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SLEEP PROBLEMS IN YOUNG CHILDREN WTH AND WITHOUT BEHAVIOR PROBLEMS

by

Penny L. Sneddon

A dissertation submitted in partial fulfillment
of the requirements for the degree

of

DOCTOR OF PHILOSOPHY

in

Psychology

Approved:

UTAH STATE UNIVERSITY
Logan, Utah

2007

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ABSTRACT

Sleep Problems in Young Children With

and Without Behavior Problems

by

Penny L. Sneddon, Doctor of Philosophy

Utah State University, 2007

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Department: Psychology

There are numerous social, emotional, and behavioral problems toddlers and preschool children can exhibit. Some of the more common problems reported by parents of young children are daytime behavior problems and sleep disturbances. This study investigated sleep difficulties in toddler and preschool-age children with (n = 31) and without (n = 59) significant behavior problems. Furthermore, the current study investigated the relationship between sleep difficulties and other psychological constructs (i.e., maternal general stress, maternal depression, and parenting stress), which might be related to sleep and behavior problems. Mothers of clinically referred children with behavior problems and nonclinically referred children without behavior problems completed measures regarding their children's sleep and behavior as well as their own general stress, parenting stress, and depressive symptomology.

Overall, children with behavior problems showed significantly more sleep difficulties than children without behavior problems. Specifically, when compared to

children without behavior problems, children with behavior problems took more time to initiate sleep, showed increased bedtime resistance, had more night wakings, and had shorter sleep durations. Additionally, the results showed that other factors (i.e., maternal depression, family stress, parent-child relationship stress) likely contribute to and/or maintain sleep disturbances in children. The findings from this study suggest a complex relationship between childhood sleep, daytime externalizing behaviors, and maternal health. Potential clinical implications of these findings and future directions for research are discussed.

(120 pages)

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Penny L. Sneddon

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CHAPTER I

INTRODUCTION

Although the majority of children within the infant and toddler age range do not have diagnosable psychological disorders, up to two thirds of parents of children within this age range express concern about their children's behavior (Mathiesen & Sanson, 2000; Stallard, 1993). There are numerous social, emotional, and behavioral problems toddlers and preschool children can exhibit. Although some levels of these problem behaviors are developmentally appropriate and expected, such problems can potentially persist into later childhood, adolescence, and even adulthood (Campbell, 1987; Campbell & Ewing, 1990; Pierce, Ewing, & Campbell, 1999). Recognition of the potential long-term persistence of emotional and behavioral problems has sparked an increased emphasis in prevention and early intervention efforts targeted toward toddler and preschool-age children.

Some of the more common problems reported by parents of young children are sleep disturbances. Research investigating prevalence rates of sleep problems among preschool- and toddler-age children vary, with rates ranging from 27-54% (Atkinson, Vetere, & Grayson, 1995; Blunden et al., 2004; Kataria, Swanson, & Trevathan, 1987; Lozoff, Wolf, & Davis, 1985; Richman, Stevenson, & Graham, 1975; Smedje, Broman, & Hetta, 1998; Zuckerman, Stevenson, & Bailey, 1987). Variation between prevalence rates may be attributed to methodological differences between studies (e.g., the wide variety of sampling procedures used, instruments used to measure sleep problems, and differences in the operational definition used to define a sleep disturbance; Atkinson et al.; Kataria et al.; Lozoff et al.; Smedje et al.; Zuckerman et al.). The sleep difficulties

infants and toddlers exhibit most often involve frequent night wakings and resistance going to bed. Although some sleep problems dissipate with time, children who exhibit sleep disturbances at a young age are more likely to exhibit persistent sleep problems (Mindell, 1993; Stein, Mendelsohn, Obermeyer, Amromin, & Benca, 2001; Zuckerman et al.).

The impact of sleep deprivation and sleep restriction has been studied extensively in adults but much less with children, particularly preschool and toddler age children. Results from previous studies with school-age children suggest sleep problems can result in short term deficits within a variety of areas of a child's functioning (e.g., Sadeh, Gruber, & Raviv, 2002, 2003); however, there is little research related to long-term effects of sleep deprivation within this population. Although most experimental studies of sleep deprivation have been conducted with adult populations (e.g., Drake et al., 2000), the experimental studies conducted with school-age children have mostly looked at acute loss of sleep and its short-term impact on performance on various neurobehavioral functioning tests (e.g., finger tapping test, reaction time test, continuous performance task, visual digit span; Sadeh et al.). However, using a sample of healthy adults (n = 12, ages 21-35), Drake and collegues showed that acute sleep loss (e.g., not sleeping for one night) has a more negative impact than cumulative sleep loss (e.g., a few nights of moderate sleep restriction) on alertness, performance, and memory. Moreover, both short-term and cumulative sleep loss have been associated with higher rates of disruptive behavior (e.g., hyperactivity, conduct problems, inattentiveness, and social relationship problems) and decreased capacity in cognitive tasks (e.g., school performance and abstract reasoning; Bates, Viken, Alexander, Beyers, & Stockton, 2002;

Kahn, Van de Merck, & Rebuffat, 1989; Sadeh et al., 2002; Smedje et al., 2001; Stores, 2001). Weissbluth (1989) suggested that sleep loss is a form of stress, which ultimately results in difficulty with emotional regulation, attention regulation, and a decreased ability to learn higher order cognitive concepts (e.g., abstract concepts). Because of the potential effects of sleep loss on a child's behavior and ability to carry out cognitive tasks, it seems likely that improvement in sleep would result in improvements in learning, performance in school, and behavior.

In addition to the impact sleep might have on cognitive and behavioral tasks, a child's sleep problems can also adversely impact the family. Sleep loss in children can result in parental loss of sleep, which can lead to problems ranging from frustration and stress to marital discord and child abuse (Bates et al., 2002; Chavin & Tinson, 1980; El-Sheikh, Buckhalt, Mize, & Acebo, 2006; Goodlin-Jones & Anders, 2000; Meltzer & Mindell, 2007; Thome & Skuladottir, 2005). Researchers have noted a relationship between maternal mental illness and children's sleep problems (Seifer, Sameroff, Dickstein, Hayden, & Schiller, 1996; Shang, Gau, & Soong, 2006). Other research has specifically found maternal depression to be related to sleep difficulties in children (Bates et al.; Lam, Hiscock, & Wake, 2003; Lozoff et al., 1985; Meltzer & Mindell; Richman, 1981); although this finding is not consistent across all studies (Zuckerman et al., 1987). Family stress and poor parent-child relationships have also been associated with a higher occurrence of sleep disturbances in children (Quine, 1992; Sadeh, Hauri, Kripke, & Lavie, 1995).

Although research investigating sleep disturbances in young children has increased during the past 15 years, there remains a limited amount of research

specifically investigating sleep disturbances in preschool and toddler children with significant externalizing behavior problems. Additionally, there have been various approaches (e.g., different methods of sampling, different operational definitions of sleep disturbances, and different methods used to measure sleep) used to investigate the relationship between sleep and behavior in children, making it difficult to directly compare findings about the relationship between sleep and behavior across studies.

Previous research that investigated the relationship between sleep and behavior has used various populations of children. Some researchers have examined behavioral correlates in children referred for significant sleep difficulties (Owens-Stively et al., 1997; Thome & Skuladottir, 2005; Zuckerman et al., 1987). Other researchers have investigated the relationship between sleep and behavior using samples of children from the community (e.g., Hiscock, Canterford, Ukoumunne, & Wake, 2007; Smedje et al., 2001; Stein et al., 2001). There has been no research investigating sleep in preschool and toddler age children clinically referred for behavior problems. However, there has been research that has looked at sleep correlates in children from community samples who show significant behavior problems, as indicated by ratings on behavior questionnaires. Lavigne and colleagues (1999) showed that shorter durations of sleep in children 2-5 years of age was related to higher rates of externalizing behavior (e.g., aggression); however, no significant associations were found between internalizing behavior problems (e.g., anxiety, depression) and sleep. Conversely, other researchers have shown that improvements in the sleep patterns of young children do not necessarily result in improved daytime behavior (Richman, Douglas, Hunt, Lansdown, & Levere, 1985; Wiggs & Stores, 1999). For example, Richman and colleagues showed that only 50% of

children (n = 6) who showed marked improvement in sleep after receiving behaviorally based sleep interventions (e.g., ignoring) also showed marked improvement in daytime behavior. The aforementioned studies were the only studies found that addressed the relationship between sleep and behavioral problems specifically in toddler and preschool age children. The limited amount of studies specifically investigating sleep problems in young children with significant behavior problems implies the need for additional studies in order to gain a better understanding of the extent to which sleep problems are exhibited and the type of sleep problems exhibited in children with significant behavior problems.

Furthermore, there has been much variability in the operational definition of sleep problems in research investigating the relationship between sleep and behavior as well as different approaches used to assess sleep disruptions, which include sleep diaries (Richman, 1981), paper/pencil questionnaires (Owens-Stively et al., 1997; Shang et al., 2006; Smedje et al., 2001; Stein et al., 2001; Thome & Skuladottir, 2005), interviews (Zuckerman et al., 1987), or more objective measures such as actigraphy (Aronen, Paavonen, Fjällberg, Soininen, &Törrönen, 2000; El-Sheikh et al., 2006). Few studies have used a combination of these measurement approaches (El-Sheikh et al.; Richman et al., 1985; Wiggs & Stores, 1999). Also, there are currently no paper/pencil sleep measures that have psychometric data to support their use with preschool- and toddler-age children. Therefore, research using a combination of sleep measurement approaches would help to establish the utility of using these measures with preschool- and toddler-age children.

