MANAGEMENT OF SLEEP PROBLEMS IN PRESCHOOLERS

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Abstract

There is minimal research into behavioural interventions for typically developing preschoolers (2-5 years of age) with sleep problems. Often these children are not considered as a distinct developmental group and are incorporated into sleep intervention studies for infants or school-aged children. Yet preschoolers do differ in their language, social and cognitive abilities. The present study examines an intervention tailored to the developmental abilities of four preschool children with sleep problems. It utilised positive reinforcement in order to create a less restrictive intervention than those based on extinction alone. This was combined with a range of other behavioural strategies such as parental presence, standard and graduated extinction to reduce a variety of sleep problems. Problems targeted included bedtime refusal, co-sleeping, night waking and a possible diagnosis of sleep terrors. Behavioural interventions effectively reduced sleep problems in all four participants. Parental report demonstrated acceptance of strategies implemented and satisfaction in intervention outcomes.
CHAPTER 1

Introduction

Sleep Disturbance

It is well documented that approximately 30% of preschoolers have a sleep problem (Krakowiak, Goodlin-Jones, Hertz-Picciotto, Croen, & Hansen, 2008). The most common of those reported by parents of preschoolers are bedtime resistance and night waking, (Kuhn & Elliott, 2005; Owens, Palermo, & Rosen, 2002; Palmstierna, Sepa, & Ludvigsson, 2008).

Sleep, as an essential part of life, aids cognitive, social, emotional and physical growth and development. Sleep reviews indicate that long term sleep problems can affect children in their cognitive functioning, social interactions, and executive functioning, as well as affecting other people in the child’s environment (Owens et al, 2002; Palmstierna et al, 2008; Mindell, Kuhn, Lewin, Meltzer & Sadeh, 2006; Kuhn & Weidinger, 2000). Parents of children with sleep problems report higher levels of depression, stress, irritability, and marital conflict. (Ramchandani, Wiggs, Webb, & Stores, 2000) Many common family behavioural interventions available for children with sleep problems target both parent, and child behaviours.

Sleep problems occur in a continuum of severity, ranging from normal to pathological (Owens, 2007), which are classified into two categories: dyssomnias and parasomnias. Dyssomnias are problems that are central to the timing or quality of
sleep such as sleep onset delay and night waking. Parasomnias are when a person’s physiology or behaviour is affected by sleep, the sleep state, or the transition from sleep to wake, including sleep terrors and somnambulism. Intrinsic and extrinsic factors contribute to sleep problems. Extrinsic refers to environmental influences such as parental responses. Intrinsic refers to biological influences such as reflux or milk intolerance. A primary sleep problem has been present from birth, whereas a secondary sleep problem has developed subsequent to a period of non-problematic sleep behaviour. Parental sleep expectations are shaped by experiences, parenting practices, and cultural or ethnic beliefs. One parent may attribute a behaviour to a developmental phase while another parent may view it as a sleep problem.

Typically Developing Preschoolers

A number of reviews in sleep literature consider sleep problems, their impact, and a variety of successful methods for their treatment (Kuhn & Elliott, 2003). Most interventions considered in reviews are for sleep problems in children with developmental delays, and in infants. Typically developing preschoolers feature as an extension of either infant or childhood treatment studies. Few reviews have considered interventions in preschoolers as a distinct group. Yet development in the preschool period differs from infants and older children as they have begun to acquire limited language and to expand on basic cognitive principles such as emotions, concepts and categories.
Basis for Literature Review

This research is focused on typically developing preschoolers aged between 2-5 years with a sleep problem. Children of this age commonly present with sleep problems such as resistance to settling, night waking, and parasomnias. The number of preschoolers presenting with sleep problems highlights the need for developmentally appropriate interventions. This literature review will examine sleep, sleep problems, and interventions as they pertain to the needs of typically developing preschoolers.

Research presented in 1989 (France) reviewed prevalence and persistence, along with individual, parental and environmental factors associated with infant sleep and sleep problems. It also summarised intervention procedures implemented with infants. A number of intervention studies reviewed, included preschool aged children in the participant groups. France (1989) discusses the need for developmentally appropriate interventions and addresses the notion that preschoolers are developmentally distinct from infants in their cognitive functioning and language ability. Therefore they require research and interventions that are at a developmentally appropriate level. The current review will continue from the conclusion of France (1989) and explore how sleep literature for typically developing preschoolers has advanced in the last 20 years.
CHAPTER 2

LITERATURE REVIEW

Typical Development of Preschoolers

It is generally recognised that by 2 years a preschooler will be able to use mental representations and symbols; understand object permanence; and form concepts and categories (Papalia, Olds, & Feldman, 2006). They have developed self-awareness which includes the emotions of embarrassment, envy, and empathy, and the early stages of shame and guilt. These emotions continue to develop through the preschool years. Negativism peaks at around 3 years along with temper tantrums; these have declined by 6 years.

Preschoolers have a growing ability to correctly read other people’s emotions, mental states, and intentions (Papalia et al, 2006). They will be demonstrating helping behaviours and wanting autonomy. The development of autonomy may exacerbate bedtime refusal and curtain calls (France & Blampied, 1999), as is reflected in the common sleep complaints from parents. Pro-social behaviour increases, in particular motivation to earn praise and avoid disapproval, this aids the effectiveness of a positive reinforcement based program.

Development in school aged children builds on learning during preschool years, including positive self-concept and gender consistency. The rigid moral
reasoning of a preschooler becomes more flexible. Theory of mind matures along with abilities necessary for academic achievement such as, memorising, encoding, strategising, constructing and generalising information (Papalia et al, 2006). Thus the differences in capabilities infer that behavioural interventions should also differ in the expectation placed on the particular age-group of participants. In addition it confirms that preschoolers are developmentally distinct from infants or school-aged children.

Language development is the point of difference from infants emphasised in this study. A typical developmental trajectory suggests that a 2-year-old preschooler uses nouns and first-person pronouns, and acquires new nouns quickly. They talk in two-word sentences and begin to engage in conversations with others. Between the ages of 3-6 years children make rapid advances in vocabulary, grammar, and syntax. At 3 years a child is learning new words almost daily, can combine 3 or more words, and has good understanding of language. This language ability is distinct from infants who have no language and school aged children who have an estimated vocabulary size of 2,600 words and speech approximating that of an adult (Papalia et al, 2006). This implies that behavioural interventions with preschoolers can involve basic language expectations and good language comprehension. Thus preschoolers are developmentally able to have intervention procedures explained to them and be involved in the sleep programs.
Development of Sleep

Newborns sleep for approximately 16 hours a day, with sleeping through the night occurring between 3-6 months of age (France, Henderson & Hudson, 1996). Approximately 50% of children in their first or second years will resume night waking, often precipitated by events such as a holiday or illness (France et al, 1996). As children develop the proportion of night sleep increases, and day sleep decreases (Sadeh, Mindell, Luedtke, & Wiegand, 2009). For a 3 year old the average night sleep time is 10.5 hours with a 1.5 hour day-time sleep. Between 3-5 years daytime sleeps cease (Dahl, 1995; Mindell, 1999).

Sleep phases develop from birth. A newborn’s sleep is evenly distributed between rapid eye movement (REM) sleep and non-REM sleep state. As infants develop, the sleep state proportions change to one third REM and two thirds NREM by approximately 8 months (France & Blampied, 1999). REM is referred to as active sleep and NREM as quiet sleep.

Children experience a large amount of NREM sleep called Delta Sleep. Delta is a deep slow-wave sleep, stages 3 and 4 of NREM sleep (Dahl, 1995; Mindell, Owens & Carskadon, 1999). Slow-wave sleep occurs in the first 1-3 hours after sleep onset. It is typical for arousal to occur as NREM transitions to REM sleep (Anders & Eiben, 1997; Mindell et al, 1999). Therefore, preschoolers are more likely to experience parasomnias than younger and older children. As a child develops, the occurrence of some parasomnias decrease. This trend follows the development of
sleep cycles as they begin to approximate those of an adult. NREM sleep divides into distinct phases and REM sleep increases in the latter part of the night (France & Blampied, 1999).

As a child’s sleep transitions from one state to another, partial or full arousal may occur. This can also contribute to night waking, as well as to parasomnias. Partial arousals generally occur during transitions from NREM sleep, the child appears unaware they are awake and sleep resumes easily (Mindell et al, 1999). A full arousal can be from REM or NREM sleep. This is when signalling occurs by crying, or attracting attention, and the child has difficulty resuming sleep without intervention. A child’s ability to self soothe will determine if the waking becomes disruptive.

Parental responses to sleep change as infants develop. Breast or bottle feeding, rocking, and holding the infant during sleep initiation decrease, while leaving infants to fall asleep alone, or crying in a cot, plus the use of verbal comfort increases (Sadeh, et al 2009). One study found parental presence during sleep onset declined from 47% at 2 years old to 24% at 4 years old (Gaylor, Burnham, Goodlin-Jones, & Anders, 2005). Sleeping in a separate room increases in the first 18 months, and then remains constant. Further, the use of an established bedtime routine increases over the first two years (Sadeh et al, 2009).
Sleep Problems Defined

Sleep problems can be primary or secondary. A secondary sleep problem occurs subsequent to a precipitating factor. The precipitating factor may be an event or circumstance, psychosocial or biological, for example illness or injury. Psychosocial factors include stressful life events or disruptions to family circumstances (France & Blampied, 1999).

The Diagnostic and Statistical Manual (DSM-IV-TR, 2000) include under parasomnias: Nightmare Disorder, Sleep Terror Disorder, and Sleepwalking Disorder. Included under dyssomnias is: Primary Insomnia, Primary Hypersomnia, Narcolepsy, Breathing-Related Sleep Disorder, and Circadian Rhythm Sleep Disorder. Common sleep problems often don’t require a formal diagnosis. Behaviours such as bedtime resistance, sleep onset delay, night awakening, and co-sleeping can be primarily attributed to dyssomnias, however on occasion they co-occur with parasomnias. These classifications will be discussed as they apply to preschoolers.

Dyssomnias manifest in problem behaviour such as difficulty initiating sleep, excessive sleepiness, and maintaining sleep (Owens, France, & Wiggs, 1999). Sleeplessness includes behaviours such as bed-time resistance, difficulty settling, and night waking. Initiating and maintaining sleep include behaviours such as sleep onset delay and night waking. Night-time Fears involve behaviours such as co-sleeping, distress or agitation when entering their parent’s room, and the use of night-lights (Owens et al, 1999).
Parasomnias include sleep terrors, confusional arousals, somnambulism and nightmares. Confusional arousals, somnambulism and sleep terrors are all arousal disorders (Owens et al, 1999; Mindell et al, 1999) which represent a continuum of behaviours, from confusional arousal to sleep terrors. Somnambulism includes sleep-talking and sleep-walking (Owens et al, 1999).

Below is a detailed description of common sleep behavioural disturbances in preschoolers, which contains summarised information from reviews published in the last 20 years (Anders & Eiben, 1997; Kuhn & Elliott, 2003; Kuhn, Mayfield, & Kuhn 1999; Mindell, 1993; Mindell et al, 1999; Mindell et al, 2006).

Dyssomnias

*Limit-setting sleep disorder*— This disturbance is when a child has difficulty in initiating sleep and typically involves stalling or refusing to go to bed. It includes difficulties with parental limit-setting such as lack of a bed-time or bed-time routine. The behaviours may also be referred to as bedtime refusal or bedtime resistance and involve calling out, wanting a drink, the toilet, getting out of bed, crying, clinging, refusing to go to bed, and attention-seeking behaviours. These behaviours are commonly referred to as ‘curtain calls’ and primarily seen in preschool children.

*Sleep onset association disorder*— This disturbance occurs when sleep onset is impaired by the absence of a certain set of objects or circumstances. For preschoolers this can be a bottle or pacifier, the presence of a parent, or being rocked to sleep. When the factors are present sleep onset is normal for the child. However
when they are absent there is delayed sleep-onset and night waking becomes disruptive. As discussed, night waking is typical however for children where night waking has become disruptive the same set of objects or circumstances is needed for sleep to resume. Thus night disturbances happen when a child wakes and the factors they need to resume sleep aren’t available. Consequently they signal causing disruption to parent’s sleep. Sleep resumes once the factors are present. The prevalence of this disturbance decreases after age 3 years, however for some children it can be maintained well into childhood.

*Night Waking* – This is a problem that many parents complain about and appears as dyssomnia behaviour. Night waking often results in co-sleeping, as parents find this the easiest way to resolve night disruption. This is reactive co-sleeping and results in regular complaints from parents.

**Parasomnias**

*Confusional arousals* – These are defined by confusion during arousals from NREM sleep. The child will show slower responses and speech to commands or questions. Parents may mistakenly assume their child is awake, this occurs in nearly all children before age five.

*Sleep terrors* – Also known as night terrors and are characterised by a sudden intense arousal from sleep with a cry or piecing scream, this may include sitting up and an appearance of fear. In addition there can be signs of hyper-arousal such as a
pounding heart, dilated pupils and extremely agitated movements (Dahl, 1995). The child can be hard to wake and unresponsive to soothing.

Sleepwalking – Is most common in children between the ages of 4 and 8 years. The behaviour can range from sitting up in bed to walking around. Sleep walking varies in frequency from a one off incident to weekly or near nightly occurrences.

The above three parasomnias are partial arousal parasomnias. Once woken the child is not able to recall any of the events. Commonly there is a familial history of partial arousal disorders (Mindell et al, 1999). Parents can find a confusional arousal event distressing, particularly in the event of a sleep terror (Owens et al, 1999; Mindell et al, 1999). They typically occur in the first third of the night during NREM sleep and are more common in young children. Children tend to grow out of this after adolescence due to a decline in delta sleep and the development of approximate adult sleep states (Mindell et al, 1999).

Nightmares – These are frightening dreams that cause full arousal. They occur in approximately 10%-50% of children aged 3-6 years old (Mindell, 1999). Typically a nightmare occurs in REM sleep and involves a distressing dream followed by sudden waking with manifestations of intense fear or anxiety. Children are usually alert upon waking, recall details of their dream and can have difficulty returning asleep.
Although the initial observable behaviours of a nightmare are similar to those of sleep terrors, differentiation can be made between the two parasomnias by comparing child behaviour responses and timing. As opposed to sleep terrors, nightmares occur during REM sleep, typically in the last half of the night. With sleep terrors children are unresponsive and have no recollection whereas a child who experiences a nightmare will be fully aroused afterwards and be able to recall detail (Kuhn & Elliot, 2003).

