

## University of Southampton Research Repository ePrints Soton

Copyright © and Moral Rights for this thesis are retained by the author and/or other copyright owners. A copy can be downloaded for personal non-commercial research or study, without prior permission or charge. This thesis cannot be reproduced or quoted extensively from without first obtaining permission in writing from the copyright holder/s. The content must not be changed in any way or sold commercially in any format or medium without the formal permission of the copyright holders.

When referring to this work, full bibliographic details including the author, title, awarding institution and date of the thesis must be given e.g.

AUTHOR (year of submission) "Full thesis title", University of Southampton, name of the University School or Department, PhD Thesis, pagination

**UNIVERSITY OF SOUTHAMPTON**

**FACULTY OF MEDICINE, HEALTH AND LIFE SCIENCES**

**School of Psychology**

**THE USE OF SOCIAL STORIES™ TO HELP BEDTIME RESISTANCE IN A  
SAMPLE OF YOUNG SCHOOL-AGED CHILDREN**

**Elizabeth Smith**

**Thesis for the degree of Doctor in Educational Psychology**

**May 2009**

**Word count: 19438**

**UNIVERSITY OF SOUTHAMPTON**

**ABSTRACT**

FACULTY OF MEDICINE, HEALTH AND LIFE SCIENCES

Doctor in Educational Psychology

**THE USE OF SOCIAL STORIES™ TO HELP BEDTIME RESISTANCE IN A SAMPLE  
OF YOUNG SCHOOL-AGED CHILDREN**

Elizabeth Smith

Childhood sleep problems are highly prevalent and the importance of adequate sleep quantity and quality in child development has been well documented. The most common area of difficulty associated with young school-age children is bedtime resistance, where the child typically refuses to go to bed or attempts to delay bedtime with repeated requests. Current behavioural approaches used to address such difficulties typically involve the use of extinction techniques, which aim to minimise parental attention after bedtime. Research has shown that these techniques have led to a reduction in problem behaviours, but the emotional difficulties that parents face during the initial phase of the intervention have led to the exploration of alternative techniques.

This review explored the potential use of a Social Story™ intervention (a short personalised story designed to teach a child how to manage their own behaviour during a specific situation) to help children with their bedtime problems. Current literature has shown that Social Story™ interventions have a good level of treatment acceptability, with supporting evidence provided for their use with both typically developing children and those with an Autistic Spectrum Disorder (ASD). Only 2 studies however have investigated the use of Social Stories™ within the specific area of children's bedtime problems (Burke, Kuhn & Peterson, 2004; Moore, 2004).

The empirical paper reports a study that investigated the use of a Social Story™ intervention with a community sample of 6 children who found it difficult to settle at bedtime. Results replicated previous findings, demonstrating a reduction in the frequency of disruptive bedtime behaviours for all 6 children associated with the introduction of the Social Story™. Treatment effects, however, were not maintained on all measures at the 6-month follow-up and results from an objective measure of sleep behaviours (actigraphy) produced mixed findings.

## LIST OF CONTENTS

|   |        |
|---|--------|
| ABSTRACT .....  | 1      |
| LIST OF CONTENTS .....  | 2      |
| LIST OF TABLES .....  | 4      |
| LIST OF FIGURES .....   | 4      |
| DECLARATION OF AUTHORSHIP .....   | 5      |
| ACKNOWLEDGEMENTS.....   | 6      |
| <br>LITERATURE REVIEW .....   | <br>7  |
| 1.1 ABSTRACT.....   | 8      |
| 1.2 INTRODUCTION .....  | 9      |
| 1.3 SLEEP PROBLEMS .....  | 11     |
| 1.3.1 Definitions.....  | 12     |
| 1.3.2 Methods used to assess sleep problems in children.....                          | 14     |
| 1.3.3 Prevalence.....   | 14     |
| 1.3.4 The impact of disturbed and inadequate sleep .....                              | 18     |
| 1.3.5 Review of current treatments.....   | 21     |
| 1.3.6 Summary .....   | 26     |
| 1.4 SOCIAL STORIES™ .....   | 27     |
| 1.4.1 Bibliotherapy .....   | 27     |
| 1.4.2 What are Social Stories™?.....  | 28     |
| 1.4.3 Theoretical background of Social Stories™.....                                  | 32     |
| 1.4.4 Studies using Social Stories™ with children with ASD .....                      | 34     |
| 1.4.5 Studies using Social Stories™ with children without a diagnosis of<br>ASD ..... | 39     |
| 1.5 SOCIAL STORIES™ AND SLEEP PROBLEMS.....   | 44     |
| 1.6 CONCLUSION .....  | 47     |
| <br>EMPIRICAL PAPER .....   | <br>50 |
| 2.1 ABSTRACT.....   | 51     |
| 2.2 INTRODUCTION .....  | 52     |
| 2.3 METHOD .....  | 58     |

|   |                                  |     |
|---|----------------------------------|-----|
| 2.3.1   | Participants .....               | 58  |
| 2.3.2   | Measures .....                   | 60  |
| 2.3.2   | Social Story™ Intervention ..... | 64  |
| 2.3.3   | Design .....                     | 65  |
| 2.3.4   | Procedure .....                  | 65  |
| 2.4   | RESULTS .....                    | 68  |
| 2.4.1   | Descriptive Data .....           | 68  |
| 2.4.2   | Group Analysis of data .....     | 75  |
| 2.4.3   | Individual differences .....     | 82  |
| 2.4.4   | Summary of results .....         | 87  |
| 2.5   | DISCUSSION.....                  | 89  |
| Appendix 1: The Sally-Anne Test Procedure.....                              |                                  | 96  |
| Appendix 2: Strange Stories (Happe, 1994) .....                             |                                  | 97  |
| Appendix 3: Strength and Difficulties Questionnaire (SDQ, Goodman, 2005) .. |                                  | 99  |
| Appendix 4: Children's Sleep Habit Questionnaire (CSHQ, Owens, 2004) ....   |                                  | 100 |
| Appendix 5: Sleep Diary .....   |                                  | 102 |
| Appendix 6: Example of Social Story™ content .....                          |                                  | 104 |
| Appendix 7: Ethics Approval Letter.....                                     |                                  | 106 |
| Appendix 8: initial Screening Letter .....                                  |                                  | 107 |
| Appendix 9: Participant Information Sheet and Consent form .....            |                                  | 109 |
| Appendix 10: Social Story™ Comprehension Check.....                         |                                  | 112 |
| Appendix 11: Debrief Sheet.....   |                                  | 113 |
| Appendix 12: Graphs of results from the subtests of the CSHQ.....           |                                  | 114 |
| REFERENCES .....  |                                  | 116 |

## LIST OF TABLES

|  |    |
|--|----|
| Table 1: Summary of the four basic sentence types comprising social stories™ (Gray, 2000) .....  | 30 |
| Table 2: Age, gender, British Picture Vocabulary II (BPVS II) score, perspective taking skills (first and second order false belief tasks) and Strengths and Difficulty Questionnaire (SDQ) scores, including the five subtests scores and the total difficulties score, for all participants .....                        | 69 |
| Table 3: Baseline sleep data for each participant, including the average number of disruptive bedtime behaviours per night, scores from the Children's Sleep Habit Questionnaire (total score and bedtime resistance subscale score), and actigraphy data (sleep onset latency, sleep duration and sleep efficiency). .... | 71 |
| Table 4: Pearsons Correlation Coefficients for baseline sleep measures.....  | 73 |

## LIST OF FIGURES

|  |    |
|--|----|
| Figure 1: Graphs depicting group mean scores from the parental report measures (sleep diary and CSHQ) taken at baseline, control, intervention and 6-month follow-up. ....   | 76 |
| Figure 2: Graphs depicting group mean scores from the actigraphy measure taken at baseline, control, intervention and 6-month follow-up. ....  | 80 |
| Figure 3: Graphs showing individual results on each of the parent report measures at baseline, control, intervention and 6 month follow-up. Participants 1-3 received the Social Story intervention and Participants 4-6 received the Social Story and a reward intervention. .... | 84 |
| Figure 4: Graphs showing individual results on the actigraphy measures at baseline, control, intervention and 6 month follow-up. Participants 1-3 received the Social Story intervention and Participants 4-6 received the Social Story and a reward intervention. ....            | 86 |

## DECLARATION OF AUTHORSHIP

I, ELIZABETH SMITH, declare that the thesis entitled '*The use of Social Stories™ to help bedtime resistance in a sample of young school-aged children*' and the work presented in the thesis are both my own, and have been generated by me as the result of my own original research. I confirm that:

- this work was done wholly or mainly while in candidature for a research degree at this University;
- where any part of this thesis has previously been submitted for a degree or any other qualification at this University or any other institution, this has been clearly stated;
- where I have consulted the published work of others, this is always clearly attributed;
- where I have quoted from the work of others, the source is always given. With the exception of such quotations, this thesis is entirely my own work;
- I have acknowledged all main sources of help;
- where the thesis is based on work done by myself jointly with others, I have made clear exactly what was done by others and what I have contributed myself;
- none of this work has been published before submission.

**Signed:** .....

**Date:**.....

## **ACKNOWLEDGEMENTS**

I would like to thank my supervisors, Julie Hadwin and Cathy Hill for their continued support throughout my thesis. Their comments and feedback have been invaluable and very much appreciated. I would also like to thank my husband, Hywel, and mother-in-law, Helen, for their time spent proof reading this document.



## **LITERATURE REVIEW**

### **THE USE OF SOCIAL STORIES™ TO HELP BEDTIME RESISTANCE IN YOUNG SCHOOL-AGED CHILDREN: A REVIEW OF THE LITERATURE**

**Elizabeth Smith**

University of Southampton

## **1.1 ABSTRACT**

Sleep problems are very common in childhood and the importance of adequate sleep quantity and quality in relation to cognition, mood and behaviour has been well documented (e.g. Fallone, Acebo, Seifer & Carskadon, 2005; Touchette et al., 2007). The most prevalent problem that young school-aged children present with is bedtime resistance (Owens, Spirito, McGuinn & Nobile, 2000b; Blader, Koplewicz, Abikoff & Foley, 1997). This is where the child typically refuses to go to bed or attempts to delay bedtime with repeated requests. Current behavioural techniques used to address such difficulties typically involve the use of extinction techniques, which aim to minimise parental attention after bedtime (Mindell, 1999). Despite research demonstrating improvements in problem behaviours associated with such techniques the reported emotional difficulties that parents face during the initial phase of the intervention has led to low compliance and the exploration of alternative techniques to address bedtime difficulties in young children (Mindell, Kuhn, Lewin, Meltzer & Sedeh, 2006). This review explored the potential use of a Social Story™ intervention (a short personalised story designed to teach a child how to manage their own behaviour during a specific situation) to help children with their bedtime problems. This technique has the advantage of having a good level of treatment acceptability and fidelity. The evidence base behind the use of Social Stories™ with both typically developing children and those with an Autistic Spectrum Disorder (ASD) was considered, and support demonstrated for addressing a range of problem behaviours. Initial findings suggest that Social Stories™ may be helpful in reducing children's problem bedtime behaviours (Burke, Kuhn & Peterson, 2004; Moore, 2004).

However further research is required due to the small number of existing studies, the absence of objective sleep measures, and the use of a Social Story™ in combination with other techniques such as rewards.

## **1.2 INTRODUCTION**

Childhood sleep problems are considered to be a major public health concern, affecting a significant number of both infants and school-aged children (Kheirandish and Gozal, 2006). Such problems encompass a number of specific difficulties, including frequent night wakings, night fears, bedtime resistance (refusing to go to bed or attempting to delay bedtime with repeated requests), morning rising problems and daytime fatigue (Iannelli, 2007). The most common area of difficulty associated with sleep within the primary school age group is reported to be bedtime resistance (Owens et al., 2000b; Blader et al., 1997).

Several factors associated with sleep disruption and/or insufficient sleep have been linked with adverse effects on children's cognitive development (learning, memory & executive function), mood regulation, attention, behaviour, general health and overall quality of life (e.g. Fallone et al., 2005; Touchette et al. 2007). In addition to the direct impact on the child, such difficulties have also been found to be associated with an increase in family stress (e.g. Shang, Gau & Soong, 2006). Therefore, given the prevalence of bedtime behaviour problems and the impact of such difficulties, further investigation and evaluation of treatments in this area is extremely important.

Current treatments associated with the behavioural symptoms of sleep problems, such as bedtime resistance, have largely focused on a procedure known as extinction, which involves ignoring the child until morning (Mindell, 1999; Mindell et al., 2006). Studies have found this technique to be successful in reducing the frequency of problem behaviours, but difficulties have been highlighted associated with social acceptability and compliance (Rickert & Johnson, 1988). Other treatments for sleep problems in children include positive routines, faded bedtimes, scheduled awakenings and parent education.

A small number of studies have considered the use of Social Stories™ as a potential treatment intervention for children's sleep problems (Burke et al., 2004; Moore, 2004). A major advantage associated with such a technique is a greater degree of social acceptability compared to existing extinction techniques (Burke et al., 2004). Social Stories™ are short personalised stories designed to teach children how to manage their own behaviour during a particular situation that they find challenging or confusing (Gray & Garand, 1993). Social Stories™ were initially designed for use with children with an autistic spectrum disorder (ASD), but recent evidence suggests that they are also of benefit for typically developing children (e.g. Jeffery, 2006; Toplis & Hadwin, 2006).

A number of studies have been conducted to investigate the effectiveness of Social Story™ interventions targeted towards either reducing problem behaviours such as tantrums, disruptive behaviour, inappropriate touching and aggression (see Scattone, Wilcznski, Edwards and Rabian, 2002, for example) or increasing appropriate behaviours, such as sitting appropriately during circle

time in school or initiating appropriate verbal interactions with peers (see Crozier & Tincani, 2007, for example). Overall, the evidence provides initial support for this technique. Burke et al. (2004) and Moore (2004) also provide preliminary support for the use of Social Stories™ with children presenting with behavioural sleep problems. However, there are a number of methodological issues associated with such studies, warranting a need for further research.

The aim of the current literature review was to consider the theoretical framework and evidence behind the use of a Social Story™ intervention for children with bedtime resistance problems. In order to explore this fully the review covers three main areas. Firstly prevalence rates, impact and an overview of current treatments associated with sleep problems within the child population are considered. This is then followed by a focus on the Social Story™ intervention technique, which described the process and provided a review of the evidence base behind this intervention. Finally the potential of using a Social Story™ intervention for children with bedtime resistance difficulties is outlined. Consideration of methodological issues and implications regarding future research in this area are also discussed.

### **1.3 SLEEP PROBLEMS**

This section aims to provide an overview of the definitions and prevalence of sleep problems in infancy and childhood. It also looks at the impact that sleep problems can have on child development and daily functioning and review current treatments available for common sleep problems in early and middle

childhood. Consideration of the different methods used to assess sleep problems in childhood has also been included.

### **1.3.1 Definitions**

Sleep problems are among the most common concerns that parents of young children raise with their doctor or health visitor (Thiedke, 2001). The most frequent symptoms that parents report are difficulties with night wakings and bedtime resistance (Mindell, 1999).

Defining disordered sleep behaviour in children is complicated due to differences in sleep patterns that occur at different developmental stages. For example, it would not be considered unusual if a 1-month-old baby wakes frequently in the night, but it would be if this was still occurring to a similar degree at 2 years of age. By 6 months of age an infant's sleep architecture (structure of sleep) closely resembles that of an adult (Thiendke, 2001).

Sleep disorders can be classified in terms of extrinsic and intrinsic disorders (International Classification of Sleep Disorders, Revised, 2001). Extrinsic disorders are caused or maintained by factors outside the body (e.g. poor bedtime routine, caffeine before bed, late or variable bedtimes, inappropriate parental attention after bedtime etc.) whereas intrinsic disorders are associated with factors from within the body (e.g. breathing difficulties) (Attarian, 2004). Although the distinction between intrinsic and extrinsic disorders is clear, Attarian (2004) highlights that the two may co-exist or interact within an individual.

Sleep problems associated with intrinsic disorders include parasomnias, sleep apnea and narcolepsy. Parasomnias include night terrors, somnambulism (sleep walking), somniloquy (sleep talking) and nocturnal enuresis (bed-wetting). These are characterised by abnormal polysomnography which reflects a central nervous system immaturity (Thiedke, 2001). Obstructive Sleep Apnea Syndrome (OSAS) is associated with difficulties breathing during sleep and narcolepsy with excessive daytime sleepiness.

The focus of this review is on extrinsic disorders that are mainly behavioural in origin, for example those associated with a poor bedtime routine and/or inappropriate adult attention after bedtime.

The International Classification of Sleep Disorders, second edition (ICSD-2, 2005) includes two categories that relate specifically to sleep problems in children. These fall under the heading of Behavioural Insomnia of Childhood (BIC). The main symptoms of BIC include difficulty falling asleep independently and/or frequent night wakings. The first type of BIC is sleep-onset association disorder, which occurs when a child associates falling asleep with an object (e.g. a bottle), an action (e.g. being rocked) or settling in a location other than their own bed (e.g. parents' bed) and finds it very difficult to fall asleep without this association. The second type of BIC is limit setting sleep disorder, which occurs when a child refuses to go to bed or attempts to delay bedtime with repeated requests (bedtime resistance).

### **1.3.2 Prevalence**

Sleep problems occur in approximately 20-30% of infants, toddlers and pre-schoolers (Mindell et al., 2006; Moore, Meltzer & Mindell, 2008). Fewer studies have examined sleep problems with school-aged children but the evidence indicates that such difficulties are also common in middle childhood with prevalence rates ranging from 10.8% (Stein, Mendelsohn, Obermeyer, Amromin & Benca, 2001) to 37% (Owens et al., 2000b) in community samples.

Blader et al. (1997), for example, conducted a community survey with 987 parents of children aged 5 to 12 years to investigate the prevalence and correlates of specific forms of sleep problems (bedtime resistance, sleep-onset delays, night wakings, morning rising problems, daytime fatigue, and parasomnias) within this population. Results showed that bedtime resistance was highly prevalent in this age group, with 27% of parents reporting that bedtime resistance occurred at least 3 nights per week. Sleep onset delays were also relatively common with 22.6% of the sample reported to have difficulties in this area at least 3 nights per week. 6.5% of the sample was reported to have wakings that came to the parents' attention at least 3 nights a week. When considering associations between sleep problems among the children with bedtime resistance problems, 34% also had sleep onset difficulties. Of the children with sleep onset problems, 81% had bedtime resistance problems. This finding indicates that while, bedtime resistance increases the risk of a sleep onset problem, an onset problem usually entails bedtime resistance. A significant limitation associated with this study however, is the sole use of parental report data and the lack of objective measures of sleep or standardised questionnaires.



When considering the exact prevalence of sleep problems there are a number of factors that make this difficult to establish. Firstly differences in the method of assessment and definitions of sleep problems mean that results may not necessarily be comparable. For example, significant rater differences have been found with child self-report resulting in higher estimates of sleep difficulties compared with parent report (Gregory, Rijsdijk & Eley, 2006). Also, as children's sleep problems are primarily defined by parents they are potentially influenced by a number of variables such as family dynamics, cultural expectations, parenting style, parental education level and parental psychopathology (Mindell et al., 2006). Furthermore, difficulties associated with the lack of cost-effective and non-intrusive methods to study sleep in natural settings have resulted in an over reliance on subjective reports such as questionnaires and sleep diaries (Mindell et al., 2006).

Before considering research on the impact and treatment of children's sleep problems a brief account of the variety of methods used to assess sleep problems in children is provided.

### **1.3.3 Methods used to assess sleep problems in children**

A variety of methods have been used to assess sleep problems in children and these can be grouped into objective measures and report measures. Objective measures include polysomnography and actigraphy and report measures include sleep diaries and the use of surveys or questionnaires. Report measures can be

completed by the parent and/or the child. A brief summary of their strengths and weaknesses is presented below.

Polysomnography is classified as the gold standard sleep measure (Parquet, Kawinska & Carrier, 2007). It is a multi-parametric test that measures or monitors biophysiological changes including eye movements (EOG), brain activity (EEG), heart rhythm (ECG), skeletal muscle activation (EMG) and breathing or respiratory effort during sleep<sup>1</sup> This procedure is however expensive, relatively invasive and does not lend itself to use in ecological environments. Due to such factors wrist actigraphy has recently emerged as a popular alternative to polysomnography, being more cost effective, easier to use in naturalistic settings and less invasive (Sadeh & Acebo, 2002).

