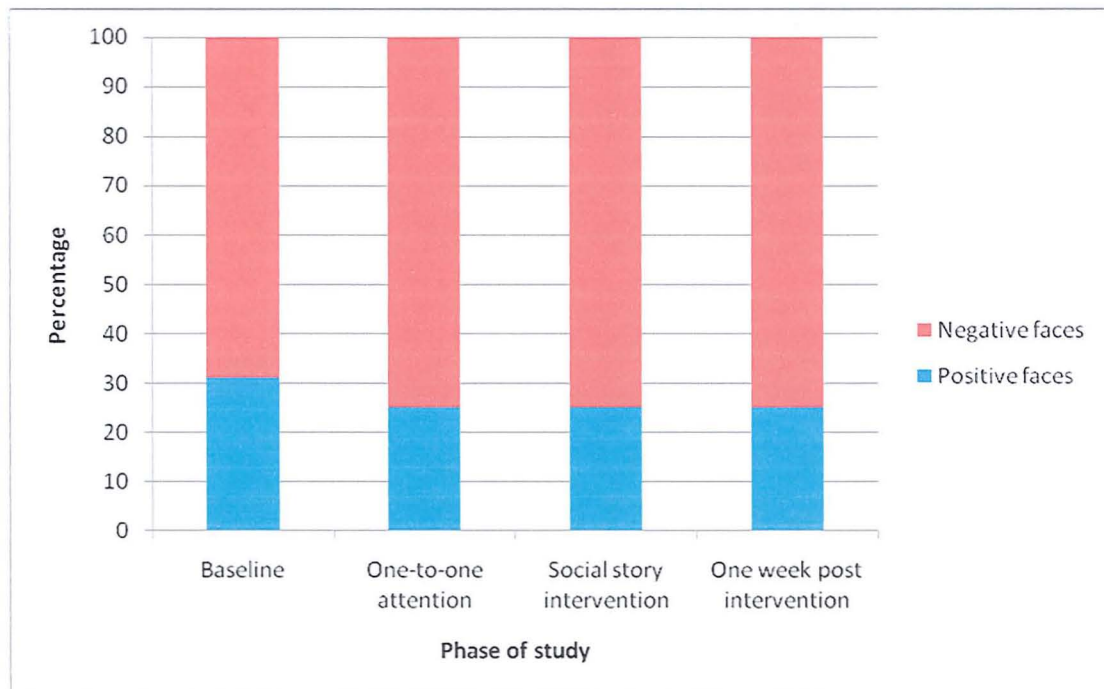
Emma's TA perceived a decrease in the intensity of her smacking following the intervention.

### ***Anxiety***

Figure 16 presents the positive and negative face choices which Emma made throughout the different phases of the study.

Figure 16

*Emma's faces choices across study phases*



Emma chose a similar number of negative faces across all study phases. Sixty-nine percent were negative in the baseline phase, and this marginally increased to 75% across the remaining phases.

The outcomes of Emma's BAI-Y questionnaire are presented in Table 42.

Table 42

*BAI-Y data for Emma*

Stage in study questionnaire completed	BAI-Y completed			Level of anxiety indicated
	by:	Raw score	T score	
Baseline phase	Parent	27	59	Mildly elevated
One week post-intervention	Parent	27	59	Mildly elevated

Emma's anxiety level was rated by her parents as being "mildly elevated" in both phases.

Table 43

*BAI-Y data for Emma according to types of anxiety reported*

	Social anxiety	Obsessive compulsive symptoms	Separation anxiety	Panic symptoms	Cognitive misattributions of somatic sensations
Baseline phase	3	3	6	5	1
One week post intervention	3	3	6	5	1

Emma showed no changes in types of anxiety reported.

Emma's TA rated the intensity of her anxiety from 1 (low) to 10 (high). These are presented in Table 44.

Table 44

*TA's intensity ratings regarding Emma's anxiety*

Participant	Baseline phase	Intervention phase	One week post intervention
Emma	7	7	4

Emma's TA perceived a decrease in the intensity of her anxiety following the intervention.

In summary, no significant difference was found between Emma's behaviour in the baseline and intervention phases. Her smacking frequency reduced substantially two thirds of the way through the intervention phase, and this was maintained one week post intervention. Emma's face choices showed little change across phases. Her parents reported no change in her anxiety level on the BAI-Y. Her TA reported a reduction in the intensity of her behaviour and anxiety one week post intervention.

Across all 8 participants the results indicate a wide variation in outcomes of the social story intervention. The factors which may underpin these different outcomes will be considered in the Discussion chapter.

### **3.2 Thematic analysis results**

Six themes were found to differentiate between the participants for whom the intervention was 'successful' and 'unsuccessful' (see Method section 2.11 for definition of these terms). These were:

- The TA perceiving existing management strategies to be sufficient prior to the intervention,
- The TA being concerned about the participant's behaviour/anxiety prior to the intervention,
- Difficulties arising with the practicalities of reading the social stories,
- The TA attributing success to the intervention,
- The TA perceiving that the intervention was inappropriate for the participant,
- Less prolonged use of the intervention being preferable in the future.

Appendix 19 presents the percentage of codes within each interview which fall into each theme. Two percentages are presented in cases where two TAs were interviewed regarding a participant.

This data indicate that the TAs of the participants for whom the intervention had little effect were more likely to believe that existing management strategies were sufficient before the intervention was implemented. These TAs also rarely indicated concern about the participant's behaviour and/or anxiety prior to the intervention. Compared to the TAs of participants for whom the intervention was

successful the TAs of participants with unsuccessful outcomes reported higher levels of difficulties surrounding the practicalities of reading the social stories. If success was seen they tended to attribute this to factors other than the intervention. They indicated more frequently that the intervention was inappropriate for their participant. The TAs of participants with successful outcomes were more likely to comment that the intervention phase was longer than needed and it could be reduced in length in the future.

### 3.3 Intervention Rating Profile-15 results

The outcomes of the IRP-15 questionnaires completed by the TAs are presented in Table 45.

Table 45

#### *Intervention Rating Profile results*

Participant assigned to the TA	TA's rating of the intervention (possible range 15-90)	Acceptability of intervention
Connor	48	Unacceptable
Lewis M	77	Acceptable
Lewis M	76	Acceptable
Lewis J	81	Acceptable
Lewis J	67	Acceptable
Luke	72	Acceptable
Harriet	84	Acceptable
Sebastian	83	Acceptable
Emma	48	Unacceptable
Bailey	87	Acceptable



Higher scores on the IRP-15 indicate a greater level of acceptability of the intervention. Scores above 52.50 are acceptable (Von Brock and Elliot 1987). According to this criterion 8 out of 10 TAs found the social story intervention acceptable. Connor's TA and Emma's TA rated the intervention to be unacceptable.

Data from the IRP-15 triangulates well with the interview data, which showed that Connor and Emma's TAs strongly believed the intervention was inappropriate for these participants. These views will be explored further in the following Discussion chapter.

### **Summary of results**

A high level of variability between the participant outcomes means that it is difficult to provide a concise summary of the findings. However, the main results were as follows:

#### ***Target behaviour***

- Three of the eight participants showed statistically significant improvements in terms of their target behaviour during the intervention phase. These participants were: Luke, Lewis M and Sebastian.
- These statistically significant improvements were maintained after 4 months for Luke and Lewis M.
- The TAs of Luke, Lewis M and Sebastian reported reductions in the intensity of their target behaviours in the intervention phase.

- Connor's TA reported that the intensity of his target behaviour increased in the intervention phase, and reduced post intervention. This was consistent with observational data.
- Little change was seen in the target behaviours of Harriet, Bailey and Lewis J throughout the study, in terms of observational data and TA intensity reports.
- Emma's target behaviour decreased sharply during the intervention phase and this was maintained one week post intervention. Her TA reported a reduction in the intensity of her behaviour post intervention.

### ***Anxiety***

- Of the three participants whose anxiety change was statistically analysed (Connor, Luke and Lewis J), only Luke showed a significant reduction in the intervention phase.
- Luke and Connor showed a significant reduction in anxiety 4 months post intervention in comparison to the baseline level.
- Connor and Lewis M showed increases in anxiety in the intervention phase.
- Sebastian's faces data indicated a reduction in negative affect in the intervention phase, which was partially maintained after 4 months.
- The TAs of Luke and Sebastian reported reductions in the intensity of their anxiety in the intervention phase.

- Emma's TA reported the intensity of her anxiety to reduce post intervention.
- Connor's TA reported that the intensity of his anxiety increased in the intervention phase and decreased post intervention.
- Little change was seen in the anxiety of Harriet, Emma and Bailey.
- Consistency was found between the BAI-Y, participant reports (using the faces or Likert scale) and TA anxiety reports for 6 of the 8 participants (Connor, Luke, Lewis J, Bailey Lewis M and Harriet). The participants' anxiety did not reduce in terms of the BAI-Y categories of severity.

### ***Thematic analysis***

Six themes were found to differentiate between the participants for whom the intervention was successful and unsuccessful. These related to TA beliefs and the practicalities of the intervention.

### ***IRP-15***

In total, 8 out of 10 TAs found the intervention acceptable.

## **CHAPTER 4: DISCUSSION**

This thesis sought to employ a rigorous single case study design with 8 participants to empirically investigate the following research questions:

- 1. Are social stories an effective intervention for promoting more positive behaviour and/or reducing the anxiety of children with a diagnosis of autism?*
- 2. Do these changes, if observed, endure over time?*
- 3. In the cases when social stories are effective, what factors appear to be relevant to their success?*

The first and second research questions were investigated empirically. The third is a secondary research question which will be deduced and inferred from the results, and will be considered later in the Discussion chapter (section number 4.4).

Before the first and second research questions are considered, a critique of the methodology will be presented.

### **4.1 Critique of methodology**

#### ***Issues relating to the design and methodology of the study***

##### ***The design***

The researcher originally planned a group comparison design whereby a larger sample of participants would be matched across groups to investigate the effect of different ratios of sentence types within social stories. One of these groups

would have formed a waiting-list control group. However, it was not possible to meaningfully match the participants available due to their heterogeneous profiles, therefore a single case study design was chosen.

This meant that the methodology needed to be adapted to suit the participants' abilities and needs. Therefore it is difficult to draw conclusions regarding social story effectiveness by combining data across participants for analysis, and hence generalising the findings to other children with autism is problematic. Ali and Frederickson (2006) argue that although the generalisability of findings is always a major question in single case designs, as the number and diversity of acceptable studies with this design accumulates so the confidence in consistent findings can increase. The author believes that the current study contributes to this evidence base.

### ***Choice of schools***

The schools who participated in the study were nominated by the PEP. These schools were chosen because the SENCOs were known to the PEP and were identified as helpful in nature and likely to be interested in the research. It could be argued that this may have created a bias towards the success of the intervention. In actuality the SENCOs were not closely involved in the daily delivery of the social stories, and the researcher believes that within each school the attitudes of the TAs towards the intervention were highly varied. Therefore the choice of schools probably had a limited impact on the outcomes, although the TAs' views of the intervention were important (see section 4.3).

### ***Selection of participants***

The participants for the study were selected by each school's SENCo. The researcher discussed with the SENCos the required criteria for participant selection including difficulties with behaviour and/or anxiety.

Although all participants selected by the SENCos had behaviour of concern, the levels of the participants' anxiety at the outset of the study were less of a concern. This became evident when the BAI-Y was completed in the pre-intervention phase. Only Emma and Lewis J had anxiety levels that were categorised as "elevated" by the BAI-Y. All other participants scores were within the "average" range for generalised anxiety.

The SENCos may have selected participants with behavioural difficulties rather than anxiety difficulties because pupils with behavioural difficulties create high levels of stress for teachers (Wilhelm, Dewhurst-Savellis and Parker 2000), and are therefore more salient to staff than those with anxiety difficulties. The low levels of anxiety amongst the participants in the pre-intervention phase means that conclusions cannot be drawn regarding the effectiveness of social stories in reducing extreme anxiety, and the majority of reductions seen currently therefore lacked clinical significance.

### ***Reviewing the social stories***

The involvement of TAs in reviewing the social stories created some difficulties. Once the researcher had written the draft versions of the social stories, the TA assigned to each participant read through the social story to suggest amendments to ensure the final version was highly suitable for the participant.

The TAs were chosen for this role due to their detailed knowledge of the participants. Only one TA (Lewis M's) suggested amendments. During the intervention phase and post intervention interviews it emerged that some TAs felt that the intervention, or aspects of it, were unsuitable for their designated participant.

Regarding Emma, it emerged that her TA felt the social story intervention was the wrong approach entirely for her. In the post intervention interview she commented:

*"We had a social story for the volume of her voice which the speech therapist had done but we did find that she was deliberately shouting more...It defeats the object. She's quite clever like that – she uses it for her advantage."*

These concerns were not voiced during discussions in the pre-social story phase. This may have been because the school's SENCo selected the participants for the intervention without negotiating with TAs. Due to the lower status of the TAs they may have felt unable to challenge this decision. In future studies it is recommended that participants are selected by SENCos following discussions with the TAs who work with the child.

Similarly Lewis J's TA had concerns about a picture within his social story which depicted a child working out the maths question:  $103 \times 405$ . The picture was included to illustrate the idea of working independently. During the post social story interview she mentioned her initial concerns that Lewis J may be distracted because of the level of difficulty of the sum:

*“Although he didn’t actually mention anything about the sum at the bottom of the page, I did think is that going to distract him? ...he does get distracted by things he doesn’t get and that did cross my mind.”*

This concern was not raised when the social story was reviewed. It is unlikely that this was due to a lack of rapport between the researcher and TAs since TAs were highly familiar with the researcher by this point in the study. It is likely to be due to the limited time that the TAs spent in the reviewing process. The researcher used an opportunistic approach, such as catching TAs at break-time in the staffroom and asking them to check the social stories. The poor sharing of initial concerns may have had a negative impact on the success of the intervention. It may have created reluctance and apathy towards implementing the intervention amongst the TAs concerned, therefore lowering their treatment integrity. In future it would be advisable to set designated time aside and review the social stories in a quiet room with the TAs.