Research suggests that the percentage of children with sleep problems reduces with age. The longitudinal perspective shows that night waking problems decrease, while sleep schedule and sleep onset problems increase or remain constant (Gaylor et al, 2005; Palmstierna et al, 2008; Scher, Zukerman, Epstein, 2005).

Parental opinion differs as to what constitutes sleep problems. This can be due to cognitions about sleep, expectations of their children and cultural influences, and the child’s developmental stage (Ander & Eiben, 1997; Goodlin-Jones, Tang, Liu, Anders, 2009). Culturally, in many non-western communities it is common for young children to co-sleep with parent’s or siblings.

As previously discussed bedtime resistance and night waking are the most common complaints from parents of preschoolers (Dahl, 1995; Kuhn & Elliott, 2003; Kuhn et al, 1999). Studies have found that sleep problems present in infants tend to persist into preschool and school aged children (Fricke-Oerkermann et al, 2007; Kuhn
et al, 1999; Mindell et al, 2006; Owens, 2007; Palmstierna et al, 2008; Ramchandani et al, 2000; Sadeh 2005). This persistence is both negative and positive in that children without sleep problems are more likely to remain without sleep problems (Thome & Skuladottir, 2005).

Effects of Sleep Problems

Sleep literature indicates that sleep problems are associated with maternal depression, marital discord, disruption of parental sleep and consequently parental fatigue (France et al, 1996). Sleep problems have an adverse effect on the child’s development, well-being, and on others in the child’s environment.

The Child

Researchers concur that sleep disruption and/or not enough sleep can affect the child’s cognitive development such as learning, memory, and executive functioning (Owens, 2007; Tse & Hall, 2007). It can affect mood regulation such as irritability; and self-regulation. Attention and behaviour are affected, which can lead to aggression, hyperactivity, inattention, distractibility, increased day-time sleepiness and poor impulse control (Mindell et al, 1999). The behavioural symptoms of sleep problems can be misdiagnosed as symptoms of Attention Deficit Disorder (Goll & Shapiro, 2006; Owens, 2007; Montgomery-Downs, Jones, Molfese, & Gozal, 2003). One study found that a higher sleep problem score at age 3 years predicted a higher aggression score at 4-years-old (Hall, Zubrick, Silburn, Parsons, & Kurinczuk, 2007).
A preschooler with persistent sleep difficulties is more likely to have behavioural problems.

Children who have disturbed sleep are associated with having cognitive and verbal impairment (Krakowiak et al 2008; Mindell et al, 1999). This can affect a child's school achievement (Palmstierna et al, 2008). School achievement is linked with social, occupational and financial indicators of success in life (Montgomery-Downs et al, 2003). Thus, the earlier intervention of sleep disruptions begins, the more likely the child is to achieve academically. Sleep problems can lead to health difficulties with affects on metabolic, immune, and cardiovascular systems, and increased accidental injuries (Mindell et a, 2006; Kuhn & Elliott, 2003; Owens, 2007).

Others Sharing the Child’s Environment

Child sleep problems have been found to impact parental marital relationships, family functioning, relationships between other family members, and familial stress. Owing to their child’s lack of sleep parents and caregivers may be suffering from lack of sleep that in turn affects functioning at work, mood, parent-child relationships and stress management (Mindell et al; 1999; Owens, 2007). Parents report higher rates of maternal depression, irritability, and marital conflict (Hall et al, 2007). Many studies report parents feel lower stress and depression levels post-intervention (Eckerberg, 2004; Wade, Ortiz, & Gorman, 2007).
How Sleep Problems Develop

France & Blampied (1999) suggest three separate processes where sleep problems may develop. The first is if the infant doesn’t learn to self initiate sleep without parental presence. The second is when the infant has failed to settle through the night by the suggested age of 6 months. The third is a secondary sleep disturbance, where the infant may be disrupted by either extrinsic or intrinsic events such as illness or moving house.

A number of parenting variables have been associated with sleep problems, in particular dyssomnias, and include the behavioural management of disruptive behaviours. Johnson and McMahon (2008), report that 20% of children have assistance in falling asleep. Children who do not fall asleep alone are more likely to wake during the night.

Johnson and McMahon (2008) attempted to identify how different parental behaviours help the development of night-time self-regulation in preschoolers. The results show that less authoritative parents, and parents who experience more problematic sleep-related cognition, interact more actively with their child at bedtime. Consequently the increased parental interaction at bedtime is linked with child sleep problems. Thus lax parenting can be associated with sleep problems (Hall et al, 2007; Scher et al, 2005). The results of Johnson & McMahon’s (2008) research give reasons as to why, when setting up a sleep intervention, consideration of the parent(s) sleep related cognitions and behaviours is important.
France et al (1999) integrates the behaviours surrounding sleep problems into Patterson's Coercion Theory, also known as a behaviour trap. A behaviour trap is where parent and child get caught in a pattern of reinforcing behaviour to avoid the aversive affects of removing reinforcing responses. In the case of night waking; the child cries upon waking. This is a signal to a parent to elicit the response which will aid the child to resume sleep. A common parental response is reactive co-sleeping. The parent lies with the child until they go to sleep; consequently the parent is reinforced for their behaviour by the onset of sleep in their child, and the child is reinforced for crying out by the presence of their parent.

The repetition of child signalling, parental attention and consequent resumption of sleep create a behaviour trap (France & Blampied 1999). An attempt to escape from this trap creates aversive consequence for both parent and child. For example, should the child signal and the parent choose not to respond, the child's signal may intensify and they will find it difficult to resume sleep. This is aversive to the child as they cannot resume sleep and aversive to the parent as the child continues to cry. Consequently, the attempt to exit the trap is aborted and the pattern of behaviour continues on both the parent and the child's part. Each time a response change fails and the original response continue, it is intermittently reinforcing the original behaviour, thus firmly establishing the behaviour trap.

France et al (1996) suggests that behaviour traps develop because parents do not understand the central facts of infant sleep and behaviour. Parental response to infants may unintentionally set up sleep problems. It is common for sleeplessness to
be a result of overtiredness; incorrect expectations from parents can result in this (France et al., 1996). To achieve their expectation parents may cut out afternoon sleeps or put the child into bed later with the intention that they will sleep through the night. In infancy overtiredness may come from over-stimulating parental attention. Parents are reinforced for their stimulating bedtime routine because their child falls asleep. However this is due to overstimulation rather than an effective sleep initiating procedure (France et al., 1996).

Parents of children with sleep problems tend to respond more frequently to night waking and are likely to use wider and differing management techniques from those used by parents of non-sleep-disturbed children (Thome & Skuladottir, 2005; France & Blampied, 1999; Sadeh et al., 2009). These techniques include putting infants to bed asleep, staying with infants until they fall asleep, taking the child into their own bed, and using stimulating rituals. In addition Gaylor et al., (2005) found that cot location in the parent's room at 12 months was related to co-sleeping at 2, 3, and 4 years old. However it was not stipulated whether the co-sleeping was reactive or parent choice.

Parental exhaustion, depression and anxiety can maintain sleep problems (Owens, 2007; Johnson & McMahon, 2008). Parental conflict has also been found to increase potential for a sleep problem at age 3 years (Hall, Zubrick, Silburn, Parsons & Kurinczuk, 2007).
Other variables associated with disruptive sleep are infant illnesses or allergies, airway obstructions, food intolerances, reflux, difficult temperament, and parent-child anxious attachment. These factors affect the infant's ability to self-sooth, and sleep through the night (Owens, 2007). Having been breast fed was not predicative of sleep problems however children who were still breast feeding at 1 year had a higher sleep problem score at 3 years than those who had been weaned (Hall et al, 2007).

Infant temperament is another variable in the development of sleep problems, which is associated with lower sleep quality and more frequent waking (Owens, 2007; Scher et al, 2005; Palmstierna et al, 2008). Difficult temperament includes increased levels of crying, high irritability, and low adaptability and mood (France & Blampied, 1999). Parents of infants with difficult temperaments may have increased opportunities to enter into a behaviour trap as exasperation over prolonged crying or infant fussiness may lead to over stimulation of infants in an attempt to manage them. Parents may engage in behaviours that do not promote self-regulation and soothing, such as low latency in responding. Non-self soothing at 6 and 9 months is associated with sleep onset difficulties at 2 years old (Gaylor et al, 2005).

Stressful and traumatic events such as abuse, natural disasters and life transitions can affect both dyssomnia and parasomnia sleep problems. Nightmares are common in young children after a natural disaster (Mindell et al, 1999).
Separation anxiety and night time fears also contribute to sleep problems. Fearing the dark is developmentally typical for preschool children and can affect sleep onset. This fear can be a learned condition as comfort may be associated with light. For example, a night waking precipitated by a nightmare is associated with darkness, when a parent responds they may turn the light on, hence the association of light with comfort (Mindell et al, 1999). Separation anxiety peaks in toddlers and can therefore be a developmental explanation for increased parental complaints of nighttime fears, night waking and delayed sleep onset (Owens, 2007).

In summary, all children wake through the night as a result of sleep cycles. Night waking is not the issue per se; it is the level of disruption and responding that impacts sleep patterns and problems. Sleep problems involve some or all learned behaviours, hence behavioural modification strategies will be affective in resolving them. Sleep is a reinforcer for both parent and child (France, Blampied, & Henderson, 2003), when a child has undisturbed sleep so does the parent. A successful sleep intervention will not only improve the entire family’s sleep but will aid the parent in developing behavioural management strategies that can potentially be generalised for use with daytime behaviour (Owens, 2007). It will educate parents about their child’s sleep, (especially in the case of parasomnias), the importance of their responses, (especially for dyssomnias), and teach the child appropriate replacement behaviours to aid sleep onset and resumption.
Interventions

Various pharmacological sedatives have been prescribed by paediatricians to children for sleep problems. This is commonly discouraged by sleep experts, due to the lack of long-term efficacy, side effects, and withdrawal symptoms (Kuhn & Weidinger, 2000). Sleep researchers agree that the varieties of behavioural interventions available are more effective and successful than medicating, particularly in long-term maintenance of behaviour change. Also they are more acceptable to parents (Dahl, 1995; France 1993; Kuhn & Weidinger, 2000; Mindell et al, 2006; Ramchandani et al, 2000). Due to this reasoning, behavioural interventions will be the focus of this review.

Behavioural Interventions

There are several established behavioural interventions to treat sleep problems. Behavioural intervention applies the principles of learning theory to bring about change in both the parent and child’s behaviour and responses. The interventions for sleep problems in preschoolers involve making parents the active agent of change to address their child’s problems (Mindell et al, 2006).

Ideally a sleep intervention will be personalised to the child and their family's needs. If necessary a combination of techniques may be incorporated into a treatment program to provide a least restrictive option of treatment, this involves planning intervention programs that maximize the positive (reinforcement) and
minimize the negative (extinction), and choosing less stressful options (France, Blampied & Henderson, 2008). As children develop, alternative options of intervention procedures become more viable and these options are less restrictive than those implemented with infants, such as positive reinforcement combined with extinction. In addition, an effective behavioural intervention must address the specific underlying causes of the sleep disturbance. This pertains to the classification of the sleep problems as they represent varying etiologies while sharing some symptoms (Owens et al, 2002). In addition to long-term effectiveness, an advantage of behavioural based interventions is the potential to be generalised to management of daytime behaviours (Mindell et al, 2006, Sadeh, 2005).

A search was conducted using psychology databases to locate all sleep interventions designed for typically developing preschoolers aged between 2-5 years since 1989. Search terms such as, sleep, sleep disorders, sleep problems and interventions, were used. Resulting articles were reviewed and reference lists checked for further relevant articles. The search revealed three behavioural intervention studies from the past twenty years that fit the criteria, these results are in Table 1. In addition the search revealed a number of other behavioural intervention studies that included participants between 2 and 5 years old alongside other groups of typically developing infants or school-aged children, these results are in Table 2. The findings have confirmed initial discussion that there is very little sleep intervention literature targeting this developmental group. Further, it confirms that preschoolers are commonly incorporated into studies addressing sleep problems with children and infants of differing developmental levels (Table 2).
<table>
<thead>
<tr>
<th>Parental Acceptance</th>
<th>Positive Recommendation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Examination</td>
<td>Examination</td>
</tr>
<tr>
<td>Avoidance</td>
<td>Avoidance</td>
</tr>
<tr>
<td>Consultation</td>
<td>Consultation</td>
</tr>
<tr>
<td>Presence</td>
<td>Presence</td>
</tr>
<tr>
<td>Frequency</td>
<td>Frequency</td>
</tr>
<tr>
<td>Duration</td>
<td>Duration</td>
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</table>

<table>
<thead>
<tr>
<th>Prevention</th>
<th>Prevention</th>
</tr>
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<tbody>
<tr>
<td>Education</td>
<td>Education</td>
</tr>
<tr>
<td>Bedtime</td>
<td>Bedtime</td>
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<tr>
<td>Sleep</td>
<td>Sleep</td>
</tr>
<tr>
<td>Safety</td>
<td>Safety</td>
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<tr>
<td>Medication</td>
<td>Medication</td>
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<tr>
<td>Monitoring</td>
<td>Monitoring</td>
</tr>
<tr>
<td>Enforcement</td>
<td>Enforcement</td>
</tr>
<tr>
<td>Response</td>
<td>Response</td>
</tr>
<tr>
<td>Development</td>
<td>Development</td>
</tr>
<tr>
<td>Evaluation</td>
<td>Evaluation</td>
</tr>
</tbody>
</table>