Actigraphy is a method of assessment that infers wakefulness and sleep relating to limb movement (Lichstein et al., 2006). The actigraph is a small wrist-worn device, containing a movement detector and memory storage, which can be worn continuously during both day and night for periods longer than 1 week (Sadeh & Acebo, 2002). This measure is also particularly useful for people who are unable to complete sleep logs, such as young children and adults who cannot read or write (Lichstein et al, 2006). A number of studies have documented the use of actigraphy with participants ranging in age from babies to the elderly and validity has been adequately established (see review by Sadeh & Acebo, 2002). Sadeh, Sharkey and Carskadon (1994), for example, showed that

---

<sup>1</sup> <http://www.sleep-tests.co.uk/polysomnography.php>

overall agreement rates between actigraphy and polysomnography ranged between 91 and 93% in a sample of 20 adults and 16 adolescents.

Despite actigraphy being less expensive than polysomnography it is still costly (approx £600 per unit) and less accessible compared to self report or parental report measures such as questionnaires and sleep diaries.

Sleep diaries are the most widely used measure of sleep in clinical settings, having reasonable validity and good agreement with videotapes and actigraphy measures of children's sleep (Burke et al., 2004). However, specific formats vary and there is a lack of standardisation.

Owens, Spirito and McGuinn (2000a) noted that previous studies investigating sleep problems in school aged children employed a range of different interviews, questionnaires and diaries, many of which did not report reliability and validity data. Owens and colleagues developed a parent-report sleep screening instrument designed for school-aged children called the Children's Sleep Habits Questionnaire (CSHQ). This measure produces a total sleep difficulties score and eight subscale scores reflecting the major medical (intrinsic) and behavioural (extrinsic) sleep disorders associated with this age group; bedtime resistance, sleep onset delay, sleep duration, sleep anxiety, night wakings, parasomnias, sleep disordered breathing and daytime sleepiness. A community sample of 469 children aged between 4 and 10 years and a sample of 154 children (mean age 6.7yrs) who had been diagnosed with sleep disorders in a paediatric sleep clinic were used to collect data associated with the reliability and validity of the

measure. Validity was investigated by comparing the community and clinical sample on the subscales scores and results showed that the clinical sample had significantly higher scores for each of the eight subscales. The internal consistency of the total CSHQ was 0.68 for the community sample and 0.78 for the clinical sample, indicating an adequate level. Test-retest reliability was also assessed in a sample of 60 parents, who completed the CSHQ again following a two-week interval and results revealed correlations for the subtests ranging from 0.62 to 0.79, which is an acceptable level. The CSHQ has become a well used measure of sleep for school-aged children and currently is recorded to have been cited in 68 studies (ISI Web of Knowledge, 2008).

#### **1.3.4 The impact of disturbed and inadequate sleep**

Disturbed and inadequate sleep can have a significant detrimental effect on a range of factors including children's cognitive development (e.g. learning, memory and executive function), mood regulation, attention, behaviour, health and overall quality of life (Mindell et al, 2006). Smedje, Broman and Hetta (2001), for example, investigated associations between sleep and behaviour in a community sample of 635 children aged six to eight years. Parental responses to a sleep habits questionnaire and a behavioural screening form were used to assess the association between sleep problems and behavioural difficulties. Results showed that 36% of the children classified with global reports of sleep problems had scores that were indicative of behavioural problems. When considering sleep problems and behaviour in more detail they also found that hyperactivity was associated with tossing and turning during sleep, conduct

problems associated with bedtime resistance and emotional problems related to night terrors and difficulties falling asleep. The large sample size is a notable strength of this study. However, limitations include the use of parental report as the sole measure of sleep problems and behaviour and the cross sectional design, which meant that causation could not be inferred. A number of other cross sectional studies have also found correlations between sleep problems and aspects of behaviour including delinquent problems and social problems (Shang et al., 2006) and reduced memory, attention, hyperactive behaviours and mood disturbances (Kheirandish & Gozal, 2006). However in order to consider causation either longitudinal or experimental designs are required.

Experimental sleep manipulation studies have considered the causal relationship between sleep and cognitive functioning and behaviour in children demonstrating negative effects associated with periods of sleep restriction (e.g. Sadeh, Gruber & Raviv, 2003; Fallone et al., 2005). Fallone et al. (2005), for example, used an experimental sleep manipulation with a large sample of healthy, typically developing children aged between 6 and 12 years whereby participants followed 3 week-long sleep schedules (baseline, optimised, and restricted). The optimised phase involved children spending no fewer than 10 hours per night in bed, whereas during the restricted phase the children aged between 6 and 9 years-old spent 8 hours per night in bed and those aged between 10 and 12 years-old spent 6.5 hours per night in bed. Following each phase of the study teachers, rated the children's behaviour and academic performance using a battery of report measures. Results found an increase in ratings of academic problems and attention problems during the restricted phase compared to the baseline and

optimised phases, showing that a period of one week of restricted sleep time duration had a direct impact on healthy school-aged children. Compliance and time asleep were quantified by the use of actigraphy and sleep diaries. Experimental studies however are associated with low levels of ecological validity, meaning that findings may not relate to natural, less controlled situations. Also they are not able to consider impact over time and therefore naturalistic longitudinal studies are also required.

A number of longitudinal studies have recently been conducted in order to further investigate the relationship between sleep patterns over time and children's behaviour, affect and cognition (e.g. Lam, Hiscock & Wake, 2008; Quach, Hiscock, Canterford & Wake, 2009; Touchette et al., 2007). Touchette et al. (2007), for example, considered the relationship between sleep duration patterns over time and behavioural and cognitive function at 6 years with 1492 families. Sleep duration was measured at 2.5, 3.5, 4.5 and 6 years of age by a parent report questionnaire given to the mother. This was used to group the children into 4 sleep duration categories; short persistent (6%), short increasing (4.8%), 10-hour persistent (50.3%) and 11-hour persistent (38.9%). Results showed that short sleep duration patterns were associated with high scores of hyperactivity-impulsivity, as rated by mothers ( $p = .001$ ), low receptive language skills, as measured by the British Picture Vocabulary Test – Revised ( $p = .002$ ) and low non verbal intellectual scores, as measured by the Block Design subtest of the WISC-III ( $p = .004$ ). Results also remained significant when potentially confounding variables such as parental education, immigrant status and age of

mother were controlled for, highlighting the importance of providing opportunities for children to sleep at least 10 hours a night throughout early childhood.

Overall, support for the importance of sleep in childhood, in relation to various academic and behavioural factors, has been shown by cross sectional, experimental and longitudinal studies. In clinical terms, this highlights the importance of early identification and treatment of such difficulties.

### **1.3.5 Review of current treatments**

A range of treatments for paediatric sleep problems exist and most can be grouped into either pharmaceutical or behavioural interventions. A large number of studies and reviews have been conducted in this area (e.g. Mindell, 1999; Mindell et al., 2006; Moore et al., 2008; Ramchandani, Wiggs, Webb & Stores, 2007). Most studies have focused on infants and pre-school aged children. A brief overview of pharmaceutical interventions is provided but the main focus is on behavioural interventions.

#### ***Pharmaceutical Interventions***

Sedative medication is the most frequently used treatment for childhood sleep problems, despite concerns about its effectiveness (Ramchandani et al., 2007). Ramchandani and colleagues reviewed four randomised controlled trials of drug treatments with children aged 5 years or under who had established settling problems. Three studies used trimeprazine and the other niaprazine. Results from all four studies indicated a significant reduction in night wakings compared

to control groups. The authors commented that the clinical significance of the results however, was less clear with up to one third of the children in one of the studies not showing any improvements with the drugs. In addition, only two studies included a follow up period, one at 6 months and the other at 4 weeks, and both indicated only a marginal improvement from baseline to follow-up. emphasising the need for alternative non-pharmaceutical approaches.

### ***Behavioural Interventions***

The main forms of behavioural interventions currently used for children's sleep problems include extinction, graduated extinction, positive routines and faded bedtime, and parental education. These are outlined below.

#### *Extinction and Graduated Extinction*

Extinction focuses on the way in which a child's problem sleep behaviours (e.g. calling out, bedtime struggles with parents etc.) can be maintained by inappropriate parental attention (Owens, France and Wiggs, 1999). Unmodified extinction involves the parent putting the child to bed at a designated bedtime and then ignoring the child until morning, thus removing the rewarding consequence of parental attention in relation to the unwanted disruptive behaviours. The parent is required to go to the child when they first hear a cry to check that they are not ill but they are told not to pick up the child, sooth, feed or interact in any way. When reassured that the child is not ill they leave the room and do not return for the duration of the crying episode (Morgenthaler et al., 2006). Graduated extinction is a modification of the extinction procedure. It involves parents ignoring bedtime crying and tantrums for pre-determined



periods of time, before checking on the child. The duration of the pre-determined periods of time increase over time (Mindell, 1999).

Extinction techniques have been used with infants (e.g. Hiscock & Wake, 2002) and children of school age (e.g. Moore, Friman, Fruzzetti & MacAleese, 2007). A large body of evidence, including a number of randomised controlled studies (e.g. Hiscock & Wake, 2002; Seymour, Brock, During & Poole, 1989), have demonstrated that this technique can be successful in reducing problem bedtime behaviours and night wakings in infants and young children (Mindell, 1999; Mindell et al., 2006; Moore et al., 2008; Owens et al., 1999; Ramchandani et al., 2000). Hiscock and Wake (2002), for example, completed a randomised controlled trial comparing the effectiveness of a behavioural intervention and control condition using a sample of 156 mothers of infants aged between 6 and 12 months. The behavioural intervention involved three private consultations with a paediatric trainee and the main approach recommended was controlled crying, a form of extinction whereby the parent was instructed to respond to the infant's cries at increasing time intervals. At 2 months and 4 months after the start of the study mailed questionnaires were sent to the parents. The main outcomes were symptoms of maternal depression and a report as to whether the child was currently experiencing sleep problems (yes or no). Results showed that, of the mothers who received the behavioural intervention, 56 out of 76 reported that their infants sleep problems had 'resolved' 2 months after the start of the study. Of the mothers in the control group, only 36 out of 76 reported that their infants sleep problem had 'resolved', showing a significant difference between groups ( $p$

= 0.005). The measure of sleep problems in this study was crude but it does demonstrate a positive effect for 74% of the sample within the intervention group.

Difficulties associated with extinction interventions, however, include the 'extinction burst' phenomenon, which can involve periods of prolonged and intense crying, associated with the introduction of the intervention, that can be emotionally distressing for parents and difficult to ignore (Moore et al., 2007). Whilst Rickert and Johnson (1988) provide empirical support for the use of extinction techniques they also state:

*"Of the 27 sets of parents, 26 reported that they had, at one time, tried to let their child 'cry it out,' but had found it practically impossible because of disturbing other children or a spouse who had to work the next morning."* p209.

#### *Positive routines and faded bedtime*

Positive routines involve parents developing a set bedtime routine characterised by a period of quiet enjoyable activities usually established close to the time the child usually falls asleep. Faded bedtime involves temporarily delaying the bedtime to more closely coincide with the child's natural sleep onset time. This is brought forward by about 5-10 minutes per week, as the child gains success of falling asleep quickly, until an appropriate bedtime is achieved. Such strategies rely on stimulus control and focus on reduced affective and physiological arousal at bedtime (Morgenthaler et al., 2006). These techniques have only been evaluated as part of larger treatment packages and therefore it is unclear as to the extent of their individual contribution (Mindell et al., 2006).

### *Parent education and prevention*

Parental education and prevention aims to prevent the occurrence of the development of sleep problems by providing information, available either through written material or in-person. Programmes generally incorporate the teaching of a number of behavioural interventions and have also focussed on teaching positive sleep habits, appropriate bedtime routines and responses to normal developmental changes (Moore et al., 2008). A number of studies have found support for this technique (e.g. Hiscock & Wake, 2002; Seymour et al., 1989) but the exact nature of the advice is variable and therefore it is difficult to establish what aspects are most effective.

Several reviews of the evidence base behind such behavioural treatments have been completed (Mindell, 1999; Mindell et al., 2006; Moore et al., 2008; Owens et al., 1999). Mindell et al. (2006), for example, reviewed 52 studies that investigated behavioural treatments for bedtime problems and night wakings in typically developing children aged 0 – 4 years 11 months. A wide range of outcome variables were used with some researchers collecting data on sleep related variables, such as total sleep time, frequency and duration of wakings, and sleep onset time, and others focussing more on behavioural measures such as duration of crying, frequency of call outs or getting out of bed etc. Results showed that (based on the authors interpretations of their own data) 49 out of 52 reported that behavioural interventions produced clinically significant reductions in bedtime resistance and night wakings. When making comparisons between interventions, Mindell and colleagues concluded that, based on the 11 studies

with the strongest methodologies (randomised controlled studies), unmodified extinction and parent education had the strongest empirical support for successful behavioural outcomes. When considering future research the authors suggest a move towards the use of standardised research diagnostic criteria, standardised assessment measures and the use of both parental report measures and objective sleep measures such as actigraphy.

### **1.3.6 Summary**

Sleep problems are very common in infants and young children with prevalence rates varying from between 10% and 30%, depending on the inclusion criteria and method of assessment used. Research has shown that disturbed and inadequate sleep in childhood can have a significant detrimental effect on cognitive development, learning, mood regulation, attention, behaviour, health and overall quality of life (e.g. Fallone et al., 2005; Lam et al., 2003; Smedje et al., 2001; Touchette et al., 2007) highlighting the importance of identification of children's sleep problems and the need for effective treatment interventions in this area.

A number of treatment strategies for bedtime behaviour problems are currently available including medication, parent education and behavioural management techniques. Most of the studies investigating behavioural interventions in this area have tended to focus on the 0 to 5 years age group with the strongest results supporting the use of extinction and parent education programmes (Mindell et al., 2006). Extinction, however, is associated with an initial increase in

the unwanted behaviour (e.g. crying and tantrums) and parents often find this distressing. It is therefore important to explore alternative treatments for children's bedtime problems, especially relating to bedtime resistance and night wakings, the most prevalent areas of difficulty young children present with.

A small number of studies have investigated the use of Social Stories™, as an alternative to extinction, which has been found to be more socially acceptable (Burke et al., 2004; Moore, 2004). The next section describes in more detail the nature of Social Story™ interventions and considers the evidence base associated with their use. The potential for using such an intervention with children with behavioural sleep problems is also explored.

## **1.4 SOCIAL STORIES™**

This section aims to provide an overview of the use of Social Stories™ as an intervention for children with specific behavioural difficulties. Details of what the intervention involves and a critical review of the literature regarding the effectiveness are discussed.

### **1.4.1 Bibliotherapy**

Bibliotherapy, or storytelling with a therapeutic purpose, has been used throughout generations (Shotton, 2004). Across many different cultures and religions, stories, myths and legends have been key tools for imparting knowledge, values and changing attitudes and beliefs (Shotton, 2004). Giving information in the form of a story is also an effective way of capturing the

attention and aiding the understanding and memory relating to key concepts. Stories also provide a non-threatening means of provoking thought on sensitive topics. Research investigating the use of bibliotherapy as a therapeutic intervention for children has found positive results in areas such as reducing anxiety (Rapee, Abbott & Lyneham, 2006) and reducing aggression and increasing empathy (Zipora, 2006).

#### **1.4.2 What are Social Stories™?**

During the early 1990s Carol Gray began to develop the use of bibliotherapy for children with an autistic spectrum disorder (ASD). She first described Social Stories™ in 1991 as an intervention to help children with ASD with specific social situations that they find challenging, stating “*a Social Story™ describes a situation, skill, or concept in terms of relevant social cues, perspectives, and common responses in a specifically defined style and format.*” (Gray, 2008).

Social Stories™ are short personalised stories designed to teach children how to manage their own behaviour during a particular social situation that they find challenging or confusing (Gray & Garand, 1993). The story describes the context of a specific social situation and includes detail relating to where the activity takes place, when it will occur, who will be participating, what will happen, how other people may be feeling and why the child should behave in a given manner. A Social Story™ is written from a first person perspective and uses positive language. Although, according to Gray, the goal of a Social Story should not be to change an individual's behaviour, it is suggested that by improving the child's

understanding of social events and expectations this will lead to more effective social responses and positive behavioural change (Gray, 2007). In addition, the visual presentation of social rules is thought to be less confusing compared to other methods of teaching social skills. For example, in more traditional social skills groups young children may struggle with the high verbal demands (Rust & Smith, 2006). A Social Story™ is written specifically for each individual child in accordance with their level of understanding. They are designed to relate to a specific area of difficulty that a child is experiencing, and can incorporate themes and characters that link to their interests. This factor can also increase the child's level of interest and motivation associated with this intervention.

Social Stories™ comprise four basic sentence types, each of which is designed to fulfil a separate function (Gray, 2000). Basic sentence types are labelled as descriptive, perspective, directive and affirmative. Descriptions and example sentences are presented in Table 1 below.

Table 1

A summary of the four basic sentence types comprising social stories (Gray, 2000)

| Sentence Type | Description of sentence   |
|---------------|---|
| Descriptive   | These are truthful, opinion-and-assumption-free statements of fact. They identify the most relevant factors in a situation or the most important aspect of the topic. Examples include; <i>'my name is ...'</i> and <i>'Sometimes my brother reads to me at home.'</i>                            |
| Perspective   | These are statements that refer to, or describe, a person's internal state, their knowledge, thoughts, feelings, beliefs or physical condition. Examples include; <i>'My sister usually likes to play on the piano'</i>   |
| Directive     | These statements identify a suggested response or choice of responses to a situation. Examples include; <i>'I will try to put my hand up if I want to ask the teacher a question'</i>   |
| Affirmative   | These statements enhance the meaning of surrounding sentences, used to stress an important point or reassure the individual and usually follow directly after a descriptive, perspective or directive sentence. Examples include; <i>'This is a good idea.'</i> <i>'This is very important'</i> . |

Each of the four sentence types described in the table above provide different information aimed at helping the child understand a given situation. Descriptive



sentences are used to describe what is happening in the situation, perspective sentences explain how or what other people may be thinking or feeling, directive sentences suggest appropriate responses and affirmative sentences either provide reassurance or highlight an important point. Recently Gray has incorporated two additional sentence types that may be used in a Social Story; control sentences and cooperative sentences. Control sentences are statements written for the child to identify personal strategies to use to recall and apply information (e.g., I can remember to ask ... for help). Cooperative sentences are statements that identify what others will do to help support the child (e.g., Miss ... can help me when I cross the road). Although these statements are not used as frequently as the basic sentences, they represent the importance of the role of the individual in determining his or her new responses, and the contributions of others in supporting positive change (Ali and Frederickson, 2006). See Appendix 6 for an example Social Story™.

Gray (2000) suggested using a balanced ratio of sentences throughout a Social Story and outlines two Social Story™ ratios. The Basic Social Story™ Ratio as defined by Gray (2000) is 0-1 directive sentences to 2-5 descriptive, perspective and/or affirmative sentences. The Complete Social Story™ Ratio is similar to the basic ratio but also incorporates control and cooperative sentences. This ratio is 0-1 directive or control sentences to 2-5 descriptive, perspective, affirmative sentences and/or cooperative sentences. These ratios apply when the story is considered as a whole and ensure the descriptive quality of every Social Story™. However, Ali and Frederickson (2006) point out that the basic social story ratio or

the complete social story ratio has neither been challenged nor investigated empirically by other authors.

There are a number of different ways that Social Stories™ can be implemented, dependent on the individual abilities and needs of the target child. Social Stories™ can be read, either independently or by an adult or peer. They can also be presented through audio equipment or through a computer based programme or video tape (see review by Sansosti, Powell-Smith and Kincaid, 2004). The method most often used in the literature is by reading (e.g. Burke et al, 2004; Jeffery, 2006; Moore, 2004; Toplis & Hadwin, 2006).

Books comprising ready-made Social Stories™ can also be bought (e.g. Gray, 2000; Gray & White, 2001). It could be argued, however, that the use of these stories goes against the principles that Social Stories™ should be based on individual assessments of the specific needs of the child. In her books, Gray (2000) suggests that such ready-made stories are to be used as tools, which can be adapted for use with an individual.

#### **1.4.3 Theoretical background of Social Stories™**

Several possible explanations have been put forward as to why Social Stories™ may be an effective intervention.

One explanation involves the use of shared schemata (mental representation) or background knowledge. Rowe (1999, p.14) stated that “*Effective communication*

*relies on shared schema developed from shared background knowledge.*" She suggested that a Social Story™ can provide a scaffold of understanding for a schema that a child has either not yet developed or is in need of adaptation or extension. This story therefore helps the child to organise his or her understanding of a situation or event, the perspectives of others and appropriate responses. However, this concept was not tested in her investigation.