### ***TAs recording data***

The TAs working with Lewis M and Connor recorded the majority of the data regarding the behaviour and anxiety of these participants over the course of the study. For Lewis M this procedure was used largely to respect his dignity and privacy around toileting behaviours. For both boys the use of 10 minute chunks of structured non-participant observation (as used with all other participants) would have been ineffective due to the sporadic nature of the behaviours being studied. Use of the TAs for recording data meant that Lewis’ toileting behaviours could be recorded across the school day. Similarly because Connor



only became upset occasionally during the maths lessons, use of the TA meant that he could be observed across the whole hour to capture the behaviour in question. This would not have been possible for the researcher to do throughout the study due to other work commitments. It is recognised that this method of data recording is not ideal as it provides the researcher with less certainty regarding the level of data accuracy. Indeed, Rust and Smith (2006) comment that TAs can be unreliable data collectors due to their involvement in educational activities. Nevertheless the researcher has a high level of confidence in the competence and reliability of the TAs concerned. Furthermore the TAs for Connor and Lewis M were specifically designated for these children, and were not general TAs who were supporting children across the classroom.

Where lesson activities permitted TAs observed participants alongside the researcher using the observation record sheet to enable inter-rater reliability to be assessed. This method was possible for Emma, Luke and Bailey since their TAs had supervisory roles in assembly, in PE, and on the playground respectively. The other TAs were teaching activities to groups or individual children, so were unable to observe. They therefore commented on the accuracy of the researcher's observations at the end of the lesson. It is acknowledged that this latter method does not provide such a stringent assessment of inter-rater reliability. Alternatives were considered, such as acquiring an additional researcher to carry out the observations. Nevertheless this was considered by staff to be problematic due to the distraction of too many additional visitors in the classroom. It was also perceived to be stressful for children with autism who find change difficult. The researcher considered

videoing the participants but this may have led to attrition of participants from the study as parents may be more likely to withhold permission for this form of data collection (Cullain 2002). It was considered unwise to risk this attrition due to the challenge of finding participants with autism who were not undergoing other interventions.

### ***The use of the Likert scale and face pictures for rating anxiety***

The faces sheet was created as an accessible method for the less cognitively able participants to indicate the presence of a given emotion (happy, sad, angry, worried). This had to be simplified to the identification of a positive or negative emotion, due to participant difficulties in differentiating between the negative emotions. The more cognitively able participants (Connor, Lewis J and Luke) indicated the degree of anxiety they felt on the Likert scale. The researcher recognises that the two measures are not equivalent. It is acknowledged that the faces sheet did not provide direct information about *anxiety* levels, but rather negative emotions. Therefore conclusions about anxiety for Lewis M, Sebastian, Harriet, Bailey and Emma need to be drawn with caution.

### ***The use of the Sally Ann false belief task***

A potential weakness of the current study is that the less cognitively able participants may have failed the Sally Ann task because of their limited understanding of language and the task demands, rather than due to a lack of ToM. Significant relations have been demonstrated between language measures and performance on false belief tasks in children with autism (Happé

1995). Important predictive factors include: pragmatic skills in conversation (Dunn and Cutting 1999), receptive vocabulary and memory (Milligan et al. 2007). Performance on the standardised tests indicated a similar level of difficulty in memory and listening comprehension (a component of which is receptive vocabulary) across the 4 special school participants. Since Sebastian passed the Sally Ann task, and Emma was the only participant to perform below his cognitive range (on P-levels), it is likely that this criticism is limited to Emma's data.

### ***Awareness of own emotions***

The pilot study for this thesis established that the participants were able to recognise emotions in others (although not all special school participants could distinguish between the negative emotions). The assumption was then made that the participants could then apply this to their own emotions experienced during the target situations. This assumption may be a weakness of the current study. For example, Rieffe et al. (2000) found that cognitively able children with autism could accurately predict emotion in others. However, in a separate study Rieffe, Meerum-Terwogt and Kotronopoulou (2007) found that children with autism had difficulty identifying their own emotions, and they proposed that these self-evaluations are hampered by limited ToM skills. It is possible that the participants with limited ToM skills in the current study (Emma, Bailey and Harriet) had difficulty connecting the faces pictures to their own feelings. Consistent with this possibility, Emma's data indicate that she may have been selecting the faces at random, since she chose each of the four faces approximately 25% of the time. Furthermore, Bailey showed highly polarised

responses, selecting the happy face at every opportunity. One possible explanation is that he preferred this face and was not relating it to his own emotions. The author therefore recognises that the anxiety data provided by these participants must be considered with caution.

When using the Likert scale, Connor, Lewis J and Luke were able to informally provide the researcher with qualitative information regarding their anxiety by describing bodily sensations (responses included “feeling hot”, “heart beating fast” and “funny tummy feelings”). This triangulation of data increased the researcher’s confidence that these participants understood that they were rating their own anxiety. The participants using the faces pictures had difficulty providing this information.

## **4.2 Consideration of research questions 1 and 2**

In response to research question 1, the results indicate that social stories combined with TA prompting (see section 4.3) can effectively diminish the frequency/duration and intensity of undesired behaviour for some participants.

The researcher acknowledges that the desired behavioural change occurred in a minority of cases (3 out of 8), therefore overall, as an intervention for behavioural change, social stories had limited impact.

Regarding anxiety, the social stories appeared to benefit 2 out of 8 participants (Luke and Sebastian) Although this may have been beneficial for these particular participants, overall social stories had a limited impact on anxiety.

Importantly, the use of social stories can *increase* anxiety as in Connor’s case if the participant dislikes the intervention. Furthermore, Lewis M’s data

demonstrated that social stories can increase anxiety (and specifically panic symptoms) if the intervention requires them to practice a daunting behaviour, such as going to the toilet alone. Although some improvements were seen, the participants' anxiety did not reduce in terms of the BAI-Y categories of severity possibly due to the low initial levels of anxiety of the majority of participants.

The anxiety data of the special school participants needs to be considered with caution due to methodological difficulties (see critique of methodology). The improvements in target behaviour and anxiety seen in the cases of Connor and Emma are unlikely to be due to the intervention (see section 4.3 for further discussion).

In consideration of research question 2, the target behavioural change was maintained for 2 of the 3 participants (Luke and Lewis M). The maintenance of anxiety reduction was less apparent. Maintenance after 4 months was seen for Luke, and only partial maintenance was seen for Sebastian. These results, although modest, provide the first known evidence that maintenance of behavioural and anxiety change can occur over a period of time as long as 4 months. The wide variation between participants is likely to be underpinned by a range of factors. These will be considered later in this chapter.

### **4.3 “Real world” research issues**

#### ***Use of prompting by TAs***

When discussing the procedure for the intervention with the TAs the researcher requested that they did not prompt the participants “beyond their normal

classroom management” as this uncontrolled variable had been a criticism of previous social story research (Sansosti et al. 2004). Nevertheless in practice the TAs found it very difficult to follow this instruction due to their desire to support the child in achieving the best possible outcome from the intervention. The researcher widely observed staff referring to the social story or its content during non-participant observation sessions. This was also indicated in the post intervention interviews. For example, Bailey’s TA felt that giving a small prompt helped Bailey to make the connection between his behaviour and the social story:

*“We gave him little prompts at break-time on the days when he was over-excited. We’d say: ‘Bailey, what have you got to do? Hands down!’ So I think that helped him relate it to himself.”*

Sebastian’s TA used the social story as a visual cue to remind Sebastian what he needed to do:

*“If he is becoming disruptive then I just get the book [social story] out. And as soon as I do that he seems to focus again.”*

Recent research indicates that social stories may be more effective when combined with prompts (Crozier and Tincani 2005). In the current study the use of prompting across the TAs means that the impact of reading the social story alone cannot be evaluated. Positive outcomes which appear to relate to the intervention should therefore be attributed to the use of a social story in conjunction with prompting.

### ***Changes in school routines***

It is acknowledged that changes in routine occurred within the school during the course of the study which may have impacted on the outcomes, especially in terms of increasing anxiety.

During the intervention phase both Lewis M and Lewis J had an additional TA working with them, due to staffing rearrangements for Lewis J's TA and Lewis M's TA going on Jury Service. Lewis J's social story was therefore delivered by two TAs each covering different days of the week. Lewis M's social story was delivered by one TA for the first 3 weeks of the intervention, and then by the second TA for weeks 4 and 5. Lewis M's original TA then returned to collect the post intervention data. This was potentially disruptive for the participants.

Nevertheless the researcher is confident that it had a minimal impact on intervention outcomes since all TAs were trained in the delivery of the social stories. Furthermore both new TAs had worked previously with their participant, thus minimising the disruption and stress created by this change.

Emma's school routine changed dramatically during the study in response to her class-teacher attending training on autism in relation to classroom management. Following the training staffing levels were increased in the classroom and Emma was given a highly structured and differentiated daily routine. This meant she only attended less structured activities, such as assembly, for brief periods of time. These changes took place at the beginning of the 3<sup>rd</sup> week of the intervention phase, and the data suggest that her improvement in behaviour and anxiety were due to the newly structured environment, rather than the social story. Staff indicated that the use of

structure was the appropriate intervention for Emma's needs, and the social story was not beneficial for her. The social story was therefore faded from use in week 4, earlier than the planned 5 weeks.

The extent of the changes made by staff in Emma's case means that her data (from week 3 of the intervention phase onwards) cannot be used to gauge the effectiveness of social stories.

It is also noted that staff changed their management of Connor in the post-intervention phase. Connor had a strong negative reaction to reading the social story, and this was largely directed at his TA. The TA felt that the social story had enabled Connor to reflect on his level of classroom support, which in turn led him to reject support from the TA. On ethical grounds Connor's TA withdrew the social story after 6 days of the intervention phase due to the distress it was causing him, and she withdrew from providing one-to-one support for him in the classroom.

The researcher recognises that the withdrawal of the TA support may have improved Connor's behaviour and reduced his anxiety in the post-intervention phase. This improvement cannot be attributed to the social story.

### ***Quantity of data collected***

Sufficient data were collected to enable patterns to be observed and statistical analyses to be conducted across most key phases. Nevertheless, it would have been desirable to collect more data points for Lewis M due to the high standard deviations in his intervention and one week post social story phases. High standard deviations create more overlap between phases so can potentially



mask significant effects. Nevertheless, Lewis M's data still indicate a positive effect of the intervention, so it was not currently problematic.

It is acknowledged that it would also have been ideal to have collected more data points across all participants in the one-to-one attention phase and the one week post social story phase to enable these phases to meet the required number of data points for PAND, as outlined by Parker et al. (2007). This was not possible due to time limitations.

Despite the limited number of one-to-one attention phase data points, the pattern observed does provide some indication that when social stories are effective this can not merely be attributed to the effect of one-to-one attention. This builds upon the earlier work of Kuoch and Mirenda (2003) who demonstrated this with one participant. This now needs to be confirmed in future studies through replication with more data points.

### ***The use of PAND for data analysis***

Although the PAND method overcomes many of the limitations of PND (see method section 2.10), it is acknowledged that some weaknesses remain. For example, PAND and PND are insensitive at the upper end of the scale. When there is no data overlap between the two phases a 100% score is recorded, regardless of the distance between the two data clusters (Parker et al. 2007). The researcher therefore believes it is important to use PAND in conjunction with visually presented data on graphs to enable the distance between non-overlapping data clusters to be observed.

A further criticism of PAND, and single case study data analysis more widely is that the data lack independence because they are produced from the same participant across the phases. Nevertheless, Parker et al. (2007) argue that the requirement of serial independence has little impact on PAND results because the tabled frequency data are unordered. Furthermore, Matyas and Greenwood (1996) argue that this concern is outweighed by the benefits of applying statistical analyses to phase comparisons.

The most plausible impact of having data from the same participant is that it may slightly reduce the likelihood of gaining a significant change in the data between phases, thus making the results more conservative.

### ***Factors which related to the success of the social stories***

In this section the researcher will consider a range of factors which differentiate the participants for whom outcomes were successful (Luke, Lewis M and Sebastian) from those who had unsuccessful outcomes. In doing so the third research question will be explored: *In the cases when social stories are effective, what factors appear to be relevant to their success?*

### ***Severity of autism and level of social responsiveness***

The severity of the autism of the participants with successful outcomes varied considerably, and included the following categories on the CARS: mild (Luke), moderate (Lewis M) and severe (Sebastian). Similarly there was no clear pattern on the SRS to indicate a specific level of social responsiveness required for successful outcomes of the intervention. Connor's mild autism and normal level of social awareness may have led to his rejection of the intervention, due to a desire for social acceptance by his peers (see section on participant attitude to the social story). The participant profiles suggest that children can benefit from social stories regardless of their severity of autism and social responsiveness, however the intervention may be rejected by participants with very mild deficits in these areas.

### ***Cognitive ability***

A range of cognitive abilities were evident amongst the participants with successful outcomes. Luke was the most cognitively able of the 3 participants, operating between the 31<sup>st</sup> and 68<sup>th</sup> percentile for his age on relevant tasks such as word reading, memory skills and listening comprehension. Lewis M was

operating between the 2<sup>nd</sup> and 9<sup>th</sup> percentiles. Sebastian was functioning at the 1<sup>st</sup> percentile across all tasks. Substantial differences in functioning remain between these successful participants even when age differences are taken into account.