Table 1. Interventions specifically designed for typically developing preschoolers between 2 and 5 years of age.
<table>
<thead>
<tr>
<th>Event</th>
<th>Sleep Measure</th>
<th>Recency of Sleep Measure</th>
<th>Recency of Sleep Measure</th>
<th>Recency of Sleep Measure</th>
<th>Recency of Sleep Measure</th>
<th>Recency of Sleep Measure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nighttime Naps</td>
<td>Multiple Baseline</td>
<td>6-9 yrs</td>
<td>Multi-phase Baseline</td>
<td>6-9 yrs</td>
<td>Multi-phase Baseline</td>
<td>6-9 yrs</td>
</tr>
<tr>
<td>Nighttime Naps</td>
<td>Single Session</td>
<td>6-9 yrs</td>
<td>Multi-phase Baseline</td>
<td>6-9 yrs</td>
<td>Multi-phase Baseline</td>
<td>6-9 yrs</td>
</tr>
<tr>
<td>Bedtime Routine</td>
<td>Sleep Diary</td>
<td>6-9 yrs</td>
<td>Multi-phase Baseline</td>
<td>6-9 yrs</td>
<td>Multi-phase Baseline</td>
<td>6-9 yrs</td>
</tr>
<tr>
<td>Bedtime Routine</td>
<td>Sleep Diary</td>
<td>6-9 yrs</td>
<td>Multi-phase Baseline</td>
<td>6-9 yrs</td>
<td>Multi-phase Baseline</td>
<td>6-9 yrs</td>
</tr>
<tr>
<td>WakeOUT Project</td>
<td>Sleep Diary</td>
<td>6-9 yrs</td>
<td>Multi-phase Baseline</td>
<td>6-9 yrs</td>
<td>Multi-phase Baseline</td>
<td>6-9 yrs</td>
</tr>
<tr>
<td>WakeOUT Project</td>
<td>Sleep Diary</td>
<td>6-9 yrs</td>
<td>Multi-phase Baseline</td>
<td>6-9 yrs</td>
<td>Multi-phase Baseline</td>
<td>6-9 yrs</td>
</tr>
</tbody>
</table>

Table 2: Interventions that include explicitly developing preschoolers aged between 2 and 6 years of age.
<table>
<thead>
<tr>
<th>Questionnaire</th>
<th>Child Behavior Checklist (CBCL), Sleep Habits Questionnaire (CSHQ), 24-Hour Sleep History</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Parental Influence</strong></td>
<td></td>
</tr>
<tr>
<td>- in sleep onset delays</td>
<td></td>
</tr>
<tr>
<td>- in bedtime behaviors</td>
<td></td>
</tr>
<tr>
<td>- in overall problem</td>
<td></td>
</tr>
<tr>
<td>- in disruptive sleep</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Group Condition</th>
<th>Group Session</th>
<th>Group Pre-Post-Hotline</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group 1</td>
<td>Single case</td>
<td>Hotline</td>
</tr>
<tr>
<td>Group 2</td>
<td>Single case</td>
<td>Hotline</td>
</tr>
</tbody>
</table>

| Table 2: Continued |
A number of reviews (France et al, 2003; Kuhn & Elliott, 2003; Kuhn & Weidinger, 2000; Mindell et al, 2006; Owens et al, 1999; Owens et al, 2002; Ramchandani et al, 2000; Sadeh, 2005) have collated information about behavioural intervention procedures used with preschoolers. These will be summarised beginning with the most widely used procedure, extinction.

**Extinction Procedures**

Extinction is a prominent, well-established theoretical technique used to manage sleep problems, most commonly in infants. Extinction involves removing attention from an undesirable behaviour which consequently results in a rapid reduction of the undesirable behaviour. There are several intervention procedures based on, or modifications of, extinction principles, these are; standard and graduated ignoring, minimal check, and parental presence.

Extinction has low parental acceptability. Parents often find the requirement to ignoring their crying child stressful and difficult to manage (Tse & Hall, 2007). Consequently the effectiveness of the intervention can be compromised as parents are less likely to follow the instructions and be consistent in their responses. Another unfavourable issue is the Post Extinction Response Burst (PERB). This term refers to the increase in behaviour before a more permanent decrease in behaviour occurs. PERB is a common occurrence in extinction interventions therefore, it is important for therapists to discuss the possibility of this with parents before the implementation of the intervention. PERB, as a point in an intervention, can be stressful for both
parents and child, as it can involve an intense response from the child such as a loud, lengthy crying.

Occasionally, a child who appears to have learnt a new behaviour or routine will revert back to the old behaviour or routine. This is called spontaneous recovering and may happen after any form of behaviour modification. Spontaneous recovering can be easily resolved by temporarily reinstating the behaviour management program and reinforcing desirable behaviour when it occurs.

**Standard Ignoring**

Standard ignoring, also described as unmodified systematic ignoring, applies to the pure form of extinction where the child is put to bed and all subsequent behaviour is not responded to. Although parents are not responding to their children during this procedure they are still monitoring for injury or illness. Advantages of this method are that learning is rapid, with the worst of the crying typically over within three days. When following the program parental responses are consistent and the opportunity for inadvertent reinforcement of behaviour is minimal (France et al, 1996). A disadvantage is low parental acceptance and subsequently low parental compliance. There can be resistance to follow through with the intervention due to stress levels related to letting the child cry and concern for child well-being.

**Graduated Ignoring & Minimal Check**

This procedure can work in two ways (Kuhn & Weidinger, 2000). Parents may wait for progressively longer periods of time before responding to the child, after 5mins, then 10mins, and then every 15mins until the child is quiet. Each subsequent
night of intervention the intervals between responding is increased by 5 mins. The second method of graduated ignoring is where parents respond immediately however the length of time they spend attending gradually decreases. This program may be more acceptable than standard ignoring. However the entering and leaving of parents from the bedroom may be a trigger for increasingly loud outbursts (France et al, 1996).

Ried, Walter and O'Leary (1999, see Table 2) compared standard and graduated ignoring procedures with a typically developing young children aged between 16-48 months. Parents in the standard ignoring group were told to give their child a warning, and return them to bed. If the child left the bed again they were returned and a pre-determined method was employed to keep the child in the room, such as closing the door, which remained shut until the child was asleep.

Parents in the graduated ignoring group were to return their child to bed if they left and given a warning. If they left again the door was held shut for a short interval. Each subsequent time this happened the door was shut for an increasingly longer period of time until the child stayed in bed, then the door was left open.

For both groups the parents were instructed to respond in the same way if the child woke during the night. The intervention procedures were explained to the children before the intervention began. Parents reinforced their children for a successful night using praise and small rewards.
Reid et al (1999) monitored the child’s behaviour via parental report and a daily parent rating on the child’s behaviour. Both procedures decreased disruptive settling and night waking behaviour. The mean weekly average rating from mothers indicated that the graduated procedure was more acceptable to parents and consequently had a higher rate of parental adherence. It is also important to note that families who dropped out had younger children and felt less confident in following the procedure. This implies that gaining parental acceptance of an intervention procedure is vital to its success. Two other notable points from Reid et al’s (1999) study is that the children were included in the intervention plan, and positive reinforcement was used in support of the extinction methods.

**Parental Presence**

This procedure is also based on extinction and is more acceptable to parents than a standard extinction program. Parental presence is where the parent lies in another bed in the child’s bedroom, while the child is settling or awake. The parent also sleeps in the child’s room. They provide no response to the child and return to their own bed after one week. (as described by Kuhn & Elliott, 2003; Sadeh, 2005). A variation of this method includes a fading procedure where parents begin in the room and slowly move further away from the child one night at a time. Hence the intensity of the parent’s presence is systematically decreased while the parental responses are eliminated as in a standard extinction procedure. An advantage of this method is lower levels of parental anxiety and infant crying (France & Blampied 2005). The procedure requires time-commitment from parents. This can be a disadvantage as
parents may not be willing, and some parents may find it stressful to listen to their child crying in such close proximity.

Eckerberg (2004) used a version of parental presence with a group of typically developing 4-45 month old infants and toddlers (see Table 2). Once the child was in bed, parents of toddlers (classified as 18+ months) were instructed to sit outside the room on a chair and return the child back to bed. Once the child achieved staying in bed while the parent sat on the chair, the parents were instructed to begin to leave the chair for increasingly longer periods of time during the settling process. During a night waking parents were instructed to behave in the same way as for settling.

Parents kept a sleep diary, recording their own and their child’s responses which aided the interpretation of the results. The intervention was successful in treating the sleep problems. At 1 and 3 month follow-ups, 92% and 94% of children had fewer night awakenings than pre-intervention. Post-intervention data shows an average increase of 33 minutes in total sleep time. From parental reports children were found to be more alert, secure, happy, and accommodating post-intervention.

Eckerberg (2004) incorporated measures to assess parental well-being. Pre-intervention mothers reported feeling more tired, depressed, and discouraged than fathers did. Post-intervention parents reported a better mood, feeling less tired, less depressed, and more hopeful.

Scheduled Awakenings
Scheduled awakening is a procedure to treat sleep problems and is specifically used in the case of parasomnias. It is only considered when there is a high frequency of partial arousals. The purpose of the procedure is to reset a child’s sleep cycles and smooth the transition between sleep phases, consequently reducing the occurrence of partial arousals. Scheduled awakening involves a parent pre-emptively waking the child 15-30 minutes before the typical time of awakening, then encouraging sleep to resume. This continues until a week passes with no incidents, then the scheduled awakening is reduced. This process continues until there are no scheduled awakenings and the child sleeps through a week with no night waking incidents (Byars, in Press). The procedure relies on that fact that generally a night terror will occur in the first third of the night and at a consistent time.

An advantage of this procedure is avoidance of unfavourable events such as PERB. A disadvantage is the commitment required from parents, particularly if the wake time is set after the parent’s bedtime. The procedure can take a long time before the child is sleeping through the night.

Scheduled awakening was used by Durand and Mindell (1999, see Table 2) with three typically developing children aged 5, 6 and 9 yrs. All three participants were experiencing night terrors. To track the participant’s behaviour, sleep charts were kept by the parents. These were important as the time of waking is scheduled using the baseline data. Durand and Mindell (1999) defined a scheduled awakening successful when the child did not wake with a sleep terror. Once a child achieved a week with no sleep terrors then the number of scheduled awakenings reduced for the
following week, until there are no night terrors. Thus the scheduled awakenings were faded out and the frequency of night terrors were significantly reduced. Parents found the intervention appropriate for treating their child's sleep problems and the amount of effort required reasonable.

**Positive Bedtime Routine**

The procedure of a positive bedtime routine intervention is to develop a relaxed routine associated with bedtime. The purpose of setting a bedtime routine is to teach the child appropriate bedtime behaviour and sleep onset skills; hence an association is learned between bedtime routine and sleep-onset. An advantage of positive bedtime routines is that it avoids lengthy crying. Owing to the positive nature, parents experience fewer bedtime struggles and reduced anxiety (Galbraith, Hewitt & Pritchard, 1993). This procedure does however require time commitment from parents.

A study by Galbraith et al (1993, see Table 2) use positive routines to treat 45 children aged between 5-72 months. Clients were encouraged to create a routine for the approach of bedtime that was filled with cues to sleepiness such as quiet table top activities and putting pyjamas on. Physical play and self-selected activities were discouraged as children inevitably chose less relaxing activities.

Results show that sleep-onset-delay and night awakenings were reduced and parents were satisfied with the treatment program. At follow-up, 62% of participants maintained improvement. Galbraith et al's (1992) study suggests that sleep problems
can be successfully treated without the use of a more restrictive applied behaviour analysis program. Had another method of behaviour modification been included to support the positive bedtime routine the treatment may potentially have had better long-term success.

A further study (Mindell & Durand, 1992, see Table 2) did just this and combined positive bedtime routine and graduated ignoring with successful results. Six young children (18-52 months) with sleep problems were treated consecutively for settling then night waking. The two phased intervention was structured to explore whether learned settling behaviour would generalise to night awakenings. A bedtime was established and then a 20-30 minute bedtime routine was instituted. The child was put to bed awake then a graduated ignoring procedure was implemented. For the first two nights responses were given from 5 minutes, then 10 minutes, and subsequently at 15 minute intervals. On nights 3-5, the parents responded after 10 minutes then at 15 minute intervals. From night 6 all responding occurred at 15 minute intervals. If the child left the bed/bedroom they were returned.

The study’s results show that for five of the six young children, the combined method reduced bedtime disturbances and night waking. With regard to the sixth child, the learned settling behaviour did not sufficiently generalise to night waking and a second phase of graduated ignoring was implemented to address this.

Parents collected data via sleep diaries. To validate adherence to the intervention plan bedtime routines were videotaped for each child. All children had
maintained new learned behaviour at follow-up. Mindell & Durand (1992) demonstrated that a combination of behaviour modification techniques is successful in intervening with young children’s sleep problems.

**Stimulus Control**

Stimulus control involves providing appropriate cues for sleep onset and routines that are associated with sleep. It can also pertain to manipulating aspects of sleep onset and routines as part of an intervention for disruptive sleep associated behaviours. Positive routine is a method of stimulus control along with response cost and bedtime fading.

Response Cost is based on the principle that keeping the child awake is aversive (Owens et al, 2002). If the child has not achieved sleep within the desired sleep onset time then the child is removed from bed and kept awake for a period of time then returned to bed. This procedure is repeated until sleep onset occurs within the desired time.

Bedtime fading requires a bedtime to be set when rapid sleep onset is likely to occur. The bedtime is then made successively earlier until a desired pre-determined bedtime is achieved (Owens et al, 2002).

Ashbaugh and Peck (1998) used a faded bedtime combined with response cost procedure to improve a typically developing 2 year old’s sleep problem (see Table 1). Baseline data was collected over 24 hour periods using a 15 minute partial-interval recording system.
The fading procedure consisted of adjusting the bedtime according to the onset of sleep the night before. The program began by computing the sleep-onset time from baseline and adding 30 minutes. If the child was asleep within 15 minutes of the bed time then the bed time the following night was scheduled 30 minutes earlier. If the child did not fall asleep within 15 minutes, then the bed time the following night was scheduled 30 minutes later. Once the intervention began the child was kept awake until the scheduled sleep time and was woken at the scheduled wake times.

The response cost was implemented when the child was not asleep within 15 minutes of the bedtime. It consisted of removing the child from bed and keeping the child awake for 30 minutes before returning to bed. This procedure was repeated until the child fell asleep within 15 minutes of being out of bed. When the child woke during the night and came to the parent’s bed, the child was returned to their own bed and told to go back to sleep.

Ashbaugh and Peck’s (1998) results support the effectiveness of faded bedtime combined with response cost. The procedures taught the child appropriate bedtime behaviours and improved the child’s sleep-wake cycle. This was maintained for nearly a year after the completion of the study.