Smith (2001) explained that Social Stories™ include aspects of accepted good practice in ASD, highlighting the fact that they are visual, written in simple language, permanent, based on individual assessments of the child, focussed on a core area or need, and provide factual information about who is doing what and why. She also noted that the process of writing the Social Story™ had brought about changes in the adult's behaviour in addition to the positive changes in the child. This may imply that the process of writing the story had an impact on the adult's perception of the child's challenging behaviour, perhaps associated with an increase in empathy and understanding. However, so far no studies have been conducted to investigate the possible contributions of each of the above factors.

Another possible explanation behind the effectiveness of the Social Story™ technique involves the concept of 'Theory of Mind' (ToM). A child or adult with a 'theory of mind' understands that people act and behave in accordance with internal, unobservable mental states which may conflict with reality (Baron-Cohen, 2001). This understanding plays a vital part in helping to make sense of other people's behaviour, helping to predict what that person might do next or

how they may react in a certain situation. In typically developing children, ToM generally develops by around 4 years of age, by which point children understand that other people have thoughts, knowledge, beliefs and desires that influence and explain their behaviour (Wimmer & Perner, 1983). Evidence suggests that some Individuals with autism lack a ToM and have specific difficulties with understanding other people's intentions, needs, beliefs and desires (review by Frith, 2003). The perspective sentences in Social Stories™ are seen to provide support in this area by explicitly stating how others feel in a given situation. Previous studies have also found that typically developing children with perspective taking difficulties, as assessed by tests of ToM, are most likely to benefit from Social Story™ interventions (Jeffery, 2006; Toplis & Hadwin, 2006).

#### **1.4.4 Studies using Social Stories™ with children with ASD**

There is growing popularity for the use of Social Stories™ in relation to the reduction of problem behaviours and/or an increase in desirable behaviours in children (Ali & Frederickson, 2006). A number of authors have reviewed the empirical research literature on the use of Social Stories™ as an intervention for children with ASD (Sansosti et al., 2004; Ali & Frederickson, 2006; Reynhout & Carter, 2006). This section aims to provide an overview of such studies and the general themes relating to methodological issues and practical implications in this area.

Recent reviews (Ali & Frederickson, 2006; Reynhout & Carter, 2006; Sansosti et al., 2004) regarding Social Story™ interventions for children with ASD include 16

published studies and 5 dissertations, the majority of which have reported positive results associated with a variety of specific target behaviours, including decreasing disruptive behaviours (Scattone et al., 2002) and increasing appropriate social communication (Thiemann & Goldstein, 2001) . However problems highlighted in the literature include a reliance on single case designs and large variation in effect size (see Reynhout & Carter, 2007).

The majority of the published studies reviewed by the three papers used single case designs. This method is associated with a number of advantages and disadvantages. In practical terms, single case designs are generally less costly and time consuming compared to group designs, and are relatively easy to incorporate into every day clinical practise (Rust & Smith, 2006). This design also lets individual uniqueness and complexity be explored, thus allowing variation to be considered as a potentially important factor, rather than a possible confound (Ali & Frederickson, 2006). Disadvantages include a lack of generalisability in terms of findings and a lack of statistical power relating to the analysis of data due to low participant numbers. In addition to this they are also susceptible to publication bias (Rust & Smith, 2006). As a result of these factors single case designs are rated at the bottom of the 'hierarchy of evidence'. (see Petticrew & Roberts, 2003 for a discussion).

The two main types of single case design are descriptive case studies and single case experiments. Descriptive case studies rely on narrative accounts of events (e.g. Rowe, 1999), whereas single case experiments are usually characterised

by repeated measures in each phase of the study and often involve the experimental manipulation of an intervention (e.g., Jeffery, 2006).

Experimental designs employ an AB, an ABAB or a multiple-baseline research design. An AB design involves collecting data on the occurrence of the target behaviour during a baseline phase (A) before the intervention is implemented, and again during the phase when the intervention is introduced (B). Problems associated with this design include the fact that it is not possible to establish whether the intervention itself, or other coincidental factors, are responsible for any changes in behaviour.

An ABAB design is generally considered to be superior to the AB design as the impact of the intervention on the behaviour is directly tested by withdrawing and then re-introducing the intervention (e.g. Jeffery, 2006). Ali and Frederickson (2006) however argued that this design has other drawbacks, most notably the ethical problem of withdrawing an apparently successful intervention. Also, reversal may not always be achievable in the second 'A' phase as it is rarely possible to return completely to baseline when learning has occurred. In addition, Sansosti and colleagues (2004) have pointed out that the purpose of Social Story™ interventions is to effect positive changes that are long-lasting and therefore it is hoped that such improvements would be continued.

An alternative to the AB or ABAB designs is a multiple baseline design. This requires more than one participant and involves the intervention being implemented in a staggered fashion across different individuals so that each

participant can serve as a control for the other participants (e.g., Scattone et al., 2002). This design minimises possible confounds with coincidental effects on outcome associated with AB designs and avoids the ethical issue associated with ABAB designs. Within-participants multiple baseline designs can also be used to consider effects across behaviours and settings (e.g., at home and at school) and do not necessarily require more than one participant.

Ali and Frederickson (2006) reviewed the literature on Social Stories™ undertaken between 1994 and 2004. They reported 15 published studies, 7 of which were single participant studies, 7 were multiple participant studies and 1 was a group study. Of the 7 single participant studies 2 used a descriptive case study design, 1 an AB design and 4 an ABAB design. A variety of different behaviours were targeted (e.g., reducing unwanted behaviours such as kicking, hitting and tantrums and increasing prosocial behaviour such as appropriate social engagement) and all reported positive results (i.e. increases in appropriate target behaviours and/or decreases in unwanted target behaviours). However, in addition to the reliance on single case studies it was also noted that 6 of the studies included additional interventions such as a positive reinforcement chart (Moore, 2004) and written text cues (Thiemann & Goldstein, 2001), making it difficult to establish the true impact of the Social Story™ itself.

The only study that did not use a single case design was completed by Smith (2001). She reported a group evaluation involving two half-day training sessions for teachers, teaching assistants and parents/carers designed to enable them to implement their own Social Story™ intervention. Results showed that 50 of the

63 people who had attended the training sessions contributed to writing, implementing and evaluating Social Stories™ for children in Key Stages 1, 2 and 3 of special and mainstream schools. Participants rated the effectiveness of their story in changing the child's behaviour on an 11 point (0 - 10) Likert-type rating scale. Ratings were completed for 19 stories, 16 of which scored above the mid-point of the scale and 13 achieved a score of between 7 and 10. There are, however, a number of factors to consider when evaluating the results of this study. The evaluation of the effectiveness of the Social Stories™ relied on a rating made by the individual who designed and implemented the intervention. This evaluation represents a very subjective measure of behavioural change and a positive bias is highly likely. Smith also acknowledges the frequent use of additional interventions in addition to the Social Stories™.

Ali and Frederickson (2006) concluded that *"there is a sufficient evidence base to suggest that the approach [Social Stories™] has promise and warrants further research."* (p372). They also highlighted however that, although all the studies report positive findings, some of the change in targeted behaviours are modest in effect size.

In order to gain a measure of treatment effectiveness of Social Story™ interventions Reynhout and Carter (2006) completed a single-subject meta-analysis including 11 peer-reviewed articles and 5 dissertations. An overall percentage of non-overlapping data (PND) was calculated from data provided for 26 Social Stories™ used in 12 of the studies. Results showed a PND of 51 (range 16 - 95) when data showing ceiling or floor effects was excluded. The



authors stated that a PND of 51 – 70 indicates a ‘mildly effective’ intervention and therefore this analysis suggests that, at best, the Social Story™ interventions that were included in this analysis were only marginally effective. The large range in scores, however, indicates significant variation and suggests that some studies revealed much more positive effect sizes.

Overall, examination of the data has suggested that Social Stories™ present as a promising intervention, but studies on their effectiveness have yielded variable effect sizes. Also, the high usage of single case designs means that findings lack power and generalisability. Interpretations of studies were also frequently confounded by the use of Social Stories™ in combination with other interventions and in these studies the individual contribution of the story itself is unclear. Evidence so far appears to support the potential for this type of intervention but further studies are required to investigate the individual contribution of the Social Story™.

#### **1.4.5 Studies using children without a diagnosis of ASD**

Although Social Stories™ were first developed for use with children with ASD, the approach has successfully been used with children with other social and behavioural difficulties, as well as typically developing individuals (Gray, 2008). A number of recent studies have investigated the use of Social Stories™ with children without a diagnosis of ASD (Jeffery, 2006; Toplis & Hadwin, 2006; Whitehead, 2007; Zimbelman, Paschal, Hawley, Molgaard & St.Romain, 2007).

Toplis and Hadwin (2006) completed the first study known to the author that investigated the use of Social Stories™ with typically developing children. Five children aged between 7 and 8 years of age in a mainstream junior school took part in the study. All of the children were recorded at Action Plus Level on the Special Educational Needs Register for behavioural difficulties (Morris, 2001) and did not have a diagnosis of ASD. In addition, they all had specific difficulties in entering the school dining hall at lunchtime. An individual Social Story™ was written for each child, targeted at increasing appropriate behaviour in independently entering the dining hall. This was introduced following an ABAB design. During intervention phases an adult read the child's Social Story™ with them just prior to the lunchtime break every day. The children were also able to access their stories at other points during the school day. During the baseline phases the children did not have any access to the Social Stories™. Research took place over an 18-day period. Behaviour was scored based on explicit criteria set out by the authors and inter-observer reliability checks were made for 28% of the total observations recorded during the study. The children's ability to understand others' perspectives was also assessed by their performance on first and second order false belief tasks. Results showed that Social Stories™ proved to be an effective intervention for three of the five children who took part in the study resulting in an increase in the appropriate lunchtime behaviour (going to the dining hall independently) when the story was introduced and a decrease in this behaviour when the story was withdrawn. The three children for whom the intervention had been successful were all reported to have had elevated scores on the social problems subscale of the Conners' Teacher Rating Scale Revised Long Version (CTRS-R:L) and poor perspective taking skills, as assessed by the

Sally-Anne test, a measure of first and second order false belief. The profiles of the two children for whom the intervention was not successful highlighted increased oppositional behaviours on the CTRS-R:L and both children showed good ability to perspective take. There are, however, a number of methodological factors to consider. The study did not measure maintenance over time, the sample size was relatively small and there was no control group.

Following the work of Toplis and Hadwin (2006), Jeffery (2006) completed a similar study with the addition of a control group. She investigated the use of Social Stories™ with a sample of 6 children from a mainstream primary school who displayed disruptive behaviour during structured teacher input sessions. The research used an ABAB design and children were either assigned to the intervention group or to the non-intervention control group, with participants in each condition matched on verbal ability. A Social Story™ was written for the three children in the intervention group and introduced during phase B of the study. Whilst children in the intervention group were read their Social Story the children in the control group were read a fictional story book. Each phase lasted 5 school days (Mon-Fri) totalling a 20 day period. Target behaviour was measured for 10 minutes three times a week. Participants were also tested on a basic theory of mind task, the Sally-Anne Test, a measure of perspective taking. It was found that participants in the Social Story™ intervention group showed a decrease in their displays of disruptive behaviour during intervention phases and an increase in disruptive behaviour when the story was withdrawn. The non-intervention group showed little variation in disruptive behaviour throughout the study, indicating that the fictional story book had no effect on their behaviour.

Results from the Sally-Anne Test indicated that 2 of the 3 children in the intervention group had difficulties with perspective taking, whereas none of the children in the control group showed such difficulties. The addition of a control group in this study is a notable positive achievement but there are some limitations that are worth considering. The sample size was small and, like Toplis and Hadwin's study, the maintenance of the behaviour improvements cannot be established.

In addition to evaluating the effectiveness of Social Story™ interventions it is also valuable to consider the practicalities of carrying out such interventions both in terms of the adult's views on implementing the treatment, and the child's views on receiving the treatment. This area was investigated by Whitehead (2007), who completed a descriptive study that focused on gaining qualitative information from pupils and school staff regarding the practicalities of the intervention and pupil feelings towards the Social Stories™. Eight non-autistic 8 to 9 year-old children in a mainstream primary school took part in the study, each having their own individual Social Story™ written for them aimed at increasing pro-social behaviour. Participants were identified by their class teacher as having some difficulty in social, emotional and/or behavioural skills. The author states that *"the sample was felt to be reflective of the nature of the school as a whole and representative of the variety of difficulties encountered by pupils in mainstream settings."* p37. Target behaviours included inattentiveness, fighting, and disrupting other pupils in lessons. Initial information was gathered for each participant over a 6-week period by means of classroom observations and discussions with staff and the pupils themselves. Following this the researcher

and class teacher wrote the Social Stories™ in accordance to Gray's guidelines (2000). The stories were read on a daily basis before target situations for a 6-week period following which data was collected in the form of observations, interviews (semi-structured format) and staff discussions. Results showed that the majority of pupils enjoyed using their stories and felt that the strategy was simple to use. Most pupils responded positively to reading the story every day but two pupils viewed the stories as time consuming. The author did not report on behavioural changes as a result of the intervention other than stating that "*the teaching assistant working with the pupil with a statement had noted a definite reduction in refusal to cooperate.*" p39. The lack of data on behavioural change means that the efficacy of the intervention cannot be considered but the qualitative information gained provides good practical information regarding using Social Stories™ within the mainstream school system.

In summary, a number of studies have attempted to use Social Stories™ with children who do not have an ASD. A small number have used experimental designs, yielding objective behavioural data. These provide initial support for the use of this technique with such a sample, with those children with perspective taking difficulties seeming to benefit most. Further research in this area is needed to replicate these findings.

The following section considers the use of Social Stories™ as a potential intervention for children with a behavioural sleep problem.

## 1.5 SOCIAL STORIES™ AND SLEEP PROBLEMS

Two studies have considered the use of Social Stories™ in the area of children's sleep problems. The first study reported a descriptive case study with a child with ASD and severe learning disabilities (Moore, 2004), and the second used an experimental design with participants from a sleep clinic (Burke et al., 2004).

Moore (2004) reported a single case study on the use of a Social Story™ with a child with severe learning disabilities and ASD who presented with problems surrounding sleep behaviours. The case study describes a 4 year old boy whose parents reported that he would only sleep in their bedroom room with his mother, took 1-2 hours to fall asleep, and would wake several times in the night to demand milk from his mother. Baseline measures included an assessment interview with the child's parents, an assessment interview with the child's class teacher, a video of the child's bedtime routine and a sleep diary completed by the child's mother. The intervention involved establishing a realistic bedtime routine in collaboration with the child's parents. A Social Story™ was then used to outline the new routine and communicate the positive consequences of the child's cooperation. A reinforcement programme was also incorporated in the form of a sticker chart and a treat box. The programme was monitored by regular telephone contact with parents and lasted 28 days. No quantitative data was provided in the report but the author stated: "*The first night Peter went to bed following the onset of the programme ... Peter readily accepted the change, and only reverted to sleeping with his mother in her bed during 2 days of sickness.*" (p. 136). Moore also reported that the mother felt that the programme had been 'extremely successful', simple to carry out and caused little stress to her or any of

her family. There was however a number of limitations associated with this study. A non-experimental design was used and no objective quantitative measures were taken of change in behaviour meaning that the results are very subjective. In addition, despite the outcome of the intervention being clearly positive, the exact role the Social Story™ played in addition to the reward chart, treat box, extra parental attention and changes to the routine is not clear. The author also stated that more research is needed and that additional research should include the use of control groups to compare the effectiveness of Social Stories™ with regular stories and other behavioural interventions.

Burke et al. (2004) conducted a study to evaluate the efficacy and acceptability of a Social Story™ with tangible rewards to reduce disruptive bedtime behaviour and frequent night waking in a sample of 4 children aged 2 to 7 years old. A single-subject design was used. Initially the authors intended to use an ABAB withdrawal experimental design, but due to the first participant's parents expressing a reluctance to complete the withdrawal phase a multiple-baseline across participants design was adopted for the following 3 children. Participants were recruited through a sleep clinic and specific selection criteria for the study were as follows; a) medical aetiologies were not believed to contribute to sleep disturbance, b) the child resisted going to bed, fell asleep in a location other than his or her own bed, or required parental intervention to return to sleep at least three nights per week, c) parents indicated a desire for their child to fall asleep independently, and d) sleep problems had been occurring for at least 4 weeks. The intervention involved parents reading a generic social storybook called 'The Sleep Fairy' (Peterson and Peterson, 2003). This story told the tale of the sleep

fairy, who left a small tangible reward under children's pillows when they demonstrate clearly described appropriate bedtime behaviours. Parents were required to read the social storybook at the conclusion of the child's nightly bedtime routine daily until the child demonstrated success for 2 weeks, at which point they are instructed to transition to intermittent use of the book. Parents were also required to give their child a small tangible reward when they had demonstrated appropriate bedtime behaviours as described in the story. Sleep diaries were used to record the frequency of disruptive bedtime behaviours and night waking. The time it took the child to fall asleep and their total sleep time was also recorded by the parent. Reliability check sheets were completed on 28% of randomly selected dates across the baseline and intervention phase.

Results showed that the intervention produced a rapid and sustained reduction in the frequency of the children's disruptive bedtime behaviours and night wakings and that this was maintained at the three-month follow-up. Parent sleep diaries indicated a 78% average decrease in frequency of disruptive bedtime behaviours from baseline to intervention, with another 7% decrease at the three-month follow-up. However, the limitations of this study merit discussion. Although the results look very promising the small sample size and relatively strict inclusion criteria means that further research with a larger sample is required. Also, the use of an extrinsic reward system in combination with the Social Story™ means that the authors are unable to identify the individual contribution of these two components. Another important point to consider is around the Social Story itself. The authors used a generic children's storybook and described their intervention as a Social Story™. Although the storybook used did outline and explain what



happens at bedtime and what the children's expected behaviours should be there are a number of components that Carol Gray uses to define a Social Story™ that 'The Sleep Fairy' storybook did not adhere to. For example, it was not written in the first person and did not use the four basic sentence types used in Social Stories™ as stated in Gray (2000). The story format is actually more in line with a narrative therapy approach (see Brett, 1988, for example), whereby the child is able to identify with the character in the story who experiences similar difficulties to that of the child. Another methodological issue is the use of sleep diary data without any form of objective measure of sleep (e.g. actigraphy).

## **1.6 CONCLUSION**

Sleep problems are prevalent in young children, occurring in approximately 20-30% of infants, toddlers and pre-schoolers (Mindell et al., 2006; Moore et al., 2008) and between 10-37% of primary school aged children (Stein et al., 2001; Owens et al., 2000b). The most common area of difficulty within the primary school age group is reported to be bedtime resistance (Owens et al., 2000b; Blader et al., 1997). The critical role of sleep in child development has been repeatedly demonstrated with links between restricted sleep and behaviour, emotional and social problems being identified in a number of studies which have used cross-sectional, longitudinal and experimental designs (e.g. Fallone et al., 2005; Smedje et al., 2001; Touchette et al., 2007). Treatments in this area have tended to focus on a behavioural procedure known as extinction, which involves discontinuing the reinforcing consequences for a targeted behaviour (Mindell, 1999). Problems associated with this approach include an initial surge

in emotion behaviour or an 'extinction burst' and in the area of bedtime resistance this can involve periods of prolonged and intense crying, which unsurprisingly can be emotionally distressing for parents and difficult to ignore (Rickert & Johnson, 1988). Consequently, although extinction alone can substantially reduce bedtime resistance, it is less socially acceptable and less likely to be used with full compliance (Rickert & Johnson, 1988). Exploration of alternative treatments is therefore advisable and 2 studies have considered the use of a Social Story™ as a potential intervention within this area (Burke et al., 2004; Moore, 2004), providing encouraging preliminary findings.

Social Stories™ were initially developed as an intervention for use with children with ASD. Recently, there has been an indication that this technique may also be valuable for use with children with other difficulties such as behavioural problems, including those with bedtime resistance difficulties. Overall, results of the studies reviewed have indicated that Social Stories™ can be used with children both with and without a diagnosis of ASD. However, further research is necessary due to a range of methodological issues and the range of effect sizes associated with the existing evidence base. The common use of other interventions in addition to the Social Story™ has also meant that it is not always possible to establish the individual contributions of different factors within the intervention. In addition, some of the changes in targeted behaviours were modest and nearly all of the studies reviewed had used a single case design. There is also a need for further investigation within the area of typically developing children, as only a very small number of studies have been

completed in this area. The role of perspective taking skills should also be considered in determining the effectiveness of the intervention.