In summary, many studies investigating the relationship between sleep and behavior in children with significant sleep disturbances and in community populations of preschool and toddler age children conclude a relationship between sleep disturbances and behavioral problems. However, few studies have been conducted using samples of clinically referred children who exhibit significant externalizing behavior problems. Furthermore, the differences in methodology among the existing research make it difficult to compare findings across studies. The current research aimed to replicate and build upon previous research. Specifically, this research aimed to look at sleep disturbances in children both with and without significant behavior problems. In addition, maternal correlates of sleep problems (e.g., depression, stress), which have been previously associated with sleep and behavior, were examined. This research builds upon previous research by using a combination of sleep outcome measures in order to help determine the concurrent validity of various sleep measures when used on preschool- and toddler-age children.

Further research on sleep disturbances and behavior problems in preschool- and toddler-age children could be useful in the design of interventions. If sleep problems are linked to daytime behavior problems, interventions designed to treat sleep problems might also lead to improvements of other behavior problems experienced by toddlers and preschool-age children, as well as associated family problems including maternal depression, general stress, and parental stress. Conversely, if interventions are solely directed toward addressing daytime behavior problems in children with sleep problems, children might not show any improvements in sleep disturbances and problems associated with sleep difficulties will likely continue.

The following are the primary research questions that guided this study:

1. Are children who exhibit clinically significant behavior problems more likely to experience sleep disturbances compared to children who do not exhibit significant behavioral problems?

2. Are there differences in the types of sleep disturbances (e.g., night waking, bedtime resistance) experienced by children with and without significant behavior problems?

3. What is the relationship between sleep, behavior problems, maternal depression, and general and parental stress in preschool- and toddler-age children? Which of these factors (e.g., child behavior problems, maternal general stress, parenting stress or depression) are most predictive of sleep difficulties?

In addition, these secondary research questions were addressed in order to gain more knowledge about the assessment of sleep problems.

4. What is the internal consistency of the 8 subscales on the Child Sleep Habits Questionnaire (CSHQ) when used for children within the preschool- and toddler-age range?

5. What is the concurrent validity of the CSHQ and a Sleep Diary measure?

CHAPTER II

LITERATURE REVIEW

The following review of the literature aims to summarize findings from existing research about sleep disturbances and behavioral problems in children, with specific emphasis on preschool- and toddler-age children. This review of the literature will synthesize results from previous studies that focused on sleep problems, behavioral problems, and the relationship between sleep disturbances and daytime behavioral problems. Treatment will briefly be discussed for the various sleep problems. Following this review, overall limitations of the current research investigating the relationship between daytime behavioral problems and sleep disturbances in preschool-age children will be discussed

Sleep Problems

Sleep disturbances (e.g., night waking, difficulty settling, bedtime resistance) are common and reportedly occur in up to 30% of preadolescent children (Lavigne et al., 1999; Lozoff et al., 1985; Reid, Walter, & O'Leary, 1999; Sadeh, Gruber, & Raviv, 2000). Similarly, prevalence studies with children between the ages of 1 and 5 years indicate up to 30% exhibit a sleep disturbance (Lozoff et al.; Richman, 1981; Richman et al., 1975). Although many sleep problems will dissipate with time, for a substantial subset of children sleep problems are likely to persist over time. Indeed, research indicates that children who exhibit sleep disturbances at a young age are more likely to exhibit persistent sleep problems (Lam et al., 2003; Mindell, 1993; Thome & Skuladottir,

2005; Zuckerman et al., 1987). Zuckerman and colleaagues reported that 41% of infants who showed sleep disturbances at 8 months continued to exhibit sleep problems at the age of 3. Furthermore, 74% of children who exhibited no sleep problems at 8 months of age continued to show no sleep problems at the age of 3 years. Lozoff and colleagues (1985) concluded the presence of a sleep disturbance for more than 1 month was associated with persistence of the sleep problem in children 6 months to 4 years of age. Other research (Lam et al.) has shown that children who experienced sleep problems in infancy were more likely to exhibit sleep disturbances in their preschool years, despite successful treatment of sleep difficulties experienced in infancy.

There are numerous sleep problems children might experience. These are often discussed using two general categories: dyssomnias and parasomnias. Dyssomnias include problems related to difficulties initiating and/or maintaining sleep in addition to hypersomnolence, which are problems related to excessive daytime sleeping. Parasomnias are abnormal behaviors (e.g., night terrors, sleepwalking, enuresis) associated with sleep (American Sleep Disorders Association [ASDA], 1997; Mindell, 1996). Prevalence rates of the individual sleep problems when available, detailed descriptions of specific sleep problems, and negative outcomes associated with sleep problems are discussed in the following sections.

Dyssomnias

Difficulties with sleep include difficulties or resistance going to bed, fears related to going to bed, and frequent awakenings during the nighttime. Additionally, children

who experience adjustment sleep disorder, which is a sleep disturbance precipitated by an environmental event, are also considered to have difficulties with sleep (Mindell, 1996).

Bedtime Resistance Problems/Night Wakings

A common problem encountered by parents is resistance from the child to go to bed, often referred to as a limit setting sleep disorder. Bedtime resistance is often encountered during the preschool years when the child becomes more mobile and/or when the child transitions from a crib to a bed (Lin-Dyken & Dyken, 2002; Mindell, 1996). Between 10-30% of toddler and preschool-age children exhibit bedtime resistance problems (Mindell & Owens, 2003). Bedtime resistance problems are typically amenable to behavioral treatments, which involve the parent establishing and enforcing a bedtime routine and associated rules. Consistent enforcement of rules related to sleep can result in more consistent bedtime routines and bedtimes, which result in increased amounts of sleep. Children over 3 often show compliance with the bedtime routine and going to bed when rewards are offered for appropriate behavior (France, Henderson, & Hudson, 1996).

Frequent night wakings are also common in young children. Although night awakenings are less prevalent after the age of 3, as many as 30% of children have frequent night awakenings until they are of school age (Dahl, 1995; Shang et al., 2006; Weissbluth, 1995). Most cases of night awakenings are a product of behavioral and learned factors. Most children wake during the night and are able to reinitiate sleep with no assistance. When parents quickly attend to the night awakenings, children do not learn to self-soothe to reinitiate sleep, hence they become dependent on the caregiver's

presence to fall back asleep (Benhamou, 2000; Dahl; Mindell, 1996; Mindell, Kuhn, Lewin, Meltzer, & Sadeh, 2006).

Similar to bedtime resistance, night awakenings in children can be decreased with increased limit setting for appropriate bedtime behavior (e.g., staying in the bed when waking), and consistent consequences (e.g., earning or losing privileges) for appropriate and inappropriate behavior. For example, a child might earn a reward upon waking for staying in his/her room throughout the duration of the night (France et al., 1996). Night awakenings with toddlers and preschool-age children are often treated using one of several extinction approaches, all of which involve the parent setting and enforcing rules pertaining to bedtime behaviors. Although there are various approaches that can be used in order to decrease the frequency of night wakings, the ultimate goal for all treatments for night waking is for the child to learn to self-soothe and fall asleep independent from the presence of parents. Unmodified extinction involves establishing and enforcing a consistent bedtime routine, placing the child in his/her bed, and not attending to the child until the morning. With this technique, all behaviors (e.g., crying, waking) are ignored until the child wakes in the morning unless the child is ill or in danger. Graduated extinction involves reducing parental attention gradually using one of two methods: parents wait for progressively longer periods of time before attending to their child or parents immediately attend to their child and progressively decrease the amount of time they spend attending to their child (Durand & Mindell, 1990; Lawton, France, & Blampied, 1991). Extinction of the parent uses the unmodified extinction method; however, the parent stays in the child's bedroom once the child is placed in bed. The parent lies in a bed and pretends to be asleep, while ignoring any attempts made by the

child to gain attention. The parent leaves the room once the child is asleep (Sadeh, 1994). All of these interventions can be effective in decreasing the need for parental involvement at both the onset of sleep and the re-initiation of sleep onset after awakening during the night. A recent review of 52 treatment studies focused on reduction of night wakings indicated that behavioral interventions (e.g., extinction, bedtime fading/positive routines, and preventative parent education) are effective in reducing the frequency of night wakings. Most children (94%) across the studies showed improvements in sleep, with 80% of these improvements maintained for more than 3 months (Mindell et al., 2006).

Nighttime Fears

In addition to resistance to going to bed and frequent night wakings, preschool- and elementary-age children often experience nighttime fears. Research shows nighttime fears occur in almost all children and are considered to be developmentally expected occurrences in preschool and school-age children. For example, children will often fear they have monsters in their room. Fear of dying during sleep and fear that something bad will happen to family members during the nighttime are also common. Typically nighttime fears decrease with maturation and/or with reassurance from parents. Although fears are often eliminated with the use of assurance, strict nighttime rules (e.g., staying in bed) need to be adhered to (Mindell & Owens, 2003). If fears are not reduced by assurance and maturation, psychotherapy using techniques such as imagery, relaxation, self-instruction, and challenging cognitions can be effective (Friedman & Ollendick, 1989; Graziano & Mooney, 1980, 1982; King, Cranstoun, & Josephs, 1989;

Ollendick, Hagopian, & Huntzinger, 1991), even in children as young as 4 years of age (McMenamy & Katz, 1989).

Adjustment Sleep Disorder

Adjustment sleep disorder involves sleep disturbances that are precipitated by environmental events. For example, a child who is hospitalized for illness might experience sleep disturbances while residing in the hospital. The duration of the sleep problems varies and often is dependent on the chronicity of the disturbing events. Children are likely to experience adjustment sleep disorder during times of transition (e.g., switching schools) or after or during a disturbing event (e.g., scary movie, abuse). There has been little research done on the treatment of adjustment sleep disorder primarily because the sleep problems tend to naturally resolve with time; however, therapy focusing on the disturbing event is often used for treatment of more chronic problems (Mindell, 1996).