All participants other than Emma were able to answer their comprehension questions, indicating that they understood the content of the social story. Even participants who scored on the 1<sup>st</sup> percentile on the WIAT II listening comprehension (Bailey, Harriet and Sebastian) could answer their social story comprehension questions, suggesting that the WIAT II was not sensitive enough to provide valuable information. It is likely that basic comprehension of the social story is a necessary cognitive factor in successful outcomes, but it is not sufficient by itself.

It appears that reading ability, memory, listening comprehension, speaking and listening skills and attention skills do not have a clear relationship with outcomes of the intervention. For example, Connor's standardised assessments indicated that he was functioning within the broad average range for his age across several areas, yet his social story was unsuccessful, whereas Sebastian had a successful outcome despite being much less cognitively able.

### ***Theory of mind***

It is widely accepted that many individuals with autism have difficulties with meta-representation (Frith 1989), and therefore show difficulties with false-belief tasks and pretend play. It has also been found that individuals with autism have

a diminished ability to differentiate themselves from others (Jordan 1989; Lee et al. 1994).

These studies suggest that the participants in the current study with limited ToM and more severe autism may have been unable to recognise that the character in the social story represented them. They may therefore have not understood that the social story related to their own, personal behaviour. The participant profiles show that all 3 participants for whom the intervention was successful passed the Sally-Ann false belief task. Two of them (Luke and Lewis M) showed some advanced ToM skills on Happé's task. Sebastian was unable to access Happé's task due to its language and cognitive demands, yet his social story was successful. This may indicate that only basic ToM skills are necessary to benefit from social stories. An alternative explanation is that Sebastian's TA compensated for his lower ToM skills. The level of ToM needed to access social stories can therefore not be established, and could be investigated in future research.

It appears that although Sebastian understood the content of the social story, he was not able to independently make the connection between the social story and his own behaviour. The post intervention interview revealed that Sebastian's TA did not always follow the given procedure for social story delivery. Having read the social story on a given day she decided to get the social story out when Sebastian was out of his chair, and emphasise the key messages in it whilst returning him to his chair. She felt that this enabled him to make the connection:

*“By capturing him later when he is walking around it was like ‘this is what I am talking about Sebastian, you are disrupting the class!’ Maybe that is where the understanding came.”*

This suggests that children who are less cognitively able can benefit from social stories provided they can understand and remember the content, and they are supported in making the connection between the social story and their own behaviour.

All 3 participants who failed the Sally-Ann task had unsuccessful interventions suggesting that basic first-order ToM skills may be necessary. Importantly, ToM skills are not a sufficient factor for successful outcomes since Connor passed the advanced ToM test with ease, and Lewis J showed some advanced ToM skills yet the outcomes for these participants were unsuccessful. Clearly other factors must also be considered. One of these factors is participant attitude to the social story.

### ***Participant attitude to the social story***

All TAs reported that their participant was happy to read the social story, other than Connor's. Connor had the cognitive ability to understand and remember his social story and the ToM skills necessary to benefit from the intervention, yet an important factor lacking for him was a positive attitude. When the researcher introduced the concept of a social story to Connor he commented that he “didn't like stories.” He also did not want to draw any pictures to illustrate the social story. He did, however, agree to read it on the computer.

Connor's TA believed that he had a negative attitude towards the intervention due to his growing desire for independence in the classroom and his need to be accepted by his peers:

*"He looked at the social story on the computer and cried and said 'I can't stand looking at the story!' I think it was highlighting the fact that he had to accept help...and that is where his issue came with it...He longs to be the same as the others now. He doesn't want to be singled out and he has kind of got the attitude that 'I'm alright, I don't need you [TA support] anymore.' Certainly in Years 3 and 4 he didn't have any issue with social stories."*

The researcher sought parental consent to informally meet with Connor a few weeks after the intervention had been withdrawn to reflect on the intervention process with him in order to understand his extreme reaction further. Connor referred to the social story as "*the sad thing*" and went on to explain the social stigma of the intervention:

*"I didn't really like it. To be honest, I really felt like I had no brain! I actually felt like I was being bossed around...I felt humiliated by having to go on the computer and look at it. To be honest I actually felt a bit...a bit funny...or gutted a bit because me and Lewis are the only ones who are supposed to read it!"*

Sebastian, in contrast appeared to have a very positive attitude towards his social story. Although he was a much less articulate participant, his attitude can be gauged through his TA's post-intervention interview:

*“He likes reading, but the thing that seemed to capture his interest was that it was his drawings and it was about him. That is what he seemed to like. Not just the pictures that he had drawn, but even seeing that front page [symbol of a chair]- he would say ‘This is Sebastian’s chair...this is Sebastian going to school.’ He really made it his own. Each picture, he would turn into his own little story about himself which was quite good.”*

These comments indicate that being able to identify that the social story is about oneself may increase the participant’s enjoyment of reading it.

Nevertheless, it seems that when participants have a greater sense of self and more developed social awareness, as in Connor’s case, the intervention can create feelings of social isolation and stigma. There is clearly a tension between the child having a sufficient sense of self to benefit from the social story and sufficiently limited self awareness to prevent them feeling self conscious and rejecting the intervention. EPs therefore need to consider the child’s level of self awareness when planning social story use as an intervention.

### ***The participant’s relationship with the TA***

Another relevant social factor which appeared to influence the effectiveness of the intervention was the participants’ relationships with their TAs. Based on triangulating observations of interactions with the content of the interviews the researcher believes that all participants had positive relationships with their TAs, other than Connor.

Connor commented:



*"I don't want to be like mean or anything, I know Mrs X is trying to do a really good job, but I don't really like her. I think she tries to help me a little bit too much."*

The tone of the interview with Connor's TA provided triangulating evidence that their relationship was strained. When asked about the effect of the intervention she responded:

*"(Sighs) Positive and negative? It's...(sighs) I don't know. He [Connor] said 'I know that if I need help I can ask you. Don't keep reminding me! You think I don't have a brain!' It kind of made him think more deeply about the help that he needs, or he doesn't think he needs it. So to be honest there was probably as much negative impact as there was positive!"*

The results indicate that Connor's distressed behaviour and anxiety reduced post intervention. This coincides with the decision to remove Connor's TA support. The removal of the TA is likely to have created these changes, rather than the intervention. This positive change demonstrates the negativity of Connor's relationship with his TA.

Lewis M's relationship with his TA also appeared to be very significant. Lewis M's behaviour improved dramatically with the introduction of the intervention, but this success waned when his TA went on Jury Service and was replaced by a different, familiar TA. The intervention continued to be successful, but to a lesser extent. This highlights that a positive relationship with the TA may substantially improve outcomes beyond that of the intervention alone. Another relevant factor may be the commitment of the TAs to the intervention.

### ***Daily reading of the social story***

Daily reading over the 5 week period appears not to have been fundamental to positive outcomes since Bailey, Emma and Harriet had a greater number of social story readings than Sebastian, yet they had unsuccessful outcomes (see Appendix 20). All TAs reported reading the social stories with the participants within the hour prior to the target situation. Sebastian was the only participant who had his social story paired directly with the target situation as described above.

Thematic analysis indicated that the TAs of the participants with successful outcomes felt that it would be appropriate to reduce the intervention length in the future, and all three independently suggested that a 2 week duration would be ideal in the post-intervention interviews. This was because they believed their participants had fully grasped the content of the social story within this fortnight.

Importantly, the TAs of participants with successful outcomes recorded average or above average adherence to the daily reading of the social story within the first 2 weeks of the intervention (see Appendix 21). This initial intensity of reading may have enabled the participants with successful outcomes to grasp the concepts presented to them effectively, and the resulting rapid changes to behaviour and anxiety may have enhanced TA confidence in the intervention. It seems that if the social stories were going to impact on behaviour and anxiety, participants understood the social stories quickly and changes were apparent within three or four readings.

### ***Location of reading the social story and level of distraction***

Thematic analysis highlighted that one of the themes which distinguished the TAs of the participants with unsuccessful outcomes from those with successful outcomes was finding the delivery of the intervention problematic. This was also confirmed through triangulating the interview data with the treatment integrity checklists completed by the TAs. Two highly distinguishing components of this were where the social story was read and how distracted the TA reported the participant to be. All TAs of participants with unsuccessful outcomes reported reading the social story in the classroom. These TAs also reported their participant being distracted during the reading process. The location chosen to read the social story and the participant's ability to concentrate appear to be related to the outcome of the intervention.

### ***TA level of concern regarding the participant's behaviour and/or anxiety***

Thematic analysis indicated that participants for whom outcomes were successful had TAs who were concerned about their participant's behaviour and/or anxiety prior to the intervention, unlike the TAs of participants with unsuccessful outcomes.

Prior to the intervention Luke's TA expressed a high level of concern about his touching behaviour in PE:

*"He put his hands around a child, a smaller child's neck...I had to tell him about it but he doesn't seem to show that much remorse, he doesn't understand that that is a really, really bad thing."*

In contrast, Lewis J's TA perceived his need for reassurance to be acceptable:

*“He is not worse than anyone in the class. If you came into the class and didn’t know him you wouldn’t segregate him [he wouldn’t stand out]. There is another little autistic boy in the class and he is always at me ‘Miss, Miss!’ all the time whereas Lewis doesn’t do that.”*

### ***TA belief that existing strategies are sufficient***

Thematic analysis also indicated that the TAs of participants with unsuccessful outcomes perceived existing strategies to be sufficient prior to the intervention. For example, Bailey’s TA had a strategy to reduce Bailey’s touching of other children on the playground:

*“He responds better if you say ‘hands down!’ or ‘leave them!’...he has got much, much better.”*

It is plausible that the level of concern about the behaviour and/or anxiety and dissatisfaction experienced by the TAs of participants with successful outcomes (regarding existing strategies) raised their level of commitment to read the social story daily.

### ***TA believes the intervention was inappropriate for the participant***

Thematic analysis indicated that another differentiating factor between TAs of participants with successful and unsuccessful outcomes was that the latter group felt that the intervention did not suit the participant in some way. A number of reasons were given (Appendix 18). A possible explanation is that many of these reasons may have been generated by TAs post-intervention, as a means of protecting self esteem in cases where the intervention was unsuccessful. One factor is selected as being of particular interest because it

was apparent pre-intervention, so was not merely generated to justify the lack of positive change. This factor is the TA's view of the child being inconsistent with the intervention. Although this did not occur for all participants with unsuccessful outcomes, it did seem particularly pertinent for Lewis J. In her pre-intervention interview his TA commented:

*"I find it hard when he is labelled as autistic because I don't see any true autistic tendencies. There are other children in the class who behave far, far worse and they haven't even got a title or anything."*

It seems that she was uncomfortable with the idea of an intervention for children with autism from the outset. Her post-intervention interview indicates that she was also uncomfortable with the aim of the social story, which was to encourage independence and reduce Lewis J's persistent seeking of reassurance:

*"I really don't like to see him struggle. I am there to help him after all."*

In this case the TA's view of Lewis J and her understanding of her own role were not consistent with the social story so may have contributed to the lack of success of the intervention.

### ***School type***

No clear pattern emerged relating outcomes to school type, since successful and unsuccessful outcomes occurred in both schools. Within each school TAs varied in their adherence to the intervention guidelines, and how regularly they read the social stories with the participants.

### ***TA rating the intervention positively***

Other than Connor's TA and Emma's TA, all TAs rated the intervention to be acceptable on the IRP-15. Connor and Emma differed from the other participants in that staff perceived them to respond inappropriately to the intervention. Connor became distressed at reading it, whereas staff perceived Emma to use it to manipulate them by deliberately smacking for attention after reading it. It is apparent that TAs were inclined to rate the intervention positively, even if no improvement was seen, so long as a deterioration in behaviour was not seen. This is consistent with other educational research which shows that interventions are widely perceived to be positive even when no positive effect occurs (e.g. Blatchford, Russell, Bassett, Brown and Martin 2007). TAs perceiving the intervention positively may have contributed to successful outcomes through enhancing their commitment to its delivery, however this factor was insufficient in differentiating between cases with successful and unsuccessful outcomes.

## **4.4 Consideration of research question 3**

Consideration of research question 3 arises from the above discussion. The third research question was:

*In the cases when social stories are effective, what factors appear to be relevant to their success?*

The above discussion highlights that there are a range of factors that may be relevant to the success of social stories, and it is unlikely that any individual factor per se can sufficiently account for the success or otherwise of the

intervention. These factors have been deduced from observations of participants, thematic analysis of interviews with TAs, conversations with participants, standardised assessments and other measures used in the study.

They are presented in three categories, factors relating to: the child; the support provided; and to the organisation of the intervention. When a factor is inter-related between categories it is presented more than once. (Those with an asterisk are factors from the thematic analysis which were associated with successful outcomes).

### ***Child factors***

- The participant not being distracted during the reading process.\*
- The participant being able to comprehend the social story and remember its contents.
- Having sufficient ToM skills to pass the Sally-Ann false belief task, as this may enable participants to recognise that the social story is about themselves. (Future research needs to establish whether basic false beliefs skills are sufficient or whether higher level ToM skills are needed when a TA is not compensating with support).
- The participant having a positive attitude towards the social story.
- The participant not experiencing social stigma relating to the intervention. Impaired social awareness appears to protect against this.

- The participant having a positive relationship with the TA delivering the intervention.

### ***Support based factors***

- The TA being concerned about the participant's behaviour and/or anxiety prior to the intervention.\*
- The TA believing that existing management strategies were insufficient.\*
- Where necessary, the TA supporting the participant to connect the social story with their behaviour through pairing the two explicitly.
- The participant having a positive relationship with the TA delivering the intervention.
- The TA believing the intervention to be consistent with her/his perception of the participant and her/his own role.
- The TA rating the intervention positively.

### ***Organisational factors***

- Reading the social story outside of the classroom or in a quiet area.\*
- The participant not being distracted during the reading process.\*
- Regular reading of the social story within the first 2 weeks of the intervention.