When specifically considering the use of Social Stories™ for children with behavioural sleep problems Burk et al. (2004) and Moore (2004) have provided initial support for the use of this intervention. However there are a number of significant limitations associated with these studies. The sample sizes used were extremely small ( $n = 4$  and  $n = 1$ ) and both studies used positive reinforcements in the form of tangible rewards or sticker charts alongside the Social Story™ intervention. It is therefore not possible to distinguish individual contributions resulting from these two components. Finally, neither study used any objective or standardised measures of sleep, relying solely on parental report measures of children's sleep behaviours. These findings are therefore encouraging but further studies with larger samples are required. In addition, the use of both objective sleep measures (e.g. actigraphy) and standardised parental report sleep measures would be of benefit.

Given the prevalence of bedtime behaviour problems and the impact of sleep disturbances in terms of child development the exploration of alternative treatments in this area is both important and necessary. Social Stories™ may provide an alternative to extinction approaches with the potential benefit of being more socially acceptable, but further research in this area is required.

## **EMPIRICAL PAPER**

### **THE USE OF SOCIAL STORIES™ TO HELP BEDTIME RESISTANCE IN A SAMPLE OF YOUNG SCHOOL-AGED CHILDREN**

**Elizabeth Smith**

University of Southampton

## 2.1 ABSTRACT

**Objective:** The aim of the present study was to investigate the effectiveness of a Social Story™ intervention (a short personalised story designed to teach a child how to manage their own behaviour during a specific situation) with a community sample of children who found it difficult to settle at bedtime. **Method:** Six children aged between 5 and 6 years-of-age, with bedtime resistance difficulties, received either a Social Story™ intervention (n = 3) or a Social Story™ and reward intervention (n = 3). A multiple baseline design was used with participants receiving staggered start dates. All participants completed a baseline phase, control phase (parents read a poem with their child before bed), intervention phase and a six-month follow-up. Parental report measures (sleep diaries and the Children's Sleep Habit Questionnaire) and actigraphy, an objective measure of sleep, were used to monitor bedtime and sleep behaviours. **Results:** Sleep diary data showed a reduction in the frequency of disruptive bedtime behaviours for all 6 children, associated with the introduction of the Social Story™ intervention. Actigraphy results showed a reduction in sleep onset latency (time between lights out and sleep start), and an increase in actual sleep time and sleep efficiency for 2 of the 6 children during the intervention week. These two children received the Social Story™ and reward intervention and had poorer perspective taking skills. Treatment effects were not maintained on all measures at six-month follow-up. **Conclusions:** The study provides initial support for the use of a Social Story™ intervention with children who experience bedtime

resistance difficulties. Methodology issues and future directions for research in this area are discussed.

## **2.2 INTRODUCTION**

Sleep behaviours are among the most frequent concerns raised with medical professionals by parents of infants and young children (Theidke, 2001). Sleep problems in childhood cover a range of specific difficulties, including bedtime resistance (children crying, calling out, or leaving their rooms after bedtime), frequent night wakings, night fears, morning rising problems and daytime fatigue (Iannelli, 2007). Such problems occur in approximately 20-30% of infants, toddlers and pre-schoolers (Mindell, Kuhn, Lewis, Meltzer & Sadeh, 2006) and between 10.8% (Stein, Mendelsohn, Obermeyer, Amromin & Benca, 2001) and 37% (Owens Spirito, McGuinn & Nobile, 2000b) of young school-aged children. The most common area of difficulty associated with sleep within the primary school age group is reported to be bedtime resistance (Owens et al., 2000b; Blader, Koplewicz, Abikoff & Foley, 1997).

The critical role of sleep in child development has been repeatedly demonstrated with links between disrupted and/or insufficient sleep and behavioural, emotional and social problems being identified in numerous studies (e.g. Fallone, Acebo, Seifer & Carskadon, 2005; Kheirandish & Gozal, 2006; Smedje, Broman, & Hetta, 2001; Touchette et al., 2007). In addition to the direct impact on the child, such difficulties have also been found to be associated with an increase in parental distress and family stress (e.g. Shang, Gau & Soong, 2006).

Current treatments for bedtime resistance difficulties in children have tended to focus on the use of a behavioural procedure known as extinction (Mindell, 1999). Extinction typically involves withdrawing the reinforcing consequence for the unwanted behaviour (Morgenthaler et al., 2006). In the area of bedtime resistance this requires parents to ignore the child's cries or requests, minimising the attention given after bedtime. Studies have found this technique to be successful in reducing the frequency of problem bedtime behaviours (reviews by Mindell, 1999; Mindell et al., 2006; Moore, Meltzer and Mindell, 2008). However, difficulties associated with this approach have been highlighted including an initial surge in emotional behaviour, known as an 'extinction burst', which can involve prolonged periods of intense crying that can be emotionally distressing for parents (Rickert & Johnson, 1988). Consequently such treatments are associated with low levels of social acceptability and are less likely to be used with full compliance, leading to the consideration of alternative approaches.

A small number of recent studies have explored the use of Social Stories™ as a possible treatment intervention for children's sleep problems (Burke, Kuhn & Peterson, 2004; Moore, 2004). This intervention offers the potential benefit of being relatively straightforward and efficient to implement (Reynhout & Carter, 2006) and having a good level of treatment acceptability and fidelity in the area of children's bedtime behavioural difficulties (Burke et al., 2004).

Social Stories™ are short personalised stories designed to teach children how to manage their own behaviour during a particular situation that they find challenging or confusing (Gray & Garand, 1993). A Social Story™ describes the

challenging situation, detailing where the activity will take place, what will happen, when it will occur and who will be there. This technique was initially designed for use with children with an autistic spectrum disorder (ASD), but can also be used with typically developing children (Toplis & Hadwin, 2006). Social Stories™ comprise four basic sentence types, each of which is designed to fulfil a separate function (Gray, 2000). Basic sentence types are labelled as descriptive, perspective, directive and affirmative. Descriptive sentences are used to describe what is happening in the situation (e.g. '*Children usually enter the class and come and sit on the carpet*'). Perspective sentences explain how or what other people may be thinking or feeling (e.g. '*My sister usually likes to play on her bike*'). Directive sentences suggest appropriate responses (e.g. '*I will try to put my hand up if I want to ask the teacher a question*'), and affirmative sentences either provide reassurance or highlight an important point (e.g. '*This is very important*'). Gray and colleagues recommend a proportion of 2 to 5 descriptive, perspective and/or affirmative sentences to every 0 to 1 directive sentence in a story (Gray & Garand, 1993; Gray, 2000).

A number of studies have been conducted investigating the effectiveness of Social Story™ interventions with children with ASD. Such interventions have been targeted towards a range of different problem behaviours including tantrums, problem lunchtime behaviour, inappropriate touching and aggression. Recent reviews (Ali & Frederickson 2006; Reynhout & Carter, 2006; Sansosti, Powell-Smith & Kincaid, 2004) have included 16 published studies, all of which reported positive findings (i.e. an increase in appropriate target behaviours and/or decrease in unwanted target behaviours associated with the use of the



Social Story™). However, it is worth noting that 6 of the studies had used Social Stories™ in combination with other interventions (e.g. rewards, verbal prompts, visual cues etc.) and when considering effect sizes, results were variable (Reynhout & Carter, 2006).

A smaller number of studies have considered the use of Social Stories™ with children without a diagnosis of ASD (e.g. Jeffery, 2006; Toplis & Hadwin, 2006; Whitehead, 2007; Zimbelman, Paschal, Hawley, Molgaard & St.Romain, 2007) with initial findings indicating that such an intervention can also be helpful with these children. Literature has also drawn attention to the fact that the children who benefited most from the Social Story™ intervention were those who had perspective taking difficulties, as measured by a false belief task (Jeffery, 2006; Toplis & Hadwin, 2006).

Two studies have considered the use of Social Stories™ for children with bedtime resistance problems, providing initial support for this intervention (Burke et al., 2004; Moore, 2004). Moore (2004) reported a case study on the use of a Social Story™ with a 4 year-old boy with severe learning disabilities and ASD. The child presented with problems surrounding sleep behaviours, including taking 1-2 hours to fall asleep and waking often during the night to demand milk from his mother. The intervention involved establishing a realistic bedtime routine and a Social Story™ was then used to outline the new routine and communicate the positive consequences of the child's cooperation. A reinforcement programme was also incorporated in the form of a sticker chart and a treat box. The programme was monitored by regular telephone contact with parents and

lasted 28 days. No quantitative data was provided in the report but the author stated that: "*Peter readily accepted the change, and only reverted to sleeping with his mother in her bed during 2 days of sickness.*" p. 136. It was also noted that the mother perceived the programme to have been 'extremely successful', simple to carry out and caused little stress to her or any of her family.

A further study that considered the use of a Social Story™ in the area of bedtime behaviour problems was completed by Burke et al. (2004) who used a sample of 4 children aged between 2 and 7 years-of-age, recruited from a sleep clinic. The Social Story™ intervention was targeted towards reducing disruptive bedtime behaviours, such as calling out to parents, getting out of bed, stalling behaviours etc., and night wakings. A social storybook called 'The Sleep Fairy' (Peterson & Peterson, 2003) was used. Parents were required to read the story daily at the end of the child's nightly bedtime routine and to leave a reward under the child's pillow when they demonstrated the appropriate bedtime behaviours, as described in the book. Sleep diaries were used to record the frequency of disruptive bedtime behaviours and night waking. The time it took the child to fall asleep and the total time they spent asleep were also recorded each day by the parent. Results showed a 78% average decrease in frequency of disruptive bedtime behaviours from baseline to intervention, with another 7% decrease at the 3-month follow-up.

There was however a number of limitations associated with both of these studies. The sample sizes used were extremely small ( $n = 1$  and  $n = 4$ ) and both studies used positive reinforcements in the form of tangible rewards or sticker

charts alongside the Social Story™ intervention, meaning that it was not possible to distinguish individual contributions resulting from the two components. Finally, neither study used any objective or standardised measures of sleep, relying solely on parental report measures of children's sleep behaviours.

When considering the evaluation of treatments for children's bedtime problems Mindell (1999) and Mindell et al. (2006) have recommended that future research use standardised assessment measures and the addition of objective assessment tools. Objective measures of sleep include polysomnography (a multi-parametric test that measures or monitors biophysiological changes including eye movements (EOG), brain activity (EEG), heart rhythm (ECG), skeletal muscle activation (EMG) and breathing or respiratory effort during sleep<sup>2</sup>) and actigraphy (a non-invasive method of monitoring human rest/activity cycles which infers wakefulness and sleep relating to limb movements (Sadeh & Acebo, 2002)). Actigraphy offers the advantage of being able to monitor sleep-wake patterns over long periods of time and has been shown to produce results that correlate highly with polysomnography in children (Sadeh, Sharkey & Carskadon, 1994).

The aim of the current study was to investigate the effectiveness of a Social Story™ intervention in the area of bedtime resistance with a community sample of 5 to 6 year-old children whose parents report they have difficulties with bedtime settling. In order to extend previous research, children were assessed on a number of first and second order false belief tasks (see Jeffery, 2006; Toplis

& Hadwin, 2006) to investigate whether perspective taking skills impact on the effectiveness of the Social Story™ intervention. Based on previous research it was expected that those children with perspective taking difficulties would benefit most from the Social Story™ intervention. Two treatment conditions were also included, involving either the use of a Social Story™ intervention paired with a positive reinforcement schedule, or a Social Story™ intervention alone. This enabled the individual contribution of the Social Story™ to be considered. A control phase that involved the parent reading a specific poem to the child every evening was also included. This meant that the potential effect of any additional individual attention resulting from the time spent reading the story together could be considered separately to the impact of the Social Story™ itself. The inclusion of both parental report measures and actigraphy, an objective measure of children's bedtime behaviours and sleep, also furthers existing research.

A 6 month follow-up was completed in order to investigate the longer term effects of the intervention. This is an area that the authors of a number of reviews on the use of Social Story™ interventions have commented upon as being lacking within the current literature (e.g. Sansosti et al., 2004).

## **2.3 METHOD**

### **2.3.1 Participants**

Six children (3 male, 3 female) aged between 5 years 2 months and 6 years 9 months (mean = 6 years 1 month) and their parents completed the study. The children all had problems falling asleep at night, as reported by their parents.

---

<sup>2</sup> <http://www.sleep-tests.co.uk/polysomnography.php>

Participants were recruited from three primary schools and one early years setting in the Southampton area. Initial screening letters were sent out to all parents or carers with a child aged between 4 and 6 years of age ( $n = 315$ ). Eight families completed the response form, fulfilling the initial inclusion criteria which indicated that their child struggles to settle to get to sleep more than twice a week and that it can take more than an half an hour for the child to fall asleep. Additional criteria were established during a home visit. Firstly, medical aetiologies were not believed to contribute to the sleep disturbance, with exclusions including a diagnosis of epilepsy, asthma and severe eczema. Secondly, sleep problems had to have been occurring for a minimum of 6 months. Thirdly, the child had no known special educational needs, and finally the child had age appropriate receptive language skills, as assessed by the British Picture Vocabulary Scale, second edition (BPVS II; Dunn, Dunn, Whetton & Burley, 1997). Medical advice was sought in relation to one child due to the severe and complex nature of their difficulties. It was felt that a referral to their GP was most appropriate and therefore this child was not included in the study. One child withdrew from the study due to an illness throughout the intervention phase, and the other 6 children all completed the study.

The criteria used in this study were based on other studies in the area of behavioural sleep interventions (e.g. Burke et al, 2004; Mindell & Durand, 1993, etc.) and the observation of Gray and Garand (1993) that children with basic language skills and average intelligence to moderate intellectual impairment are likely to benefit most from Social Stories™.

### **2.3.2 Measures**

#### ***Participant Information***

*The British Picture Vocabulary Scale (BPVS II, Dunn, Dunn, Whetton and Burley 1997)*

The BPVS II was used to assess children's receptive language skills. This measure is a standardised assessment of receptive vocabulary for standard English. The BPVS II was standardised using a representative sample of the population, across a range of ages, gender mix, geographical variation and ethnic groups and has been shown to have a high level of internal consistency (median of the split-half values for raw scores = .86) and reliability (re-test reliability coefficient = .75) (Dunn et al, 1997).

#### ***First and Second Order False Belief Tasks***

Following previous research (Jeffery, 2006; Toplis & Hadwin, 2006) the Sally-Anne story (Baron-Cohen, Leslie and Frith, 1985) was used to assess children's abilities to understand others' perspective.

*First order belief.* Children were shown two dolls, called Sally and Anne, which were used to act out a scenario depicted in Appendix 1. In this scenario Sally places a marble in a basket and leaves the room. While she is gone Anne moves the marble from the basket to a box. When Sally comes back into the room the child is asked '*Where will Sally look for her marble?*'

*Second order belief.* In order to assess the child's understanding of embedded (second order) beliefs the same scenario is acted out again but this

time Sally secretly watches Anne move the marble. The child is then asked 'Where does Anne think Sally will look for her marble?'

*The Strange Stories test* (Happe, 1994) was also used as an additional indicator of second order theory of mind. This test consists of 24 short story vignettes with two examples for each of the 12 story types: Pretence, Joke, Lie, White Lie, Misunderstanding, Persuasion, Appearance/Reality, Sarcasm, Irony, Double Bluff, Contrary Emotions, and Forgetting. The stories comprise simple accounts of events relating to various motivations underpinning everyday comments that are not literally meant. The current study used a selection of 6 stories covering the story types; Lie, Appearance/Reality, Sarcasm, Forgetting, White Lie and Double Bluff. See Appendix 2 for full details of the stories used in the current study.

*Strength and Difficulties Questionnaire (SDQ, Goodman, 2005, see Appendix 3)*

The SDQ was used to provide information of the behavioural profile of the children in order to investigate whether the presence of specific behavioural difficulties had any links with the effectiveness of the Social Story™ intervention. The SDQ is a behavioural screening tool for children and adolescents comprising 25 items which are divided between five subscales; hyperactivity, emotional symptoms, conduct problems, peer problems and prosocial behaviour. The SDQ also generates a sum score of total difficulties made up of the subscale scores, excluding the prosocial subscale. Goodman (2001) completed a nationwide study of 10438 British 3-15 year olds, obtaining SDQs from both parents and teachers to assess the validity and reliability of measure. Results showed that

reliability scores were satisfactory, stating figures for internal consistency of Cronbach  $\alpha$  .73 and retest stability after 4 to 6 months of Cronbach  $\alpha$  .62.

### ***Intervention Measures***

#### *Children's Sleep Habits Questionnaire (CSHQ)*

Parents completed the abbreviated version of the CSHQ (Owens, Spirito, & McGuinn, 2000a, see Appendix 4) as a measure of their child's sleeping problems. For each child this was completed at four time points, at baseline, following the control week, following the intervention week, and at the 6 month follow-up.

The abbreviated version of the CSHQ consists of 33 items such as 'child struggles at bed time (cries, refuses to stay in bed, etc)' and 'child talks during sleep', each rated on a 3-point scale (1 = rarely to 3 = usually). The CSHQ consists of the following eight subscales; bedtime resistance, sleep onset delay, sleep duration, sleep anxiety, night wakings, parasomnias, sleep disordered breathing and daytime sleepiness. A total sleep difficulties score can also be calculated. The CSHQ has been used in a number of previously reported studies for children aged between 4-10 years and has been shown to have good internal consistency (community sample = 0.68) and adequate test-retest reliability (range 0.62 – 0.79) (Owens et al, 2000a).

#### *Actigraphy*

Activity monitoring was used to assess sleep-wake patterns. Parents were instructed to attach a miniature actigraph unit (actiwatch mini), in the form of a



wrist watch, to the child's non-dominant wrist at 4pm in the afternoon and remove it in the morning. Actigraphy is a non-invasive method of monitoring human rest/activity cycles (Sadeh & Acebo, 2002). Sleep estimates provided by actigraphy are between 91% and 93% in agreement with polysomnographic measures of sleep (Sadeh et al., 1994). The unit continually records movement and this data is read to a computer for analysis. In the current study analysis focused on the following three output measures; 1) *sleep onset latency*, the time between the child's bedtime (as reported by the parent) and the time of sleep onset (as recorded by the actiwatch mini), 2) *actual sleep time*, minutes of sleep from sleep onset to wake, excluding periods of nocturnal waking, as determined by the algorithm, and 3) *sleep efficiency*, defined as the actual sleep time divided by the total time spent in bed. These outputs were produced by the Actiwatch sleep-wake scoring algorithm which calculates sleep-wake and movement information for the period between sleep start and end times (provided by the parent in the sleep diary).

### *Sleep diaries.*

Sleep diaries are a widely used measure of sleep and have reasonable validity, high internal consistency and good agreement with videotapes and actigraph measures of children's sleep (Corkem, Tannock, Moldofsky, Hogg-Johnson & Humphries, 2001). This measure was used to provide data on the child's behavioural difficulties associated with their bedtime settling problems. The sleep diary used in the current study was structured so that parents could record the frequency of disruptive bedtime behaviours during bedtime preparation for each night of the study. Disruptive behaviours included stalling, non-compliance, vocal

protests, calling out for parents, crying, screaming, tantrums, aggression and 'other', and were chosen as a replication of those used in Burke and colleagues previous study. A record of when the Social Story had been read and the child's bedtime was also recorded on the diary. A copy of the sleep diary is included in Appendix 5.

### **2.3.3 Social Story™ Intervention**

A Social Story™ was written by the researcher for each child and included photographs of the child and parent at different stages of their bedtime routine (see Appendix 6).

Background information to aid the story writing process was gathered through an informal interview with the parent. The focus of this was to ascertain information on the child's usual bedtime routine, the type and frequency of the child's disruptive bedtime behaviours, and the time it usually took for the child to fall asleep after their bedtime. Children were also asked to draw a picture of themselves at bedtime and explain what was happening. This information formed the basis of the Social Story™ for each child.

All stories in the study applied Gray's Basic Social Story™ Ratio and an example of a social story used in the current study is included in Appendix 6. The procedure for writing a Social Story™, as outlined by Gray (2000), was also followed. The aim of the story was to reduce the number of disruptive bedtime

behaviours children presented with during bedtime preparation and to try to stay in bed quietly until they fell asleep.