Excessive Daytime Sleepiness

Excessive daytime sleepiness is more common in adolescents than in younger children; hence, these types of problems will only be discussed briefly. Excessive sleepiness can be caused by various problems such as a lack of night-time sleep and various sleep disorders such as narcolepsy, idiopathic hypersomnolence, Kleine-Levin syndrome, delayed sleep phase disorders, and sleep apnea (Wise, 1998).

Narcolepsy is characterized by excessive daytime sleepiness and is often accompanied by other neurological abnormalities such as cataplexy (decreased muscle tone) and dreamlike imagery prior to falling asleep. Idiopathic hypersomnolence is also

characterized by persistent and excessive daytime sleepiness, but differs from narcolepsy in that individuals with idiopathic hypersomnolence do not have cataplexy nor do they experience rapid eye movement (REM) sleep during their naps. Additionally, while individuals with idiopathic hypersomnolence nap up to 2 hours a day, they do not find the naps refreshing. Idiopathic hypersomnolence is often treated using behavioral interventions consisting of planned naps in addition to the use of stimulant medication (Littner, Johnson, & McCall, 2001; Wise, 1998).

Kleine-Levin syndrome is a neurological disorder characterized by episodes of problems including excessive somnolence, hypersexuality, compulsive overeating, and mental disturbances (e.g., irritability, thought problems such as hallucinations and confusion; Levin, 1929). There is not a known cure for Kleine-Levin syndrome and treatment for Kleine-Levin syndrome consists primarily of treating symptoms (e.g., sleep) of the major disorder.

Delayed phase sleep disorder results in sleeping problems that are caused by a shift in the sleep/wake schedule. Individuals with delayed phase sleep disorder often experience good sleep quality; however, these individuals have a later sleep onset and wake later in the day. The sleep/wake often interferes with the individual's daily obligations (e.g., school, work, behavior; Lin-Dyken & Dyken, 2002; Mindell & Owens, 2003). This disorder is most common in adolescents (affecting 5-10%) and is primarily treated using methods aimed to change and stabilize to a more normal sleep/wake schedule. For example, treatment can involve setting a bedtime similar to the time the individual naturally falls asleep and bedtime is then gradually moved to an earlier time. Simultaneously, the individual will wake each morning at a designated time.

Chronotherapy can also be used to treat delayed phase sleep disorder. During chronotherapy the bedtime is delayed 3 hours each day. For example, if an individual typically goes to bed at 3:00 a.m., bedtime would be moved to 6:00 a.m. the first day of treatment, 9:00 a.m. the second day of treatment, and so forth, until the desired bedtime is accomplished. Chronotherapy requires strict treatment adherence and should be attempted only when the child's obligations are limited (Garcia, Rosen, & Mahowald, 2001; Mindell & Owens, 2003).

Parasomnias

Parasomnias consist of a variety of unusual sleep behaviors that include night terrors, nightmares, sleepwalking, confusional arousals, enuresis, and bruxism. Neither enuresis (recurrent and involuntary bedwetting) nor bruxism (stereotypic movements of the mouth that result in clenching and grinding of the teeth) is associated with any particular stage of sleep (Adair & Bauchner, 1993; Anders & Eiben, 1997). Confusional arousals, sleep terrors, and sleepwalking are parasomnias that have similar clinical features. These behaviors occur at the end of the first period of deep slow-wave sleep (typically within the first 1-3 hours of sleep) during transition to REM sleep, a lighter sleep, or a brief arousal. Additionally, these parasomnias are often characterized by agitation and/or confusion that are not responsive to comforting by caregivers (Rosen, Ferber, & Mahowald, 1996). Prevalence rates indicate 1-6% of all children experience night terrors and 1-8% of all children experience chronic sleepwalking (Shang et al., 2006; Simonds & Parraga, 1982). No prevalence rates specific to preschool- and toddler-age children could be located.

Confusional Arousals/Sleep Terrors/Sleep Walking

Confusional arousals often consist of a child exhibiting slow speech, disorientation, and slow response patterns in comparison to night terrors, where a child is often unresponsive to others and seems panicked and agitated. When a child sleepwalks, the child's eyes are typically open and the child might seem confused and mumble or answer questions directed to her/him inappropriately. Children who sleepwalk might also exhibit strange behavior (e.g., urinating in the closet). Both night terrors and confusional arousals often are interpreted as anxiety based; however, research indicates both behaviors are normal developmental phenomena that typically subside by adolescence (Kales, Kales, Soldatos, Caldwell, Charney, & Martin, 1980; Mahowald & Rosen, 1990; Mahowald & Schenck, 2000). When seeking treatment, parents are often instructed to ignore the awakenings unless the child is in danger (Mahowald & Schenck). Additionally, scheduled awakenings (Lask, 1988) and short-acting medications such as diazepam and imipramine have been shown to decrease night terrors (Cameron & Thayer, 1985; Fisher, Kahn, Edwards, & Davis, 1973).

Nightmares

Nightmares occur in approximately 10-50% of all children between the ages of 3 and 6 years (Diagnostic Classification Steering Committee, 1990; Mindell & Owens, 2003). The occurrence of nightmares decreases with time, with very few children experiencing them into their adolescence (Diagnostic Classification Steering Committee). Nightmares can be differentiated from night terrors because they typically occur in the second half of the night during REM sleep. Unlike the retrograde amnesia often

experienced after a night terror, children experiencing nightmares often wake up after the nightmare and often remember the nightmare the following day. Very little is known about the cause of nightmares; however, the occurrence seems to increase during periods of traumatic events (e.g., death of a loved one; Mindell & Barrett, 2002). Typically, children only require reassurance after experiencing a nightmare; however, more persistent nightmares are often treated by guided imagery, relaxation, systematic desensitization, and cognitive behavioral techniques such as use of coping statements. Empirical support for cognitive behavioral techniques to treat nightmares has come primarily from single case studies (Cavior & Deutsch, 1975; Krakow, Kellner, & Pathak, 1996; Palace & Johnston, 1989).

Physiology of Sleep

Children's sleep patterns change with age and significantly differ from adult sleep patterns. Dahl (1995) reported the average 1-year-old child sleeps approximately 11 hours during the night in addition to 2.5 hours of sleep across two daytime naps. The average nighttime sleep duration drops to 10.5 hours accompanied by a 1.5 hour nap during the daytime by the time a child reaches the age of 3. Between the ages of 2-6, children sleep approximately 10-12 hours during a 24-hour time period. Most of this sleep occurs during the nighttime, although many children continue to take naps until 3-4 years of age (Anders, Sadeh, & Appareddy, 1995; Jenni & LeBourgeois, 2006; Mindell & Owens, 2003; Mindell, Owens, & Carskadon, 1999; Weissbluth, 1995).

In order to accurately evaluate and diagnose a sleep disorder, a basic understanding of sleep physiology, the various stages of sleep, and developmental processes is necessary. Three electrophysiologic measures (i.e., electroencephalogram [EEG], muscle tone, and eye movements) are used to divide sleep into two broad categories: REM or active sleep and nonrapid eye movement (NREM or quiet) sleep. REM sleep is characterized by rapid eye movement, decreased muscle tone, and changes in the regulation of subcortical central nervous functions (variability in blood pressure, increased heart rate and respiration; Dahl, 1995). During REM sleep, infants and young children might move their arms and legs, cry, whimper, or sleep with their eyes partly open. During REM sleep, higher cortical functions remain active. For example, dreaming occurs during REM sleep and if awakened while in REM sleep, the person gains alertness quickly (Dahl, 1995; Mindell & Owens, 2003; Mindell et al., 1999; Saper, Scammell, & Lu, 2005). Until the age of 3 or 4, the organization of sleep patterns differs from those of adults. When compared to adult sleep patterns, young children spend more time in REM sleep and settle into stage 4 NREM sleep faster. Compared to adults, infants experience faster REM sleep onset and REM cycles are shorter (50 minutes); however, durations of REM cycles gradually increase in duration through childhood. By 6 months of age, REM cycles occur through most of the night and last 60-110 minutes in duration. Around the ages of 2-4, children's REM and NREM sleep closely resemble those of adults, with the most intense cycle of REM sleep occurring just prior to morning awakening (Anders et al., 1995; Dahl; Mindell & Owens; Mindell et al.; Saper et al.).

NREM sleep is divided into four different stages: 1, 2, 3 and 4. Very young infants do not experience these four stages of NREM sleep; however, around 3 months of

age, NREM sleep in infants and adults begins to resemble each other (Dahl, 1995; Mindell & Owens, 2003; Mindell et al., 1999). Soon after an individual transitions into sleep, stage 1 sleep begins. Stage 1 sleep is characterized by little EEG activity. EEG activity increases at the onset of stage 2 sleep. Stages 3 and 4, commonly referred to as delta and slow wave sleep, represent the deepest levels of sleep in humans and typically occur within the first 3 hours of sleep. During NREM sleep, children lie still and breathing is regular. The amount of slow wave and delta sleep decreases as age increases. Slow wave sleep increases in proportion to how long an individual has been awake and increases when an individual is sleep deprived or experiences sleep disturbances (Dahl; Mindell & Owens; Roffwarg, Muzio, & Dement, 1966; Saper et al., 2005).

Culture and Sleep

One area of sleep research has focused on identifying cultural differences in sleep practices and how sleep problems are viewed across various cultures. One result of this research has shown cultural differences in sleep practices concerning where the child sleeps. For example, Mayan communities in Guatemala place less emphasis on a child sleeping independently, as their values are more communal and interdependent (Morelli, Rogoff, Openheim, & Goldsmith, 1992). Conversely, other cultures (e.g., United States and Germany) are more likely to value independence and a child sleeping alone (Morelli et al.; Valentin, 2005). Other research has identified cross-national differences in the importance placed on bedtime routine. For example, in the United States there is an emphasis placed on children engaging in a consistent sleep routine, as this is believed to

help the child learn to calm and use self-regulation skills (Milan, Snow, & Belay, 2007). Conversely, other countries (e.g., Italy) place less value on bedtime routine and parents are more likely to allow their children to fall asleep when they get tired (Ottaviano, Giannotti, Cortesi, Bruni, & Ottaviano, 1996). Furthermore, there is evidence to suggest cross-national differences in how parents perceive their children's sleep behavior. For example, higher prevalence rates of sleep difficulties (e.g., daytime sleepiness, difficulty initiating sleep) were found in children from China as opposed to children from the United States. It was suggested the differences in prevalence rates could be a result of differences in parental expectations (Liu, Liu, Owens, & Kaplan, 2005).