It is not possible to determine whether all or some of the factors are required for successful outcomes, nor is it possible to indicate which factors hold greatest



importance. This was not investigated currently, and remains an area for future research. However, it is possible to speculate about the importance of factors. For example, the participant's ability to comprehend and remember the social story may be more important than regular reading of the social story within the first two weeks. The researcher recognises that other factors not presented may be relevant, and the above factors need to be debated and examined in future studies.

## **4.5 Implications of the findings for the practice of Educational Psychologists**

### ***The need for individualised approaches***

The current study has developed previous research by providing detailed participant description through the creation of participant profiles. These highlight that even within a given school, the skills and abilities of children with autism vary considerably. It is likely that the outcomes of the intervention were diverse due to the heterogeneity of the participants and other unknown factors and therefore the social stories did not benefit all of the children who received them. This leads the researcher to suggest that the "blanket" use of social stories for all children with autism is inappropriate. When social stories are described, they are often promoted as widely beneficial to all:

*"Although social stories were first developed for use with children with ASD, the approach has also been successful with children, adolescents, and adults with ASD and other social and communication delays and differences, as*

*well as individuals developing normally” (The Gray Center website, Gray 2010).*

The outcomes of this thesis indicate that a more measured approach may be helpful when considering whether to implement social stories. As has previously been discussed, a wide range of factors relating to the child, the support and the organisation of the intervention need to be considered to promote changes in target behaviour and anxiety.

A growing body of literature is beginning to indicate that a range of approaches are needed to meet the needs of children with autism. For example, Jordan, Jones and Murray (1998) reviewed interventions for pupils with autism and found that there was:

*“no one approach where research had clearly demonstrated its superiority to other approaches” (p.127).*

More recently, Jones et al. (2008) supported this point in the Government’s AET report:

*“Given the diversity within the spectrum and between individuals, there is no single educational intervention that is useful for all children on the autism spectrum, and there is no single intervention that would on its own be sufficient to meet all the needs of a particular child on the autism spectrum.” (p.14).*

The current results contribute to this literature by strengthening the case for using individualised approaches. It appears that social stories are suitable for

some children with autism, but not others. It is therefore recommended that EPs support teachers and TAs in considering the most appropriate approach for each child with autism individually, through consideration of factors such as the child's profile of abilities and contextual factors at school.

***The consideration of factors associated with successful outcomes in consultations***

The above discussion relating to research question 3 indicates that EPs need to consider a range factors when planning social story interventions with schools, such as the location of social story delivery during the consultation process.

Research indicates that consultations usually take place between an EP, a teacher or SENCo and a parent (Kennedy et al. 2008, Harris, Hughes and Newman 1997). In the researcher's experience it is rare for TAs to attend consultations and it is the TAs who deliver interventions, such as social stories within schools. This is problematic since this thesis highlights that it is the beliefs and concerns of the TA which are of importance to successful outcomes. In consultations EPs are usually exploring the concerns of a SENCo or class-teacher, and as indicated in this thesis, these can differ from those of the TA. EPs therefore need to support SENCos in recognising the value of engaging TAs in consultations and actively encourage this within schools. This will enable the EP to explore the beliefs of the TA and make an informed judgement as to whether the implementation of a social story is likely to be an efficient use of time and resources.

### ***Developing social stories with participants and involving them throughout the intervention process***

Published guidelines for writing social stories emphasise the importance of individualising them to suit the child's interests, developmental age, attention span and preferred learning style (Gray 1998). This thesis indicates that EPs need to go beyond these recommendations by being aware that small details within the social story can be important to the child, and these can easily be overlooked by adults. For example, Connor felt the content of a maths question in a picture was too easy, and he disliked the fact that his social story did not acknowledge the effort that he put into his work. The researcher had included several sets of comprehension questions at the end of Connor's social story, to enable him to answer a different set each day to maintain his interest due to his cognitive ability and age. Connor's comments indicate that he found this overwhelming.

To increase the success of social stories EPs need to give cognitively able participants a greater level of involvement in the development of their social stories. This may involve the EP reading the social story with the child and amending it to suit their preferences. The researcher found that it can be difficult to predict which aspects of a social story a participant will dislike based on their interests and developmental age. Therefore EPs need to actively involve the child in the designing process.

The present thesis provides the first known social story study which incorporates the views of children who received them. Discussions were held informally with the more cognitively able participants post-intervention on an

opportunistic basis. Listening to children is of both pragmatic and moral importance, and it is an important part of the EP role (Gersch 1996). In the current study this clearly yielded some valuable insights. For example, Luke was able to suggest ways that his social story could be improved, such as having a version on the computer with a moving fish:

*“Some days I might want to read the book and some days I might want to go on the computer. I would like it on the computer, but like so that all the pictures move! Like a fish going ‘well done Luke!’ and moving up and down.”*

This investigation highlights that children have a valuable contribution to make to the development of their social story including agreeing on the text, illustrating the text, helping to select printed pictures, and developing strategies to manage the target behaviour which can be included in the social story. The EP needs to support the child in selecting strategies which they are likely to carry out in practice. EPs should also use children’s ideas to make the delivery process more dynamic. This may include changing the mode of social story presentation, and resolving problems raised by the child as they arise. This may increase the success of the intervention through its acceptance by the child, and the maintenance of their interest in reading it.

### ***Promoting evidence based practice***

There is an increasing trend towards evidence based practice within the profession of Educational Psychology (Fox 2003), and research is now recognised as one of the principal functions of the EP’s role (Gersch 2004; MacKay 2002). Indeed MacKay (2002) argues that with the increased

delegation of SEN funding to schools, the development of the EP profession rests upon research.

With the introduction of the Doctoral training route within Educational Psychology, EPs will be increasingly able to conduct high quality, rigorous research into the effectiveness of interventions in schools, such as social stories. This research can be used to promote good practice within the profession and even inform literature and Government reports which are widely disseminated.

From the experience of carrying out this thesis, the author believes that EPs are ideally situated to increase the research base, due to their knowledge of school systems and social networks within schools. As currently demonstrated, they are also able to promote the voice of children within research, when historically, children have been marginalised as participants (Lewis and Lindsay 2002).

Eodanable and Lauchlan (2009) emphasise that a tension exists between the value placed on high quality research and the time allocated to this within Educational Psychology Services. The researcher therefore believes that EPs need to negotiate the allocation of research time with their PEPs to ensure that high quality research into interventions continues to be conducted and disseminated.

### ***The publication of research***

Within the medical profession it has been found that a publication bias exists towards positive outcomes, whereby studies presenting negative results are less likely to be published (Stern and Simes 1997). EPs need to pursue the

publication of rigorous social story studies, even when outcomes are negative.

Interestingly, the authors of the Government's AET report comment that:

*"Successes need to be better publicised and disseminated to show that, given appropriate support and resources the difficulties arising from autism can be addressed effectively" (p.106).*

Although it is important to promote a sense of hope for parents and staff, the researcher believes that studies with negative outcomes need to be published to promote an accurate and realistic understanding of social stories. This will help to avoid the application of "blanket" intervention policies within schools, which are likely to arise from low quality studies and literature which may present social stories as an infallible approach to the undiscerning lay reader.

#### **4.6 Recommendations for future research**

The discussion which follows provides a range of recommendations for future studies such as: maintaining high quality designs, investigating maintenance over longer periods of time, examining specific and generalised anxiety and gathering the views of less cognitively able participants.

##### ***The need for rigorous, high quality studies***

The present thesis provides a rigorous investigation into the effectiveness of social stories using a multiple baseline across participants single case study design. It builds upon the existing literature through the use of methodological features such as: providing detailed participant profiles and avoiding social story use with other interventions (except prompting). It assesses participant

comprehension, inter-rater reliability, social validity, treatment integrity and the influence of one-to-one attention.

Further studies are needed in the field of social stories, and specific suggestions for this research can be found below. Throughout these studies rigorous designs need to be employed to ensure that high quality research is produced, which in turn will enable appropriate decisions to be made about the application of social stories.

### ***The duration of future studies***

The present thesis developed the literature base by providing data regarding the long term outcomes of social stories 4 months post intervention. This builds upon existing research which only considers outcomes for a few weeks post intervention (Crozier and Tincani 2007; Kuoch and Miranda 2003). Other long term studies are now needed to enable a greater evidence base to be established in this area. The maintenance of positive outcomes could be studied over longer periods of time, such as one year, although maturational and other effects would need to be considered.

The TAs in the current study indicated that it may be of greatest efficiency to read social stories for 2 weeks, since the participants with successful outcomes appeared to have changed their behaviour by this stage. It would be beneficial to investigate this empirically in the future and explore whether long term benefits can be maintained over time following variable times of social story exposure, including 2 weeks.



Future researchers could also increase the number of data points recorded in the one-to-one attention phase and one week post intervention phase. This would enable these phases to be used in PAND calculations of significance, and would therefore increase confidence in the accuracy of the observations.

### ***Specific and generalised anxiety***

As previously mentioned, research indicates that children with autism experience higher levels of generalised anxiety than neuro-typical children (Gillott et al. 2001), and also higher levels of phobias about specific situations (Evans et al. 2005).

In the current thesis the BAI-Y measured participants' generalised anxiety, in addition to specific types of anxiety. Although some relevant changes were observed using the BAI-Y, these were not clinically significant according to the categories provided by the measure. Luke, Lewis M and Sebastian showed only small changes on the BAI-Y yet their own recordings of anxiety in the target situation indicated that reasonably substantial changes in anxiety occurred. It is possible that social stories impact on specific anxiety relating to the target situation, and this was not detected by the anxiety categories of the BAI-Y and the overall generalised anxiety score. This seems plausible since the social stories were focussing on behaviour and anxiety relating to one specific situation.

In the future it would be useful to maintain a generalised anxiety measure, but also take a greater focus on investigating changes in specific anxiety. A measure with more items relating to social anxiety might detect a relevant

change. It may also be beneficial to assess children's state anxiety, rather than trait anxiety as this may enable any transitory anxiety changes to be detected. In future studies it may also be helpful to recruit participants with higher levels of anxiety than in the current thesis.

Discussions could be held with more cognitively able participants to establish which aspects of a situation the child feels anxious about, and how the child experiences the anxiety physiologically. Personalised rating scales could be developed to detect changes in these areas. Some studies have used physiological measures such as salivary cortisol to explore anxiety levels amongst children with autism (Lopata, Volker, Putnam, Thomeer and Nida 2008). Physiological changes such as cortisol or heart rate may be useful measures of specific anxiety in a target situation. This could be applied to social story research providing high ethical standards were upheld.

### ***Systematically exploring the views of all participants***

In the present thesis the views of cognitively able participants were sought informally post intervention. In the future children's views could be explored systematically through recorded interviews.

A challenge for future research is finding practical ways to gauge the views of less cognitively able children with autism. Past research has sought the views of children with SEN through using visual narrative, whereby pupils express their views through taking photographs (Ryan 2009) or using drawings and key words in meetings (Hayes 2004). It may be possible to simplify interviews through using drawings or symbols which can be selected. Staff who know the

participant well could be involved to facilitate communication and elicit views about social stories.

### ***Investigating the factors associated with successful outcomes***

The researcher highlighted a range of factors associated with successful outcomes when social stories were used. These were categorised as factors relating to: the child, the support provided in the intervention process and the organisation of the intervention (see section 4.4). These factors now need to be investigated more thoroughly in future research to establish which of the factors are robustly associated with desired changes in target behaviour and anxiety. Some factors may be of greater importance than others, and there may be other relevant factors that have not yet been considered.

### ***Investigating an alternative explanation***

Since social stories appeared to be effective for *some* participants but not others, it is likely that social stories are only suitable for some children with autism. However an alternative explanation is also possible. Since the social stories were designed to address qualitatively different behaviour, it may be the case that social stories are only effective for some challenging behaviours. It could also be the case that social stories are effective for *some* children with autism with *particular* challenging behaviours. Future studies could differentiate between these explanations by creating several social stories for the same participant to target different challenging behaviours. Greater clarity in this area would support EPs in identifying when the employment of social stories is likely to be beneficial.

### ***An alternative to using a social story***

In the present study Lewis J's TA felt that social stories were an indirect approach and that conversation with Lewis J was a suitable alternative. In her post-intervention interview she commented that:

*"Some things you can sit and explain it to him and he doesn't need a social story, he just takes it on board. And if he forgets it then you just have to remind him and he is able to turn it around himself."*

Social stories may be beneficial because they provide visual cues which may enhance understanding (Howley and Arnold 2005). However the comment of Lewis J's TA raises the question of how necessary a social story is when a child is cognitively more able. It is possible that conversation in the target situation would enable the participant to effectively make the connection between the discussion and the situation. Alternatively, if anxiety is created by the target situation, the participant may be unable to process the message being presented since anxiety reduces accurate information processing (Teachman 2005). Future research could investigate whether social stories provide greater benefit than conversation, for cognitively able participants.

## **4.7 Conclusion**

The researcher believes that the current study largely meets its aims in providing a rigorous investigation into the effectiveness of social stories in improving target behaviour over time and deducing factors which may underpin successful outcomes, when social stories are combined with prompting. The anxiety data need to be considered with greater caution due to the

methodological difficulties in gaining accurate data from the less cognitively able participants. Nevertheless, the anxiety component of the thesis does cover new ground within the field, and paves the way for future research through highlighting potential pitfalls when working with less cognitively able participants.

The data indicated that social stories can be effective in reducing target behaviour and anxiety, but this was only the case for a minority of participants. A simple answer regarding whether social stories are an effective intervention cannot be given. Indeed, there appears to be a wide range of factors associated with successful outcomes relating to the participant, the support provided in the intervention process and the organisation of the intervention. The importance of these factors needs to be investigated in future studies.