#### **2.3.4 Design**

Each participant completed a baseline period, control period and an intervention period. A 6 month follow up was also completed.

| <b>Baseline</b> | <b>Control</b> | <b>Intervention</b> | <b>6 month Follow-up</b> |
|-----------------|----------------|---------------------|--------------------------|
| <i>3 days</i>   | <i>7 days</i>  | <i>7 days</i>       | <i>7 days</i>            |

The study utilised a multiple baseline design. This design involved the intervention being implemented in a staggered fashion across the 6 individuals, enabling each participant to serve as a control for another. For example, when the first participant was completing the intervention week the second was completing their control week, acting as their control. This design was chosen following recommendations made by Sansosti et al. (2004) and Ali and Frederickson (2006).

#### **2.3.5 Procedure**

Ethical approval was obtained from Southampton University School of Psychology Ethics' Committee and followed the university research governance procedures. The study adhered to guidelines set out in the British Psychology

Society Code of Ethics and Conduct (BPS, 2006). A copy of the Ethical Approval letter is included in Appendix 7.

Initial screening letters (see Appendix 8) were sent out to all parents with a child aged 4 to 6 years of age attending 3 primary schools and one early years setting within the Southampton area ( $n = 315$ ). Those who expressed an interest in the study and satisfied the initial criteria were then visited at home. During this home visit consent was obtained and a brief history of the child's sleep difficulties taken. Due to the age of the children participating in the study consent was obtained from the child's parent or legal guardian (see Appendix 9 for the participant information sheet and consent sheet). The children were also told about the study and asked verbally if they were happy to take part. Both children and parents were also made aware of their right to withdraw from the study at any time. The child's receptive language skills were measured using the BPVS II, and their performance on a number of first and second order false belief tasks assessed. Parents also completed the SDQ and the CSHQ.

Participants were randomly assigned into one of the two intervention groups. Children in the first group ( $n = 3$ ) received the Social Story™ intervention alone. Children in the second group ( $n = 3$ ) received the Social Story™ intervention with an integrated sticker reward chart. Each participant had a specified start date for the study, set at one week intervals. Parents were given a choice of start date wherever possible so as to avoid holidays and unusual events. All data was collected during the school term time.

Throughout the study period participants wore an actiwatch from 4pm in the afternoon until breakfast time the following day. Parents completed a sleep diary each evening and at the end of every phase the CSHQ was also completed. The same parent completed the questionnaires at each time point. During the control phase parents were asked to read a specific poem with their child at the same time each evening before they went to bed. This poem was chosen as it was similar in length to that of the Social Stories™. The researcher visited the families on the last day of the control week to introduce the Social Story™ to the child and parent. A comprehension check was used comprising 4 questions on a section of the story (see Appendix 10) to ensure an adequate level of understanding relating to the story content. During the intervention week the parent was required to read the Social Story™ with their child every evening. Those in the Social Story™ and reward condition were also given a colourful sticker card with either an underwater or pirate theme, and a variety of stickers to be used as rewards at breakfast time if the child had settled well the night before. At the end of the intervention week parents were told that they could keep the Social Story™ and to read it as and when they felt necessary.

Six months after the completion of the study participants took part in a follow-up that involved the child wearing the actiwatch and the parent completing the sleep diary for 7 days. The CSHQ was also completed. Parents were also asked how often they had read the Social Story™ with the child after the intervention week. Following this parents were given a debrief information sheet (see Appendix 11).

## **2.4 RESULTS**

Results have been divided into three sections. The first section presents descriptive data for each individual participant on all baseline measures and also considers the relationship between the different sleep measures. The second section focuses on group analysis of the data, and the final section looks at results for each individual participant, enabling some consideration of factors such as gender, age, language ability, perspective taking skills and severity of baseline sleep difficulties.

### **2.4.1 Descriptive Data**

#### ***Description of participants***

An overview of each child's individual score on every measure taken at baseline is provided below in Tables 2 and 3. Age, gender, language ability, perspective taking skills and scores on the Strength and Difficulties Questionnaire (SDQ) are presented in Table 2 and corresponding baseline sleep measures presented in Table 3.

Table 2

Age, gender, British Picture Vocabulary II (BPVS II) score, perspective taking skills (first and second order false belief tasks) and Strengths and Difficulty Questionnaire (SDQ) scores, including the five subtests scores and the total difficulties score, for all participants

| Participant no | Age (at start of study) | Gender | Language Ability            | Perspective taking skills |                           |                                      | SDQ Scores         |                  |               |               |                    |            |
|----------------|-------------------------|--------|-----------------------------|---------------------------|---------------------------|--------------------------------------|--------------------|------------------|---------------|---------------|--------------------|------------|
|                |                         |        | BPVS score (age equivalent) | First order false belief  | Second order false belief | Happe Stories score (score out of 6) | Emotional Symptoms | Conduct Problems | Hyperactivity | Peer Problems | Total Difficulties | Pro-social |
| 1              | 6 years 0 months        | Female | 6 years 9 months            | Pass                      | Pass                      | 4                                    | 2                  | 3                | 8*            | 2             | 15                 | 10         |
| 2              | 5 years 11 months       | Female | 6 years 2 months            | Pass                      | Pass                      | 4                                    | 3                  | 0                | 0             | 1             | 4                  | 8          |
| 3              | 6 years 9 months        | Male   | 7 years 7 months            | Pass                      | Pass                      | 4                                    | 1                  | 0                | 4             | 1             | 6                  | 9          |
| 4              | 6 years 9 months        | Male   | 6 years 7 months            | Pass                      | Pass                      | 3                                    | 5*                 | 2                | 4             | 0             | 11                 | 10         |
| 5              | 6 years 8 months        | Male   | 8 years 1 month             | Pass                      | Fail                      | 3                                    | 0                  | 2                | 4             | 0             | 6                  | 8          |
| 6              | 5 years 2 months        | Female | 4 years 8 months            | Pass                      | Fail                      | 3                                    | 1                  | 2                | 4             | 0             | 7                  | 7          |

\* scores in the abnormal band

As can be seen from Table 2 all the children passed the first order false belief task and 4 out of 6 passed the second order false belief task. Three of the children scored 4 out of 6 on the Happe Stories assessment and the other 3 children obtained a score of 3 out of 6. All children had BPVS II scores within the average range and their receptive language skills ranged from 4 years 8 months to 8 years 1 month.

Scores on the SQD can be grouped into three categories (normal, borderline and abnormal). None of the children's total difficulties score was in the 'abnormal' band (17-40). When considering the subscale scores 4 children had most difficulties in the area of hyperactivity and the other 2 children had most difficulties with emotional symptoms. Two scores from the subtests were in the abnormal band. These were the hyperactivity score for participant 1 and emotional score for participant 4.

A combination of parent report measures and actigraphy data was used to monitor the children's sleep behaviours throughout the duration of the study. The sleep diary data provided a daily measure of the frequency of bedtime resistant behaviours displayed by the child. From this information the average number of disruptive bedtime behaviours per night was calculated for each experimental phase (baseline, control, intervention and follow-up). The CSHQ was also completed at the end of each experimental phase. Analyses were focused primarily on the bedtime resistance subscale score and the total sleep



disturbance score as bedtime resistance was the target behaviour for the current intervention.

Actigraphy data, obtained from the actiwatch mini, produced objective information on the child's sleep patterns for each night of the study. Analysis focused on the following three output measures sleep onset latency, actual sleep time and sleep efficiency. Below, Table 3 presents the baseline data for all of the above sleep measures for each individual participant

Table 3:

Baseline sleep data for each participant, including the average number of disruptive bedtime behaviours per night, scores from the Children's Sleep Habit Questionnaire (total score and bedtime resistance subscale score), and actigraphy data (sleep onset latency, sleep duration and sleep efficiency).

| Participant number | Age               | Gender | Average number of disruptive bedtime behaviours per night | Children's Sleep Habit Questionnaire (CSHQ) |             | Actigraphy data               |                          |                      |
|--------------------|-------------------|--------|---|---|-------------|-------------------------------|--------------------------|----------------------|
|                    |                   |        |   | Bedtime Resistance subscale score           | Total score | Sleep onset latency (minutes) | Sleep duration (minutes) | Sleep efficiency (%) |
| 1                  | 6 years 0 months  | Female | 9.00  | 7   | 51          | 30.33*                        | 588.33                   | 80.87                |
| 2                  | 5 years 11 months | Female | 1.67  | 10  | 45          | 36.33*                        | 465.00*                  | 74.43                |
| 3                  | 6 years 9 months  | Male   | 1.00  | 11  | 54          | 17.33                         | 536.33*                  | 88.63                |
| 4                  | 6 years 9 months  | Male   | 10.00   | 14  | 66          | 102.33*                       | 495.33*                  | 76.40                |
| 5                  | 6 years 8 months  | Male   | 9.33  | 8   | 62          | 106.00*                       | 538.00*                  | 72.53                |
| 6                  | 5 years 2 months  | Female | 2.00  | 7   | 51          | 12.67                         | 578.00                   | 80.87                |

NB \* scores outside the average range suggested by the Loughborough Sleep Research Clinic<sup>3</sup>

<sup>3</sup> [http://www.lboro.ac.uk/departments/hu/groups/sleep/disorders/child\\_sleep.html](http://www.lboro.ac.uk/departments/hu/groups/sleep/disorders/child_sleep.html)

The CSHQ data presented in Table 3 shows that all of the children in the current sample scored above the clinical cut-off total score of 41 (Owens et al., 2000a). This indicates that they all presented with a high level of difficulty with their sleep. Research from Loughborough Sleep Research Clinic indicates that the average sleep duration for children aged between 5 and 7 years is between 9 and 10 hours (540-600 minutes) and the average sleep onset time for 5 to 11 year-olds is 20 minutes. Table 3 shows that 2 of the 6 children (participants 1 and 6) had actual sleep duration times within the average range whereas the other 4 participants had times that were below average. Participants 3 and 6 had sleep onset times that were slightly less than average whereas participants 1, 2, 4 and 5 had times greater than 20 minutes. The times for participants 1 and 2 were only slightly above average (30 and 36 minutes respectively) whereas both participants 4 and 5 had times that were over 5 times that of the average 20 minutes. It can also be seen that there was a large degree of variation within the children's scores on most of the measures, most notably for the average number of disruptive bedtime behaviours (1-10) and for the sleep onset latency time (17.33 minutes – 106 minutes).

### ***Comparisons between Sleep Measures***

One-sample Kolmogorov-Smirnov tests showed that the data sets were not significantly different from the normal distribution. The relationship between the individual sleep measures was investigated using Pearsons correlation coefficient and results are presented in Table 4 below.

Table 4:  
Pearsons Correlation Coefficients for baseline sleep measures

|   | 1 | 2   | 3   | 4     | 5    | 6    |
|---|---|-----|-----|-------|------|------|
| 1. Disruptive bedtime behaviours          | - | .10 | .71 | .78   | .13  | -.58 |
| 2. CSHQ bedtime resistance subscale       |   | -   | .49 | .41   | -.71 | -.15 |
| 3. CSHQ total sleep disturbance score     |   |     | -   | .83 * | -.06 | -.29 |
| 4. Sleep onset time in minutes            |   |     |     | -     | -.37 | -.77 |
| 5. Actual sleep time per night in minutes |   |     |     |       | -    | .56  |
| 6. Sleep efficiency percentage            |   |     |     |       |      | -    |

Due to the lack of power associated with the small sample size only the relationship between the total score on the CSHQ and the sleep onset time reached statistical significance ( $r = .83$ ,  $n = 6$ ,  $p < .05$ ). However it may be helpful to consider Cohen's (1988) guidelines for indications to the strength of the relationship between variables. Cohen (1988) suggests that Pearsons correlations coefficients between .10 and .29 indicates a small relationship, coefficients between .30 and .49 indicate a medium relationship and those between .50 and 1.0 indicate a large relationship.

When considering the parent report measures there was a strong relationship between the average number of reported disruptive bedtime behaviours per night, as recorded in the sleep diary, and the CSHQ total score ( $r = .71$ ). The relationship between the average number of bedtime disruptive behaviours and

the bedtime resistance subscale however, was small ( $r = .10$ ). The relationship between the bedtime resistance subscale and the total score from the CSHQ was of medium strength ( $r = .49$ )

When looking at the relationship between the parent report measures and the actigraphy data the number of disruptive bedtime behaviours was strongly associated with the sleep onset latency ( $r = .78$ ) and to sleep efficiency ( $r = -.58$ ). The bedtime resistance subscale of the CSHQ was strongly associated with actual sleep time ( $r = -.71$ ) and there was a medium strength association with sleep onset latency ( $r = .41$ ). The total score from the CSHQ was strongly associated with sleep onset latency ( $r = .83$ ) and there was a medium strength association with sleep efficiency ( $r = -.29$ ).

### ***Treatment Integrity***

Parents recorded whether they read the Social Story™ with the child for each night of the intervention phase and results indicated 100% compliance. During the intervention week, 4 of the 6 parents read the Social Story™ to the child every night and the other 2 parents either read the Social Story™ to the child or the child read the story to them. All 6 children were able to answer the 4 questions used as a comprehension check correctly, indicating that they had a good understanding of the content of the Social Story™. At follow-up parents were asked whether their child had access to their Social Story™ after the intervention week. Four parents reported not reading the Social Story™ with the child following the intervention week. One parent reported reading the Social

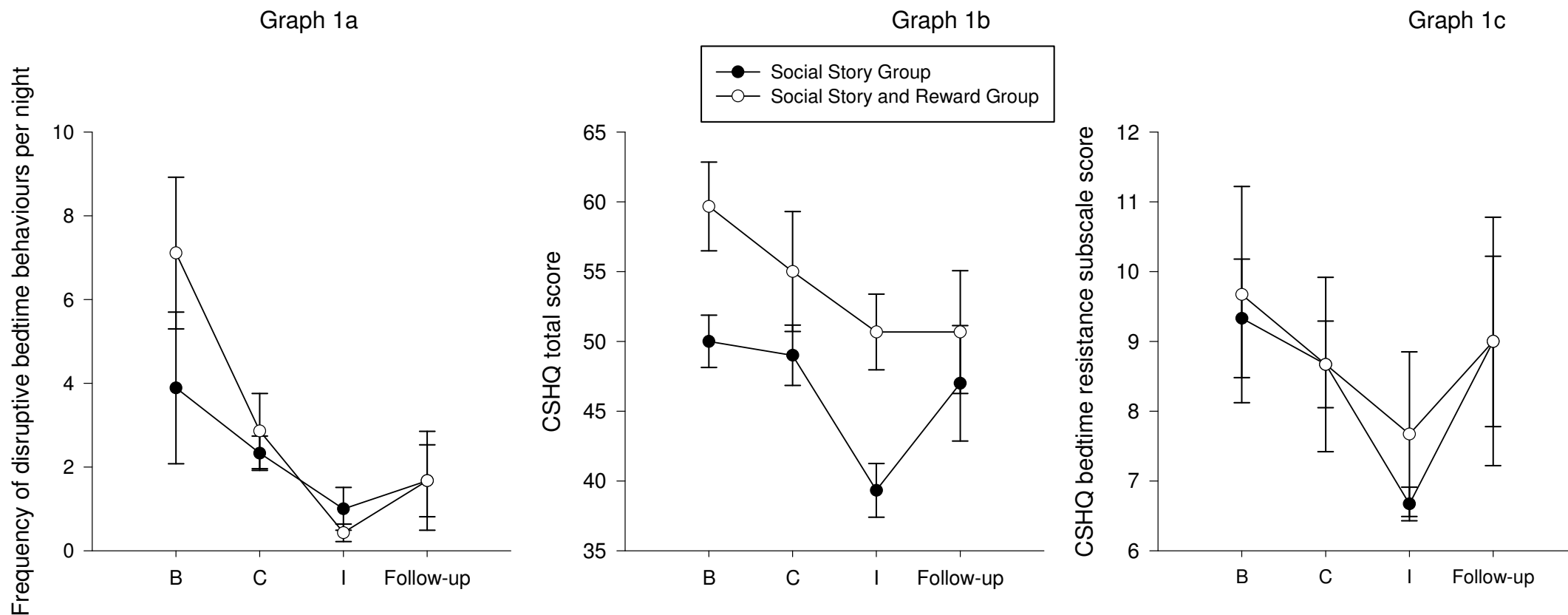
Story™ 1-2 times after the intervention and another parent reported reading the story 3-5 times following the intervention.

#### **2.4.2 Group Analysis of data**

In order to consider the difference between the sleep measures taken during the 4 different phases of the study; baseline, control, intervention and follow-up a series of mixed ANOVAs were completed for each of the sleep measures. Graphs depicting these results are shown in Figures 1 and 2.

##### ***Parent Report Measures***

Figure 1 shows results from the parental report measures. The graphs represent data recorded in the sleep diary and from completion of the CSHQ. Graph 1a represents the data collected from the sleep diary (average number of disruptive behaviours recorded per night). Graph 1b displays the results from the total sleep disturbance score obtained from the CSHQ and graph 1c displays results from the bedtime resistance subscale within the CSHQ. Graphs for the other seven subscales of the CSHQ are presented in Appendix 12



*Note:* B = Baseline (3 days), C = control week, I = Intervention week (social story™ or social story™ and reward). The follow-up was one week in duration 6 months after the intervention week.

Figure 1: Graphs depicting group mean scores from the parental report measures (sleep diary and CSHQ) taken at baseline, control, intervention and 6-month follow-up.

Graph 1a shows a reduction in the frequency of disruptive bedtime behaviours per night from baseline ( $m = 5.5$ ) to intervention ( $m = 0.7$ ). This reduction is apparent for both the Social Story™ and the Social Story™ plus reward group. It should also be noted that there also seems to have been a lesser reduction between baseline and control, which indicates that some improvements may be related to time and/or the increase in adult attention resulting from the reading of any story before the child's bedtime. There was a rise in disruptive behaviours present during the 6-month follow-up compared to those reported during the intervention week, but this level was still lower than that exhibited at baseline. It should be noted, however, that due to the nature of the multiple baseline design used in the current study there was no control comparison group at follow-up.

A similar pattern is presented in the graphs detailing the total and bedtime resistance CSHQ scores. The group who had the Social Story™ without the reward showed a larger decrease on the total sleep disturbance score and the bedtime resistance score at intervention compared to the group who had the Social Story™ and the reward. Both groups showed an increase in scores at follow-up, indicating that the improvements recorded during the intervention week were not sustained.

In order to investigate whether there were any main effects for each of the three parental report measures and to consider the interaction between the two intervention groups a series of mixed Analysis of Variance (ANOVA) were

completed. For each sleep measure (frequency of disruptive bedtime behaviours, bedtime resistance scores and total sleep disturbance scores) a mixed ANOVA was conducted for 2 intervention group (Social Story™ group, Social Story™ plus reward group) X 4 experimental phase (baseline, control, intervention, follow-up).

Analysis revealed significant main effects for frequency of disruptive bedtime behaviours ( $F_{(3,12)} = 7.64, p < 0.01$ ), bedtime resistance scores ( $F_{(3,12)} = 3.41, p = 0.05$ ) and total sleep disturbance score ( $F_{(3,12)} = 10.59, p = 0.01$ ) over the four time points. The difference between the group who received just a Social Story™ intervention and those who received a Social Story and rewards was not significant for any of the three measures ( $F_{(1,4)} = 0.18, p = 0.69$ ) ( $F_{(1,4)} = 0.02, p = 0.89$ ) ( $F_{(1,4)} = 1.58, p = 0.28$ ). Bonferroni planned comparison tests revealed no significant differences between any of the individual experimental phases for the frequency of disruptive bedtime behaviours and the bedtime resistance subscale scores. Significant differences were found between baseline and intervention ( $p < 0.01$ ) and between control and intervention ( $p = 0.05$ ) for the total sleep disturbance scores. (The small number of significant differences resulting from planned comparison analysis is likely to be associated with a lack of power due to the small sample size and the low scores that some of the participants received at baseline.)