Two further studies expanded on methods of stimulus control. Firstly, through the use of a social story (Burke, Kuhn & Peterson, 2004, see Table 2). A social story describes a social situation, incorporating relevant cues and desired responses (Gray
& Garand, 1993, cited by Burke et al, 2004). The story used was about two children who defeated their bedtime problems by learning new, more appropriate, settling behaviour. The story incorporated a Sleep Fairy character that leaves treats under the pillows for children who fall asleep independently.

Participants aged between 2-7 years were read the social story every night as a conclusion to their bedtime routine, until they had shown two weeks of successful bedtime behaviour. Parents fulfilled the role of the Sleep Fairy and tangible reinforcement was placed under the child’s pillow before they woke in the morning. The positive reinforcement was contingent on the child demonstrating appropriate bedtime behaviours such as non-disruptive settling and night waking. Results demonstrated that disruptive sleep behaviours reduced for all six participants and was maintained at the three month follow-up. Parent’s rated the use of a social story highly acceptable.

Secondly, Freeman (2006, see Table 1) approaches stimulus control with an initiative different to the social story used by Burke et al (2004). The study was specifically implemented with typically developing preschoolers who present with curtain calling behaviour. Baseline data recorded the length of calling out before settling and number of times the child left the bedroom.

The procedure used a card which was then traded for one pass out of the bedroom or for one request after bedtime. A list of acceptable requests and reasons to use the pass was compiled and all other behaviour ignored. Once the pass was
used extinction procedures were implemented as a response to all subsequent behaviour. The child was returned if they left their bedroom. One of the four participants had an added phase in the intervention this was to determine the effect the pass had without extinction procedures.

The results show that bedtime pass combined with extinction methods was an effective way to manage bedtime problems and that the use of bedtime pass alone was not as effective. Also the results indicate that the use of bedtime pass was a means to moderate the effect of PERB as this did not occur with any of the participants. The bedtime pass intervention was repeated again in 2007 (Moore, Friman, Fruzzetti & MacAleese, see Table 2). The study compared the use of bedtime pass with a control group. Moore’s et al (2007) results confirmed Freeman’s (2006) results with the bedtime pass group showing a reduction in curtain calls and sleep-onset delay. The control group’s behaviour remained stable through out the study with no significant changes identified. Bedtime pass had high parental acceptance (Freeman, 2006; Moore et al., 2007) and was found manageable and stress free to implement.

Both of the previous intervention procedures rely on the developmental abilities of a preschooler. Bedtime pass (Freeman 2006; Moore et al, 2007) acknowledges the child has the necessary cognitive abilities and communication skills to manage the exchangeable pass interactions. The effectiveness of a social story and delayed positive reinforcement (Burke et al, 2004) also relies on a preschooler’s advanced cognitive abilities and language skills, namely comprehension. Both studies
demonstrate that parents need not rely singularly on extinction methods to modify children’s behaviour, thus less restrictive alternatives were employed. For both procedures to be successful require a change in parental responses was required. They also have a low negative impact on the child, i.e. PERB, and results are maintained. Importantly parents view these interventions as highly acceptable; this increases the likelihood of parental adherence to the program and subsequent success of the intervention.

**Other behavioural management techniques**

*Parent education, advice, support* — Parent education is a prevention approach rather than an intervention per se, and is targeted towards soon-to-be parents or parents of young infants. The programs, and or other sources of information educate parents about establishing positive bedtime routines, parental expectations, parental handling during sleep initiation such as putting a drowsy infant to bed rather than one that is already asleep (Mindell et al, 2006); and parental response during night waking (Kuhn & Elliott, 2003). The education of parents can prevent behaviour traps and help to regulate infant sleep-wake patterns (Wolfson, Lacks, & Futterman, 1992).

*Positive reinforcement* — Reinforcement is the use of rewards when a desired behaviour such as, sleeping through the night, or settling quietly occurs. Positive reinforcement can be social, praise, hugs, special privileges; or tangible, sticker charts, reward boxes and points systems. Positive reinforcement has been mentioned in studies described thus far. Reid et al (1999) used it with standard and
graduated ignoring, and Burke et al (2004) combined positive reinforcement with a social story.

Studies have shown the use of a single intervention method is not imperative for success (Reid et al, 1999; Mindell & Durand, 1992; Burke et al, 2004). The combination of procedures can strengthen the effect of an intervention. In addition give flexibility for intervention programs that are tailored to the requirements and constraints of the family and child.

A study by Wade et al (2007) used parent group education and training sessions to implement an intervention for young children that combined positive routines with a minimal check procedure (see Table 2). Parents attended a two hour workshop where, along with handouts and role-plays, they were educated about the intervention procedure and possible outcomes. Two days later a second group session was held where questions and difficulties encountered by parents were discussed.

A bed time was established along with a positive bedtime routine. Once the child was in bed a graduated minimal check procedure was implemented following the 5, then 10, then 15 minutes schedule used by Reid et al (1999) and Eckerberg (2004). If the child left the room the door was held shut for progressively longer intervals as with the minimal check procedure. Wade et al (2007) found that the intervention decreased overall sleep and daytime behaviour difficulties along with
sleep onset delay. In addition, parents reported feeling less depressed and stressed, and found the procedure favourable. Compliance was rated at 90%.

A combined intervention was used in a study by Ronen (1991, see Table 1) with a 4 year old typically developing girl who had bedtime and night time problems. The behaviour included delayed sleep-onset, and parental presence at sleep-onset, disruptive night waking and only resuming sleep in the parent’s bed. If returned to her bed the behaviour would repeat, thus disruptive night waking occurred up to seven times a night. This behaviour disrupted parent’s and sibling’s sleep. Parents had tried using medication, extinction, and punishing procedures to no avail. Data was independently collected by both parents in a sleep diary, this gave a description of behaviour, times and places they occurred, and it also included recording what attention was received.

The behaviour identified during baseline was set in a hierarchy of easiest to most difficult behaviour to change. Six specific behaviours became the goals for the intervention plan. The goals were introduced consecutively and worked on independently, hence while the first goal was being learnt the remaining five stayed consistent with the baseline. The goal was achieved and maintained for three consecutive days before the next goal was introduced.

The parental response to behaviour was modified in conjunction with the presentation of each goal including extinction and positive reinforcement procedures. Positive reinforcement included praise, attention, and informing significant social
figures of progress and tangible rewards. Initially rewards were given immediately however later, when the goals required the child to sleep through the night, they were delayed until the morning.

The child responded well to the program, she was motivated to achieve the goals presented to her. The intervention took eight weeks to complete at which time the therapist and parents were satisfied that the learnt sleeping habits would be permanent. This was maintained at follow-up meetings, three and six months after the intervention.

Ronen (1991) discusses how important parental responses are to maintaining a child’s behaviour. The results of this study clearly showed that behaviour changes occurred when parental responses were modified. The combination of extinction and reinforcement methods was successful. Notably this intervention required the child to wait until morning for reinforcement of night settling behaviours. It is assumed that because the behaviour increased the use of delayed reinforcement was effective and may be generalised for interventions with other preschool children.

Parent role in Sleep Interventions

Parental adherence to an intervention plan is fundamental to success. Parents report that persevering is a challenging aspect of behavioural interventions. Also enduring intense crying was challenging particularly if it was potentially disturbing other family members, and sticking to a routine (Tse & Hall, 2007).
Studies such as Ronen (1991), Ashbaugh & Peck (1998) and Burke et al (2004) require significant input and behaviour modification of parents. Two factors that may influence parent's compliance in executing a behaviour intervention plan are parental acceptance of the plan and parental understanding of aspects of the treatment plan. It is important parents have input into the intervention plan and that they are educated about what is going to happen. Tse & Hall's (2007) study found that parents did not anticipate the changes in themselves and were only anticipating changes in their child's sleep problem.

**Concluding Comments and Rational for Current Study**

The current study will extend preschool sleep literature by implementing behavioural sleep interventions, with typically developing preschoolers. There are 5 key points discussed in the review, which will validate the implementation of an intervention with the proposed child population.

1. 30% of typically developing preschoolers have a sleep problem.
2. The developmental level of preschoolers is distinct from other developmental stages.
3. Parental management of sleep related behaviour is a significant factor in the development and maintenance of sleep problems.
4. Sleep problems can affect a child's emotional, physical, and cognitive functioning and development, and
5. Only 3 studies have addressed this issue in the last 20 years.
Behavioural interventions that have been used with typically developing young children have been discussed. These interventions are based on learning theory principles such as extinction, reinforcement, fading, and shaping. A number of studies show the effectiveness of an intervention plan that combines several methods (Ashbaugh & Peck, 1998, Ronen, 1991, Burke et al 2004, Freeman, 2006). It is important for parents to be accepting of the intervention procedures and to understand the techniques used, this helps to ensure parental compliance and intervention success. Due to the behavioural nature of many sleep problems, behavioural intervention procedures address both parent and child behaviours (for example Ronen, 1991, Freeman, 2006, Burke et al, 2004).

France et al (2003) suggested that the use of a reward program for children over 2 years old can be effective in treating sleep problems. In addition it has been suggested (France et al, 1996; France et al, 2008) that a reinforcement program in conjunction with an extinction program is the best and least restrictive option for interventions intended for preschoolers, Ronen (1991) demonstrates this procedures effectiveness with one 4 year old.

This study aims to examine the effectiveness of positive reinforcement combined with other behaviour intervention techniques, in reducing or eliminating sleep problems in 4 typically developing preschoolers.
CHAPTER 3

GENERAL METHOD

Participants and settings

This study was approved by the University of Canterbury Ethics Committee (Appendix 1) and was conducted as part of the Canterbury Sleep Program (CSP). Participants were recruited through advertisements (Appendix 2) posted in local preschools and referrals to the CSP from health practitioners. Despite advertising, one participant was recruited through a health practitioner referral and the remaining three were recruited through word of mouth. The participants lived in Christchurch and North Canterbury, they were treated with no charge. To be included in the study participants must have met the following criteria:

- The child was perceived as having a sleep problem by their parent(s), experiencing one or more of the following: a) bed refusal, b) sleep onset delay, c) night waking, or d) co-sleeping. Definitions are given on pages 60-61.

- The child was typically developing.

- The child was between the ages of 2 – 5 years of age.

- The child had no apparent medical or physical problem that was determined to be the primary cause of the sleep problem.

- The child had exhibited the presenting sleep problem for at least three months

Descriptions of the children and their families are summarised in Table 3. To preserve the anonymity of the participants pseudonyms have been used. Four boys
(aged 2 years, 2 months, 2 years, 3 years, seven months, and 2 years, 5 months) and their families participated in this research. All participants were from two-parent families. Two children were the only child in the family, one was the middle of three siblings and one was a twin. The parents were aged between 24 - 39 years. One child was New Zealand-European, one was NZ-European and Maori decent, one NZ-European – and South African-European decent and the fourth was NZ-European and Samoan decent. English was the first language in all families and one family spoke Samoan in the home as well. The families represented a range of socio-economic statuses, rated by the Elley-Irving Index (Elley & Irving, 2003). All children were typically developing and suffered at least two types of sleep disturbance. Three children had sleep disruptions from birth and the fourth from approximately 8 months onwards. A summary of the children's sleep disturbances is presented in Table 4.

Full information for each child is given in the individual case procedures.

<table>
<thead>
<tr>
<th>Child</th>
<th>Gender</th>
<th>Age (at initial interview)</th>
<th>Ethnicity</th>
<th>No. of Siblings</th>
<th>Birth Order</th>
<th>Parents Residing</th>
<th>Parent’s Age</th>
<th>SES*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seth</td>
<td>Male</td>
<td>2yrs, 2 mths</td>
<td>NZ European</td>
<td>1 (twin)</td>
<td>1</td>
<td>2</td>
<td>M = 39</td>
<td>F = 39</td>
</tr>
<tr>
<td>Noah</td>
<td>Male</td>
<td>2yrs</td>
<td>NZ European/Maori</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>M = 25</td>
<td>F = 29</td>
</tr>
<tr>
<td>Ethan</td>
<td>Male</td>
<td>3yrs, 7 mths</td>
<td>NZ European/Samoan</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>M = 24</td>
<td>F = 28</td>
</tr>
<tr>
<td>Jack</td>
<td>Male</td>
<td>2yrs, 5 mths</td>
<td>NZ European/South African</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>M = 26</td>
<td>F = 33</td>
</tr>
</tbody>
</table>

*Socio-economic status as rated on the Elley-Irving Scale (Elley & Irving, 2003) based on the occupation of the principle income earner. Where 1=highest and 6=lowest.
### Table 4. Child and type of sleep disturbance

<table>
<thead>
<tr>
<th>Child</th>
<th>Type of disturbance</th>
<th>Onset of Sleep Disturbance</th>
<th>Parental Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seth</td>
<td>Bed refusal</td>
<td>Secondary</td>
<td>Return to bed</td>
</tr>
<tr>
<td></td>
<td>Sleep onset delay</td>
<td></td>
<td>Re-settling and Parental Presence</td>
</tr>
<tr>
<td></td>
<td>Night waking</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Noah</td>
<td>Bed refusal</td>
<td>Primary</td>
<td>Parental Presence in bed until sleep onset</td>
</tr>
<tr>
<td></td>
<td>Night waking</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Co-sleeping</td>
<td></td>
<td>Taken into parent's bed</td>
</tr>
<tr>
<td>Ethan</td>
<td>Bed refusal</td>
<td>Primary</td>
<td>Inconsistent combination of ignoring behaviour and complying with requests.</td>
</tr>
<tr>
<td></td>
<td>Sleep onset delay</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Night waking</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Co-sleeping</td>
<td></td>
<td>Taken into parent's bed</td>
</tr>
<tr>
<td>Jack</td>
<td>Night waking</td>
<td>Secondary</td>
<td>Low latency in responding, complying with requests, parental presence in child's bed.</td>
</tr>
<tr>
<td></td>
<td>Co-sleeping</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Query confusional arousal*</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Not included in criteria as it originally presented as a night waking

### Measurement

**Socio-Economic Status (SES)**

The SES of participating families was determined using the Elley-Irving Socio-Economic Index: 2001 Census Revision (Elley & Irving, 2003). Versions of this scale have been widely used by researchers; the current scale was developed based in the results of the 2001 Census of New Zealand (Elley & Irving, 2003). The Index ranks 630 occupations on a scale of 1 – 6, where 1 = highest SES and 6 = lowest SES.
The ranking is based on the average income and educational level for each occupation.