Other studies have looked at the cultural differences in sleep amongst various cultural groups within the United States. A recent study investigated cultural differences in perceptions of children's (mean age = 35.5 months) sleep and differences in children's sleep habits in 3,068 African American, Caucasian, and Latina mothers within the United States. After controlling for various confounding factors (e.g., number of rooms in the household, parental shift work), results showed that Caucasian mothers reported more sleep difficulties in their children compared to mothers who were Latina or African American, and children who were African American and Latino/a were more likely to sleep with a parent compared to children who were Caucasian. There were no differences between the three ethnic groups in their reported use of bedtime routines (Milan et al., 2007). Results from another study investigating culture and sleep in African American and Caucasian children showed that African American children (ages 2-7) were reported to have later bedtimes, shorter durations of sleep and more daytime sleepiness than Caucasian children (McLaughlin Crabtree et al., 2005). Overall, research

investigating sleep perceptions and practices cross-nationally and also within different ethnic groups within the United States implies that cultural values and practices impact how parents perceive their children's sleep.

Behavioral Problems in Young Childhood

Although anecdotal evidence supports the notion that deficiencies in the amount of sleep a child gets can have a negative impact on behavioral and emotional functioning, there is limited research specifically investigating the emotional and behavioral correlates of sleep disturbances in preschool- and toddler-age children. In order to better understand the behavior problems commonly exhibited by preschool and toddler age children that might be associated with sleep problems, the following sections will provide an overview of daytime behavior problems that are likely to be exhibited by preschool- and toddler-age children.

Types of Behavioral Problems

Behavior problems are generally divided into two types of categories: externalizing and internalizing problems (Achenbach, Edelbreck, & Howell, 1987). Externalizing behaviors include a broad range of behaviors that are often characterized by aggressiveness, hyperactivity, and/or antisocial characteristics (Cicchetti & Toth, 1991; Koot, 1993). For example, children who exhibit externalizing behavior problems will often exhibit one or more of the following behaviors: acting-out, defiance, opposition, hyperactivity, and disruptive behavior. Because externalizing problems are often overt, disruptive and annoying to others, they are often easily identified.

Unlike externalizing behavior problems, internalizing behavior problems often go undetected and can be difficult to identify in young children. Symptoms that fall under the umbrella of internalizing symptomology include depressed mood, anxiety, withdrawn behavior, irritability, and somatic complaints. Symptom presentation of internalizing problems can differ between young children and older children. For example, young children often have somatic complaints (e.g., headaches, stomachaches), cry excessively, tantrum, or exhibit anger when they are anxious or depressed compared to older children who might discuss their emotions (Achenbach et al., 1987; Gimpel & Holland, 2003; Koot, 1993).

Although there are diagnostic categories for behavioral problems that can be given to preschool- and toddler-age children when appropriate, children within this age range often do not receive formal diagnoses of externalizing disorders (i.e., attention-deficit/hyperactivity disorder (ADHD), conduct disorder, and oppositional defiant disorder) or internalizing disorders (i.e., depressive and anxiety disorders; *Diagnostic and Statistical Manual of Mental Disorder, 4th ed.- text rev.;* American Psychiatric Association [APA], 2000; Lavigne et al., 1996). Instead, these children are often referred for treatment by parents and teachers because of difficult-to-manage behaviors such as tantrums, aggression, whining, irritability, and noncompliance (Gimpel & Holland, 2003; Thomas, Byrne, Offord, & Boyle, 1991). Interventions are then designed to treat the specific symptoms with which the child presents.

Prevalence and Gender

The DSM-IV-TR (APA, 2000) does list prevalence rates for the various disorders

discussed in the previous paragraphs; however, until recently there has been little research conducted investigating prevalence rates of disorders specifically in the preschool and toddler population. Although some children below the age of 5 will undoubtedly meet criteria for a psychological disorders defined in the DSM-IV-TR, the DSM-IV-TR fails to identify guidelines delineating developmentally appropriate manifestations of symptoms such as noncompliance, inattention, and disruptive behavior. For this reason, it is often difficult to differentiate between normal developmental behavioral problems compared to significant behavioral problems that would meet criteria for a diagnosis. Concerns have been voiced about the need to take precautions when applying diagnostic criteria developed and applied primarily to adults to children (Gimpel & Holland, 2003). For this reason, much of the research investigating prevalence of behavior problems in preschool-age and toddler children has been conducted using behavior checklists that use cut-off criteria to define the presence or absence of a behavioral problem, although some research has used categorical criteria for disorders in the DSM and/or a combination of the two.

Campbell (1995) conducted a review of the literature pertaining to the prevalence, course, and correlates of behavior problems in preschool- and toddler-aged children. The review included a comprehensive analysis of research studies pertaining to behavioral problems that occur in early childhood, including both prospective epidemiological studies and follow-up studies of both clinical (high risk) and nonclinical samples. Campbell made the following conclusions based on her review of the literature: roughly 10-15% of preschool children have mild-to-moderate behavioral problems; behavioral problems that are identified early (ages 3-4) have a 50% likelihood of persisting into

childhood and adolescence; and negative and inconsistent parenting behavior in addition to high rates of familial adversity are associated with the onset and persistence of behavioral problems into childhood.

Some research has specifically focused on rates of behavior problems within non-clinical samples. These studies suggest that prevalence rates of behavior problems within nonclinical populations range between 7-13%. Richman and colleagues (1975) conducted a survey of behavioral problems among 3-year-old children living in London. Fifteen percent of their sample met criteria for mild behavioral problems, while 7% met criteria for moderate-to-severe behavioral problems. Using a sample of 3-year-olds from rural Pennsylvania, Cornely and Bromet (1986) reported 11.3% of the children scored above the clinical cutoff on a behavioral rating scale. Koot (1993) reported 12.5% of his large representative sample of 2- and 3-year-olds in Holland scored higher than the 98th percentile on at least one of the syndrome scales of the Child Behavior Checklist (CBCL; ages 2-3), with higher rates in males (14.4%) compared to females (7.8%).

Lavigne and colleagues (1996) reported that 8.3% of children between the ages of 2 and 5 showed significant behavioral problems when 90th percentile cutoff scores were used on the CBCL. The occurrence of externalizing behavioral problems and internalizing behavioral were the same when using the CBCL (3.7%). Within this same sample, 21.4% of the children met criteria for a DSM-III-R (*Diagnostic and Statistical Manual of Mental Disorders, 3rd ed., revised;* APA, 1994) diagnosis. The most common diagnosis was Oppositional Defiant Disorder (16.8% of the total sample), followed by ADHD (2% of the total sample). Less than 1% of the children met DSM-III-R (APA) criteria for internalizing disorders (i.e., depression or individual anxiety disorders).

Other research has compared prevalence rates of child behavior problems in the general population to prevalence rates in low socioeconomic households. Huaquing Qi and Kaiser (2003) systematically reviewed research on the prevalence of behavior problems in preschool-age children from low-income families. Of the 30 studies reviewed, the percentages of children exhibiting a significant externalizing behavior ranged from 16-30%. The percentage of children exhibiting internalizing disorders ranged from 7-31%. Differences in the prevalence rates found were attributed to factors such as the informant (e.g., teacher vs. parent) and the type of behavioral checklist used. Based on the results, the authors concluded that children from low-income families consistently showed higher prevalence rates of both externalizing and internalizing problems when compared to prevalence rates that would be expected in the general population (3-6%).

Other studies have looked at rates of behavior problems in clinically referred samples. Keenan and Wakschlag (2000) reported that approximately 80% of their clinically referred sample of children between the ages of 2 and 5 met diagnostic criteria for at least one of the DSM-IV disruptive behavior disorders. Authors of another recent study reported 34% of their sample of clinic-referred children between the ages of 18-47 months met DSM-IV (APA, 2000) criteria for at least one of the DSM disruptive behavior disorders. The same percentage (34%) of children from this same sample also met DSM-IV criteria for an internalizing disorder (Thomas & Guskin, 2001).

The results from studies that have looked at gender differences in the prevalence rates of behavioral problems within the preschool- and toddler-age population have been variable, with some studies indicating higher rates of externalizing behavioral problems

(e.g., tantrums, disobedience, aggressive behavior, overactivity) in males (Crowther, Bond, & Rolf, 1981; Luk, Leung, Bacon-Shone, & Lieh-Mak, 1991; Prior, Smart, Sanson, & Oberklaid, 1993; Webster-Stratton, 1996). Other studies have not found significant differences in the rates of behavioral problems between females and males (Achenbach et al., 1987; Newth & Corbett, 1993).

Sleep and Behavior Problems

Sleep and Daytime Behavior Problems

The relationship between sleep disturbances in children and daytime behavioral problems has been a topic of interest in recent research. Researchers have investigated the relationship between sleep and behavior problems using a variety of approaches. Some researchers have investigated whether sleep differs in children from community samples with and without daytime behavior problems, while others have researched whether children with sleep problems are more likely than children without sleep problems to exhibit daytime behavioral problems. Still other researchers have focused on whether behavioral changes occur as a result of decreases in sleep disturbances after sleep interventions have been implemented. Much of the research suggests there is a relationship between sleep patterns and daytime behavior; however, some studies have reported inconsistent findings pertaining to the relationship between sleep disturbances and daytime behavioral problems. Additionally, much of the research conducted has focused on older children, resulting in a lack of research specifically investigating the relationship between sleep difficulties and daytime behavioral problems in children within the preschool- and toddler-age range. Most importantly, there is no research that

directly assesses sleep in children who are clinically referred for behavior problems. The following section will review the research related to the relationship between sleep and behavior in preschool-, toddler-, and school-age children.