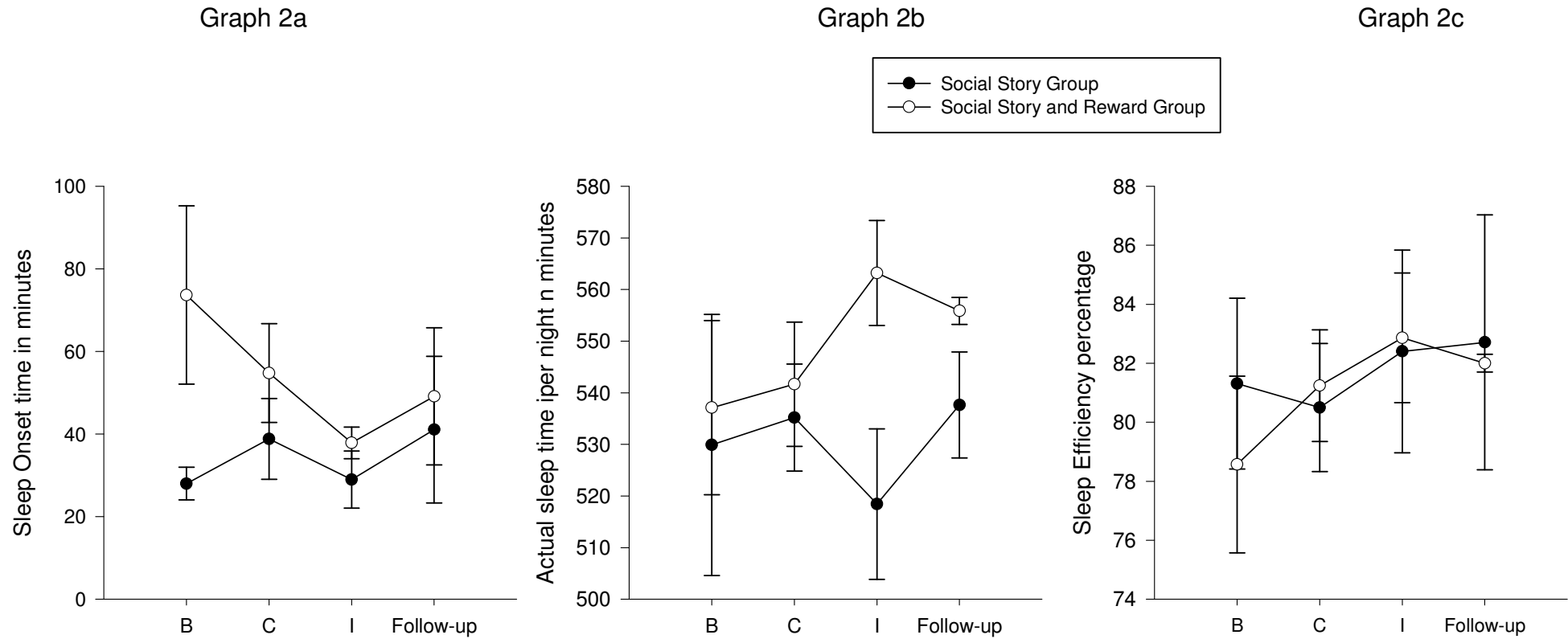
### ***Actigraphy Data***

Figure 2 shows results from the actigraphy measure. Data was collected every night throughout the duration of the study and mean scores were calculated for



the four time points (baseline phase, control phase, intervention phase and follow-up phase) for each child. Two children did not wear the actiwatch for one night during the study and this missing data was produced by calculating an average score using data from the remaining 6 days within the corresponding time condition. During the follow-up phase two actiwatches failed to record properly due to faulty batteries. Analysis for this time point was therefore restricted to 4 of the 6 participants, 2 from each intervention group.

The three graphs in Figure 2 show group mean scores for the four time points. Graph 2a considered the impact on sleep onset latency. Graph 2b shows the impact on the actual time and graph 2c looks at the sleep efficiency percentage.



Note: B = Baseline phase, C = control week, I = intervention week (social story™ or social story™ and reward). The follow-up was one week in duration 6 months after the intervention week.

Figure 2: Graphs depicting group mean scores from the actigraphy measure taken during baseline, control, intervention and 6 month follow-up.

These results indicate that for the group who received the Social Story™ and the reward a reduction in sleep onset latency between baseline ( $m = 74$  minutes) and intervention ( $m = 38$  minutes) was noted. Actual sleep time and sleep efficiency also increased for participants within this group from baseline ( $m = 537$  minutes per night and  $m = 78.57\%$ ) to intervention ( $m = 563$  minutes per night and  $m = 82.86\%$ ).

Results for the group who received the Social Story™ intervention without the reward show little difference between the sleep onset latency at baseline ( $m = 28$  minutes) and intervention ( $m = 29$  minutes). Actual sleep time was slightly less at intervention (518 minutes) than baseline (530 minutes) but sleep efficiency was somewhat improved (from 81.31% to 82.4%).

For each of the three actigraphy output measures a mixed ANOVA was conducted for 2 intervention group (Social Story™ group, Social Story™ plus reward group) X 4 experimental phase (baseline, control, intervention, follow-up). Missing data for 2 of the participants at follow-up meant that such analysis was limited to the remaining 4 participants. Results from the sleep onset latency data showed a non significant main effect for experimental phase ( $F_{(3,6)} = 0.56$   $p = .66$ ) and the difference between the two intervention groups was also non significant ( $F_{(1,2)} = 0.13$ ,  $p = .75$ ). Results from the actual sleep time data and the sleep efficiency data also showed a non significant result for the main effect of experimental phase ( $(F_{(3,6)} = 0.21$ ,  $p = .89)$  and  $(F_{(3,6)} = 0.42$ ,  $p = .75)$

respectively) and for between subject differences relating to the two intervention groups ( $(F_{(1,2)} = 0.91, p = .44)$  and  $(F_{(1,2)} = 0.19, p = .71)$  respectively).

Further analysis was also conducted using the data from all 6 participants, restricted to the three experimental phases of baseline, control and intervention. This also showed no significant effects for either the main effect of experimental phase or between subject effects relating to the two different intervention groups.

Due to the small sample size statistical analysis is somewhat limiting and therefore it is also helpful to consider the data for each individual participant by means of visual analysis. Ali and Frederickson (2006) point out that individual analysis allows individual uniqueness and complexity to be considered, rather than having the constraints of group analysis. Variation can also be examined as a potentially important factor, rather than as a possible confound.

### **2.4.3 Individual differences**

Figures 3 and 4 present individual scores for each participant at baseline, control, intervention and follow-up on every individual sleep measure. The graphs on the left show results for participants 1, 2 and 3, who received a Social Story™ intervention. The graphs on the right show results for participants 4, 5 and 6, who received a Social Story™ and reward intervention. Figure 3 displays results from the parental report measures and Figure 4 displays results from the actigraphy data.

Visual analysis of the graphs detailing individual participants scores allow consideration of how the baseline measures detailed in Table 1 (age, gender, language ability, perspective taking skills and SDQ scores) may be impacting on the effectiveness of the intervention. Further consideration can also be made relating to potential differences between the two types of intervention.

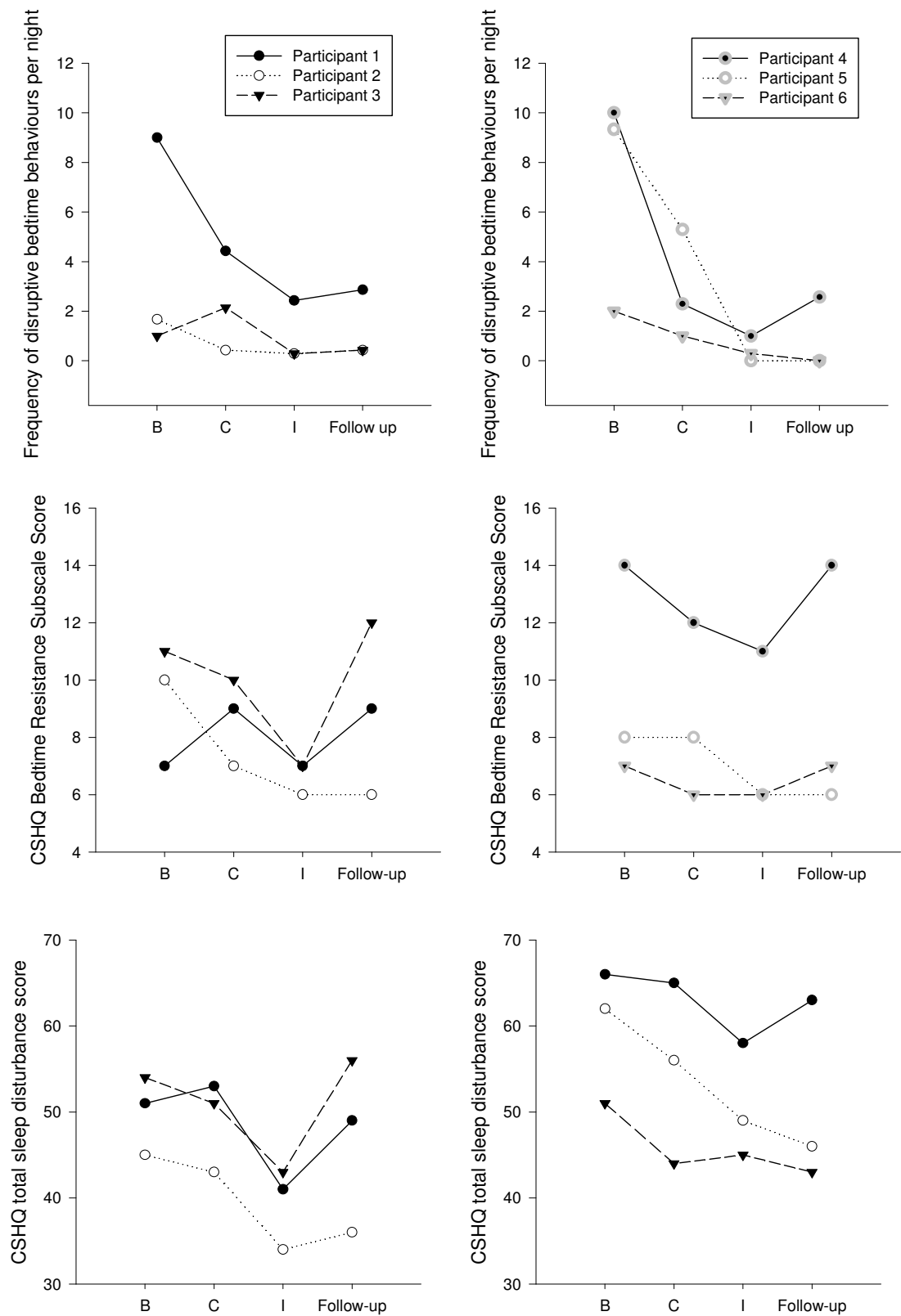


Figure 3: Graphs showing individual results on each of the parent report measures at baseline, control, intervention and 6 month follow-up. Participants 1-3 received the Social Story intervention and Participants 4-6 received the Social Story and a reward intervention.

Figure 3 shows that the scores on all three parental report measures were lower following the intervention compared to baseline for every participant. Scores from the CSHQ appear to be a lot higher at follow-up for 3 of the children. These 3 children had received the top 3 scores at baseline,

Visual inspection of the graphs indicate that the general trend in data seems to be consistent for all participants and the main variation looks to be driven by the severity of the difficulties reported at baseline. It may therefore be inferred that factors such as gender and perspective taking skills do not appear to be related to the effectiveness of a Social Story™ intervention on the parental sleep measures within the given sample.

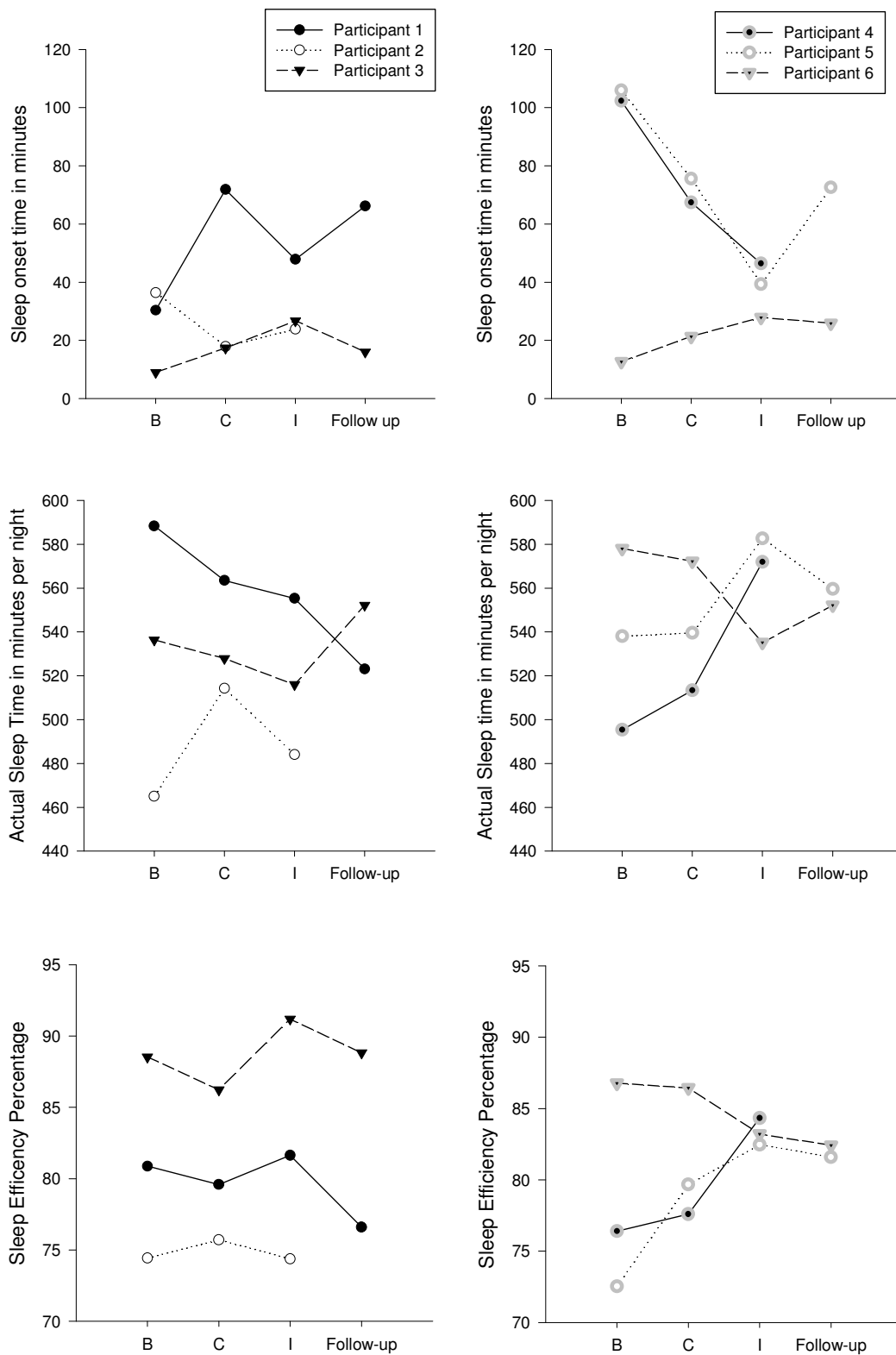


Figure 4: Graphs showing individual results on the actigraphy measures at baseline, control, intervention and 6 month follow-up. Participants 1-3 received the Social Story intervention and Participants 4-6 received the Social Story and a reward intervention.



Figure 4 shows a large degree of variation between individual participants scores on all three of the actigraphy measures (sleep onset latency, actual sleep time and sleep efficiency percentage). Visual inspection of the graphs suggests that only participants 4 and 5 showed a notable decrease in sleep onset time with an increase in actual sleep time and sleep efficiency percentage. The other participants appear to show little improvements on any of the three measures. When considering the difference between participants 4 and 5 and the rest of the group a number of factors may be worth highlighting. They both received the intervention of a Social Story™ with a reward, they are both male, one passed the second order false belief task and the other failed and they both only scored 3 out of 6 on the Happe Stories test.

When considering the comparison between Figure 3 and Figure 4 it can be seen that the trend in the data provided by the parental report measures is much more consistent when looking at the results from the individual participants, compared to that produced by the actigraphy data. The individual data shows improvements noted on the parental measures relating to the intervention for all participants whereas the objective actigraphy measure suggests that only two participants actually show improvements in sleep relating to the intervention.

#### **2.4.4 Summary of results**

Visual analysis of the group data relating to the parental report measures indicated a general trend of a reduction in disruptive bedtime behaviours

associated with the introduction of the Social Story™ Intervention. This was observed for participants in both intervention groups. This improvement however was not noted at on all of the measures at the 6-month follow up. Statistical analysis showed a significant main effect for each of the three parental report measures over the 4 time points and further planned comparison tests revealed a significant difference between participants' scores at baseline and intervention, and between scores at control and intervention on the total sleep difficulty score of the CSHQ. There were no significant differences between participants scores based on intervention type, indicating that the Social Story™ was equally effective when implemented alone or in combination with a reward chart.

Visual analysis of the group data for the actigraphy measures showed a trend towards a reduction in sleep onset latency with an increase in actual sleep time and sleep efficiency percentage for the group of participants who received the Social Story™ intervention with the reward. Statistical analysis however showed no significant effects.

Individual analysis of the parental report measures indicated that the general trend in data was consistent for all individual participants with the main variation seeming to have been driven by the severity of the difficulties reported at baseline. The children who presented with worse problems at baseline showed greatest improvements following the intervention. Individual analysis of the actigraphy data on the other hand, revealed less clear trends in the data. Visual inspection of the data suggested that only participants 4 and 5 actually showed

a notable decrease in sleep onset latency with an increase in actual sleep time and sleep efficiency percentage associated with the initiation of the Social Story™ intervention. The other participants showed little or no improvements on any of the three measures. These results suggest that boys with poorer perspective taking skills who received the Social Story™ and reward interventions showed most improvements on the objective sleep measures. However, the small sample size and lack of statistical analysis means that such findings should be interpreted with caution.

## **2.5 DISCUSSION**

The current study considered the relatively novel approach of using a Social Story™ intervention with young school-aged children as a potential treatment for bedtime resistance difficulties. This intervention has the potential to be both cost effective and easy to implement (Reynhout & Carter, 2006). In addition, it should be highly acceptable to its target audience as no adverse effects are associated with implementation (e.g. extinction burst) (Burke et al., 2004). Given the prevalence of bedtime problems within this age group and implications of disrupted and inadequate sleep on child development, investigations of treatments in this area is of great clinical and practical relevance.

Previous research has shown some evidence that a Social Story™ intervention can help reduce disruptive bedtime behaviours in young children (Burke et al, 2004; Moore, 2004). The current study extended research in this area by using

both parental report measures (sleep diaries and the CSHQ) and actigraphy, an objective sleep measure, with a larger community sample of 6 children. In addition, 2 intervention conditions were used in order to investigate the potential difference between the Social Story™ intervention when used alone and in conjunction with a rewarding sticker chart. Furthermore, the current study measured perspective taking skills, areas of strengths and difficulties, as measured by the SDQ, and receptive language ability in order to consider potential individual factors that may contribute to the effectiveness of the Social Story™ intervention.

In line with previous findings from Burke et al. (2004) and Moore (2004), visual inspection of the results showed that the Social Story™ intervention was associated with a reduction in frequency of bedtime resistance behaviours, as rated by parents. In addition, it was found that the Social Story™ and reward intervention was associated with improvements on the objective sleep measures of sleep onset latency, actual sleep time and sleep efficiency for 2 of the 3 children in this group.

When considering the impact of perspective taking skills on the effectiveness of the intervention, the two children who demonstrated improvements on the objective sleep measures both achieved a relatively low score on the Happe (1994) Strange stories test and one of the children also failed the Sally-Anne second order false belief task. These results support suggestions from Jeffery (2006) and Toplis and Hadwin (2006) who proposed that children with poorer perspective taking skills benefit most from Social Story™ interventions.

However, within the current sample the amount of variation in the children's scores on the perspective taking tasks was minimal and therefore it is very difficult to provide an accurate assessment of the impact of these skills. Also, there was one child who failed the second order false belief task and who did not show improvements on the actigraphy measures.

Previous research in this area has not typically included a control group (e.g. Burke et al., 2004; Toplis and Hadwin, 2006). The inclusion of a control phase, whereby the children were read a poem by their parent every evening, enabled exploration of the effect of the joint attention of this shared activity on bedtime resistance. Parents generally reported a slight decrease in disruptive bedtime behaviours associated with this phase. This decrease was less than that associated with the intervention phase, but the decrease in bedtime resistance is worth noting because it does suggest that the shared experience of parents reading a poem with their child before bedtime had a positive impact on some of the children's bedtime behaviours.