Sleep Measures

A sleep diary (Appendix 3), or parental report form, was established to record the child and parent behaviours around day-time and night sleeps. The sleep diary was used as the main assessment instrument and was completed daily by one parent. The diary was used during baseline, intervention and follow-up phases. Parents were asked to record the time the child went to bed, where they went to bed and the time they settled. Curtain calls were described and an approximate duration, along with night waking events and duration. Parental responses were recoded along with the child behaviour. Finally, the time the child woke was recorded. Sleep diaries are commonly used in studies (Freeman, 2006, Reid et al, 1999, Ronen, 1991, Wade et al, 2007), and have been found to have high internal consistency and face validity. The sleep diary was adapted form the CSP (France, 1989).

Reliability

In keeping with standard CSP procedure infrared-time-lapse video was used to check reliability of the parent reported sleep diaries. The equipment was set up in the child’s bedroom and consideration was given to the fact that the children were mobile and active. Therefore the equipment was only used when child safety was ensured. In all four cases there were surfaces higher enough to safely mount the equipment and hide cords in a way that was acceptable to parent and researcher. The infrared-time-lapse camera was setup to capture bedtime settling routines and behaviour
throughout the night during two baseline nights and two follow-up nights. Children were informed about why the camera was being used and were present when the equipment was set-up to help reduce possible novelty or anxiety of having a camera present.

**Calculating Reliability**

Reliability was assessed by calculating the percentage of agreement or consistency between the sleep diary and the infrared-time-lapse recording on time down, time settled, curtain calls, night waking and morning wake time. Interpretation of recorded information was validated by establishing 100% agreement on how to code a given behaviour between the researcher and an independent viewer. A 15 minute margin of error was allowed between records.

Reliability (%) = the number of consistent records/ the total number of records x 100

**Experimental Design**

A multiple base-line within participants design was planned to examine the effects of the intervention. Participants, except for Jack, were randomly assigned baselines of 5 nights (name), 10 nights (name), 15 nights (name). Jack was assigned a fourth, 20 night baseline. This was because there were time restraints for the other participants who all needed shorter baselines. The other participants were given the baseline options written on pieces of paper and placed face-down. Baseline length was allocated depending on the paper chosen by the parent. Varying child and
family characteristics and circumstances, as well as different sleep problems
presenting in each child and consequently differing interventions procedures,
restricted the application of a multiple baseline within participants design. It was
decided to consider these families as separate case studies, and single-case design
was used.

General Procedure

Interview

Initial contact was made with participants via telephone and an information
sheet outlining details of the research was given to the parents (Appendix 4). After
parents indicated interest in participating in the research an assessment interview
was conducted to explain the sleep program and to ascertain information about the
child’s sleep problem, sleep history and developmental history. Informed consent
was gained from the parent to participate in the interview (Appendix 5). The interview
was conducted in either the family’s home or University clinic rooms, with one or both
parents present with the child. The child’s presence gave an opportunity for informal
observation of the child’s current developmental abilities, behaviour and parent-child
interactions.

Further information gathered during the interview included family
demographics, medical history, current health, previously tried intervention for sleep
problems, day-time and bedtime routines. All the information was used to assess
whether the child was suitable for inclusion into the program (criteria list on pp.51). If
the child met inclusion criteria then the behavioural intervention program was
discussed and informed written consent to participate was obtained from the parent(s)
(Appendix 6).

**Baseline**

Once the initial interview was completed the sleep diary was explained to the
parents and a working example written up. The diary was to be filled out by the
parent who had the most responsibility for, and was the most familiar with, bedtime
routines. Parents kept the sleep diaries for the assigned number of baseline nights.
Parents were given a generalised overview of the intervention program so as not to
compromise the baseline data. At the end of the baseline phase, the sleep diaries
were collected.

**Analysis of Presenting Problems**

An analysis was completed based on the information gathered from the initial
interview, home visits and baseline data. The information was used to generate a
formulation about how the sleep problems were being maintained for each child. The
information was then used to facilitate planning intervention programs that
appropriately addressed the behavioural aspects of the child’s sleep problem.

**Intervention**

Target behaviours were identified for each child and interventions were
individually designed to meet the needs of the family. Behavioural techniques were
outlined and discussed with the parents. The discussion included informing parents
about the sleep problems their child was experiencing and explaining the rationale behind the intervention techniques. This included aspect of procedures such as extinction, PERB, and positive reinforcement. The intervention procedures began only when parents felt comfortable with the procedure(s) and confident in implementation. Contact was made with the families daily via telephone to offer support and advice. Further, parents were advised to contact the researcher at any time if they were having difficulties with implementing the program or with their child's sleep. Home visits were organised in accordance with the families' need and parent were advised to discontinue the intervention during illness or if they had concerns for the child's health or safety.

All four participant's intervention programs included positive reinforcement. During the discussion meeting with parents, a star chart was made with the child, along with an introduction to a reward box. The intervention program was explained carefully to the child, in child friendly language. Positive aspects such as rewards were emphasised and negative aspects such as the parent's extinction response were explained carefully and reassuringly. The emphasis was on the child having another opportunity to gain rewards the next night. The children were able to earn two stickers by demonstrating identified desirable behaviour such as, settling quietly and sleeping in their own bed, before having access to the reward box.

The intervention phase was discontinued when it was agreed by both the researcher and the parent that the sleep problems had reduced to a satisfactory level.
The child had achieved the goals of the intervention and the parents no longer required support and advice.

**Maintenance**

Once the intervention was discontinued a meeting with the family was organised to discuss a maintenance program, including fading the use of tangible reinforcement. Fading involved reducing the quantity and regularity positive reinforcement was received and by replacing tangible reinforcers with intermittent social reinforcement such as a high 5, hug or praise. The parents were advised that they may need to return briefly to the program should the sleep problems re-appear, in particular after illness or a change in routine. The daily telephone contact was discontinued; however parents were encouraged to contact the researcher at any time for support or advice.

**Follow-up**

Follow-up data was collected 1-2 months after the completion of the intervention phase. Parents were asked to record a sleep diary for 7 nights to determine if the intervention effects had been maintained over time and what habits had been maintained. A meeting was organised where parent(s) were given the opportunity to review any changes in their child’s behaviour, to discuss and evaluate the intervention procedure(s), progress and maintenance. A standard set of questions were used to guide the discussion (see Appendix 7).
Data Coding

Data from the sleep diaries were coded and graphed. The following variables were evaluated for some or all participants.

_Curtain calls:_ were defined as any behaviour exhibited by the child that competed with the onset of sleep. That included attention seeking behaviour such as crying, calling out, shouting, and leaving the bed. This variable was coded for Seth and Ethan.

_Sleep onset delay:_ was the length of time, in minutes, between when the child was put to bed and when they were first noticed asleep by their parents. This included duration of curtain calls. This variable was coded for all participants.

_Night waking:_ was defined as the number of times the child awoke between sleep onset and morning awakening, that the parent’s were aware of. An appropriate wake time was deemed to be from 6am, all waking prior to this time was coded as a night waking. The frequency and duration of this was coded for all participants.

_Co-sleeping:_ was defined as the child and parent sleeping together for all or part of the night. This could be in either the child’s or parent’s bed. This variable was coded for all participants.

_Child illness:_ nights when the child was sick were coded. Illness can affect child sleep patterns and behaviours along with parental responses.
CHAPTER 4

CASE STUDY 1: SETH

Method

Seth was 2 years and 2 months when first referred for a sleep problem, summary of information in Table 4. He had a secondary sleep problem which began at approximately 8 months after sleeping through the night for 3 months. Seth is a twin and shared a bedroom with his sister. Due to his disruptive settling behaviour Seth was settled to sleep each night in another room and transferred to his own bed once asleep. Seth and his sister had the same bedtime routine; however Seth’s bedtime was different and varied depending on how tired he appeared. Seth’s parents had previously tried standard ignoring and a graduated form of parental presence. Standard ignoring was discontinued because of vomiting and the parental presence procedure had limited success.

Seth’s sister was to share in the intervention program to keep things fair for both siblings.

Presenting Problems

The target behaviours were identified as, curtain calls, night waking and place of settling. For curtain calls, Seth’s mother would return Seth directly to the settling bed while avoiding eye contact and verbal responding. In response to night waking,
Seth’s mother would enter the room and re-settle Seth and lie on the floor until sleep resumed. It was hypothesised that parental attention was maintaining the disruptive behaviours.

**Intervention**

Two procedures were combined to address the target behaviours consecutively. Firstly, the number of curtain calls then, transitioning Seth to his bedroom for the whole night and finally, addressing night waking, if required. Seth’s mother was unwilling to use extinction techniques due to his history of vomiting and previous experience with parental presence.

- **Phase 1**

**Positive Reinforcement**

Seth received a sticker for drinking his bedtime milk quietly by himself. The second sticker and subsequent access to the reward box was given in the morning on the condition that Seth had settled quietly and independently.

**Decrease in intensity of reinforcement**

A decrease in intensity of reinforcement was implemented to decrease the attention Seth was receiving while being returned to his settling bed. This involved being walked by the hand back to bed and no longer being carried.

**Implementation of the program**

Issues of implementation and modifications made to the programs are presented below. Procedures in phase one were modified resulting in Phase 2. Prior to the
completed implementation of Phase 2 and owing to a disruption in family location and circumstances, the intervention procedures were modified. Two more Phases were implemented. The final intervention consisted of Phase 1 (described above) followed, Phase 2, 3 and 4. Phases 1 (3 weeks and 6 days) and 2 (5 days) are pre change in family circumstances and Phases 3 (3 weeks and 1 day) and 4 (4 weeks) are post change in family circumstances. The following is a description of the procedures used in each additional phase.

- **Phase 2**

  The low impact standard extinction was not being effective in eliminating Seth's curtain call behaviour. A progress meeting was scheduled and options of intervention modifications were presented to the mother. It was decided to implement a full standard extinction procedure combined with parental presence. The modified program was given to the parents in writing to assist in the implementation (see Appendix 8)

  *Standard Extinction*

  When Seth was put to bed he was warned that if he left the room the door would be shut. Seth mother waited outside the closed door monitoring Seth's safety and the door was re-opened when Seth was asleep.

  *Parental Presence*

  The procedure began with the parental presence just outside the bedroom door, this was the mother's preference, as she did not want to begin in the room because she had previously implemented that. She was instructed to ignore Seth's behaviour and follow the extinction procedure should Seth leave
the bedroom. After two consecutive nights of success Seth’s mother moved further away from the door, she remained in sight of the bed.

- **Phase 3**

  Seth moved house and began sharing a room with his sister for settling and sleeping. Maternal stress was high and both children were experiencing heightened separation anxiety. Seth’s bedtime was moved earlier to match his sister’s. The procedures in Phase 2 were continued however the consistency of procedure implementation was questionable due to confounding family variables.

  **Positive Reinforcement**

  After Phase 2 Seth developed intense crying and bedtime refusal behaviours. This became the target behaviour for receiving the first sticker, hence Seth was given a sticker when he was brave and went to the bedroom quietly. This modification was implemented on night 16.

  **Standard Extinction**

  Seth was given a warning the first time he left the room, if he left a second time the door was shut until he was quiet, then it was opened again. This modification was to accommodate the presence of Seth’s sister, Seth’s mother felt comfortable shutting the door as his sister was used to settling with the door shut.

  **Parental Presence**

  Parental presence remained as defined in Phase 2, however the requirement to move away included successful nights from both children.
• Phase 4

This phase was implemented as a fresh start for the family as stress and anxiety levels lessened and routines were established. Targeted behaviours were, bed time refusal, curtain calls, and child anxiety. Combinations of procedures were implemented.

Positive Reinforcement

Stickers were no longer motivating for Seth so a two part picture designs replaced sticker charts. Seth and his sister received one half for going to the bedroom quietly and the other half in the morning for no curtain calls. If the whole picture was made up, access to a highly preferred activity was given. Both children were shown a brave badge that would receive once they had learnt how to be brave.

Standard Extinction

Shutting the door was no longer implemented as an extinction response because Seth’s sister had become increasingly upset by it and Seth’s mother felt uncomfortable following through. In addition the number of curtain calls had decreased and the need for such an extreme method was not necessary. For this Phase Seth’s mother was instructed to return to the initial method of returning Seth to his bed should he leave the room. Firstly Seth was given a verbal instruction, if he did not responded he was guided back to his bed, all verbal and physical responses were limited.

Social Story

This method was specifically targeted to reduce the children’s anxiety. Several versions of a social story were written explaining bedtime routine, desirable
and undesirable behaviours along with their consequences, and the role of each family member. Accompanying the story were photos of the family members engaging in the activities (Appendix 9).

Pictorial Routines

Further routines were written for each family member with accompanying photos to make it simple to follow for the children (Appendix 10). The routine for Seth’s mother addressed the separation anxiety, as it included a description of what and where the mother was after the children were in bed (Appendix 10).

The social stories and bedtime routines were read to the children every night before bedtime and each child had their own copy next to their bed so they could look at them whenever they chose.

Maintenance and Follow-up

Due to family circumstances the intervention is not complete; therefore maintenance and follow-up were unnecessary. During Phases 3 & 4 full sleep diaries were not kept as, a week of full sleep diaries were completed and used as follow-up data.

Special considerations

Owing to Seth’s history of vomiting it was probable that it would be an issue during Phase 2. This was discussed with Seth’s parents. The discussion involved possible emotions during the implementation of the procedure and ways that the
vomiting could be dealt with in a neutral and non-intrusive way. The room was prepared with the consideration of child safety; vomiting and access to the bed (Appendix 8).

Data Coding

The following variables were coded for Seth: *Curtain calls* (number of times out of bed), *sleep onset delay*, *night waking*, *duration of night waking*, and *child illness*. As the intervention proceeded vomiting became a variable that required management and was coded. The coded variables were then graphed.