A finding of importance in this study was that social stories have variable outcomes and it is therefore recommended that they are not used as a “blanket approach” by EPs for all children with autism. As previously stated, this is consistent with the findings of Jordan et al. (1998) who reviewed interventions for pupils with autism and found that there was:

*“no one approach where research had clearly demonstrated its superiority to other approaches” (p.127).*

It is also consistent with the Government’s AET report (2008) in which it was noted that:

*“there is no single educational intervention that is useful for all children on the autism spectrum” (p.14).*

The findings of this thesis clearly contribute to a developing body of evidence which indicates that children with autism may not benefit from a single intervention approach.

This thesis builds upon existing social story literature by providing data to confirm that when social stories are effective, this is not merely due to the experience of receiving one-to-one attention. Furthermore, this thesis uses PAND analysis and it is suggested that the use of this innovative approach increases the rigour of the study.

Overall the researcher believes this study provides a valuable contribution to the existing literature. The findings could be used by EPs to guide schools and families in identifying when social story use may be appropriate and beneficial. The current data could be aggregated with other rigorous studies to provide teachers and parents with a meaningful and realistic understanding of social stories as an intervention for children with autism.

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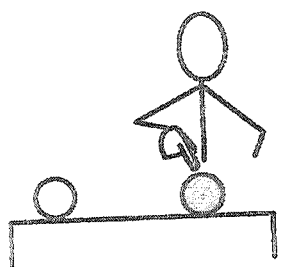
## Appendix 1: Parental consent letter

Dear Parent,

My name is Wendy Penton, I am an Educational Psychologist in Training and I work for the Child and Community Psychology Service in X. I am working with the Social Communication Service to carry out a research study into the effectiveness of social stories over time for children with autism. Social stories are short written stories for children on the autistic spectrum used to aid their understanding of social situations (for example why it is important to raise your hand in the classroom/ stay sitting on your chair). Despite the growing popularity of social stories there is limited research evidence for the effectiveness of this approach.

I am particularly interested in looking to see whether social stories can change behaviour and reduce anxiety when read with individual children daily by a Teaching Assistant (TA) over a five week period. Although it is hoped that the intervention will benefit your child, there is no guarantee of a positive change. I will write a personalised social story for each child in the study in conjunction with class-teachers and TAs, designed to target the child's specific area of need. To get to know the children's needs I would like to observe the children at school and carry out some assessment activities. I may also ask parents to complete a questionnaire at different stages through the study. If children show improvements with the social story, I would like to follow up these children four months later to see if the changes are maintained.





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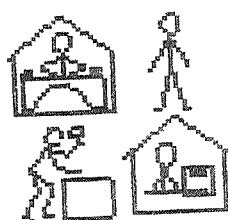
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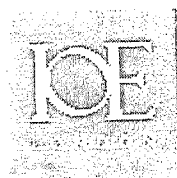


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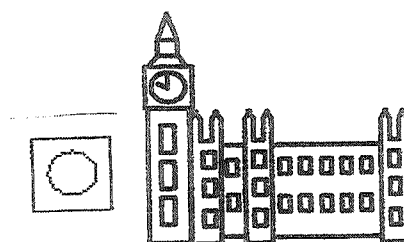


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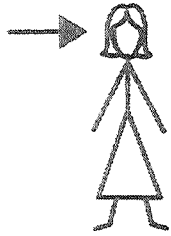
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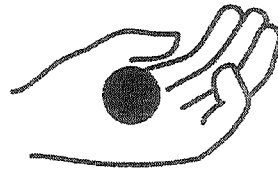
Leading education  
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The Institute of Education in London.



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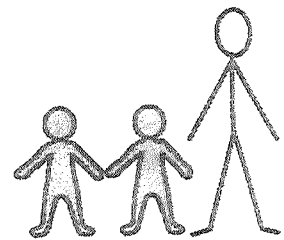
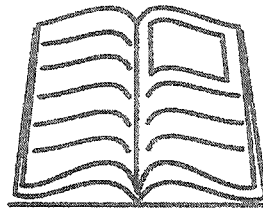


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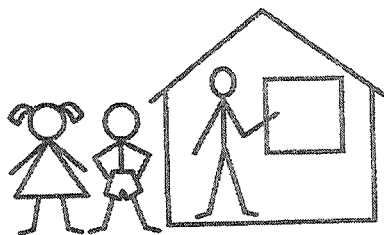


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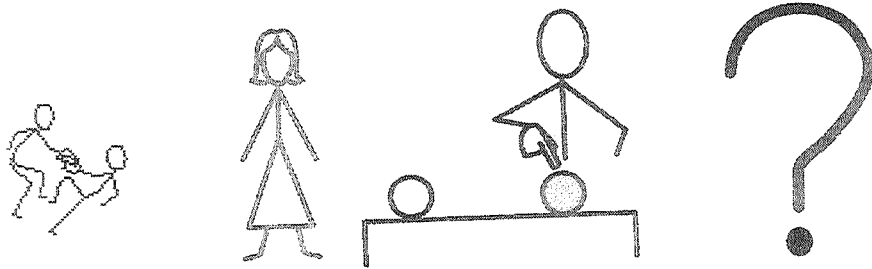
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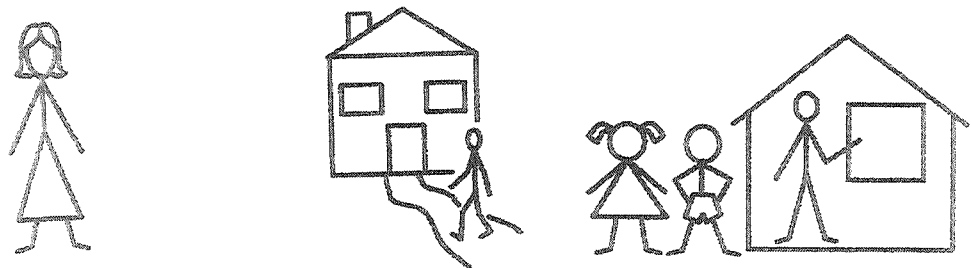
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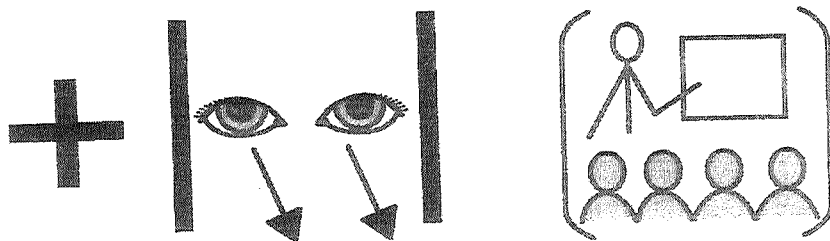
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To help her with this question,

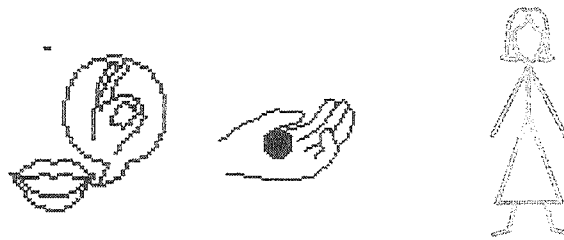


She wants to visit your school

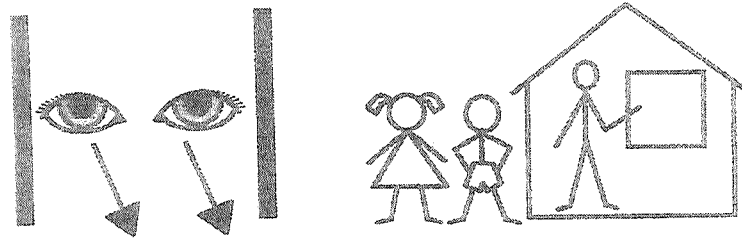


and watch your class.

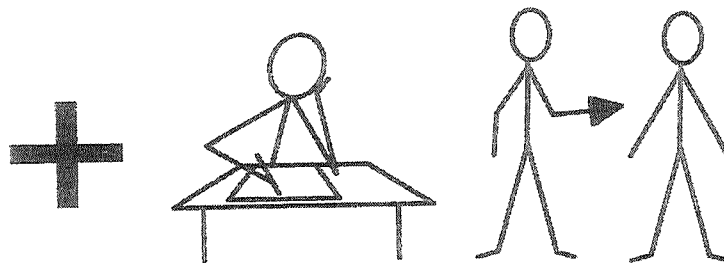




Do you agree to have Wendy



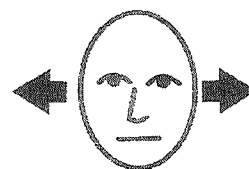
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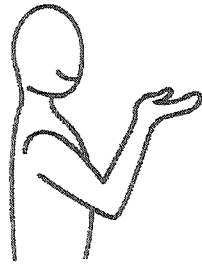
and working with you?



Yes



No



Thank you

### Appendix 3: Profile of each participant

#### **Mainstream participants**

##### **Connor**

###### *Age:*

Connor had a chronological age of 10 years 7 months at the start of the study. He was in Year 5, although chronologically he was the age of a Year 6 pupil.

###### *Autism:*

Connor had a diagnosis of autism. On the CARS he scored in the mild autism category.

###### *Background:*

Connor had always attended a mainstream school. He repeated his nursery year due to his social and communication difficulties. During his time in the infant school, staff reported that Connor liked to be in control and would only participate in activities on his own terms. He could be oppositional and reluctant to cooperate. He has found it difficult to cope with changes in routine. These behaviours are improving with maturity. During his time at the infant school Connor received speech and language therapy.

Throughout his schooling Connor had shown anxiety about specific situations, such as being last in the line, not getting a turn to answer a question in class or not completing his work in the allocated time.

Connor received a social story upon his transfer to the junior school to help him to understand new routines such as a different procedure for lining up on the playground. He responded well to this and was happy to read it regularly over a few weeks.

Connor had a statement of special educational needs relating to difficulties with speech and language, attention, behaviour and social interaction.

*Cognitive abilities:*

BAS II Word reading: 19<sup>th</sup> percentile

BAS II Recall of digits forward (auditory memory): 1<sup>st</sup> percentile

BAS II Recognition of pictures (visual memory): 8<sup>th</sup> percentile

WIAT II Listening comprehension: 34<sup>th</sup> percentile

*ToM:*

Connor passed the Sally Ann false belief task.

On Happé's advanced ToM task eight items were presented and he got all of them correct. He was able to understand the following story types: pretend, joke, lie, white lie, figure of speech, double bluff, irony and persuasion. This indicates that he had good ToM abilities.

#### *Social abilities:*

Connor scored in the milder end of the moderately impaired range for social cognition. He scored in the normal range for social communication, social awareness and social motivation.

#### *Anxiety:*

The pre-intervention BAI-Y indicated that Connor had an “average” level of generalised anxiety. The sub-types of his anxiety can be seen in Appendix 13.

#### *Understanding of emotions:*

Connor was accurately able to use a Likert scale to record the feelings of a fictitious character.

#### *Behaviour of interest:*

Connor became tense and anxious in the classroom when he made errors in his work or did not know the answers. He found it difficult to accept adult correction.

### **Luke**

#### *Age:*

At the beginning of the study Luke had a chronological age of 8 years and 6 months. He was in Year 4.

#### *Autism:*

Luke had a diagnosis of autism. On the CARS he scored within the mild autism category.

*Background:*

As a young child Luke had problems relating to his ears, tonsils and adenoids. He received surgery to correct these difficulties at age 7. He received speech and language therapy briefly but was discharged due to non-attendance. Luke's family background was reported to be chaotic and characterised by high levels of family conflict.

Staff at school reported that Luke found it difficult to cope with change. He was noted to be defiant, and would display challenging behaviour if there was a change of teacher. Staff reported that he showed "ritualistic behaviour and fixations". He had a particular interest in goldfish.

Luke received 15 hours of validated support in school per week from the LA.

*Cognitive abilities:*

BAS II Word reading: 47<sup>th</sup> percentile

BAS II Recall of digits forward (auditory memory): 38<sup>th</sup> percentile

BAS II Recognition of pictures (visual memory): 31<sup>st</sup> percentile

WIAT II Listening comprehension : 68<sup>th</sup> percentile

*ToM:*

Luke passed the Sally Ann false belief task.

On Happé's Advanced ToM Task eight items were presented and he got six of them correct. He was able to understand the following story types: pretend, lie,

joke, white lie, double bluff and persuasion. He was unable to understand figure of speech and irony. This indicates that he had sound ToM abilities.

*Social abilities:*

On the SRS Luke scored in the milder end of the moderately impaired category for social cognition, social communication, social awareness and social motivation.

*Anxiety:*

The pre-intervention BAI-Y indicated that Luke had an “average” level of generalised anxiety. The sub-types of his anxiety can be seen in Appendix 13.

*Understanding of emotions:*

Luke was able to use a Likert scale to record the feelings of a fictitious character.

*Behaviour of interest:*

Luke tended to show inappropriate social behaviour in some lessons, whereby he would touch, poke and grab hold of other children. This tended to occur more in PE than lessons where he was seated. It occurred both when he was getting changed and during the physical activity.

## **Lewis M**

### *Age:*

At the beginning of the study Lewis M had a chronological age of 9 years and 11 months. He was in Year 5.

### *Autism:*

Lewis M had a diagnosis of autism. On the CARS Lewis M scored in the moderate autism category.

### *Background:*

Lewis M had always attended mainstream school. At age 3 he was observed to have petit mal absences. His blood tests were normal although an electroencephalograph was suggestive of epilepsy. He received medication for this for 6 months. This was then withdrawn as it was perceived to be ineffective. He was assessed by a hospital based Neuro-developmental team and was reported to have global developmental delay.