One line of research investigates the relationship between sleep problems and behavior problems in preschool- and toddler-age children from community samples. For example, Lavigne and colleagues (1999) investigated sleep and daytime behavioral problems in 510 children between the ages of 2-5 who scored $\geq 90^{th}$ percentile on the CBCL during an initial screening process. In an interview parents reported the total amount of sleep their children received during the night and the sleep they received during a 24-hour period. The authors then explored the relationship between sleep and the presence of a diagnosable DSM psychiatric disorder (determined during participation in the study) and behavioral problems as measured by the CBCL (Achenbach, 1991, 1992). Results showed that children who slept less during the night were more likely to meet criteria for a DSM diagnosis and had higher total behavior problems scores on the CBCL (Multiple $R = .32$). Children who slept less during a 24-hour period showed higher scores on the total behavior problems score on the CBCL (Multiple $R = .31$), but they were not more likely to meet criteria for a DSM diagnosis. Although decreased amounts of sleep were associated with higher externalizing behavior problems there were no significant associations between sleep and internalizing behavior problems. Richman (1981) also showed that children (ages 1-2) from a community sample with sleep disturbances ($N = 55$), as defined by the child waking five or more times per week for more than 3 months, scored higher on a behavioral rating measure compared to children without sleep disturbances ($N = 30$). Hiscock and colleagues (2007) investigated the

relationship between sleep and behavior in 4,983 Australian children 4-5 years of age. Parental report was used to assess sleep disruptions (i.e., none, mild, moderate and severe) and the frequency with which specific sleep problems occurred (i.e., > = 4 nights/week), while behavior was measured using a questionnaire. The results of this study showed that children with sleep problems (e.g., difficulty falling asleep, morning tiredness) exhibited more behavior problems (e.g., hyperactivity).

Other research investigated sleep and behavior in school-aged children from community samples. For example, one study showed that children (n = 71, average age = 6 years) whose parents reported them to have behavioral, developmental, and/or academic problems exhibited more sleep difficulties (e.g., snoring, mouth breathing, night waking, shorter durations of sleep, longer sleep onset) than their same-aged peers (Weissbluth, Davis, Poncher, & Reiff, 1983). Smedje and colleagues (2001) investigated the relationship between sleep and behavior using 635 Swedish children, ages 6-8. Parents completed a sleep habits questionnaire and behavioral screening questionnaires. Results showed that 36% of children with global sleep problems also exhibited comorbid behavior problems, where 15% of children with significant behavior problems also had comorbid sleep problems. Children who exhibited high rates of hyperactivity showed increased rates of tossing and sleep walking during sleep. Children with conduct problems were more likely to exhibit bedtime resistance and children who exhibited emotional problems (symptoms of depression and anxiety) had higher rates of night terrors, more difficulty falling asleep, and daytime somnolence (Smedje et al., 2001). Stein and colleagues (2001) also used a community sample of 472 children to examine sleep problems in school-age children (ages 4-12). Parents completed a CBCL and

answered questions pertaining to medical history and both current and past sleep patterns of their children. Results showed sleep problems present at the age of 2 were the best predictors of current sleep problems. There was a strong, positive correlation between sleep problems and both internalizing and externalizing scores on the CBCL. Specific sleep disorders were also associated with specific subscale scores: tiredness was best predicted by social problems and somatic complaints subscales; insomnia was best predicted by the anxious/depressed, attention problems, and somatic complaints subscales; enuresis was best predicted by the thought problems subscale; and noisy sleep was best predicted by the aggressive behavior subscale. Another study investigated the relationship between sleep and behavior in 1,391 children (ages 4-9). Parents completed the CBCL and a sleep questionnaire. Results showed that children with sleep disturbances (i.e., early insomnia, late sleeping, night wakening, sleep talking, sleep terrors, nightmares, bruxism, and snoring) scored higher on all CBCL subscales. Children with enuresis scored higher on all CBCL scales with the exception of the thought problems subcale and children who sleepwalked scored higher on all CBCL subscales except the anxious/depressed, somatic complaints and withdrawn subscales (Shang et al., 2006).

Another study investigated the relationship between sleep and behavior in children referred for sleep problems. Owens-Stively and colleagues (1997) compared daytime behavior of children with diagnosed sleep disorders (behavioral sleep disorders such as limit setting and sleep onset association disorders, obstructive sleep apnea, and parasomnias) and children without sleep problems who were recruited from primary care clinics. Results showed that children with diagnosed sleep disturbances (average age 5.7

years) exhibited more disruptive behavior during the daytime compared to children without sleep difficulties (average age 4.3 years).

Other researchers have investigated the relationship between sleep problems and daytime behavior problems using longitudinal data. For example, Zuckerman and colleagues (1987) conducted a study across 3 years, where information about the children's (n = 308) sleep and behavior was taken at 8 months of age and again at 3 years of age. Results showed that children who exhibited persistent sleep disturbances (defined as sleep onset at bedtime that lasted more than 1 hour or waking more than 3 times during the night at both the 8 months of age and 3 years of age based on interviews with mothers) showed more behavior problems (e.g., tantrums and behavior management problems) compared to children who did not exhibit persistent sleep disturbances. Scher, Zukerman, and Epstein (2005) also looked at the potential impact of persistent sleep problems on daytime behavior in a sample of 68 children. Results showed that night waking during the first year of life was not predictive of behavior problems at 3 years of age; however, children with both persistent night waking and ongoing sleep difficulties (e.g., difficulty settling) scored higher on the CBCL at the age of 3. Thome and Skuladottir (2005) conducted a longitudinal study with children (n = 31, ages 3-5) who were referred and successfully treated for sleep disturbances in infancy. Sleep patterns of the referred group (n = 31) were compared to those of a community sample of children (n = 17) who experienced sleep difficulties (e.g., settling, waking) in infancy, and a community sample of children (n = 19) who were not reported to experience sleep difficulties in infancy. Sleep was assessed using a questionnaire that addressed sleep difficulties in infancy to the child's present age. Results showed that both referred and

nonreferred children who experienced sleep difficulties in infancy showed improvements in sleep behavior at the age of 3 to 5; however, both referred and nonreferred children with sleep problems in infancy were more likely to experience night wakings at follow up than children reported to have no sleep difficulties in infancy. Nonreferred children with sleep difficulties in infancy were experienced more frequent night wakings at follow up compared to the referred children.

Seifer and colleagues (1996) investigated the relationship between sleep and behavior in a sample of children (n = 182) considered to be "at risk" because of parental mental illness. Both internalizing and externalizing behavior scores on the CBCL were associated with increased sleep problem scores on a sleep questionnaire. Results showed children with more internalizing behavior problems showed more problems during sleep (i.e., restlessness and moves while asleep, moves to another bed during the night, and nightmares), more daytime sleepiness, and had less of a morning preference (i.e., negative mood upon waking, difficulty waking). Children with more externalizing behavior problems exhibited more bedtime problems, more problems while asleep (i.e., restlessness, movement while sleeping), more daytime sleepiness, and shorter total sleep.

The relationship between sleep and behavior suggests that improvements in sleeping patterns might result in improved daytime behavior. Researchers have studied whether behavior changes after children receive interventions for sleep disturbances (Durand & Mindell, 1990; Minde, Faucon, & Falkner, 1994; Richman et al., 1985; Seymour, Bayfield, Brock, & During, 1983). Some research has concluded that improvements in sleep disturbances result in improvements in daytime behavior (Durand & Mindell; Minde et al.; Seymour et al.). In one study, 28 children (12-36 months)

showed marked improvements in daytime behavior after receiving treatment for sleep difficulties (e.g., bedtime resistance and nightwaking) compared to matched peers who did not receive treatment for their sleep difficulties (Minde et al.).

Conversely, other research has concluded that changes in sleep patterns do not necessarily result in improved daytime behavior (Richman et al., 1985; Wiggs & Stores, 1999). Using a sample of children who were clinically referred for sleep problems (n = 6, ages 1-5) Richman and colleagues (1985) found that only 50% of children who showed marked improvement in sleep (e.g., based on sleep diary scores and parental report) after receiving behaviorally based sleep interventions (e.g., ignoring) showed co-occurring improvements in daytime behavior. Wiggs and Stores assigned school-aged children with learning disabilities, significant behavioral problems, and sleep problems (n = 31) to either a behaviorally based sleep intervention group (average age = 8.21 years) or a control group (average age = 10.77 years) where no intervention was provided. Results showed both children who did and did not receive a behaviorally based sleep intervention showed improvement in sleep patterns when measured by actigraphy, but only mothers in the intervention group verbally reported improvements in sleep. Additionally, both groups showed improvements with some specific behaviors (e.g., irritability, hyperactivity, noncompliance, and aggression); however, no behavior changes were specific to the children in the group that received the sleep intervention. Hence, the researchers attributed improvements to nonspecific effects of participation in their study. More specifically, the authors concluded it was likely that behaviors improved because of the gradual increase in sleep duration which the children in both of the groups experienced. No explanation was provided as to why the control group's

sleep duration increased. The Wiggs and Stores (1999) study was the only one that was found that included participants who exhibited both significant sleep problems and significant behavior problems at the onset of treatment. The differences in the samples used in studies investigating the relationship between sleep and behavior makes it difficult to draw conclusions about the impact of sleep improvement on daytime behavior.