Reliability

Infrared-time-lapse video recording was completed during baseline and follow-up. The baseline footage was shot over four consecutive nights to account for the two bedrooms used for Seth’s settling and night sleeping.
Figure 1. Sleep Related Problem Behaviours for Seth
Sleep diaries were completed for baseline, Phase 1 and 2, and follow-up. Data for Phases 3 and 4 was limited. Parental adherence to the program is undefined. On night 40 Seth settled in a room with his sister, this continued to be the settling and sleeping bed for the remaining conditions. Seth was ill on night 20.

Reliability

Table 5a. Reliability of data across variable - Seth

<table>
<thead>
<tr>
<th>Measures</th>
<th>Number of consistent records/ Total number of records</th>
<th>Reliability %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bedtime</td>
<td>4/4</td>
<td>100%</td>
</tr>
<tr>
<td>Curtain Calls</td>
<td>25/26</td>
<td>96%</td>
</tr>
<tr>
<td>(number of times out of bed)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Time asleep</td>
<td>3/3</td>
<td>100%</td>
</tr>
<tr>
<td>Night Wakes</td>
<td>7/7</td>
<td>100%</td>
</tr>
<tr>
<td>Morning wake time</td>
<td>3/3</td>
<td>100%</td>
</tr>
<tr>
<td><strong>Total Reliability</strong></td>
<td><strong>=</strong></td>
<td><strong>97%</strong></td>
</tr>
</tbody>
</table>

Total reliability between sleep diary data and direct observation was 97% with the only one discrepancy noted over the four nights in the number of times Seth left his bed.

Curtain Calls

Figure 1 shows the number of times out of bed each night for Seth over Baseline, Phases 1-4 and Follow-up. During baseline and phase 1 the number of times Seth got out of bed ranged from 0 – 20 plus times per night. There is considerable variability throughout the baseline. Phase 2 shows a marked decrease in curtain calls. In comparison to Phase 2, Phases 3 and 4 show a slight increase in curtain calls, however the frequency of behaviour continues at markedly less than
baseline and Phase 1. Curtain calls in these Phases were accompanied at times by a resumption of the vomiting which was evident prior to the family's involvement in the study. Seth began vomiting in Phase 2, this first period lasted for all of Phase 2 and the first three nights of Phase 3. It began again on night 50 in Phase 3 and lasted for 7 nights of an 8 night period. Vomiting was intermittent in Phase 4 spanning a period of 12 nights, with 7 nights showing vomiting occurred. The behaviour was not present during baseline, Phase 1 and follow-up. Follow-up demonstrates a distinct reduction of curtain call frequency compared to the frequency values graphed from baseline and Phase 1.

**Sleep onset delay**

Data was available for baseline, Phase 1 and 2, and follow-up, as indicated in Figure 1. Sleep onset varied considerably in baseline between 3 minutes and 75 minutes. Sleep onset delay remains varied at follow-up.

**Night Waking**

The number of night waking remained stable throughout intervention.

**Duration of night waking**

Baseline shows that duration of night waking ranged between 5 and 15 minutes where as follow-up data shows a relative decrease in night waking duration ranging from 2 to 5 minutes (Figure 1). Night 20 shows a marked increase in duration which maybe attributed to child illness.
Discussion

The aims of Seth’s intervention were adjusted over Phases as circumstances changed. Initial aims for Seth were reducing curtain calls, and sleeping through the night in his own bed while sharing a room with his sister. At follow-up the number of curtain calls had markedly reduced and Seth was spending the whole night in his own bed while sharing a room with his sister. However, night waking is yet to be addressed.

The number of times out of bed decreased markedly in Phase 2, the change can be attributed to the implementation of an extinction program. Although this behaviour was a target in Phase 1 it is probable that the methods implemented did not significantly reduce the attention maintaining the problem. Vomiting began in Phase 2 and continued periodically through Phases 3 and 4. There was no vomiting during follow-up. This cannot be directly attributed to effective behaviour management as Seth had begun receiving reflux medication, post Phase 4. It is difficult to identify the cause and effect of the vomiting behaviour.

Despite the marked decrease in the number of time out of bed sleep onset delay was varied and inconsistent through all conditions. There was no identifiable trend. The change in family circumstances meant that Seth’s sleeping behaviours were shaped to match his sister’s. This change included a new bedtime of up to an hour earlier than Seth’s previous settling time. This may explain the varied sleep onset at follow-up as Seth’s sleep cycles may have not yet adjusted to the earlier
time. The reduction of curtain calls despite the unchanged variance of sleep onset delay suggests that Seth was now engaging in appropriate independent settling behaviours during this time.

Night waking was not targeted in the intervention phase, the Figure 1 shows that the night waking frequency has remained stable throughout the intervention. Contrary to this, the duration of night waking decreased, this may suggest that an element of learned settling behaviour had generalised to night waking. It may be inferred that night waking was being maintained by parental response however has lessened in intensity due to new learned behaviour.

The intervention was incomplete due to the change in family circumstances. The intervention Phases addressed different issues. In particular Phase 4 addressed possible child anxiety. Through the use of social stories and pictorial routines the children appeared to fully comprehend the expectations that were being placed on their behaviour and also to understand the roles of other family members. This was important as it may have contributed to reducing anxiety and increasing compliance.

All procedures implemented were acceptable to the parents. To ensure this, parents were given the opportunity to negotiate about the methods chosen. Parent's reported that the intervention was manageable however implementation during Phase 2 was more stressful. Overall, the intervention experience had been positive and successful for the family.
CHAPTER 5

CASE STUDY 2: NOAH

Method

Noah was a 2 year old, NZ-European/ Maori boy. As an infant Noah was medicated for reflux and he has always been difficult to settle to sleep. At 12 months a graduated extinction intervention was attempted under the guidance of a health nurse. This was unsuccessful and Noah began conditioned vomiting. Noah has an older sister, 5 years, and a younger sister, 9 months. Noah had his own room and slept in a bed. After an evening routine, Noah’s mother lies in bed with him until he is asleep. Noah then wakes during the night and spends the rest of the night in his parent’s bed, if he is returned to his own bed he becomes upset and co-sleeping is resumed (Table 4).

Presenting Problems

The target behaviours were identified as, parental presence during sleep onset, night waking, and co-sleeping. It was formulated that parental presence was conditioned for sleep onset, this condition was reinforcing both mother and child through subsequent sleep onset and resumption.

Method

A 10 day baseline was randomly assigned.
**Intervention**

Two procedures were combined to address target behaviours in a two phased intervention schedule. Noah had an established bedtime and bedtime routine, this was continued through the intervention. The intervention Phase lasted for 5 weeks.

- **Phase 1**

  Settling behaviours were targeted while response to night waking remained in baseline condition. This was to reduce impact of procedures and possible increase in anxiety. This phase lasted for 8 nights.

  *Positive Reinforcement*

  Noah received a sticker for brushing his teeth by himself and a second sticker and subsequent reward box was received in the morning for self settling.

  *Graduated Parental Presence*

  The gradual approach to removing parental presence in the bed was chosen. Noah’s mother was instructed to remove all attention to Noah’s behaviour, including eye contact and verbal responding. Initially Noah’s mother sat in the bed, after three consecutive successful nights, she moved to the edge of the bed, then on a chair next to the bed, on a chair near the door, then in the doorway, outside the door, at the end of the hall and finally the lounge. If Noah got out of bed he was returned.

- **Phase 2**

  Night waking and co-sleeping were added to Phase 1’s target behaviours. This phase lasted 3 weeks and 6 nights.

  *Positive Reinforcement*
Noah received a sticker for brushing his teeth by himself. He then received a second sticker and subsequent access to the reward box for settling quietly by himself and sleeping in his own bed all night.

_Graduated Parental Presence_

In the event of a night waking, Noah was to be returned to his own bed and all reinforcing responses were eliminated. Then his mother resumed the position she was in during settling, on a chair in the room, until sleep resumed. If Noah left the bed he was returned.

**Implementation of the program**

Issues of implementation and modifications made to the program are presented below.

- _Positive Reinforcement_

The reward box was discontinued during Phase 2 as Noah no longer displayed an interest in it.

_Graduated Parental Presence (Phase 2)_

The graduated parental presence procedure was discontinued for night waking after 7 nights; subsequently Noah was returned to his own bed and left to self settle.

**Follow-up**

Follow-up was completed 3 weeks after the intervention phase was discontinued.
Data Coding

The following variables were coded for Noah: Sleep onset delay, night waking, duration of night waking, co-sleeping and, child illness. These coded variables were then graphed.

Reliability

Infrared-time-lapse video was completed during baseline only, at the parents' request.
Figure 2. Sleep Related Problem Behaviours for Noah
Sleep diaries were completed every night over all conditions. Non-adherence was noted in the previously discussed discontinuation of the reward box, and on night 22, both during Phase 2. Noah was ill on nights 50 and 51 as indicated in Figure 2.

Reliability

Table 5b. Reliability of data across variables - Noah

<table>
<thead>
<tr>
<th>Measures</th>
<th>Number of consistent records/ Total number of records</th>
<th>Reliability %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bedtime</td>
<td>2/2</td>
<td>100%</td>
</tr>
<tr>
<td>Time asleep</td>
<td>3/3</td>
<td>100%</td>
</tr>
<tr>
<td>Night Wakes</td>
<td>2/3</td>
<td>66%</td>
</tr>
</tbody>
</table>

Total Reliability = 87.5%

A total reliability score of 87.5% was computed. The only discrepancy identified between sleep diary data and direct observation via infrared-time-lapse recording was for night waking.

Sleep onset delay

Baseline data showed high variability in sleep onset delay, that ranged from 0 – 40 minutes. There were no changes to Noah’s sleep onset delay, the average data points suggest that Noah’s sleep onset delay ranged from 10 to 30 minutes (Figure 2). On night 20 in Phase 1 there was a marked increase in sleep onset delay with a total of 120 minutes.
Night Waking

Figure 2 shows an average of one waking a night in baseline. The highest frequency of night wakings is on nights 17 and 50, with 5 and 8 awakenings. Baseline conditions remained for night waking during Phase 1. A slight increase in night waking is noticeable during Phase 2, after the beginning of the intervention. This increase is maintained at follow-up. Co-sleeping occurred in conjunction with night waking during baseline and Phase 1. In Phase 2 and follow-up co-sleeping no longer occurred.

Duration of Night Waking

In Figure 2 baseline conditions remained for night waking until Phase 2. On the second night of this phase there was a major increase in the duration of night waking, with a total of 140 minutes. This increase was followed by a dramatic decrease in duration which is maintained at follow-up. On night 38 there is an increase in duration which decreases again by night 48.

Discussion

This intervention aimed to teach Noah how to settle independently at bedtime by eliminating parental presence and to eliminate co-sleeping and night waking. The intervention was successful in eliminating parental presence at bedtime and co-sleeping. Night waking was not reduced, however the duration of night wakings was markedly reduced.
Noah’s sleep onset delay was within an expected range and was not considered problematic by his parents or the researcher; however in night 20, the 9th night of intervention, Noah took 120 minutes to go to sleep. This marked increase may be explained as a PERB following the withdrawal of parental presence in the bedroom. Typically a PERB would be seen at the beginning of an intervention however due to the nature of the graduated parental presence procedure it may have taken Noah longer to detect the change in contingencies. At this point in intervention the parent had begun to sit away from the bed. The sleep diaries show that behaviours exhibited during the extended sleep onset fit with what would be expected in a PERB, these were intense attention seeking behaviours such as jumping on the bed, calling out, and attempting to initiate a parental response.

The gradual removal of parental presence in the bed for sleep onset began in Phase 1 and continued through Phase 2. On night 48 Noah settled with no parental presence, this behaviour was maintained during follow-up. Though visual sleep onset data does not portray the parental presence implementation, aspects of the parental presence procedure are visible with regards to sleep onset delay, particularly between nights 34-56. The data points that represent longer sleep onset delay correspond to the nights parental presence was adjusted. A trend is noted where the night of change in parental presence is accompanied by a longer sleep onset delay and then followed three consecutive nights of lower sleep onset (Figure 2). This relative increase in sleep onset delay may be described as a series of minor PERB’s. Once parental presence was eliminated (night 48) this variation of sleep onset delay does not present again and the final 8 nights of Phase 2 suggest an approximate
sleep onset time was stabilised. Follow-up data demonstrates that the effects of Phase 2 were not maintained.

The highest number of times Noah woke during a night was 8. It is possible that the high frequency of night wakes is associated with child illness. Due to this reasoning this behaviour is not considered a response to the intervention but rather a response precipitated intrinsically. The slight increase shown in night waking during phase 2 can be explained by the removal of co-sleeping responding and possible additional attempts made by Noah to resume the baseline status. Other confounding variables the may contribute to night waking were disturbances from dogs barking and Noah's younger sister's crying on nights, 28, 29, 40, 62, and 64. These confounding variables are particularly noted in the sleep diaries during follow-up on the nights with three reported awakenings. These awakenings reportedly caused little disruption to family sleep as waking duration was short and no attendance was required for sleep to resume. It is possible that if the parents were not awake and attending to another child they would not have been aware that a night waking had occurred.

A second PERB was experienced on the second night of Phase 2, as there was a dramatic increase in duration of night waking before a decrease in behaviour occurred. The timing of the increased duration is typical of a PERB along with the behaviour reported during the waking.
Further anecdotal behaviour changes noted by Noah's parent's were that he appeared to be getting a better quality sleep each night, he spent more free time in his bedroom, and appeared happy to go to bed at night. They found the intervention "easy" to implement, highly acceptable and worthwhile.
CHAPTER 6

CASE STUDY 3: ETHAN

Method

Ethan is 3 years and 7 months old, NZ-European/Samoan boy, see summary of information in Table 4. Ethan has had sleep problems since birth. Ethan has his own room and slept in a bed. Ethan did not have a bed time, did not like his bed and got upset when informed that it was time for bed. Ethan was reported to take a long time to complete his bedtime routine and will cry and call out once in bed. Ethan wakes during the night and spends the rest of the night in his parent’s bed.

Presenting Problems

The target behaviours were identified as; resistance to bedtime, curtain calls, night waking and co-sleeping. For bedtime resistance and curtain calls parents used a variety of techniques ranging from ignoring to complying with the child’s behaviour. It was formulated that inconsistent responding to curtain calls and lack of a bed time were maintaining Ethan’s disruptive bedtime behaviours. The absence of response during co-sleeping, primarily due to sleeping parents, gave no indication to Ethan that the behaviour was a problem.
Method

A 15 day baseline was randomly assigned.