A further strength of the current study was that it considered the impact of the social story intervention over a 6-month period. Previous research had generally focused on short term evaluations (e.g. Jeffery, 2006; Toplis & Hadwin, 2006) and therefore maintenance could not be established. In the current study, at the six-month follow up, results showed that the improvements associated with the intervention phase had not been maintained and children's scores had returned to a level slightly below that assessed at baseline or during the control phase on most of the measures. This lack of continuity of the positive effects seen during

the intervention phase indicates that the improvements associated with such an intervention are only short lived. Alternatively, the duration of the intervention may not have been long enough to secure lasting change in the children's behaviour. When deciding on the length of the intervention it was noted from Burke et al. (2004) that a significant reduction in the disruptive bedtime behaviours occurred as soon as the story was introduced, and this then continued fairly consistently over a two-three week period. Also, because it was felt to be important to complete the study during the school term time, in order to avoid any confounding effects associated with the school holiday period, the duration of the main study was required to fit into a seven-week school half term period. Sustained improvement in children's bedtime behaviour after a short-term intervention might have been achieved if parents had continued with the intervention. In the current study, explicit instructions and guidelines about the continuation of the use of the Social Story™ following the intervention phase, however were not made clear enough to parents and therefore most did not continue reading the story. A study with a longer intervention phase is therefore required in order to investigate this issue further.

Overall, the results of the present study provide initial support for the use of Social Stories™ as an intervention to help reduce disruptive bedtime behaviours in young school-aged children with bedtime resistance. The impact on objective sleep measures, such as sleep onset latency, requires considerable further investigation, however, as current findings showed variable results across the different participants and, as far as the author is aware, this is the only study to have used such measures to investigate this intervention.

While the results of the current study are promising, they represent an initial investigation with only 6 children and there are a number of methodological issues that need highlighting. Firstly, although the sample size in the current study was larger than previous studies (Burke et al., 2004; Moore, 2004) it was still very small, meaning that analysis had to rely mainly on visual analysis, rather than statistical analysis. Also, the multiple baseline design used meant that at follow-up there was not a control group comparison. Consequently, it could not be determined whether the effects at this time were due to the intervention or influenced by other variables, such as maturation over time.

The baseline phase only lasted three days and therefore the degree of variation was greater than during control and intervention weeks. Ideally, Acebo et al. (1999) suggest that a minimum of five days of actigraph recording should be used to establish reliable results ( $< .70$ ). However, a large number of previous studies have used shorter periods of between one and three nights (e.g. Lichstein et al., 2006; Paquet, Kawinska and Carrier, 2007; Sadeh et al., 1994).

On reflection, the inclusion criteria in relation to the severity of the child's bedtime resistant behaviours should have been raised, as baseline data for some of the children revealed that their difficulties may not have been at a level that could enable much improvement (floor effects). Three of the children had an average of only between 1 and 2 disruptive bedtime behaviours per night during baseline, despite parents reporting more significant difficulties at the initial home visit.

Future research would benefit from the use of a larger sample size, with a waiting list control group in order to investigate longer term impact fully. The use of a baseline phase lasting 5-7 days, and a longer intervention phase would also be beneficial, in order to consider whether this would lead to maintenance of target behaviours. Further research is also needed with the use of objective sleep measures to investigate the impact of the different elements of the intervention, such as the use of rewards.

In addition, sleep difficulties have often been reported as associated difficulties for children with ASD (e.g. Allik, Larsson & Smedje, 2006) and therefore it would also be interesting to consider the use of Social Stories™ within this population in addition to typically developing children.



## **APPENDICES**

Appendix 1: Sally Anne procedure

Appendix 2: Strange Stories

Appendix 3: Strength and Difficulties Questionnaire (SDQ)

Appendix 4: Children's Sleep Habit Questionnaire (CSHQ)

Appendix 5: Sleep Diary

Appendix 6: Social Story

Appendix 7: Ethics letter

Appendix 8: Initial Screening letter

Appendix 9: Participant information sheets and consent forms

Appendix 10: Social Story Comprehension Check

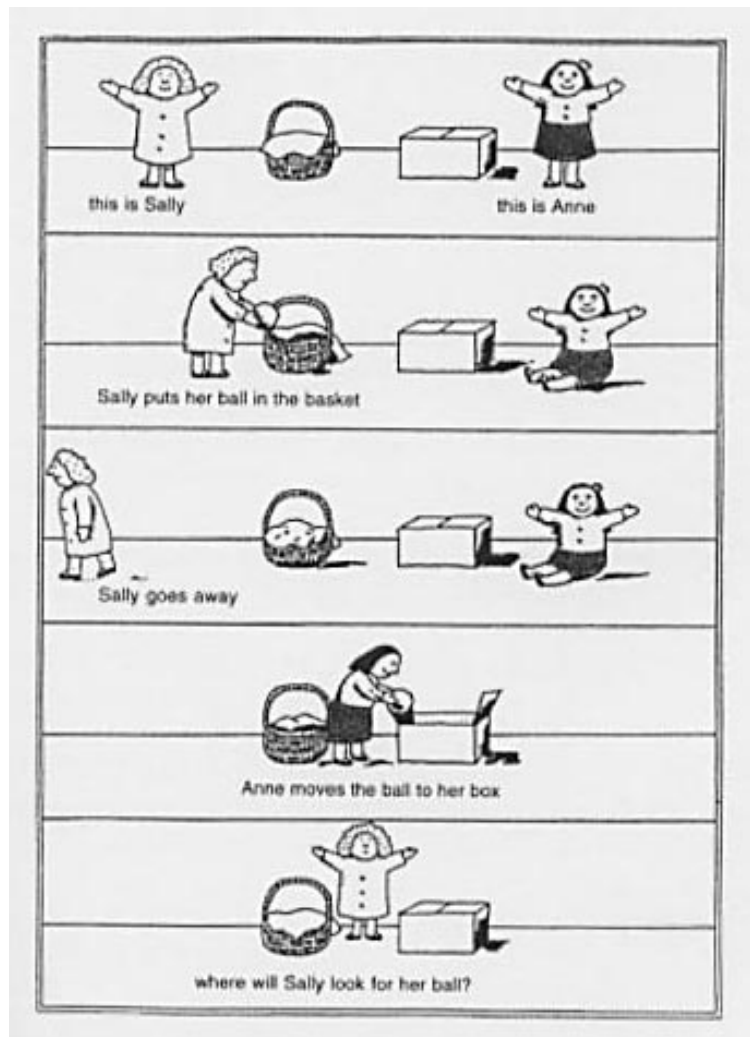
Appendix 11: Debrief information

Appendix 12: Graphs for CSHQ subtest results

## APPENDIX 1: The Sally-Anne Test Procedure

### Level one:

The following story will be acted out with two dolls, a basket and a box. The child will be asked 'Where will Sally look for her marble?'



### Level 2:

The same story will be acted out. However, this time Sally will secretly watch Anne move the marble. The child will be asked 'Where does Anne think Sally will look for the marble?'

## APPENDIX 2: Strange Stories (Happe, 1994)

### ***Story 1: Dentist (lie)***

John hates going to the dentist, because every time he goes to the dentist he needs a filling, and that hurts a lot. But John knows that when he has tooth-ache, his mother always takes him to the dentist. Now John has bad tooth-ache at the moment, but when his mother notices he is looking ill and asks him "Do you have tooth-ache, John?", John says "No, Mummy".

Is it true, what John says to his mother?

Why does John say this?

### ***Story 2: Santa Claus (appearance reality)***

On Christmas Eve Alice's mother takes her to the big department store in town. They go to look in the toy department. In the toy department Mr Brown, Alice's next door neighbour, is dressed up as Santa Claus, giving out sweets to all the children. Alice thinks she recognises Mr Brown, so she runs up to him and asks. "Who are you?" Mr Brown answers "I'm Santa Claus!"

Is it true what Mr Brown says?

Why does he say this?

### ***Story 3: Picnic (sarcasm)***

Sarah and Tom are going on a picnic. It is Tom's idea, he says it is going to be a lovely sunny day for a picnic. But just as they are unpacking the food, it starts to rain, and soon they are both soaked to the skin. Sarah is cross. She says "Oh yes, a lovely day for a picnic alright!"

Is it true what Sarah says?

Why does she say this?

### ***Story 4: Doll (forget)***

Yvonne is playing in the garden with her doll. She leaves her doll in the garden when her mother calls her in for lunch. While they are having lunch, it starts to rain. Yvonne's mother asks Yvonne, "Did you leave your doll in the garden?" Yvonne says, "No, I brought her in with me, Mummy."

Is it true what Yvonne says?

Why does Yvonne say this?

**Story 5: Hat (white lie)**

One day Aunt Jane came to visit Peter. Now Peter loves his aunt very much, but today she is wearing a new hat; a hat which Peter thinks is very ugly indeed. Peter thinks his aunt looks silly in it, and much nicer in her old hat. But when Aunt Jane asks Peter, "How do you like my new hat?", Peter says "Oh, it's very nice".

Is it true what Peter said?

Why did he say it?

**Story 6: Ping Pong (double bluff)**

Simon is a big liar. Simon's brother Jim knows this, he knows that Simon never tells the truth! Now yesterday Simon stole Jim's ping-pong bat, and Jim knows Simon has hidden it somewhere, though he can't find it. He is very cross. So he finds Simon and he says. "Where is my ping-pong bat? You must have hidden it either in the cupboard or under the bed, because I've looked everywhere else. Where is it, in the cupboard or under your bed?" Simon tells him the bat is under his bed.

Was it true what Simon told Jim?

Where will Jim look for the ping-pong bat?

Why will Jim look there for his bat?

APPENDIX 3: Strength and Difficulties Questionnaire (SDQ, Goodman, 2005)

APPENDIX 4: Children's Sleep Habit Questionnaire (CSHQ, Owens, 2004)



# Sleep Diary

**Child Name:** \_\_\_\_\_

**DOB:** \_\_\_\_\_

**Week Beginning:** \_\_\_\_\_





NB: The diary contained a page like this for every day of the study in a weekly format..

Day 1: Date: \_\_\_\_\_

What time did your child wake up this morning? \_\_\_\_\_

Did you read the social story with your child this evening? **Yes / no**

If yes at approximately what time did you read it \_\_\_\_\_

*Please circle a number each time your child demonstrates one of the following behaviours during their bedtime preparation today.*

| Description of Behaviour  | Frequency                                |
|---|--|
| <b>STALLING</b><br>Examples: Asking for a drink; Asking for food.   | 1 2 3 4 5 6 7<br>8 9 10 11 other: ____   |
| <b>NON-COMPLIANCE</b><br>Examples: Refusing to do something that you have asked them to do;   | 1 2 3 4 5 6 7<br>8 9 10 11 other: ____   |
| <b>VOCAL PROTESTS</b><br>Examples: "I don't want to go to bed."<br>General complaining e.g. "It's too hot"<br>OR<br>Demanding requests. | 1 2 3 4 5 6 7<br>8 9 10 11 other: ____   |
| <b>CALLING OUT FOR PARENTS</b>  | 1 2 3 4 5 6 7<br>8 9 10 11 other: ____   |
| <b>CRYING</b>   | 1 2 3 4 5 6 7<br>8 9 10 11 other: ____   |
| <b>SCREAMING</b>  | 1 2 3 4 5 6 7<br>8 9 10 11 other: ____   |
| <b>TANTRUMS</b><br>Examples: Prolonged crying and screaming; Throwing toys.   | 1 2 3 4 5 6 7<br>8 9 10 11 other: ____   |
| <b>AGGRESSION</b><br>Examples: A verbal or physical aggressive act.   | 0 1 2 3 4 5 6 7<br>8 9 10 11 other: ____ |
| <b>OTHER</b><br>Please give an example.   | 1 2 3 4 5 6 7<br>8 9 10 11 other: ____   |
| <b>Night waking</b><br>Any time your child aroused your attention and required you to do something to settle him/her.                   | 1 2 3 4 5 6 7<br>8 9 10 11 other: ____   |

Please give the time that your child was in bed with the lights out \_\_\_\_\_ P.M

Please give the time that you observed your child to be asleep \_\_\_\_\_ P.M.

# Thank you



## APPENDIX 6: Example of Social Story™ content

My name is W.  
This is a picture of me.

[picture]

In the evening I usually have my tea at about 6.30pm.

[picture]

After tea I usually play with my toys or watch some TV until mum tells me that it is time to have my bath and brush my teeth.

[picture]

I put my pyjamas on ready to go to bed. Most of the time mum reads me a bedtime story or I read to her. I enjoy this time together and it helps me to feel calm and relaxed. We can also talk about what is going to happen tomorrow so that I know what we will be doing.

[picture]

When it is time for me to go to sleep mum usually gives me a hug and a kiss and then she says 'goodnight'. This means that it is time for me to close my eyes and try to go to sleep.

Sometimes daddy also gives me a hug and a kiss. Daddy cannot always give me a hug and a kiss goodnight because he is not always at home when it is my bedtime. This is okay because I will get to see him in the morning at breakfast.

**After mum or dad has said goodnight to me I will try to stay still and quiet in my bed until I fall asleep. This will make my mum and dad very pleased with me.**

Mum will turn my bedroom light out. This is okay because the landing light will be left on and this will make it easier for me to fall asleep.

Here I am going to sleep on my own!

[picture]

Good morning ... Mum wakes me with a big cuddle and a kiss for settling down to sleep quietly and staying in my bed. She is really pleased with me.

Well done W!! What a good boy you are for settling down to sleep quietly.

## APPENDIX 7: Ethics Approval Letter

## APPENDIX 8: initial Screening Letter

[Printed on University Headed paper]

Dear Parent / Guardian

### **Do you have a child aged 4-6 years old who finds it difficult to go to bed and struggles to get to sleep?**

My name is Liz Smith and I am a Trainee Educational Psychologist at Southampton University. I am conducting a study regarding the use of social stories with young school-aged children who find going to bed and getting to sleep difficult.

Social stories are personalised stories that are written in a specific style and format to explain what happens in everyday situations. The study would involve the researcher developing a personalised social story for your child about going to bed, which you would be required to read with your child every night for a one week period. You would also be asked to complete a few short questionnaires and a brief sleep diary during a three-week period of the study. Your child will also be asked to complete two short activities during a home visit at the beginning of the study. This study is supported by Dr Julie Hadwin and Dr Cathy Hill at the University of Southampton.

In order for me to identify children to take part in this study I would be grateful if you could answer the questions below.

#### ***Bedtime quiz:***

How many times a week does your child struggle to settle to sleep e.g. resist going to bed or simply find they are unable to settle down to sleep?

- a) Less than once a week
- b) once or twice a week
- c) more than twice a week



On the nights that your child struggles to settle to sleep, how long does this take from the time they first go to bed to the time they actually fall asleep?

- b) up to one hour
- c) more than an hour

If your child is aged between 4 and 6 years old and you have answered b or c to both questions in the bedtime quiz I would be very interested in hearing from you.

If you are interested in finding out more about the study could you please return the bedtime quiz and the response slip below to your child's school by XXX. I will then contact you by telephone to explain more about the study and to go over a short questionnaire. Please be reassured that all information remains confidential and if you wish to withdraw from the study at any time then you are entirely free to do so.

---

**Social Story and bedtime resistance study**

I give my permission to be contacted further about the above study.

Child's name: \_\_\_\_\_ gender: male/female

Date of Birth: \_\_\_\_\_

Parent / Guardian name: \_\_\_\_\_

Contact telephone number \_\_\_\_\_

Address: \_\_\_\_\_  
\_\_\_\_\_

Please return to XXX by XXX

## APPENDIX 9: Participant Information Sheet and Consent form

### **A social story to improve bedtime resistance in young school-aged children**

My name is Liz Smith and I am a Trainee Educational Psychologist at Southampton University. I am requesting your child's participation in a study regarding the use of social stories with young school-aged children who find going to bed and getting to sleep difficult. Social stories can be defined as personalised stories that are written in a specific style and format to explain what happens in a challenging situation.

This study will last three weeks and during this period you will be asked to complete a sleep diary for your child.

During a home visit you will be asked to complete a questionnaire on your child's sleep behaviour and your child will complete two 5-minute activities with the researcher. The first is to measure your child's general language development and the second will look at their understanding of other people's perspective in a short story that is acted out with two dolls (Sally-Anne test).

A personalised social story will be developed for your child around their bedtime routine. Fun photographs of your child and family members may be used in this story. You will be required to read this story to your child every evening for 7 nights.

#### Study Overview

| Week 1<br>(baseline phase)     | Week 2<br>(control phase)  | Week 3<br>(intervention phase)  |
|--------------------------------|--|---|
| Parent completes a sleep diary | Parent completes a sleep diary<br>Parents read a bedtime story to child each evening | Parent completes a sleep diary<br>Parent reads the personalised social story to the child each evening. |

You will also be asked to complete a questionnaire at the end of the study and be contacted as part of a follow-up three months after completion of the study. The follow-up will involve the completion of a questionnaire and the sleep diary.

Personal information will not be released to or viewed by anyone other than researchers involved in this project. Results of this study will not include your

name or any other identifying characteristics.

Your participation is voluntary and you may withdraw your child from participating at any time.

If you have any questions please ask them now, or contact me Liz Smith at [ek@soton.ac.uk](mailto:ek@soton.ac.uk) or my supervisor, Dr Julie Hadwin on 02380592590

Signature

Date

Name

Liz Smith



**A social story to improve bedtime resistance in young school-aged children**

Researcher Name: Liz Smith

Ethics Reference: 556

Date:

**Statement of Consent**

**Child Name:** \_\_\_\_\_

**Name of parent/guardian giving consent:** \_\_\_\_\_

*Please initial the box(es) if you agree with the statement(s):*

I have read and understood the information sheet (date/version no.) ☐  
and have had the opportunity to ask questions about the study

I agree for my child to take part in this research project and agree ☐  
for his/her data to be used for the purpose of this study

I understand my child's participation is voluntary and I may withdraw ☐  
at any time without my legal rights being affected

I give consent for photographs to be taken of my child by ☐  
Liz Smith during a home visit to be used in a personalised  
social story that will be given to my child.

I understand that these photographs will be destroyed after ☐  
analysis

Signature \_\_\_\_\_ Date \_\_\_\_\_  
Name *[participants name]*

I understand that if I have questions about my rights as a participant in this research, or if I feel that I have been placed at risk, I can contact the Chair of the Ethics Committee, Department of Psychology, University of Southampton, Southampton, SO17 1BJ.  
Phone: (023) 8059 5578.

#### APPENDIX 10: Social Story Comprehension Check

In the evening I usually have my tea at about 6.00pm.

After tea I usually play with my toys or watch some TV until mum tells me that it is time for me to have my bath and brush my teeth.

Mum and dad have a different bedtime to me. Usually children need to sleep longer than mums and dads and this is why I go to bed before them. It is okay for me to be asleep when mum and dad are awake. They will go to bed soon as they have a bedtime too. It is important for me to get lots of sleep as this will help me to concentrate at school and feel wide awake during the day.

When it is time for me to go to sleep mum usually gives me a hug and a kiss and then she says 'goodnight'. This means that it is time for me to close my eyes and try to go to sleep.

#### **Questions**

1. What time is tea?
2. What usually happens after I have my tea?
3. Do mum and dad have the same bedtime as me?
4. When it is time for me to go to sleep what does mum usually say?

## APPENDIX 11: Debrief Sheet

### **A social story to improve bedtime resistance in young school-aged children**

The aim of this research was to investigate the use of a personalised Social Story to help bedtime resistance in young school aged children.

Your data will help our understanding of the use of Social Stories as an effective intervention for parents to use with children who are experiences difficulties in going to bed and settling down to sleep. Once again results of this study will not include your name or any other identifying characteristics.

The experiment/research did not use deception. You may have a copy of this summary of research findings once the project is complete.