Sleep and Cognition/Performance Tasks

In addition to the research on sleep problems and general behavior problems, research has also been conducted investigating the effects of sleep disturbances and sleep loss on cognitive and performance related tasks. Most of this research has been conducted on school-aged children. Results from these studies suggest sleep problems can result in short term deficits within a variety of areas of a child's functioning. For example, sleep loss has been associated with decreased capacity in cognitive tasks (e.g., school performance, abstract reasoning; Bates et al., 2002; Kahn et al., 1989; Smedje et al., 2001; Stores, 2001). Sadeh and colleagues (2002) showed that increased frequency of night wakings and decreased sleep efficiency was associated with poorer performances on neurobehavioral functioning tasks (e.g., reaction time tests, digit recall tests). Experimental studies on sleep deprivation have mostly looked at acute loss of sleep and its short term impact on performance; however, it has been shown that acute sleep loss (e.g., not sleeping for one night) has a more negative impact than cumulative sleep loss (e.g., a few nights of moderate sleep restriction) on alertness, performance, and memory (Drake et al., 2001). Weissbluth (1989) suggested sleep loss is a form of stress, which

ultimately results in difficulty with emotional regulation, attention regulation, and a decreased ability to learn higher order cognitive concepts (e.g., abstract concepts). Because of the potential effects of sleep loss on a child's behavior and ability to carry out cognitive tasks, it seems likely that improvement in sleep would result in improvements in learning, performance in school, and behavior.

Sleep and Family Functioning

Sleep problems in children can also have a negative impact on the family. Often parents of children with sleep disturbances complain about fatigue, stress, feelings of depression, marital difficulties, and poor parent-child relations (Bates et al., 2002; Durand & Mindell, 1990; El-Sheikh et al., 2006; Meltzer & Mindell, 2007; Quine, 1992; Thome & Skuladottir, 2005; Zuckerman et al., 1987). For example, mothers and fathers who reported sleep problems in their children also reported they had an increase in sleep difficulties after becoming parents. Common complaints of mothers included early waking, daytime sleepiness, and not feeling rested upon waking. Common complaints of fathers included not feeling rested, difficulty initiating sleep, and night waking (Smedje et al., 1998). The combination of increased stress and sleep disturbances in parents and increased behavioral problems in children emphasizes the effect that sleep disturbances in a child can have on both the child and the family.

Maternal Psychopathology

The relationship between maternal mental health status and the presence of children's sleep patterns has also been researched. Using a sample of 182 children (ages 12-48 months) with mothers who had a mental illness, Seifer and colleagues (1996)

showed that child sleep disturbances (i.e., bedtime problems and shorter durations of sleep), as measured by the Children's Sleep Habits Questionnaire, were significantly associated to the presence of maternal mental illness. No significant associations existed between specific maternal mental illnesses (e.g., depression, anxiety, personality disorders) and sleep disturbances in children. Other research has specifically linked the presence of maternal depression to sleep difficulties in children (Bates et al., 2002; Lozoff et al., 1985; Meltzer & Mindell, 2007; Richman, 1981). Most of these studies cannot conclude a causal relationship between sleep and maternal depression because of the cross-sectional design of the studies (Bates et al.; Lozoff et al.; Richman); however, one longitudinal study concluded sleep difficulties were not a cause of maternal depression. These conclusions were based on data that showed new diagnoses of maternal depression when a child was 3 years old did not significantly differ in parents of children diagnosed with sleep problems or children without sleep problems at 8 months of age. Additionally, these authors showed that the presence of maternal depression when the child was 8 months was significantly related to the persistence of the sleep disturbances at the age of 3 (Zuckerman et al., 1987).

Familial stress

Family stress and poor parent-child relationships have also been associated with higher occurrences of sleep disturbances (Quine, 1992; Sadeh et al., 1995; Seifer et al., 1996). In a sample of 76 children (ages 4-16), those with severe disabilities who also had co-occurring sleep disturbances were rated as having poorer quality parent-child relationships compared to children without sleep disturbances (Quine). Additionally,

parents of the children with sleep disruptions showed more marital stress compared to parents of children without sleep problems. Similarly, El-Sheikh and colleagues (2006) found that in a community sample of children (n = 54, average age = 8.85), parents of children with more sleep disturbances, as measured by actigraphy and parent and child questionnaires, reported higher rates of marital conflict. As noted above, Seifer and colleagues (1996) looked at the relationship between family functioning and sleep disturbances in a sample of children (12-36 months) whose mothers had a mental illness. Better family functioning was related to decreased bedtime problems, increased total duration of sleep times in children, decreased bedtime problems (i.e., bedtime resistance) and increased morning preference (i.e., easier time waking in morning, better mood upon waking). In a longitudinal study Thome and Skuladottir (2005) compared children (ages 3-5) who were referred and successfully treated for sleep disturbances in infancy (n = 31), nonclinically referred children who experienced sleep disturbances in infancy (n = 17), and children who experienced no sleep disturbances in infancy (n = 19). Despite that nonreferred and referred children who experienced sleep disturbances in infancy were reported to experience more night wakings at follow up compared to children who did not experience sleep difficulties in infancy, parents of children with higher rates of night waking at follow up did not report experiencing more distress compared to parents of children with no reported sleep disturbances. Parents of the referred children did report higher levels of fatigue compared to parents of nonreferred children, despite improvements in their child's sleep behavior.

Previous research has shown that improvement in a child's sleep disturbances is associated with improvements in maternal depression (Hiscock & Wake, 2002; Mindell

& Durand, 1993), decreased stress related to parenting (Reid et al., 1999), and increased marital satisfaction (Mindell & Durand, 1993). Research investigating the relationship between sleep disturbances in children and various familial correlates (e.g., maternal depression, parenting stress, maternal sleep patterns) imply that resolution of sleep disturbances in children could lead to improvements in family functioning.

In addition to the aforementioned correlates of sleep difficulties, more recent research has begun to investigate maternal sleep patterns of children with and without sleep disturbances. In one study 47 mothers of typically developing, healthy children (ages 3-14) completed a sleep questionnaire (i.e., CSHQ) about their child's sleep and an inventory about their personal sleep patterns. Results showed that sleep patterns (i.e., bedtime, wake time, total sleep time) of mothers of children with sleep disturbances did not differ from those of mothers of children with no sleep problems. However, mothers of children who reported their children to have more night wakings, experienced more disrupted sleep (Meltzer & Mindell, 2007).

Summary

Sleep problems are common among preschool- and toddler-age children and often persist if left untreated. Many sleep problems are amenable to behavioral treatments; however, sleep problems in children are often under-diagnosed and/or are not a focus of treatment (Mindell, 1996). The high prevalence of sleep problems in children warrants more research pertaining to sleep. Additionally, limited research has been conducted investigating sleep problems in children referred for externalizing behavior problems. Research conducted thus far has suggested that a relationship between sleep disturbances

and daytime behavioral problems exists; however, having a better understanding of sleep problems in children clinically referred for behavior problems will glean information regarding the nature of sleep disturbances in this population, with future research in this area ultimately targeting treatment intervention. Additionally, other factors (i.e., maternal depression, family stress, parent-child relationship stress) have been shown to contribute to sleep disturbances in children, making the relationship between sleep, behavior, maternal depression, and stress complex. However, there is limited research investigating the relationship between child's sleep, behavior, and maternal health in clinically referred children with behavior problems. Given the high prevalence of sleep disturbances in young children, the complexity of factors that might contribute to sleep disturbances, and the limited research conducted thus far on sleep disturbances in clinically referred children with significant behavior problem, further research is warranted to better understand the link between sleep and behavior in addition to factors that contribute to or sustain sleep and behavior problems.

CHAPTER III

METHOD

Participants

A total of 105 mothers of children between the ages of 2-5 participated in the current research. Of the 105 participants (39 female, 66 male), 31 were mothers of clinically referred children with significant behavioral problems (7 female, 24 male), 59 were mothers of nonclinic referred children without clinically significant behavioral problems (27 female, 32 male), 12 were mothers of nonclinic referred children with significant behavior problems (5 female, 7 male), and 3 were mothers of clinic-referred children without significant behavior problems (3 male).

The mean maternal age for the total sample was 30.26 years ($SD = 5.07$). All mothers were Caucasian and had at least a high school education (i.e., diploma, GED), with over a third of the mothers having a college degree. Few mothers (5.7%) were currently receiving mental health services; however, approximately a fourth of the mothers reported receiving mental health services in the past. Almost a third of the mothers reported currently taking prescription medications. Refer to Table 1 for total sample demographic information for the mothers who participated in the study.

To determine if there were differences in demographic characteristics between mothers of clinically referred children with behavior problems and those of nonclinically referred children without behavior problems, several analyses of variance and chi square analyses were conducted. There were no significant differences, $F(1, 88) = 4.55$, $p = .502$, between the mean ages of mothers of the clinically referred children ($M = 29.97$,

Table 1

Mothers' Demographic Information

Variable	Total sample (N = 105)		Clinically referred with behavior problems (N = 31)		Nonclinically referred without ehavior problems (N = 59)		Nonclinically referred with behavior problems (N = 12)		Clinically referred without behavior problems (N = 3)	
	n	%	*n*	%	*n*	%	*n*	%	*n*	%
Receive current mental health services										
Yes	6	5.7	3	9.7	3	5.1	0	0	0	0
No	99	94.3	28	90.3	56	94.9	12	100	3	100
Received previous mental health services										
Yes	20	20	15	48.4	4	6.8	1	8.3	0	0
No	84	80	16	51.6	55	93.2	11	91.7	3	100
Take prescription medications										
Yes	29	27.6	13	41.9	11	18.6	4	33.3	1	33.3
No	76	72.4	18	58.1	48	81.4	8	66.7	2	66.7
Education level										
No response	1	1	1	3.2	0	0	0	0	0	0
GED	2	1.9	1	3.2	0	0	0	0	0	0
High school	40	38.1	16	51.6	17	28.8	1	8.3	1	33.3
Associates	20	19	8	25.8	9	15.3	6	50	0	0
Bachelors	34	32.4	5	16.1	26	44.1	3	25	1	33.3
Graduate	8	7.6	0	0	7	11.9	2	16.7	1	33.3

SD = 6.00) and mothers of nonclinically referred children (M = 30.75 years, SD = 4.73). The average income for the households of children who were clinically referred (M = \$34,117.14, SD = \$19,845.19) was significantly lower, $F(1, 76) = 8.60$, p =.004, than the average income for the households of children who were not clinically referred (\$51,278.00, SD = \$27,137.84). There were no significant differences, $\chi^2(1, N = 90) = .69$, p =.407, between the two groups on use of current mental health services, yet significantly more, $\chi^2(1, N = 90) = 21.12$, p = .000, mothers of clinically referred children

had previously received mental health services compared to mothers of nonclinically referred children. In addition, significantly more, $\chi^2(1, N = 90) = 5.64, p = .018$, mothers of children in the clinically referred group reported taking prescription medications than mothers of nonclinically referred children. Mothers of children who were not clinically referred had significantly higher education levels, $\chi^2(4, N = 89) = 14.39, p = .006$, than mothers of clinically referred children.