Intervention

Two procedures were combined to address all target behaviours simultaneously. An ideal bedtime was established and parents were encouraged to carry out the bedtime routine at this time. The intervention phase lasted for 5 weeks and 2 days.

Positive Reinforcement

Ethan received a sticker for putting his pyjamas on by himself. The second sticker and subsequent access to the reward box was given in the morning on the condition that Ethan had settled quietly and had slept in his own bed for the whole night.

Standard Extinction

Parents were instructed to eliminate all reinforcing attention to Ethan’s behaviour. Curtain calls were ignored and if Ethan left the bedroom he was returned and the door shut until he settled. The same response was used in the event of a night waking.

The strategy to address co-sleeping was implemented with parental consent and consistency of parental responding was stressed as key to the success of the intervention.
Implementation of the program

Issues of implementation and modifications made to the program are presented below.

- *Positive Reinforcement*

It became necessary to reinforce curtain calls and co-sleeping independently, a third sticker was added to the chart to cover this and subsequently Ethan had to receive three stickers before having access to the reward box. The reward box was eventually discontinued by the parents as they felt the stickers were more reinforcing.

Ethan got very ill after the 25th day of intervention. Intervention procedures were stopped during this time and implementation commenced once Ethan was healthy. The intervention phase was lengthened to ensure the new behaviours were learnt and to counter any possible spontaneous recovery precipitated by the illness.

Follow-up

Follow-up was completed 6 weeks after the intervention phase was discontinued.

Data Coding

The following variables were coded for Ethan: Percentage of sleep onset delay in *curtain calls, sleep onset delay, co-sleeping, night waking, duration of night waking,* and *child illness*. These coded variables were then graphed. Sleep onset in the car was also noted as the frequency of this may have confounded the presence of settling behaviours early in the intervention phase.
Reliability

Infrared-time-lapse video was completed during follow-up only, due to technical difficulties.
Results

Key:
X - missing data
C - co-sleeping

Figure 4. Sleep Related Problem Behaviours for Ethan
Sleep diaries were completed for every night over all conditions apart from 10 days where Ethan was ill, as indicated in Figure 3. Non-adherence occurred on nights 40, 43, and 46, during intervention.

**Reliability**

*Table 5c. Reliability of data across variables - Ethan*

<table>
<thead>
<tr>
<th>Measures</th>
<th>Number of consistent records/ Total number of records</th>
<th>Reliability %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bedtime</td>
<td>2/2</td>
<td>100%</td>
</tr>
<tr>
<td>Curtain Calls</td>
<td>5/6</td>
<td>83%</td>
</tr>
<tr>
<td>Time asleep</td>
<td>1/1</td>
<td>100%</td>
</tr>
<tr>
<td>Night Wakes</td>
<td>1/1</td>
<td>100%</td>
</tr>
<tr>
<td>Morning wake time</td>
<td>1/1</td>
<td>100%</td>
</tr>
</tbody>
</table>

**Total Reliability = 91%**

A total reliability score of 91% was computed. The only discrepancy identified between sleep diary data and direct observation via infrared-time-lapse recording was for curtain calls.

**Sleep onset delay**

Ethan’s sleep onset delay demonstrated considerable variability during baseline that ranged between 0 to 65 minutes (Figure 3). Sleep onset delay appeared to stabilise at approximately 15 minutes by the end of intervention, this was maintained at follow-up. Notably, however, the second night of follow-up was the longest recorded sleep onset delay of 70 minutes.
Curtain Calls

A graph in Figure 3, shows the percentage of sleep onset delay spent engaging in curtain calls was calculated:

- Sleep onset delay in curtain calls (%) = curtain call total/ sleep onset delay x 100

The highest (66%) and lowest (8%) percentages of sleep onset time that Ethan used to engage in curtain calls were recorded in baseline. The variation between percentages is consistent with the variation noted in sleep onset delay. During baseline curtain calls occur 12 out of 16 nights (75%), although curtain call percentages are higher during intervention, 50 and 60%, an obvious reduction in the frequency of curtain calls is noted (7%). This reduction from baseline is maintained at follow-up with curtain calls occurring on 2 of 7 nights (28%).

Night Waking

During baseline night waking occurs 10 of 16 nights (62%). There is a visible decrease in night waking during intervention (16 %); follow-up shows a slight increase in night waking with it occurring during 3 of 7 nights (42%). During baseline all night waking resulted in co-sleeping in the parent's bed (Figure 3). This is eliminated at the beginning of intervention however on night 40, 43, and 46 co-sleeping occurred, 33% of night wakings. Co-sleeping is also seen in follow-up occurring on 2 of 7 nights (28%).
Duration of night waking

In Figure 3, baseline night waking duration generally lasted between 5 and 10 minutes. This duration appeared to decrease slightly over intervention and follow-up.

Discussion

The aim of this intervention was to reduce bedtime refusal and curtain calls, and to eliminate night waking which resulted in co-sleeping. The intervention was successful in markedly reducing the duration and frequency of curtain calls. Co-sleeping was somewhat reduced, however parental non-adherence limited the effectiveness of the intervention.

The removal of reinforcing parental responses resulted in a rapid decrease in curtain calls. This was maintained at follow-up, night 60 shows a high percentage of curtain calls, this was explained as Ethan was sharing a room that night and was being disrupted from sleep onset by the other occupants. During the intervention phase Ethan fell asleep in the car 7 times, nights 21, 22, 24, 25, 32, 37, and 44. In these cases sleep onset delay was rated a 0, curtain calls did not occur and Ethan received positive reinforcement accordingly. It is possible these events disrupted the behaviour trap associated with curtain calls. Thus the reinforcement earned without an opportunity to engage in undesirable behaviour may have contributed to the acquisition of new learned behaviour, particularly during the earlier nights (5, 6, 8, 9) of intervention phase.
Night waking and co-sleeping decreased during intervention, however showed a slight increase at follow-up. It is possible that the requirements of the intervention procedure were compromised by heavily sleeping parents. During a number of night awakenings throughout data collection a duration time was not recorded as parents became aware of the waking in the morning upon finding Ethan in their bed. This correlation is particularly noted for nights 43, 46 and during follow-up. Intermittent responding to co-sleeping may have given unclear boundaries to Ethan and limited the success of the intervention.

Other anecdotal results reported by Ethan’s parents are that he now has an established bedtime, daytime behaviour has noticeably improved and bedtime refusal has lessened. The intervention was highly acceptable to Ethan’s parent’s and implementation was manageable, aside from the required responding for night waking which parent’s found challenging. Overall the intervention was successful and parental satisfaction was high.
CHAPTER 7

CASE STUDY 4: JACK

Method

Jack is a 2 year and 5 months old, NZ-European/ South African boy. He had his own bedroom and slept in a bed. Jack presented with a secondary sleep problem since weaning from a bottle at 2 years. Jack has followed a typical developmental trajectory but was reported to be colicky and unsettled as a small baby. Typically Jacks wakes between 11pm and 1am crying (Table 4). His response to consolation was variably being confused at times, talkative at others. Jack demanded that his father settle him during awakenings. Jacks parents had successfully implemented two previous interventions, standard extinction and parental presence.

Presenting Problems

The target behaviours were identified as night waking, and co-sleeping. Parents had a low latency in responding to night waking and a variety of methods were employed to manage the disruptive behaviours. Commonly, a waking resulted in co-sleeping for the rest of the night. A differential diagnosis suggested that sleep terrors may have been the cause of Jack’s disruptive night waking hence there was a physiological component to the behaviour. The alternative was that the disruptive night waking was behavioural in function and was being maintained by low latency in, and intensity of, parental responding.
Method

A 20 day baseline was assigned to the family. After a week of intervention a progress meeting was scheduled with the family to discuss the intervention procedures. During this meeting the intervention procedure was modified, see general procedure.

Intervention

Intervention 1 tested the differential diagnosis by using a single procedure to address all target behaviours simultaneously. The alternative was tested in intervention 2 by using a combination of procedures to address the target behaviour simultaneously. The total intervention phases last for 3 weeks and 1 day.

- **Intervention 1** – lasted for 8 nights

*Scheduled Awakening*

A awakening time was scheduled 30 minutes before a sleep terror commonly happened. The parents were instructed to wake Jake each night, by lightly touching him, at the scheduled time, ensure he was awake, such as eyes are open, and then assist sleep to resume.

- **Intervention 2** – lasted for 2 weeks

*Positive Reinforcement*

Jack received a sticker for reading stories quietly. Then a second sticker and subsequent access to a reward was given in the morning on the condition that Jack had stayed quietly in his bed for the whole night.
Standard Extinction

Parents were instructed to eliminate all reinforcing attention to Jack’s behaviour. When Jack awoke, calling and crying was ignored. If Jack left his bed during the night he was put back and the door was shut until sleep had resumed.

Implementation of the program

Issues of implementation and modifications made to the program are presented below.

- Scheduled Awakening

On the third and fourth nights Jack woke before the scheduled wake time, to prevent this occurring again the wake time was reset 30 minutes earlier. The number of awakenings increased and at the progress meeting the parent and the researcher agreed to discontinue the intervention procedure.

- Positive Reinforcement

The reward was discontinued as the stickers and chart were more reinforcing for Jack

- Standard Extinction

When Jack woke he ceased to call out and began to leave his bed and seek out his parents. His mother would meet him in the hall and return him to bed. This was discouraged as parental attention was delayed rather than eliminated.

Follow-up

Follow-up was completed 5 weeks after the intervention was discontinued.
Data Coding

The following variables were coded for Jack: *Night waking, duration of night waking, co-sleeping* and *child illness*. These coded variables were then graphed.

Reliability

Infrared-time-lapse video was completed during baseline and follow-up.
Management of Sleep Problems in Preschoolers

Results

Key:
C - co-sleeping
I - child illness
* - scheduled awakening procedure implemented
X - missing data

Figure 4. Sleep Related Problem Behaviours for Jack
Sleep diaries were completed every night over all conditions however there missing data for 40% of nights for sleep onset delay (Figure 4). Non-adherence occurred on nights 39 and 40. Jack was ill a total of four nights, 11 and 14 during baseline, 33 and 36 during Phase 2, as indicated on graphs in Figure 4.

Reliability

Table 5d. Reliability of data across variables - Jack

<table>
<thead>
<tr>
<th>Measures</th>
<th>Number of consistent records/ Total number of records</th>
<th>Reliability %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bedtime</td>
<td>2/2</td>
<td>100%</td>
</tr>
<tr>
<td>Time asleep</td>
<td>3/3</td>
<td>100%</td>
</tr>
<tr>
<td>Night wakes</td>
<td>5/6</td>
<td>83%</td>
</tr>
<tr>
<td>Morning wake time</td>
<td>2/2</td>
<td>100%</td>
</tr>
</tbody>
</table>

Total Reliability = 92%

Sleep diary data received a total reliability score of 92%. Over three nights of reliability data one disagreement was noted between information collected about night waking and direct observation through time-lapse-infrared video recording. Due to lack of data the fourth night of reliability was not computed.

Night Waking

Figure 4 shows that Jack woke 18 out of 20 nights (90%) during baseline and 3 out of 7 nights (42%) during follow-up. Jack woke up to 5 times a night, night 28 during phase 1. The highest number of awakenings during baseline was 3 (3 nights) and the highest number of awakenings during follow-up was 2 (1 night). The frequency of night waking decreased through phase 2 and was maintained at follow-
up. Co-sleeping occurred 7 times during data collection. During baseline there were 5 co-sleeping occurrences and only 2 occurrences during phase 2.

Scheduled Awakening

During phase 1 a scheduled awakening procedure was implemented, the scheduled awakening was not coded as a night waking. The procedure was successfully implemented on 3 of 8 nights due to Jack waking before the scheduled wake time (Figure 4).

Duration of Night Waking

The longest duration of night waking occurred twice during baseline and lasted for 120 minutes. Follow-up shows durations of night waking to be no more than 2 minutes. Thus, there is a marked decrease in the duration of night waking at follow-up.

Discussion

The intervention for Jack had two primary aims, 1) to confirm the differential diagnosis of possible sleep terrors, and 2) to eliminate night waking. The results of intervention 1 found the night waking to be behavioural therefore the differential diagnosis was unconfirmed. Intervention 2 did not eliminate night waking however there was a decrease in the number of night wakings and more noticeably a marked reduction in the duration of night wakings.
Night waking was the target behaviour and as the duration of night waking decreased so did the frequency of night waking. A compounding variable was wind, on nights 23 and 39, Jack’s night waking was attributed to the noise of a strong wind, night 39 resulted in co-sleeping (Figure 4). Further anecdotal reports suggest other noise contributed to night waking, such as an owl and parental movement about the house.

A differential diagnosis was considered after analysing parental reports and recorded infrared-time-lapse footage. The scheduled awakening program was trailed based on the proposition that Jack was experiencing confusional arousals. The scheduled awakening program was abandoned after 9 nights due to the relative unsuccessful increase in night waking and parental motivation. However, the duration of night waking in Phase 1 markedly decreased, which is suggestive of an element of success, this was supported by parental report of the comparative ease in which Jack returned to sleep. It is possible that scheduled awakening caused a minor disruption to Jack’s sleep cycles and in turn aided the success of the behavioural intervention.

Following the success of a behavioural intervention it was probable that Jack’s disruptive night waking behaviour was being maintained by low latency and high intensity of parental responding. Once these responses were eliminated in phase two behaviour change was achieved quickly. Phase 2 lasted for 16 nights and the results of were maintained at follow-up.
Parents reported the implementation of the intervention to have been a positive experience for the family. The implementation was found to be challenging through the middle, however it was also described as easy, with high parental acceptance.
CHAPTER 8

General Discussion

The aim of this research was to demonstrate the effectiveness of behavioural interventions that considered the distinct developmental needs of preschoolers aged 2-5 years. The results of all four cases suggest that the use of positive reinforcement combined with other behavioural management techniques, such as, extinction, effectively decreases or eliminates multiple sleep problems. Behaviours targeted through intervention were sleep onset delay, curtain calls, co-sleeping, and night waking. Methods used were standard extinction, parental presence, scheduled awakening, social stories, pictorial routines and positive reinforcement.