Lewis M received speech and language therapy from age 4. He was noted to have a significant language delay in both expressive and receptive elements at the time of the study.

He had a statement of special educational needs relating to difficulties with listening and attention, speech and language, interaction with peers and imaginative play. Staff reported that he frequently copied the behaviour of particular children in his class at school.



*Cognitive abilities:*

BAS II Word reading: 5<sup>th</sup> percentile

BAS II Recall of digits forward (auditory memory): 7<sup>st</sup> percentile

BAS II Recognition of pictures (visual memory): 2<sup>nd</sup> percentile

WIAT II Listening comprehension: 3<sup>rd</sup> percentile

*ToM:*

Lewis M passed the Sally Ann false belief task.

On Happé's Advanced ToM task eight items were presented and he got three of them correct. He was able to understand the following story types: pretend and figure of speech. He was unable to understand: lie, joke, white lie, double bluff, irony and persuasion. This indicated that he had some basic ToM abilities.

*Social abilities:*

On the SRS Lewis M scored in the moderately impaired range for: social motivation, social communication and social cognition. He scored in the severe impairment range for social awareness.

*Anxiety:*

The pre-intervention BAI-Y indicated that Lewis M had an "average" level of generalised anxiety. The sub-types of his anxiety can be seen in Appendix 13.

### *Understanding of emotions:*

Lewis M was unable to accurately use a Likert scale to rate the emotions of a fictitious character. He was therefore shown a sheet of four faces depicting happy, sad, worried and angry. When scenarios were presented using soft toys, he was accurately able to identify all four emotions.

### *Behaviour of interest:*

Lewis M had high levels of anxiety about going to the toilet by himself and requested a TA to come with him. This behaviour arose when there was a fire started in the boys' toilets about a year ago. Lewis M also had high levels of anxiety about the fire alarm going off and when it was tested earlier in the year Lewis had toileting accidents in the classroom for several weeks later.

### **Lewis J**

Age:

At the beginning of the study Lewis had a chronological age of 8 years and 3 months. He is in Year 3.

### *Autism:*

Lewis has a diagnosis of autism. On the CARS he scored within the mild autism category.

### *Background:*

Lewis has a statement of special educational needs relating to difficulties with language, concentration and social interaction. He had received speech and

language therapy; he also had received an Applied Behavioural Analysis (ABA) programme in the home setting as a pre-schooler.

*Cognitive abilities:*

BAS II Word reading: 37<sup>th</sup> percentile

BAS II Recall of digits forward (auditory memory): 2<sup>nd</sup> percentile

BAS II Recognition of pictures (visual memory): 21<sup>st</sup> percentile

WIAT II Listening comprehension: 5<sup>th</sup> percentile

*ToM:*

Lewis J passed the Sally Ann false belief task.

On Happé's Advanced ToM task eight items were presented and he got four of them correct. He was able to understand the following story types: pretend, lie, joke and white lie. He was unable to understand: double bluff, persuasion, figure of speech and irony. This indicates that he has some basic ToM abilities.

*Social abilities:*

On the SRS Lewis J scored in the moderately impaired range for social cognition and social motivation. He scored in the mild end of this category for social awareness and social communication.

### *Anxiety:*

The pre-intervention BAI-Y indicated that Lewis J had a “moderately elevated” level of generalised anxiety. The sub-types of his anxiety can be seen in Appendix 13.

### *Understanding of emotions:*

Lewis J was able to use a Likert scale to record the feelings of a fictitious character.

### *Behaviour of interest:*

Lewis J easily became anxious in maths when he knew he had a test or when he got an answer incorrect. He also appeared to be anxious when he was working in his maths book regarding the layout of his work and frequently sought TA reassurance about where to write and when to turn over the page without relying on common sense.

## **Special school participants**

### **Bailey**

#### *Age:*

At the start of the study Bailey had a chronological age of 8 years and 8 months. He was in Year 4.

*Autism:*

Bailey had a diagnosis of autism. On the CARS he scored in the moderate autism range.

*Background:*

Bailey originally attended a mainstream primary school. At age 7 he began a dual placement between the mainstream and the MLD school whereby he attended the MLD setting for 60% of the week. This arrangement was designed to provide work of a suitable cognitive level in the MLD setting, whilst providing him with social role models in mainstream. Nevertheless concerns were raised regarding Bailey's ability to cope with transferring between settings and after a term he attended the MLD school on a full-time basis. He had received speech and language therapy since 2005. He showed expressive and receptive language delay with features of developmental dyspraxia. Bailey had a statement of special educational needs relating to difficulties with language skills and social interaction.

*Cognitive abilities:*

BAS II Recall of digits forward (auditory memory task): 1<sup>st</sup> percentile

BAS II Recognition of pictures (visual memory task): 1<sup>st</sup> percentile

WIAT II Listening comprehension: 1<sup>st</sup> percentile

*P-levels:*

Speaking and listening P6: He had the ability to initiate and maintain short conversations.

Reading P8: Bailey could read all 26 letter sounds and could read most two letter words and some three and four letter words. He understood that words, symbols and pictures conveyed meaning, and had a growing repertoire of familiar words.

Attention P5: He had emerging attention skills. Bailey could focus for about 10 minutes on a structured activity that interested him.

*ToM:*

Bailey did not pass the Sally-Ann ToM task. This indicated that he had limited ToM skills.

*Social abilities:*

On the SRS Bailey scored in the severely impaired range for social awareness, social cognition and social communication. He scored in the moderately impaired range for social motivation.

*Anxiety:*

The pre-intervention BAI-Y indicated that Bailey had an “average” level of generalised anxiety. The sub-types of his anxiety can be seen in Appendix 13.

### *Understanding of emotions:*

Bailey was shown a sheet of four faces depicting happy, sad, worried and angry. When scenarios were presented using soft toys, Bailey accurately identified “happy” and “angry”. He was unable to understand the difference between “sad” and “worried.” He would have been unable to accurately use a Likert scale to rate the emotions of a fictitious character.

### *Behaviour of interest:*

Bailey tended to push into other children, touch them, pull their hats off and hold onto other children. He did this more in unstructured times such as when watching a video in the classroom, or when out on the playground.

## **Sebastian**

### *Age:*

At the start of the study Sebastian had a chronological age of 10 year and 5 months. He was in Year 5.

### *Autism:*

Sebastian had a diagnosis of autism. On the CARS he scored in the severe autism range.

### *Background:*

Sebastian was one of six children in his family. He attended a nursery for children with Profound and Multiple Learning Difficulties (PMLD). He then transferred into the attached PMLD school. He moved to the MLD school at age

6 due to the view that he needed a more vocal peer group. He had received speech and language therapy since 2005 due to poor articulation of speech sounds. He had a statement of special educational needs relating to difficulties with speech and language, communication and social play skills.

*Cognitive abilities:*

BAS II Recall of digits forward (auditory memory task): 1<sup>st</sup> percentile

BAS II Recognition of pictures (visual memory task): 1<sup>st</sup> percentile

WIAT II Listening comprehension: 1<sup>st</sup> percentile

*P-levels*

Speaking and listening P6: He had the ability to initiate and maintain short conversations, although his articulation was unclear.

Reading P7: He showed an interest in reading, and could distinguish between print, symbols and pictures. Sebastian was able to correctly identify 7 of the 26 letter sounds.

Attention P5: He had emerging attention skills. Sebastian could focus for about 10 minutes on a structured activity that interested him.

*ToM:*

Sebastian passed the Sally-Ann false belief task. The task was repeated a few weeks later and again Sebastian passed.



### *Social abilities:*

On the SRS Sebastian scored in the severely impaired range for social awareness, social communication and social motivation. He scored in the moderately impaired range for social cognition.

### *Anxiety:*

The pre-intervention BAI-Y indicated that Sebastian had an “average” level of generalised anxiety. The sub-types of his anxiety can be seen in Appendix 13.

### *Understanding of emotions:*

Sebastian was shown a sheet of four faces depicting happy, sad, worried and angry. When scenarios were presented using soft toys, Sebastian was accurately able to identify all four emotions. He would have been unable to accurately use a Likert scale to rate the emotions of a fictitious character.

### *Behaviour of interest:*

Sebastian tended to wander around the classroom. He would return to his chair when he was told to, but did not stay seated for long.

## **Harriet**

### *Age:*

At the start of the study Harriet had a chronological age of 10 years and 2 months. She was in Year 5.

### *Autism:*

Harriet had a diagnosis of autism. On the CARS she scored in the moderate autism range.

### *Background:*

Harriet originally attended a mainstream primary school. She transferred to the MLD school at age 9 due to the view that her learning needs could no longer be catered for in mainstream and her parents were concerned about her ability to cope in a mainstream secondary school. She had received speech and language therapy from age 9. She had a statement of special educational needs relating to difficulties with language comprehension and production, social communication skills, learning and attention.

### *Cognitive abilities:*

BAS II Recall of digits forward (auditory memory task): 1<sup>st</sup> percentile

BAS II Recognition of pictures (visual memory task): 1<sup>st</sup> percentile

WIAT II Listening comprehension: 1<sup>st</sup> percentile

### *P-levels*

Speaking and listening P7: She could listen, attend and follow stories for short periods of time, and could respond to questions from adults and peers about her experiences.

Reading P7: She showed an interest in reading, and could distinguish between print, symbols and pictures. She was able to correctly identify 10 of the 26 letter sounds, although she was unable to blend two letter sounds together.

Attention P5: She had emerging attention skills. Harriet could focus for about 10 minutes on an activity.

*ToM:*

Harriet did not pass the Sally-Ann false belief task.

*Social abilities:*

On the SRS Harriet scored in the severely impaired range for social cognition. She scored in the moderately impaired range for social communication, social awareness, and social motivation.

*Anxiety:*

The pre-intervention BAI-Y indicated that Harriet had an “average” level of generalised anxiety. The sub-types of her anxiety can be seen in Appendix 13.

*Understanding of emotions:*

Harriet was shown a sheet of four faces depicting happy, sad, worried and angry. When scenarios were presented using soft toys, Harriet was accurately able to identify “happy.” She was able to choose a negative emotion when appropriate but she was unable to understand the difference between “angry,” “sad” and “worried.” She would have been unable to accurately use a Likert scale to rate the emotions of a fictitious character.

*Behaviour of interest:* Harriet tended to call out in the classroom inappropriately during lessons. She frequently commented on what others were doing, echoed the teacher when pupils were corrected, and asked questions about topics unrelated to the work at hand.

## **Emma**

### *Age:*

At the start of the study Emma had a chronological age of 9 years 10 months. She was in Year 4.

### *Autism:*

Emma had a diagnosis of autism. On The CARS she scored within the severe autism range. Her areas of greatest difficulty were her excessive emotional responses to situations, her level of intellectual functioning and her limited verbal communication.

### *Background :*

Emma initially attended a nursery for children with PMLD. Staff reported that at times Emma would smack adults. Staff believed this was when she did not want to participate in activities. Educational Psychology reports indicated that Emma had continued this behaviour to the time of the study. On leaving the nursery Emma went on to attend the attached PMLD school. She then transferred to the MLD school at age 7 due to parental request for her to be exposed to children whose language was better developed. During her infancy Emma had difficulties with glue ear and middle ear effusion, leading to mild hearing loss in

one ear during her time at nursery. She had a heart murmur and was born with a cleft palate. She had been assessed to have global developmental delay and delayed myelination. Emma had a statement of special educational needs relating to difficulties with receptive and expressive language, basic literacy, concentration and social skills.

*Cognitive abilities:*

BAS II Recall of digits forward (auditory memory task): 1<sup>st</sup> percentile

BAS II Recognition of pictures (visual memory task): 1<sup>st</sup> percentile

WIAT II Listening comprehension: 1<sup>st</sup> percentile

*P-levels:*

Speaking and listening P5: She responded appropriately to simple requests containing two key words. She frequently displayed echolalia.

Reading P5: She could recognise a few words, pictures and symbols and derive some meaning from text. When assessed on her letter sound knowledge, Emma was able to correctly identify 1 of the 26 letter sounds.

Attention P5: She had emerging attention skills. Emma could focus for about 10 minutes on a structured activity that interested her.

*ToM:*

Emma did not pass the Sally-Ann false belief task. She may have struggled with the language requirements of this task (see Discussion section 4.1).

### *Social abilities:*

On the SRS Emma scored in the severely impaired range for social awareness, social cognition and social communication. She scored in the moderately impaired range for social motivation.

### *Anxiety:*

The pre-intervention BAI-Y indicated that Emma had a “mildly elevated” level of generalised anxiety. The sub-types of her anxiety can be seen in Appendix 13.

### *Understanding of emotions:*

Emma was shown a sheet of four faces depicting happy, sad, worried and angry. When scenarios were presented using soft toys, Emma was accurately able to identify “happy” and “sad”. She was unable to understand the difference between “angry” and “worried.” She would have been unable to accurately use a Likert scale to rate the emotions of a fictitious character.

### *Behaviour of interest*

Emma tended to smack both the children and adults around her. This tended to occur during activities which were less structured such as assemblies, carpet time and playtime. She was less inclined to smack others when she was sitting at her desk as she was usually more engaged with the given activity in this setting.