Of the 105 children who were rated by their mothers, 101 (96%) were Caucasian and 4 (4%) were African American/Black. A fourth of the children in the sample were reported to have a disability. Twenty-four (23%) of the children were currently receiving mental health services, and 7 (7%) children had previously received mental health services. Ten (9.5%) of the children were taking prescription medications. See Table 2 for complete child demographic information.

To determine if there were differences on child demographic characteristics the two main groups of children (clinic-referred children with behavior problems and nonclinically referred children without behavior problems) were compared. Children who were clinically referred were significantly younger ($M = 2.58$ years, $SD = .99$) than children who were not clinically referred ($M = 3.07$ years, $SD = 1.05$; $F(1, 88) = 4.550, p = .036$). There was no significant difference, $\chi^2(1, N = 90) = 3.05, p = .081$, regarding ethnicity. However, significantly more, $\chi^2(1, N = 90) = 43.97, p = .000$, children in the clinically referred group had a disability (i.e., 16 children had speech delays, 3 children had mental health concerns, and 3 children's disabilities were unspecified) compared to nonclinically referred children (i.e., 1 child had speech delays, 1 child had vision

Table 2

Demographic Information for Children

	Total sample (N = 105)		Clinically referred with behavior problems (N = 31)		Nonclinically referred without ehavior problems (N = 59)		Nonclinically referred with behavior problems (N = 12)		Clinically referred without behavior problems (N = 3)	
Variable	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%
Gender										
Male	66	63	24	77.4	32	54.2	7	58.3	3	100
Female	39	37	7	22.6	27	45.8	5	41.7	0	0
Ethnicity										
Caucasian	101	96	28	90.3	58	98.3	12	100	3	100
African American	4	4	3	9.7	1	1.7	0	0	0	0
Disabilities										
Yes	26	25	22	71	3	5.1	0	0	1	33.3
No	79	75	9	29	56	94.9	12	100	2	66.7
Current mental health services										
Yes	24	23	23	74.2	0	0	0	0	1	33.3
No	81	77	8	25.8	59	100	12	100	2	66.7
Previous mental health services										
Yes	7	6.7	7	22.6	0	0	0	0	0	0
No	98	93.3	24	77.4	59	100	12	100	3	100
Take prescription medications										
Yes	10	9.5	5	16.1	5	8.5	0	0	0	0
No	95	90.5	26	83.9	54	91.5	12	100	3	100

problems, and 1 child had a motor delay). There were also significant differences between the current, $\chi^2(1, N = 90) = 58.80, p = .000$, and previous, $\chi^2(1, N = 90) = 14.45$, $p = .000$, use of mental health services, with more clinically referred children currently and previously accessing mental health services compared to the nonclinically referred children without behavior problems. There were no significant differences, $\chi^2(1, N = 90) = 1.21$ $p = .272$, regarding the use of prescription medications.

Instruments

Parents of all children in this study completed the CBCL for ages 1 1/2-5 (Achenbach & Rescorla, 2000), a rating scale intended to help detect the presence of externalizing, internalizing and other behavioral problems in young children. The CBCL was used to ensure that clinic-referred children had significant behavioral problems and nonclinic-referred children did not have significant emotional or behavior problems. The CBCL for ages 1 ½-5 includes 100 problem behavior items. The instrument has satisfactory psychometric properties that include test-retest reliabilities for the total problems, externalizing problems, and internalizing problems scales ranging between .87 and .90. Inter-rater (mother and father ratings) agreement on the total problems scale is .65. The scale's structure is supported by factor analysis and correlations are high with previously established measures of behavior (e.g., Toddler Behavior Screening Inventory = .70). The measure has been shown to distinguish between children with clinically significant behavior problems and children who do not have significant behavior problems (Achenbach & Rescorla). All analyses that included the CBCL in the current research were calculated using the total raw score on the CBCL. The internal consistency of the CBCL total score in the current sample was calculated using Cronbach's alpha coefficient and was found to be adequate ($\alpha = .952$).

A demographic sheet was completed by mothers at the same time the CBCL was completed. The demographic information collected included the following variables: child's ethnicity, gender, age, disability status, family's SES, maternal education level,

maternal and child's previous and current assess to mental health services, and maternal and child general prescription medication use (see Appendix A).

To assess sleep disturbances, parents completed a Sleep Diary for a 1-week period. Included in the diary were the following categories of sleep: time the bedtime routine started, time the child was placed in bed, time asleep, total number of wakings during the night, duration of the wakings, nap times, time spent in parents' bed, and a column for the parent to write in how she reacted to the child's wakings (e.g., let child sleep with parents, ignored). The scoring guidelines for Sleep Diaries from Richman et al. (1985) were used (see Appendix B) in which 6 items were rated on a 0-4 scale. The total sleep disturbance scale was the sum of 6 different items: (a) average time taken to settle once in bed, (b) average number of night wakings during the week, (c) average number of wakings per night, (d) average duration of each night waking, (e) average total hours slept during the 24-hour period, and (f) average time child spent in parents' bed each week. Higher scores are indicative of more severe sleep disturbances. Richman (1981) reported an average composite sleep disturbance scale score of 3 in children who were sleeping well and 10.6 in children with sleep difficulties, concluding the Sleep Diary was effective in distinguishing good sleepers from bad sleepers. Similarly, Sleep Diary scores were congruent with parental report of their child's sleep patterns, when using a semistructured questionnaire. Richman and colleagues indicated tracking sleep with a Sleep Diary can be an effective way to measure changes in sleep patterns when implementing interventions for sleep. Furthermore, Sleep Diaries have been found to be helpful because they do not require the family to solely rely on retrospective data to report sleep patterns. When using retrospective recall, research suggests parents are

more likely to recall incidents where sleep disturbance or behavior was more severe (e.g., sleepless night) compared to nights where behavior and sleep were unremarkable (Douglas, 1989). See Appendix C for an example of a Sleep Diary.

Parents also completed The Children's Sleep Habits Questionnaire (CSHQ; Owens, Spirito, & McGuinn, 2000) as a second measure of sleep disturbances. On this measure parents rated the frequency with which their children exhibited various sleep problems. The CSHQ includes 46 items that are rated on a "rarely" = 0-1 night per week, "sometimes" = 2-4 nights per week, and "usually" = 5-7 nights per week format. The CSHQ includes the following 8 subscales: bedtime resistance, sleep onset delay, sleep durations, sleep anxiety, night waking, parasomnias, sleep disordered breathing, and daytime sleepiness. Higher scores on the CSHQ are indicative of more significant sleep disturbances. There are no established norms for the CSHQ. However, Owens and colleagues (2000) evaluated the psychometric properties of the CSHQ using a sample of children (ages 4-10), 469 from a community sample and 154 who had received a diagnosis of a sleep disorder in a pediatric sleep clinic. Results indicated satisfactory test-retest reliability (from .62-.79) in the community sample and adequate internal consistency for the total score (community sample: $\alpha = .68$, clinical sample, $\alpha = .78$). Alpha coefficients for the CSHQ subscales ranged from .36 (parasomnias subscale) to .70 (bedtime resistance subscale) for the community sample and .56 (parasomnias subscale) to .93 (sleep disordered breathing subscale) for the clinical sample. Although the internal consistency estimates for the parasomnias subscale is low, this is likely because questions within the scale ask about different types of parasomnias (e.g., wets the bed at night and

sleepwalking) and it is unlikely that most children would exhibit multiple types of parasomnias. The total score and subscale scores showed adequate ability to consistently distinguish between children with significant sleep problems and children without significant sleep problems (Owens et al., 2000). To determine the internal consistency of the subscales on the CSHQ when used on preschool- and toddler-age children who participated in the current research, the internal consistency of the entire CSHQ was calculated using Cronbach's alpha coefficient. The internal consistency was adequate ($\alpha = .852$).

In order to assess for the presence of parental depression, parents completed the Beck Depression Inventory-II (BDI-II; Beck, Steer, & Brown, 1996). The BDI-II consists of 21 questions related to attitudes and symptoms characteristic of depression (e.g., mood, irritability, social withdrawal, changes in sleep patterns, changes in appetite, changes in sexual drive, somatic complaints). Each item on the BDI-II consists of 4 response options, which are ordered by severity. Higher scores on the BDI-II are indicative of more severe levels of depression. A classification system for severity of depression has been assigned to the following ranges of scores: 0-13 (minimal depression), 14-19 (mild depression), 20-28 (moderate depression), and 29-63 (severe depression). The BDI-II has adequate psychometric properties that include adequate test-retest reliability with an outpatient sample ($\alpha = .93$); adequate internal consistency (outpatient sample, $\alpha = .92$; student sample, $\alpha = .93$); and adequate ability to distinguish between those with depression and those without depression (Beck et al.). Using

Cronbach's alpha calculations the internal consistency of the BDI-II using the current sample was found to be adequate ($\alpha = .902$).