If you have any further questions please contact me, Liz Smith, at [ek@soton.ac.uk](mailto:ek@soton.ac.uk)

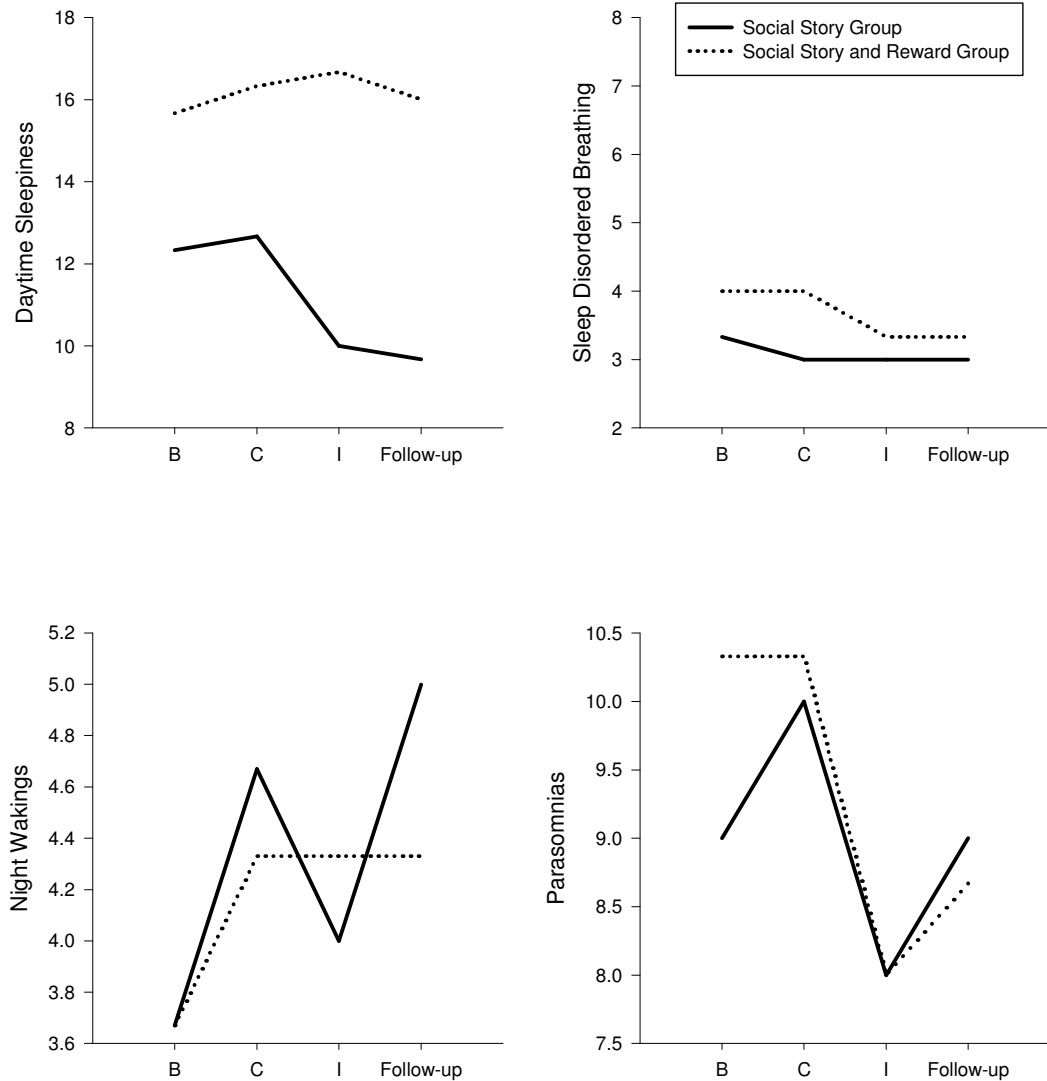
Thank you for your participation in this research.

Signature \_\_\_\_\_ Date \_\_\_\_\_

Name Liz Smith

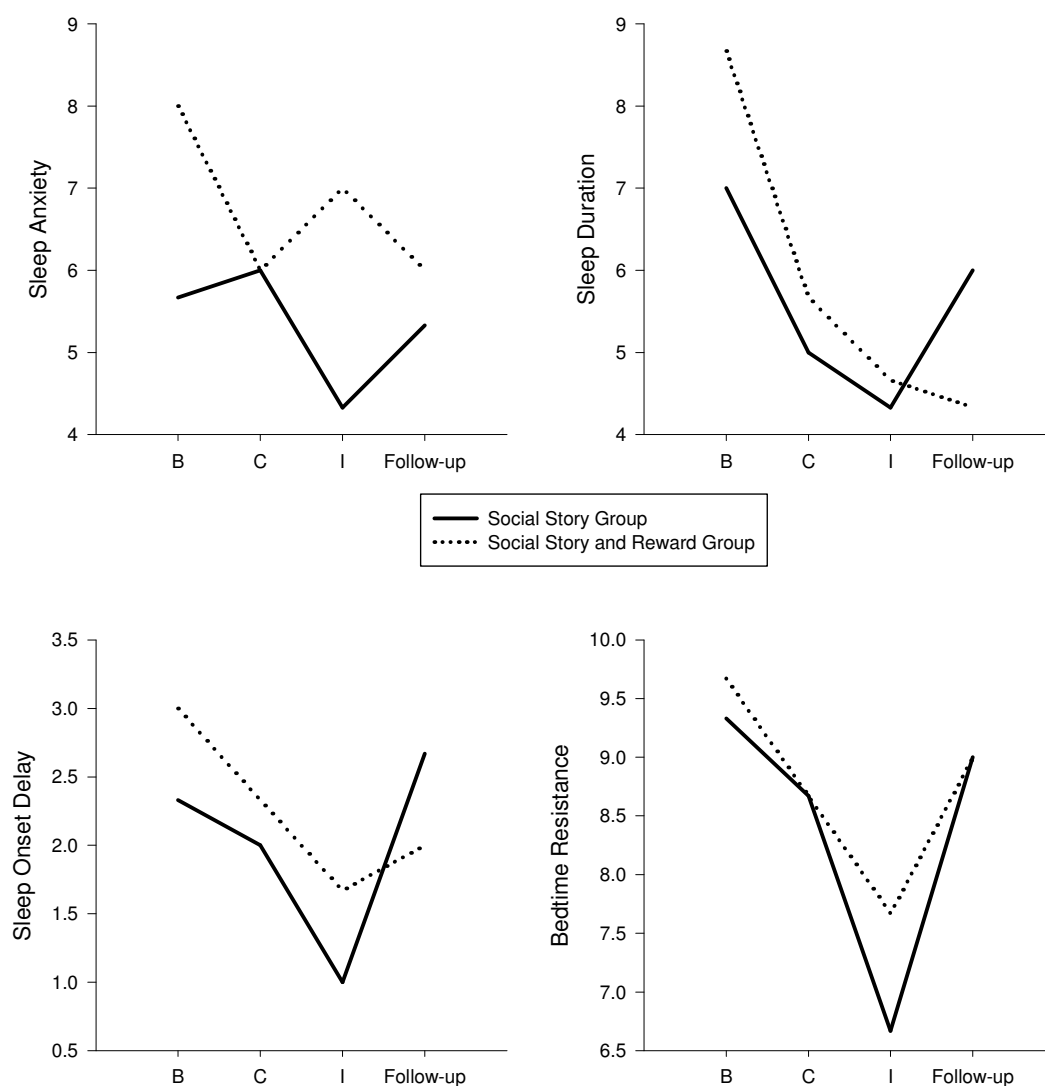
If you have questions about your rights as a participant in this research, or if you feel that you have been placed at risk, you may contact the Chair of the Ethics Committee, Department of Psychology, University of Southampton, Southampton, SO17 1BJ.  
Phone: (023) 8059 5578.

## APPENDIX 12: Graphs of results from the subtests of the CSHQ



*Note:* B = Baseline (3 days), C = control week, I = Intervention week (social story or social story and reward). The follow-up was one week in duration 6 months after the intervention week.

Higher scores equate to more difficulties in this area



*Note:* B = Baseline (3 days), C = control week, I = Intervention week (social story or social story and reward). The follow-up was one week in duration 6 months after the intervention week.

Higher scores equate to more difficulties in this area

## REFERENCES

- Acebo, C., Sadeh, A., Seifer, R., Tzischinsky, O., Wolfson, A. R., Hafer, A., and Carskadon, M. A. (1999). Estimating sleep patterns with activity monitoring in children and adolescents: How many nights are necessary for reliable measures? *Sleep*, 22. 95-103.
- Ali, S. & Frederickson, N. (2006). Investigating the Evidence Base of Social Stories. *Educational Psychology in Practice*, 22. 355-377.
- Allik, H., Larsson, J-O., and Smedje, H. (2006). Sleep patterns of school aged children with aspergers syndrome or high functioning autism. *Journal of Developmental Disorders*, 36. 585-595.
- Attarian, H. P. (Ed.) (2004). *Clinical Handbook of Insomnia*. New Jersey: Humana Press.
- Baron-Cohen, S. (2001). Theory of mind in normal development and autism. *Prisme*, 34. 174-183.
- Baron-Cohen, S., Leslie, A. M. and Frith, U. (1985). Does the autistic child have a 'theory of mind'? *Cognition*, 21. 37-46.
- Blader, J. C., Koplewicz, H. S., Abikoff, H., and Foley, C. (1997). Sleep Problems of elementary school children. A community survey. *Archives of Paediatric Adolescent Medicine*, 151, 473-480.
- Brett, D. (1988). *Annie Stories: A special kind of storytelling*. New York: Workman Publishing.
- Burke, R. V., Kuhn, B. R. and Peterson, J. I. (2004) Brief Report: a 'storybook' ending to children's bedtime problems the use of a rewarding social story to reduce bedtime resistance and frequent night waking. *Journal of Paediatric Psychology*, 29. 389-396.

- Cohen, J. (1988). *Statistical Power analysis for the behavioural sciences*. Hillsdale, NJ: Erlbaum.
- Corkum, P., Tannock, R., Moldofsky, H., Hogg-Johnson, S., and Humpherries, T. (2001). Actigraphy and parental ratings of sleep in children with attention-deficit / hyperactivity disorder (ADHD). *Sleep*, 24. 303-312.
- Crozier, S., Tincani, M. (2007). Effects of social stories on prosocial behaviour of preschool children with autism spectrum disorders. *Journal of Autism Developmental Disorders*, 37. 1803-1814.
- Dunn L, M., Dunn L, M., Whetton, C. and Burley, J. (1997) *The British Picture Vocabulary Scale. 2nd ed*. National Foundation for Educational Research, NFER-Nelson.
- Fallone, G., Acebo, C., Seifer, R., and Carskadon, M. A. (2005) Experimental restriction of sleep opportunity in children: Effects on teacher ratings. *Sleep*, 28. 1561-1567.
- Frith, U. (2003). *Autism: Explaining the Enigma*. Oxford: Blackwell Publishing
- Goodman, R. (2001). Psychometric properties of the strength and difficulties questionnaire. *Journal of the American Academy of Child and Adolescent Psychiatry*, 40. 1337-1345.
- Goodman, R. (2005). Strength and Difficulties Questionnaire. Downloaded, December 10<sup>th</sup> 2007 from, <http://www.sdqinfo.com>
- Gray, C. (2000). *The New Social Story Book: Illustrated Edition*. Arlington: Future Horizons Inc
- Gray, C. (2007). *How to write social stories*. Retrieved December 10,

- 2007 from, <http://www.thegraycenter.org>
- Gray, C. (2008). *Social Stories*. Retrieved August 14, 2008, from <http://www.thegraycenter.org>
- Gray, C. A., & Garand. J. (1993). Social stories: Improving responses of students with autism with accurate social information. *Focus on Autistic Behaviour, 8*, 1-10.
- Gray, C. and White, W. L. (2001). *My Social Stories Book*. London: Jessica Kingsley Publishers.
- Gregory, A. M., Rijdsdijk, F. V., and Eley, T. C. (2006). A twin-study of Sleep difficulties in school-aged children. *Child Development, 77*. 1668-1679
- Happe, F. G. E. (1994). An advanced test of theory of mind: understanding of story characters' thoughts and feelings by able autistic, mentally handicapped, and normal children and adults. *Journal of Autism and Development Disorders, 24*. 129-154.
- Hiscock, H., and Wake, M. (2002). Randomised controlled trial of behavioural infant sleep intervention to improve infant sleep and maternal mood. *British Medical Journal, 324*. 1062-1065.
- International Classification of Sleep Disorders, Revised, (2001)*. Westchester: American Academy of Sleep Medicine.
- International Classification of Sleep Disorders, second edition (2005)*. Westchester: American Academy of Sleep Medicine.
- Iannelli, V. (2007). *Childhood Sleep Basics*. Retrieved August 14, 2008, from [www.pediatrics.about.com/od/sleep](http://www.pediatrics.about.com/od/sleep)
- Jeffery, A. (2006). An Evaluation of Social Stories as an Effective



- Intervention for Children who have a Behavioural Difficulty.  
Unpublished MSc dissertation. Southampton University, UK.
- Kheirandish, L. and Gozal, D. (2006). Neurocognitive dysfunction in children with sleep disorders. *Developmental Science*, 9. 388-399.
- Lam, P., Hiscock, H., and Wake, M. (2008). Outcomes of Infant Sleep Problems: A Longitudinal Study of Sleep, Behaviour, and Maternal Well-Being. *Pediatrics*, 111. 203-208.
- Lichstein, K. L., Stone, K. C., Donaldson, J., Soeffing, J. P., Murray, D., Lester, K. W., and Aguillard, R. N. (2006). Actigraphy Validation With Insomnia. *Sleep*, 29, 232-239.
- Mindell, J. A. (1999). Empirically supported treatments in pediatric psychology: Bedtime refusal and night waking in young children. *Journal of Pediatric Psychology*, 24. 465-481.
- Mindell, J. A. and Durand, V. M. (1993). Treatment of childhood sleep disorders: generalisation across disorders and effects on family members. *Journal of Pediatric Psychology*, 18. 731-750.
- Mindell, J. A., Kuhn, B., Lewis, D. S., Meltzer, L. J., and Sadeh, A. (2006). Behavioural treatment of bedtime problems and night wakings in infants and young children. *Sleep*, 29, 1263-1276.
- Moore, P. S. (2004) The use of social stories in a psychology service for children with learning disabilities: a case study of a sleep problem. *British Journal of Learning Disabilities*, 32. 133-138.
- Moore, B. E., Friman, P. C., Fruzzetti, A. E., and MacAleese, K. (2007). Brief Report: Evaluating the bedtime pass program for child

- resistance to bedtime – a randomised, controlled trial. *Journal of Pediatric Psychology*, 32. 283-287.
- Moore, M., Meltzer, and Mindell, J. A. (2008) Bedtime problems and night wakings in children. *Primary Care Clinics in Office Practice*, 35. 569-581.
- Morgenthaler, T. I., Owens, J., Alessi, C., Boehlecke, B., Brown, T. M., Coleman, J., Friedman, L., Kapur, V. K., Lee-Chiong, T., Pancer, J., and Swick, T. J. (2006). Practice parameters for behavioural treatment of bedtime problems and night wakings in infants and young children. *Sleep*, 29. 1277-1281.
- Morris, E. (2001). *Special Educational Needs Code of Practice*. London: DfES
- Owens, J. L., France, K. G., and Wiggs, L. (1999). Behavioural and cognitive behavioural interventions for sleep disorders in infants and young children: A review. *Sleep Medicine Reviews*, 3. 281-302.
- Owens, J. A. Spirito, A., and McGuinn, M. (2000a). The Children's Sleep Habits Questionnaire (CSHQ): Psychometric Properties of A Survey Instrument for School-Aged Children. *Sleep*, 23 1-9.
- Owens, J. A., Spirito, A., McGuinn, M., and Noble, C. (2000b). Sleep habits and sleep disturbance in elementary school aged children. *Journal of Developmental and Behavioural Pediatrics*, 21, 27-36.
- Paquet, J., Kawinska, A., and Carrier, J. (2007) Wake Detection Capacity of Actigraphy During Sleep. *Sleep*, 10. 1362-1369.
- Peterson, J and Peterson, M. (2003) *The Sleep Fairy*. Omaha: Behave'n Kids Press

- Petticrew, M., and Robers, H. (2003). Evidence, hierarchies, and typologies; horses for courses. *Journal of Epidemiology Community Health*, 56. 527-529
- Quach, J., Hiscock, H., Canterford, L., and Wake, M. (2009). Outcomes of child sleep problems over the school-transition period: Australian population longitudinal study. *Pediatrics*, 123. 1287-1292.
- Ramchandani, P., Wiggs, L., Webb, V., and Stores, G. (2007) A systematic review of treatment for settling problems and night waking in young children. *British Medical Journal*, 320. 209-213.
- Rapee, R. M., Abbott, M. J., and Lyneham, H .J. (2006). Bibliotherapy for children with anxiety disorders using written materials for parents: a randomised controlled trial. *Journal of Counselling and Clinical Psychology*, 74. 436-444
- Reynhout, G., and Carter, M. (2006). Social stories for children with disabilities. *Journal of Autism and Developmental Disorders*, 36, 445-469.
- Rickert, V. I., and Johnson, C. M. (1988). Reduced awakening and crying episodes in infants and young children: A comparison between scheduled awakenings and systematic ignoring. *Pediatrics*, 81. 203-212.
- Rowe, C. (1999). Do social stories benefit children with autism in mainstream primary schools? *British Journal of Special Education*, 26. 12-14.
- Rust, J. and Smith, A. How should the effectiveness of Social Stories to modify the behaviour of children on the autistic spectrum be tested? Lessons from the literature. *Autism*, 10. 125-138.
- Sadeh, A. and Acebo, C. (2002). The role of actigraphy in sleep

- medicine. *Sleep Medicine Reviews*, 6. 113-124.
- Sadeh, A., Gruber, R., and Raviv, A. (2003). The effects of sleep restriction and extension on school-age children: What a difference an hour makes. *Child Development*, 74. 444-455.
- Sadeh, A., Sharkey, K. M. and Carskadon, M. A. (1994). Activity-based sleep-wake identification: An empirical test of methodological issues. *Sleep*, 17. 201-207.
- Sansosti, F. J., Powell-Smith, K. A., and Kincaid, D. (2004) A Research Synthesis of Social Story Interventions for Children with Autism Spectrum Disorders. *Focus on Autism and Other Developmental Disabilities*, 19. 194-204
- Scattone, D., Wilcznski, S. M., Edwards, R. P., and Rabian, B. (2002). Decreasing disruptive behaviours of children with autism using social stories. *Journal of Autism and Developmental Disorders*, 32. 535-543.
- Seymour, F. W., Brock, P., During, M., and Poole, G. (1989). Reducing sleep disruptions in young children: Evaluation of therapist-guided and written information approaches: A brief report. *Journal of Child Psychology and Psychiatry*, 30. 913-918.
- Shang, C., Gau, S. S., and Soong, W. (2006). Association between childhood sleep problems and perinatal factors, parental mental distress and behavioural problems. *Journal of Sleep Research*, 15, 63-73.
- Shotton, G. (2004). Therapeutic Stories: Writing stories to help troubled and troubling children. Merseyside: Positive Behaviour

## Management

- Smedje, H., Broman, J. E., and Hetta, J. (2001) Associations between disturbed sleep and behavioural difficulties in 635 children aged six to eight years: a study based on parents' perceptions. *European Child and Adolescent Psychiatry*, 10. 1-9.
- Smith, C. (2001). Using social stories to enhance behaviour in children with autistic spectrum difficulties. *Educational Psychology in Practice*, 17. 337-345.
- Stein, M. A., Mendelsohn, J., Obermeyer, H., Amromin, J., and Benca, R. (2001). Sleep and behaviour problems in school-aged children. *Pediatrics*, 107, 1-9
- Thiedke, C. C. (2001). Sleep disorders and sleep problems in childhood. *American Family Physician*, 15. 277-284
- Thiemann, K. S., and Goldstein, H. (2001). Social stories, written text cues and video feedback; Effects on social communication of children with autism. *Journal of Applied Behaviour Analysis*, 34. 423-446.
- Touchette, E., Petit, D., Seguin, J., R., Bovin, M., Tremblay, R., E., Montplaisir, J. Y. (2007). Associations between sleep duration Patterns and behavioural/cognitive functioning at school entry. *Sleep*, 30. 1213-1219.
- Toplis, R. & Hadwin, J. A. (2006) Using social stories to change Problematic Lunchtime behaviour in school. *Educational Psychology in Practice*, 22, 53-67
- Wimmer, H., and Perner, J. (1983). Beliefs about beliefs: representation and constraining function of wrong beliefs in young children's

understanding of deception. *Cognition*, 13. 103-128.

Whitehead, J. (2007). Telling It Like It Is: Developing Social Stories for Children in Mainstream Primary Schools. *Pastoral Care*. 35-41.

Zimbelman, M., Paschal, A., Hawley, S. R., Molgaard, C. A., and St.Romain, T. (2007) Addressing physical inactivity among developmentally disabled students through visual schedules and social stories. *Research in Developmental Disabilities*, 28. 386 396.

Zipora, S. (2006). The contribution of bibliotherapy to the counselling of aggressive boys. *Psychotherapy Research*, 16. 631-636.