#### Appendix 4: Examples of observation record sheets

**Name:** Bailey

**Date:**

**Study phase:**

**Target behaviour definition:** Touching other children inappropriately in the playground

**Examples:** grabbing arm, grabbing clothing, body barging, sitting on top of child

**Non examples:** tapping to get attention, touching briefly when caught, holding hands

Time	Frequency Tally	Total	Comments
First ten minutes			
Second ten minutes			
Third ten minutes			
Fourth ten minutes			

**Name:** Sebastian

**Date:**

**Study phase:**

**Target behaviour definition:** Out of seat in classroom

**Examples:** Walking around room when should be sitting, bottom not in contact with chair

**Non examples:** Getting up to go to the toilet, movement to carpet when activity change, getting an item when asked first

Time	Duration	Comments
First ten minutes		
Second ten minutes		
Third ten minutes		



## Appendix 5: The Likert scale anxiety measure

Participant \_\_\_\_\_ Date \_\_\_\_\_

Study phase \_\_\_\_\_

Situation \_\_\_\_\_

### How are you feeling?

Not worried\*

A bit worried

Very worried



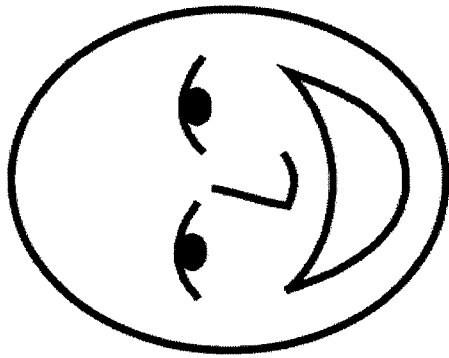
\_\_\_\_\_

1      2      3      4      5      6      7      8      9      10

(\*The term 'worried' was used instead of 'anxious' following the pilot as this was more familiar to the participants).

Notes \_\_\_\_\_

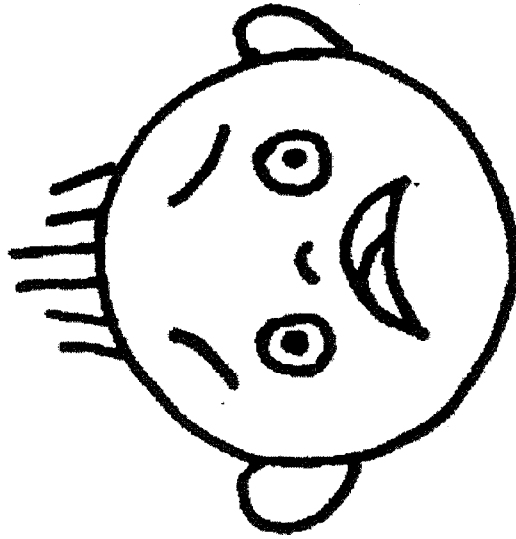
Appendix 6: Faces sheet



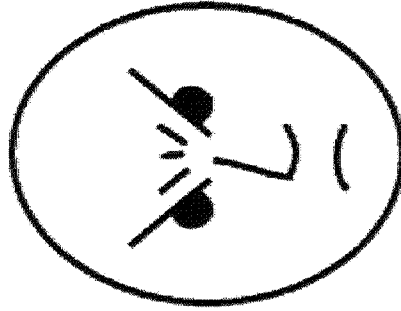
Happy



Sad



Worried



Angry

Appendix 7: Fictitious scenarios to pilot the Likert scale



This is Bob.

Bob feels very anxious\* when it is nearly playtime because he thinks he won't have anyone to play with.

Where would you put Bob on this anxiety scale?

Not anxious

A bit anxious

Very anxious



1 2 3 4 5 6 7 8 9 10

255

At story time Bob feels much more relaxed. Where would you put him on the anxiety scale at story-time?

Not anxious

A bit anxious

Very anxious



---

1      2      3      4      5      6      7      8      9      10

(\*The term 'worried' was used instead of 'anxious' following the pilot as this was more familiar to the participants).

## Appendix 8: Scenarios used to pilot the faces sheet using soft toys

### **Happy**

1. "It is Ben's birthday and a friend arrives with a present. How does Ben feel?"
2. "Ben gets all of his work right and his teacher is going to give Ben a special sticker. Ben loves stickers. How does Ben feel?"

### **Worried**

1. "Ben is scared of mice and he sees one in his kitchen. How does Ben feel?"
2. "Ben has lost his homework and he thinks his teacher might tell him off. How does Ben feel?"

### **Angry**

1. "Ben has been saving some of his favourite chocolate. His dog finds it and eats it. How does Ben feel?"
2. "Ben's sister broke his favourite toy car and instead of saying sorry she laughed about it. How does Ben feel?"

### **Sad**

1. "Ben loves to play with his cat. One day his cat dies. How does Ben feel?"

2. “Ben was looking forward to going to Max’s birthday party, but now Ben can’t go because he is ill. How does Ben feel?”

### Appendix 9: Summary of target behaviours and target situations

The following table outlines the behaviours and situations that were targeted by the social stories.

#### The behaviours and situations targeted by the social stories

<i>Participant</i>	<i>School type</i>	<i>Target behaviour</i>	<i>Target situation</i>
Emma	Special	Smacking others	Assembly
Bailey	Special	Holding onto other children	Playground
Sebastian	Special	Getting out of chair during lessons	Classroom – morning table top activity sessions
Harriet	Special	Calling out inappropriate comments in lessons	Classroom – independent work sessions
Connor	Mainstream	Getting upset and tearful due to anxiety about getting work incorrect	Maths lessons
Lewis M	Mainstream	Insistence on adult accompanying him to toilet due to anxiety about a previous fire	Throughout school day

Luke	Mainstream	Grabbing hold of other children	PE lessons
Lewis J	Mainstream	Persistent seeking of reassurance from TA due to anxiety about getting work incorrect	Maths lessons – independent work activity



## Appendix 10: Semi-structured interview format: Pre- intervention

### **Introduction covering:**

- Purpose of interview
- Length of interview
- Nature of questions
- Use of tape-recorder – it can be stopped at any point
- Right to withdraw
- Confidentiality – Responses may be included in thesis, but will be anonymised

### **Areas to cover in the interview:**

- The behaviours the participant displays in school which relate to a limited social understanding
- How often behaviour occurs
- Duration of behaviour
- Intensity of behaviour – rate on a scale from 1 (low) to 10 (high)
- Origins of the behaviour
- What happens before and after the behaviour (sequence of events)
- Possible motivations for the behaviour / triggers

- Impact of the behaviour on participant / others
- Exceptions when it doesn't occur
- Existing / past management strategies
- Any anxiety experienced by participant when the behaviour occurs
- Indications that participant is anxious
- How often anxiety occurs
- Duration of anxiety
- Intensity of anxiety (rate on scale)
- Anxiety triggers / sequence of events
- Origins of anxiety
- Impact of the anxiety on participant / others
- Any exceptions when anxiety does not occur
- Existing / past management strategies
- Any other relevant information
- Thank TA for participation

## Appendix 11: Inter-rater reliability calculations

Inter-rater reliability was calculated using the following three methods:

1. The exact agreement method (Repp, Deitz, Boles, Deitz and Repp 1976)  
for frequency observations lasting 10 minutes each:

Number of agreements / Total (number of agreements + disagreements)  $\times$  100

This was calculated for Luke, Bailey and Emma.

### **Luke**

Total time co-observed = 50 minutes

Co-observations occurred:

- Once in baseline phase
- Once in one-to-one attention phase
- Once in intervention phase
- Once in one week post intervention phase
- Once in four months post intervention

$29/32 \times 100 = 91\%$

## **Bailey**

Total time co-observed = 40 minutes

Co-observations occurred:

- Once in baseline phase
- Once in one-to-one attention phase
- Once in intervention phase
- Once in one week post intervention phase

$$38/41 \times 100 = 93\%$$

## **Emma**

Total time co-observed = 30 minutes

Co-observations occurred:

- Once in baseline phase
- Once in one-to-one attention phase
- Once in intervention phase

$$17/17 \times 100 = 100\%$$

**Lewis M:** The exact agreement method was used over morning sessions.

Total time co-observed = 3 mornings (3 hours long)

Co-observations occurred:

- Once in baseline phase

- Once in intervention phase
- Once in four months post intervention phase

$$6/6 \times 100 = 100\%$$

2. The duration agreement approach (described by Kennedy 2005) for duration observations:

Smallest duration total from observer / largest duration total  $\times 100$

This was calculated for Connor.

### **Connor**

Total time co-observed =  $8 \times 1$  hour maths lessons

Co-observations occurred:

- Once in baseline phase
- Once in one-to-one attention phase
- Twice in intervention phase
- Three times in one week post intervention phase
- Once in four months post intervention phase

$$23.5 / 27 \text{ minutes distressed} \times 100 = 87\%$$

3. TA agreement at the end of the researcher's 10 minute observation

TAs were asked to comment on the accuracy of the researcher's observations.

This method was used for Lewis J, Harriet and Sebastian.

## **Lewis J**

Total observation time co-agreed by TA = 40 minutes

Co-agreements occurred:

- Once in baseline phase
- Once in one-to-one attention phase
- Once in intervention phase
- Once in one week post intervention phase

35/35 = 100%

## **Harriet**

Total observation time co-agreed by TA = 50 minutes

Co-agreements occurred:

- Once in baseline phase
- Once in one-to-one attention phase
- Twice in intervention phase
- Once in one week post intervention phase

21/21 = 100%

## **Sebastian**

Total observation time co-agreed by TA = 50 minutes

Co-agreements occurred:

- Once in baseline phase
- Once in one-to-one attention phase
- Once in intervention phase
- Once in one week post intervention phase
- Once in four months post intervention phase

The researcher presented the duration recording for Sebastian to the TA at the end of each observation session, and TA provided agreement that the data appeared accurate on all five occasions, therefore 100% agreement.

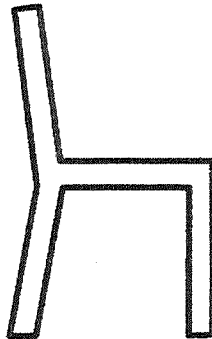
Appendix 12: Suggestions from cognitively able participants regarding strategies to be included in their social stories

Participant	Suggestions by participants which were incorporated into their social stories
Connor	To practice breathing calmly when feeling stressed in maths lessons
Luke	To stand near to his TA if he feels that he wants to touch people To ask for a few minutes of 'time-out' if he feels he has lost control of his behaviour
Lewis M	To ask an adult to come to the toilet five minutes after Lewis M has gone, in case he has become anxious
Lewis J	To attempt to do three maths questions before asking for help

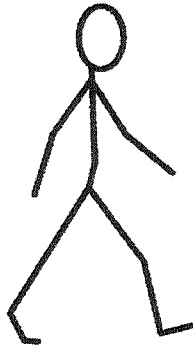


Sebastian's social story

Sitting on my chair in lessons

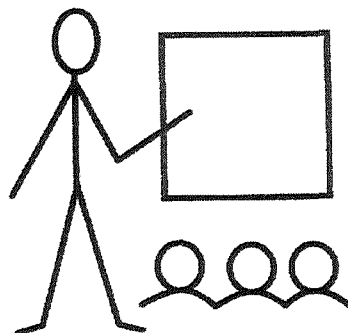


My name is Sebastian.

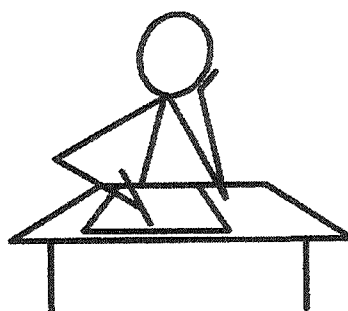


I go to  School.

Children go to school to learn.



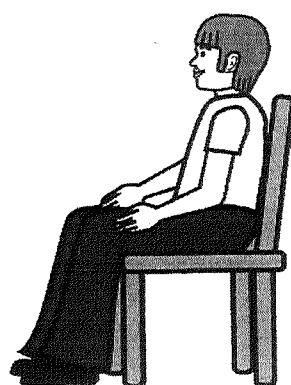
In lesson time children usually sit on chairs at their tables to do their work.



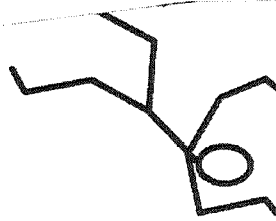
When I am working at my table it is important to stay sitting on my chair.



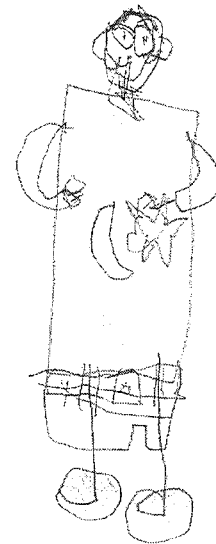
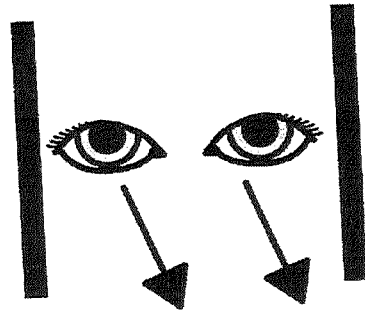
It is best to keep my bottom on the chair and my feet on the floor.



This will stop me from falling off the chair and hurting myself.



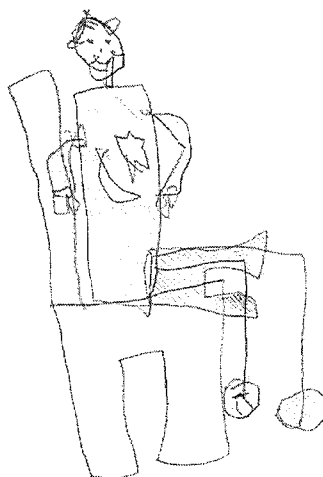
If I walk around the classroom other children look to see what I am doing.



This means they stop doing their work to look at me.

Mrs B likes us to work hard so that we learn things.

**I will try to stay sitting on my  
chair in the classroom.**



---

### Questions to ask Sebastian

What should I remember to do in the classroom?

Why is this important?