In all four cases parents reported that the intervention had been a positive experience for them and their families, it was successful and something they would continue to follow. The parents found implementing the intervention manageable and feedback suggested high parental acceptability. Parents described it as “easy but challenging in the middle”, “fine”, “thought it would be worse – amazed”. The parental acceptance was a significant achievement as this has been shown to affect adherence to the program and the success of program outcomes.

There were a very small number of studies published in the last 20 years that discussed sleep interventions tailored to the developmental abilities of a typically developing 2 year old. With sleep problems presenting in approximately 30% of
preschoolers (Krakowiak et al, 2008) the need for appropriate interventions is highlighted. This study has clearly demonstrated the effectiveness of interventions which take these developmental factors into account.

An appropriate intervention for preschoolers relies on the development of communication ability and cognitive functioning. Thus by 2 years of age this study has shown that a preschooler can be involved in the sleep intervention. Through explanation of positive and negative aspects of the program and through the use of materials such as social stories (Burke et al, 2004), bedtime passes (Freeman, 2006) and reward boxes, as used in the present study.

This study has also demonstrated the importance of parental behaviour in regulating sleep behaviour in children, including preschoolers. Some parental responses addressed in the current study are co-sleeping, parental presence during sleep onset, and attention for undesirable behaviour such as getting out of bed.

This study also demonstrates the challenges of carrying out interventions in a family setting. Other family members had impact on the success of two interventions. Seth and Noah experienced night waking precipitated by their siblings.

One strength of the procedure followed in this study was the discussion and support offered via daily telephone contact. This was particularly important when discussing the possibility of a PERB and managing this effect. Another strength was
the individual tailoring of the intervention to the needs of each child and family while remaining true to the Social Learning Paradigm informing the interventions.

In general, the intervention plans implemented in the present study used extinction and positive reinforcement, in the form of sticker charts and a reward box, to bring about behavioural change. Seth's data suggests that the use of reinforcement alone is not as effective as the combination with extinction. The success of the results confirm that positive reinforcement is a developmentally appropriate method to incorporate into sleep management programs for preschoolers, and offers a least restrictive means to managing sleep problems.

Limitations of the Current Study

This study has several methodological limitations. Firstly, the original experimental design of a multiple-baseline across participants was abandoned and replaced with single-case design. This was due to the diversity of presenting problems and methods of implementation. Generalisation of the study to clinical setting may be limited by the small sample size. No standardised measures were used to assess child parental attitudes and stress. These would have been beneficial to identify changes in pre and post intervention ratings. In addition, a standardised questionnaire would have been more beneficial to assess parental acceptance and attitudes towards the intervention implementation and outcome.

Implications for future research

The literature review revealed a gap in sleep literature that focuses on typically developing preschool children, in particularly developmentally appropriate behavioural
interventions. Further large scale research addressing this specific age group and their needs is recommended. Specifically in reviewing effectiveness of intervention methods, and identifying methods of least restriction, and high parental acceptance.

Owing to the commonality of sleep problem complaints to health professionals and the prevalence of sleep problems in preschool children, research into the development and nature of sleep problems for preschool children may be beneficial. Further research on parent education methods may aid in addressing current parental sleep management techniques and avoidance of behaviour traps.

Implication for professional practice

This study supports the effectiveness of developmentally appropriate behavioural interventions for resolving sleep problems in typically developing preschoolers, in particular through the use of positive reinforcement. In interventions with children, the least restrictive option should be used - for example using reinforcement in preference to, or together with, extinction.

The study also highlights the need for intervention programs that are adaptive to the family’s needs, and possible changes in family circumstances. This includes consideration of other family members. Behavioural interventions can be time consuming and intensive for parents thus evidenced-based, effective and positive interventions should be considered and parental acceptance of the program attained. In addition, regular support and advice may help to maintain parental adherence to the program to ensure success and prevent withdrawal from the program. Finally,
ensuring parents are appropriately educated about their child's sleep and the nature of behavioural interventions will assist in successful outcomes. Professional practice should include education of parents as a preventative measure.

Conclusion

There is a high prevalence of sleep problems in typically developing preschool children and a limited amount of research supporting clinical practice in this area. The current research has highlighted the need for behavioural interventions that acknowledge this age group as having distinct developmental needs.

This research demonstrated that positive reinforcement combined with a variety of other behavioural intervention methods successfully eliminated or reduced multiple sleep problems in four case studies of typically developing preschoolers. The new behaviours were maintained at follow-up suggesting long term effectiveness of the implemented procedures and parents report a high level of satisfaction with intervention outcomes.
References


Appendix 1

Letter of approval from Human Ethics Committee
Ref: HEC 2009/101

2 September 2009

Gabrielle Bisseker
Child and Family Psychology Program
Health Sciences Centre
UNIVERSITY OF CANTERBURY

Dear Gabrielle

The Human Ethics Committee advises that your research proposal “Management of sleep problems in preschool children” has been considered and approved.

Please note that this approval is subject to the incorporation of the amendments you have provided in your email of 28 August 2009.

Best wishes for your project.

Yours sincerely

Dr Michael Grimshaw
Chair, Human Ethics Committee
Appendix 2

Advertisement used for Recruitment
Having Sleep Problems with your preschooler?

Hi my name is Gabrielle Bisseker. I’m at the University of Canterbury and am a 5th year Child and Family Psychology student. As part of my research I am offering a sleep program to help parents of preschoolers with sleep problems. There will be no charge and the work I do will be supervised by Dr Karyn France from the Canterbury Sleep Programme. I will work alongside your family to assist you with your child’s sleep difficulties.

I am looking for parents with a typically developing preschool child, aged between 2–5 years old, with sleep problems.

If you are struggling with your child’s sleeping and would like further information please contact me:
Phone: 027 405 8852
Email: gbi15@student.canterbury.ac.nz
Appendix 3

Sleep Diary
# Behaviour Diary

**Name:**  
**Date:**  
**Goal Bed-time:** 7.30pm

## Day Sleep

<table>
<thead>
<tr>
<th>Where:</th>
<th>Time Down</th>
<th>Time Awake</th>
</tr>
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<tr>
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<td></td>
<td></td>
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<tr>
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<td></td>
<td></td>
</tr>
<tr>
<td>Comments:</td>
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<td></td>
</tr>
</tbody>
</table>

## Night Sleep

<table>
<thead>
<tr>
<th>Ideal Bed-time</th>
<th>Actual Bed-time</th>
<th>Settled:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Where:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Comments:</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Approximate Time

<table>
<thead>
<tr>
<th>Pre-settling Routine</th>
<th>Approximate Duration:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Describe: what you did and what the child did</td>
<td></td>
</tr>
<tr>
<td>Curtain Calls:</td>
<td></td>
</tr>
<tr>
<td>Describe: what you did and what the child did</td>
<td>Approximate Duration:</td>
</tr>
<tr>
<td>1</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
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</tr>
<tr>
<td>4</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td></td>
</tr>
</tbody>
</table>

## Night Wake

<table>
<thead>
<tr>
<th>Time</th>
<th>How did you know? Describe what you did:</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
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</tr>
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<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Morning Wake Time:**  
_____am
Appendix 4

Parent Information Sheet
Management of Sleep Problems in Preschool Children

Information for Parents/Caregivers

Hello

My name is Gabrielle Bisseker. I am a 5th year Child and Family Psychology student at the University of Canterbury. I am researching an intervention for typically developing preschool children with sleep problems and I would like to invite you and your child to participate in this research.

I will be working alongside you to implement a behaviour management system that focuses on positive consequences. The intervention will last for approximately one month and will also involve a time of monitoring your child’s sleeping patterns before the intervention is implemented, a baseline phase. This monitoring will continue throughout the intervention phase. A follow up time will be negotiated approximately 4-6 wks after the conclusion of the intervention. You will be supported in your role via home visits, phone and email contact.

As part of monitoring your child’s sleep patterns I will video them over two nights in the baseline phase and two nights in the follow-up phase. The infra-red recording system includes a laptop and a small wireless camera which will be placed unobtrusively in your child’s bedroom to record your child sleeping. The data collected will enable the proportions of wake and sleep during the night to be determined as well as to indicate when these wakeings are attended to.

This intervention is run in association with the Canterbury Sleep Program (CSP); this program is well-established in developing sleep programs for children of all ages. The work I do with you will be supervised by Dr Karyn France (Registered Clinical Psychologist and the co-ordinator of the Child and Family Psychology Program), from the CSP.

The results from this intervention will be written up in my dissertation and may be published. Identifying details of you, your family and your child will not be included and names will be changed to ensure confidentiality.

If this sounds like something you would be interested in participating in we will arrange an interview time. This is so I can meet you and you can find out about me and we can discuss this research in more detail. If you or your child change your mind about being involved with the intervention that’s fine, all you have to do is say so.

If you have any questions about this project you can talk to me or to Karyn France, my supervisor. Thank you for considering this opportunity.

Signed: 

University of Canterbury College of Education

Date: __________________________
Appendix 5

Interview Consent Form
Management of Sleep Problems in Preschool Children

Parent/Caregiver Interview Consent Form

I consent to be part of an interview with Gabrielle Bisseker.

I understand that the purpose of this interview is to:
- assess whether my child is eligible for the sleep program by talking about their developmental and medical history, and bedtime behaviour.
- inform me further about the Sleep Program
- answer any questions I have about what might happen

I understand that everything said in this interview is confidential and the information gathered will be destroyed should we not be eligible, or kept in a locked cabinet should we participate in the sleep program.

Name: ________________________________

Date: ________________________________

Signature: ____________________________
Appendix 6

Sleep Program Consent Form
Management of Sleep Problems in Preschool Children

Parent/Caregiver Consent Form

I consent for me and my child/the child in my care, to participate in the sleep management intervention.

I understand that as part of this program my child will be filmed during the night using an infra-red camera. This will occur 4 nights in total and the camera will be setup unobtrusively in my child’s bedroom.

I have read and discussed the information given to me about the research project and understand what will be required of me and my child/the child in my care.

I understand that anything I or my child says during this research will be treated as confidential. No findings that could identify my child or myself will be published.

I understand that participation in this project is voluntary and that I can withdraw from the project at any time without repercussions.

Name: __________________________

Date: __________________________

Signature: ______________________
Appendix 7

Follow-up Questions
Standard Follow-up Questions

Follow-up Interview
Tell me about child's sleep since we last spoke? Let’s start with last night, what happened then?
Is last night typical? What has been happening over the past weeks? Any illness or glitches?
Have you continued to see results since the intervention ended? Tell me about that.

Parent Satisfaction
Have you found that intervention has helped with Child's sleep?
How did you find implementing the intervention?
Do you think this is something that was successful and you could continue to enforce?
How has Child responded to the change?
Has this been a positive experience for you and your family?
Appendix 8

Seth’s Sleep Program
(Parent Information Sheet)
Seth’s Sleep Program

Parental Presence & Ignoring

- Preparation: 1. Sam is prepared for change of parental responses by being informed that "tonight if he gets out of bed then mummy/daddy will shut the door.”
2. Room is made safe for Sam to be alone in it. (step/box or raised level placed by bed to aid Sam’s independent return to bed)
3. Should Sam become upset and vomit have several changes of clothes in the room and the bed made to aid a quick and easy change. This may included several layers of alternating cotton and plastic sheets. The purpose of this is to make dealing with the vomiting as undistruptive and neutral as possible.
4. Sam may not like the consequence of having the door shut and respond intensely and perhaps for a long period of time, be prepared to ignore whatever response Sam has.

- Typical bedtime routine is followed.
- Sam is put into bed and parent sits in Sam’s line of vision just outside the bedroom door. The parent does not interact with Sam in any way and remains there until Sam is asleep.
- Should Sam get out of bed and leave the room, he is to be returned directly and told that “Mummy/Daddy is going to shut the door now because he got out of bed, it’s time for sleep.”
- The parent shuts the door and waits on the other side until Sam is calm and quite and asleep. The parent may only enter the room if there are valid concerns for Sam’s health or safety i.e. vomiting
- This procedure is to be repeated every night until Sam has three consecutive nights of success.
- When Sam is successful in staying in bed he is able to put a sticker on the chart and choose a treat from the box.

The success of this plan depends upon whether the: Responses are consistent Ignoring is followed through Interactions are brief and neutral

I will be in contact with you initially every day. Once Sam has achieved three consecutive successes then the parental presence will be altered.

Please don’t hesitate to call me at any time - #########################
Appendix 9

3 versions of a Social Story

*Blank boxes are where photographs of family members engaging in the relevant sleep activity.
Bedtime

Seth and Lucy are learning how to be brave. Its really good when Seth goes to bed and stays in bed without crying. Sometime he feels sad because he wants mummy. Its ok to feel sad. When Seth feels sad he tries to be very brave and go to bed quietly. Mummy is very proud of Seth when he is brave and goes to sleep all my himself.
Bedtime

When it is time to go to bed I try really hard to be brave and go to sleep quietly. I stay in my bed and close my eyes. Mummy waits in the lounge for me to go to sleep. She is really proud and happy when I go to sleep quietly and stay in my bed. When I stay in my bed I get to choose a treat because I have been very brave and have tried very hard. Mummy, Lucy and Seth are all happy.
Sleep time

After tea it is time to get ready for bed.

First we have a bath then mummy helps us put on our pjs.

When our pjs are on we get to have pudding and then we read our books.

When mummy tells us its time for bed we hop into our beds.

Sometimes we cry but we are learning how to be brave and go to bed quietly.
Then mummy says good night and goes to the lounge. We say “good night Mummy” and then we go to sleep.

Sometimes we get out of bed and try to find mummy. This is not a good thing to do. We have to try to be brave and go to sleep without mummy. When we are brave and don’t cry or get out of bed, mummy is really proud of us and we feel very happy.
Appendix 10

a) Children’s Pictorial Bedtime Routine

b) Mother’s Pictorial Bedtime Routine

*Blank boxes are where photographs of family members engaging to the relevant sleep activity.*
Children’s Night Routine

Bath

PJs on

Pudding

Books

Bedtime (quietly)

Sleep time
Mum’s Night Routine

Helps Bath

Helps put on PJs

Pudding

Read Books

Seth and Lucy’s Bedtime (quietly)

Mummy waits

for Seth and Lucy to go to sleep

Mummy’s Sleep time