Appendix 14: Treatment Integrity checklist

<b>Date</b>	<b>Social story read (tick/cross)</b>	<b>Comprehension questions understood (tick/cross)</b>	<b>Social story was read within an hour of the target situation (tick/cross)</b>	<b>Location where social story was read and brief description of the environment</b>	<b>Other Comments</b>



## Appendix 15: Semi-structured interview format: Post- intervention

### **Introduction covering:**

- Purpose of interview
- Length of interview
- Nature of questions
- Use of tape-recorder – it can be stopped at any point
- Right to withdraw
- Confidentiality – Responses may be included in thesis, but will be anonymised

### **Areas to cover in the interview:**

#### *The process of reading the social story:*

- What went well
- The challenges
- The participant's response to reading it (e.g. interest, concentration)
- Participant's level of comprehension
- Who read it

#### *The TA's perception of changes seen in behaviour:*

- Frequency
- Intensity

- Duration
- If changes are seen, what these are attributed to
- Current impact of participant's behaviour on participant / others

*The TA's perception of changes seen in anxiety:*

- Frequency
- Intensity
- Duration
- If changes are seen, what these are attributed to
- Current impact of participant's anxiety on participant / others

*TA's response to the intervention:*

- Likes/dislikes
- Potential improvements
- Thoughts regarding the future use of the intervention with other children

## Appendix 16: Intervention Rating Profile-15

**TA's name:**

**Child's name:**

Please circle the number that best describes your agreement or disagreement with each statement

(6= strongly agree, 1= strongly disagree)

1. This was an acceptable intervention for the child's problem behaviour  
123456
2. Most teachers would find this intervention appropriate for behaviour  
problems in addition to the one described 123456
3. This intervention proved effective in changing the child's problem  
behaviour 123456
4. I would suggest the use of this intervention to other teachers 123456
5. The child's behaviour problem was severe enough to warrant use of this  
intervention 123456
6. Most teachers would find this intervention suitable for the behaviour  
problem described 123456
7. I was willing to use this intervention in the classroom setting 123456
8. The intervention did not result in negative side effects for the child  
123456
9. The intervention would be appropriate for a variety of children 123456
10. The intervention is consistent with others used within the classroom  
123456
11. The intervention was a fair way to handle the child's problems 123456
12. The intervention is reasonable for the given behaviour problem 123456
13. I liked the procedures used in this intervention 123456
14. The intervention was a good way to handle the child's behaviour  
problem/anxiety 123456
15. Overall the intervention was beneficial to the child 123456

## Appendix 17: Method for calculating Percentage of All Non-overlapping Data (PAND)

*Adapted from: Parker, Hagan-Burke and Vannest (2007)*

PAND/*Phi* is first demonstrated with a short, fabricated multiple baseline design (MBD) dataset, created to facilitate replication. In this MBD, a note taking strategy seeks to improve the quality of homework by Adam, Bob, and Carol: 3 students with learning disabilities (LD). Homework is rated weekly on a 30-point scale. An MBD graph is presented in Figure 1, with horizontal mean lines superimposed on each phase.

Summary statistics on the data are presented in Table 1.

**Figure 1: Graphs showing quantity of homework produced by Adam, Bob and Carol**



Figure 1 and Table 1 show that the three data series for Adam, Bob, and Carol are of unequal length, as well as unequal means and variances, qualities that cause problems for an  $R^2$  (ANOVA or regression analyses). The example was made challenging in another way: Two of the baseline phases are too short and variable to infer a stable trend. Therefore, trend control techniques available in  $R^2$  analyses cannot be legitimately applied.

Table 1: Descriptive Summary of the Fabricated Multiple Baseline Example

Statistics	Students		
	Adam	Bob	Carol
Phase scores	A: 20, 18, 20	A: 18, 17, 16, 20	A: 19, 18, 24, 22, 21, 19
	B: 20, 21 23	B: 19, 22, 19, 20, 20, 24	B: 30, 21, 23, 28, 32, 34
Number of scores	6	10	12
SDs	1.63	2.32	5.43
Phase means	A: 19.3	B: 21.3	A: 17.8
	B: 20.7	A: 20.5	B: 28.0

Visual analysis of Figure 1 reflects a somewhat effective intervention. Data clusters between Phase A and Phase B are not widely separated, and overlap is apparent for each student series. Overlapping data points are defined as the minimum number that would have to be swapped across phases for complete score separation.

With a transparent ruler, we carefully calculated overlapping data as 1 for Adam, 1 for Bob, and 2 for Carol, totalling 4, or  $4/28 = 14.2\%$  overlap. PAND is therefore  $100 - 14.2 = 85.8\%$ . From PAND, we also can calculate non-overlap beyond chance level (50%):  $85.8 - 50 = 35.8\%$  beyond chance level.

For short datasets like this example, counting from the graph is usually accurate. For longer, more crowded datasets, an alternative spreadsheet sorting method will be provided. However, first the hand-calculation method is continued to demonstrate a 2x2 table and a *Phi* effect size. Table 2 demonstrates the creation of the 2x2 contingency table in two steps, from left to right.

Table 2: Two-Stage Construction of the 2 x 2 Table of Proportions

Overlap	Phase A		Total
	Intervention	Baseline	
Higher	<i>cell a</i>	<i>cell b</i>	7.1
Lower	7.1 <i>cell c</i>	<i>cell d</i>	
Total:	46.4	53.6	100

Overlap	Phase B		Total
	Intervention	Baseline	
Higher	39.3 <i>cell a</i>	7.1 <i>cell b</i>	46.4
Lower	7.1 <i>cell c</i>	46.5 <i>cell d</i>	53.6
Total:	46.4	53.6	100

Beginning at the left, the percentages of data points in the baseline and intervention phases are calculated:  $13/28 = 46.4\%$ ,  $15/28 = 53.6\%$ . These percentages are entered at the bottom of their respective columns (see Table 2, Phase A). Next, the proportion of overlapping data (14.2%) is split between cells *b* and *c*: 7.1% in each cell. These two cells represent “too high” scores in the baseline phase (cell *b*) and “too low” scores in the intervention phase (cell *c*).

Finally, cells *a* and *d* are filled in by subtraction:  $46.4 - 7.1 = 39.3$  and  $53.6 - 7.1 = 46.5$ . Because this table has completely balanced vertical and horizontal marginals, a Pearson *Phi* effect size can be calculated as the difference between the two cell ratios:  $[a/(a + c)] - [b/(b + d)]$ . In this example  $39.3/46.4 - 7.1/53.6 = 0.715$ , so *Phi* = 0.72.

This *Phi* value can be confirmed by entering the table's four inside numerals into either a crosstabs statistical module or a "test of two independent proportions" module; they will both yield **.72**. A proportions test module is preferred because nearly all provide CIs for *Phi*. For a 90% level of confidence, the exact bootstrap interval is **.58 << .72 >> .81**. So we can be 90% certain that the true effect size is somewhere between **.58 and .81**.



Appendix 18: Thematic analysis themes which distinguished between participants with successful and unsuccessful outcomes

**Theme 1**

*Label:* Existing strategies are sufficient.

*Definition:* The TA describes informal management strategies used within the classroom prior to the intervention indicating that these reduce the target behaviour and/or anxiety.

*Indicators:* Mentioning any of the following as successful management strategies: Use of structured environment; consistent routine; ignoring inappropriate behaviour; use of praise; differentiation of work; having a good knowledge of the child.

TA suggests that progress using the existing strategies is good.

*Differentiation:* Interviews regarding: Emma, Bailey, Connor, Lewis J and Harriet had 23%, 29%, 24%, 14%, 8% and 3% of codes falling within this theme respectively. Not coded in interviews regarding: Sebastian, Luke and Lewis M.

**Theme 2**

*Label:* TA concerned about participant's behaviour/anxiety prior to intervention.

*Definition:* The TA raises concerns about how the behaviour and/or anxiety impinges on the participant or other children currently or in the future.

*Indicators:* TA mentions either: Safety concerns; impact on learning; social consequences; negative impact on peers or concerns about impact during future secondary school education.

*Differentiation:* Occurs in interviews for all participants but in differentiating proportions of codes: Sebastian (22%), Luke (26%), Lewis M (18%), (8%), Harriet (5%), Emma (4%), Bailey (2%), Connor (4%), Lewis J (0%), (2%).

### **Theme 3**

*Label:* Difficulties arose with practicalities of reading social stories.

*Definition:* TA indicates that a difficulty arose during the process of reading the social story.

*Indicators:* Mentioning any of the following: difficulties finding a quiet location, unable/inappropriate to remove participant from classroom to find a quiet location, lack of time to read social story, TA was not proactive enough to make time, reading had to be abandoned because of aggression of other pupils, participant either: disliked re-reading the social story / was distracted / lost interest in the social story/ did not want to answer the comprehension questions / was tired.

*Differentiation:* The theme occurred in the following percentages of codes: Sebastian (2%), Luke (0%), Lewis M (0%), (0%), Harriet (17%), Connor (24%), Bailey (8%), Emma (8%), Lewis J (19%), (19%).

### **Theme 4**

*Label:* Attributions for success related to social story.

*Definition:* TA attributed improvements in behaviour and/or anxiety to the features of the social story not maturation or natural gain in confidence.

*Indicators:* TA comments that any of the following created desired change: Social story was pitched correctly to child's level of ability; participant had a sense of involvement in developing the social story; participant could identify that social story was about him/herself; participant could link social story to the target behaviour; reading the social story had a calming effect; the frequency of reading helped to consolidate concepts; the content of the social story was appropriate to the child's needs.

*Differentiation:* The theme occurred in the following percentages of codes: Sebastian (21%), Luke (21%), Lewis M (27%), (22%), Harriet (8%), Connor (0%), Bailey (13%), Emma (0%), Lewis J (5%), (6%).

## **Theme 5**

*Label:* Intervention was inappropriate for participant.

*Definition:* TA comments that the use of a social story as an intervention was inappropriate for the given participant.

*Indicators:* TA raised any of the following points: The participant lacked the confidence to apply the social story; the social story was incorrectly pitched; participant used the social story to manipulate staff; participant disliked reading the social story; the social story led the participant to reject TA support; social story was inconsistent with participant's own identity; social story was inconsistent with TA's perception of participant; a more mobile intervention is needed for the participant; participant needs an alternative intervention or a combination of interventions.

*Differentiation:* Not coded in interviews regarding: Sebastian, Luke, Lewis M. Interviews regarding the remaining participants had the following percentages of codes falling within this theme: Harriet (14%), Connor (57%), Emma (53%), Lewis J (5%), (21%) and Bailey (18%).

## **Theme 6**

*Label:* Less prolonged use of intervention preferable in the future.

*Definition:* TA believes that the social story would have been equally/more effective if it had been applied for a shorter period of time.

*Indicators:* TA comments that: The initial 2 week block of the intervention was most useful; continued use of intervention led to participant boredom or TA boredom. TA would use a social story for a shorter period of time if the intervention was used in the future.

*Differentiation:* The theme was found in the interviews in the following percentage of codes: Sebastian (10%), Luke (14%), Lewis M (15%), (28%). The theme was not coded in interviews regarding: Harriet, Connor, Bailey, Emma or Lewis J.

Appendix 19: The percentage of codes in each interview within each theme

Theme	Theme occurred in the following percentage of codes, %								Example Quotation
	Successful participants			Unsuccessful participants					
	<i>Sebastian</i>	<i>Lewis M</i>	<i>Luke</i>	<i>Emma</i>	<i>Connor</i>	<i>Harriet</i>	<i>Bailey</i>	<i>Lewis J</i>	
Theme 1: Existing strategies are sufficient	0	0 0	0	23	24	3	29	14 8	<i>"It's [the work is] more personalised now, so she is getting more things suited to her. That seems to have calmed her down and she is less anxious" (Emma's TA)</i>
Theme 2: TA is concerned about the participant's behaviour / anxiety	22	18 8	26	4	4	5	2	0 2	<i>"He could hurt or injure other children who walk past because he does literally flop everywhere!" (Sebastian's TA)</i>
Theme 3: Difficulties arose with the practicalities of reading social stories	2	0 0	0	8	24	17	8	19 19	<i>"Ideally we would have had a little quiet area but there isn't really such as place." (Bailey's TA)</i>

Theme	Theme occurred in the following percentage of codes, %								Example Quotation
	Successful participants			Unsuccessful participants					
	<i>Sebastian</i>	<i>Lewis M</i>	<i>Luke</i>	<i>Emma</i>	<i>Connor</i>	<i>Harriet</i>	<i>Bailey</i>	<i>Lewis J</i>	
Theme 4: Attributions for success related to the social story	21	27 22	21	0	0	8	13	5 6	<i>“What helped it work was that he was definitely able to identify that the story was about him.”</i> (Sebastian’s TA)
Theme 5: The intervention was inappropriate for the participant	0	0 0	0	53	57	14	18	5 21	<i>“It needs to be something immediate, very short, so like if we put a procedure in place when she does smack it has got to be something we can do anywhere at anytime.”</i> (Emma’s TA)
Theme 6: Less prolonged use of the intervention is preferable	10	15 28	14	0	0	0	0	0 0	<i>“I think he had grasped it sometime during the second week. I think it should be a regular thing, but perhaps not every day.”</i> (Luke’s TA)

Appendix 20: Frequency and percentage of times social stories were read before intervention fading

Participant	Frequency of times read	Percentage of times read/ number possible
Lewis M	21	91%
Luke	22	96%
Sebastian	13	57%
Bailey	19	83%
Emma	19	95%*
Lewis J	10	43%
Harriet	16	66%
Connor	6	100%*

\*Connor and Emma had fewer possible readings due to early withdrawal of the intervention

Appendix 21: Frequency of reading the social story within the first two weeks of the intervention phase

<b>Participant</b>	<b>Number of times social story was read out of 10 possible readings</b>
Sebastian*	8
Lewis M*	10
Luke*	10
Emma	10
Bailey	8
Harriet	7
Connor	6
Lewis J	5

\*participants with successful outcomes