In order to assess stress in the parent-child dyad, parents completed the Parenting Stress Index-Short Form (PSI-SF; Abidin, 1995). The PSI-SF consists of 36 items that are rated using a 5-point Likert type scale, ranging from "strongly agree" to "strongly disagree." The scale yields a Total Stress scale, which was used to measure stress related to parenting. As reported in the manual, psychometric properties for the PSI-SF are adequate, with an alpha coefficient reliability of .91. There are high correlations between the Total Stress scores ($r = .94$) of the long and short forms of the PSI. The long form of the PSI has adequate test-retest reliability (1-3 month time interval, $\underline{r} = .96$; 1 year time interval, .65). The scale is supported by factor analysis and has shown to be useful in identification of dysfunctional parent-child relations and potential parent and child characteristics that might inhibit healthy child development (Abidin). Cronbach's alpha calculation revealed the internal consistency of the PSI-SF to be adequate ($\alpha = .959$) in the current sample.

Parents also completed the Perceived Stress Scale (PSS; Cohen & Williamson, 1988) in order to assess each parent's perception of the stress she experiences. On this measure, parents rated the amount of stress they experienced during the previous month. The PSS includes 14 questions which are rated on a 5-point Likert scale ranging from 0 = "Never" to 4 = "Very Often" (Cohen & Williamson). The PSS is supported by factor analysis, has adequate internal consistency reliability (alpha coefficient = .78), and has high correlations with other stress measures (e.g., ratings of stress experienced in the

average week, life event scales, number of stressful events, impact of stressful events, job responsibility scales, workload demands; Cohen & Williamson). The PSS is not intended to be used as a diagnostic tool, meaning there are no cutoff scores to classify the severity of stress one is experiencing; however, Cohen and Williamson published normative data based on a 1983 U.S. representative sample. The PSS mean score for the sample was 19.62 with a standard deviation of 7.49. In the current sample, the internal consistency of the PSS was found to be adequate using Cronbach's alpha calculation ($\alpha = .890$).

Procedures

Families of clinically referred children were recruited from various agencies located throughout the Cache Valley (i.e., a university psychology clinic, an early intervention program, medical clinics, mental health clinic). Families of nonclinic-referred children were recruited through word of mouth at local women's recreation leagues, church groups, and through acquaintances of individuals who had already participated in the study. Requests for participation occurred in one introductory psychology class; however, this did not result in any volunteers. When individuals verbally expressed a desire to participate in the research project to others (e.g., case workers, other individuals who participated in study), permission was obtained verbally for the researchers to telephone them about possible participation in the study. When contact was initially made, potential parent participants were asked their child's age and asked specific questions regarding their child's disability status and familial cultural background in order to determine if the child qualified for the study based on the

exclusion criteria described below. If eligible for the study, parents were given the option of scheduling an in-person initial meeting to sign the consent form (see Appendix D) and complete measures (i.e., demographic information sheet, CBCL, CSHQ, BDI, PSS, and PSI), or they could have these sent by mail. Measures were presented in a counter-balanced manner. All parents were asked to complete measures prior to tracking sleep with the Sleep Diary. For the participants who desired to have an initial meeting, they had the option to have the initial meeting in their home or at the Utah State University Community Clinic. If parents opted to have the measures sent to them, verbal consent was obtained on the phone and parents were asked to return the consent form along with the completed measures by mail. The Sleep Diary and the categories to be monitored were described in detail during the initial scheduled meeting or on the telephone for those parents who opted to not have an initial meeting. Of the 105 families that participated in the study, 44 requested to have a scheduled initial meeting, all of which occurred at their home, and 61 opted to have the measures sent via mail or dropped off at their home. A total of 122 packets were distributed to individuals who agreed to participate in the current study. Of the 122 packets, 112 (92%) of the packets were returned. Of the returned packets, 7 packets (6%) were returned incomplete and parents could not be reached by telephone to follow up on unanswered questions. This resulted in a total useable return rate of 86% (n = 105). Ten (8%) packets were not returned, 4 of these participants indicated they lost the materials and were not interested in receiving replacement materials, 5 participants failed to mail back completed packets after multiple reminders, and 1 participant was not comfortable answering the questions and dropped out of the study.

The following inclusion criteria were used for the two main groups in the study (clinically referred with behavioral problems and nonclinically referred without behavior problems): (a) children in the clinically referred-with-behavior-problems group must have been clinically referred and had to fall within the "clinical" (*T* score ≥ 64) or "borderline" (*T* scores = 60-63) range as indicated by the CBCL total and/or externalizing behavior problems scales; and (b) children in the nonclinically referred-group without behavior problems could not be clinically referred and had to fall within the "normal" (*T* score < 60) range on the CBCL total, externalizing, and internalizing behavior problems scales. Fifteen children did not fall into either of these groups. These children's data were not included in the primary analyses focused on sleep problems in children with and without behavior problems; however, these data were included in the analyses measuring internal consistency of the CSHQ and concurrent validity of the CSHQ and the Sleep Diary.

The following exclusion criteria was used: (a) individuals not fluent in English were not included because a majority of the normed assessment measures used in this study have not been used with individuals fluent in other languages, making the validity of these measures questionable; (b) families with parents from two different cultures, as defined by ethnicity, were excluded from the study because there are differing cultural values related to how sleep and behavior problems are viewed and defined; (c) children with asthma, sleep apnea, seizure disorders, autism and/or mental retardation were excluded from the study because medical conditions, developmental disabilities, and medications can contribute and/or promote sleep and behavior disturbances in children.

After completion of the initial measures, parents tracked sleep behaviors using the Sleep Diary on a daily basis for 1 week. At the end of 1 week, parents were asked if the week was typical or atypical for their child. If the week was not representative of their child's typical sleep, parents were asked to track sleep for another week. Four of the parents completed an additional diary because they did not believe the initial diary was representative of their child's typical sleep pattern. Packets were collected and/or parents sent a copy of the Sleep Diary via the postal service using an addressed and stamped envelope, which was provided during the initial visit. This concluded parents' participation in the study.

After completion of the study all participants were placed in a drawing for a $50 gift certificate to Walmart. All participants were also offered the opportunity to discuss various behaviorally based sleep interventions upon completion of their participation in the study. This meeting typically occurred when the Sleep Diary was collected. Of the 105 families that participated in the study, 29 (27.4%) requested to meet in order to discuss sleep and/or behavior, 7 (6.6%) requested to have questions about sleep and behavior answered via telephone, and 69 (65%) did not have questions regarding sleep or behavior.

CHAPTER IV

RESULTS

Because there were few children not clinically referred but with significant behavior problems and few children clinically referred without significant behavior problems, statistical significance analyses comparing groups only includes the clinically referred children with significant behavior problems and the nonclinically referred children without significant behavior problems. In addition to statistical significance analyses, mean difference effect sizes were calculated in order to measure the magnitude of the differences between groups.

In order to determine whether there were differences in the levels of maternal stress and depression between mothers of children with and without behavior problems, mean scores on the BDI, PSI-SF, and the PSS were compared. Mothers of children with behavior problems had significantly higher total raw scores on the BDI, $F(1, 86) = 25.26$, $p = .000$, $ES = 1.14$; PSI-SF, $F(1, 86) = 87.74$, $p = .000$, $ES = 2.10$; and the PSS, $F(1, 88) = 36.35$, $p = .000$, $ES = 1.34$. Overall, mothers of children with clinically significant behavior problems reported higher levels of depression, general stress, and stress related to parenting. See Table 3 for the mean scores on the BDI, PSI-SF, and the PSS for mothers of children with and without behavior problems.

In order to ensure children who were clinically referred were actually displaying higher levels of behavior problems compared to children who were not clinically referred for behavior problems, mean scores on the CBCL were compared. Children who were clinically referred for behavior problems had significantly higher total raw scores,

Table 3

Mean Scores on the BDI, PSI-SF, and PSS for Mothers of Clinically and Nonclinically Referred Children

Instrument	Nonclinically referred children	Clinically referred children
BDI		
Mean	6.14	14.86
SD	6.41	9.67
PSI-SF		
Mean	59.64	94.90
SD	13.76	21.31
PSS		
Mean	18.74	28.65
SD	6.57	8.72

$F(1, 88) = 304.15$, $p = .000$, $ES = 3.87$, and T scores, $F(1, 88) = 266.56$, $p = .000$, $ES = 3.62$, on the CBCL compared to children from the nonclinic-referred sample. The magnitude of the difference in CBCL scores was large. Overall, the mean scores on the CBCL for the nonclinically referred children fell within the normal range and the mean scores for the clinically referred children fell within the clinical range. See Table 4 for the mean scores on the CBCL for clinical and nonclinical samples.

Sleep Problems in Children With and Without Behavior Problems

To answer the first research question regarding whether children who exhibit clinically significant behavior problems are more likely to also experience sleep

disturbances than children who do not exhibit significant behavior problems, a multivariate analysis of covariance (MANCOVA) was conducted with group status (clinically referred children exhibiting significant behavior problems versus nonclinically referred children who do not exhibit significant behavior problems) as the independent variable and scores on the Sleep Diary and the total score on the CSHQ as the dependent variables. Both the child's age and familial gross annual income were used as covariates in order to control for differences on these variables found in previous analyses. Results indicated significant differences between the two groups, $F(2, 73) = 23.59, p = .000$. To follow up on this analysis, univariate F tests were conducted. Results from the univariate F tests showed there were significant differences between children with behavior problems and children without behavior problems on both the CSHQ, $F(1, 78) = 47.542$, $p = .000$, $ES = 1.68$, and Sleep Diary, $F(1, 78) = 5.41, p = .023$, $ES = .58$. The children with behavior problems showed higher rates of sleep disturbance on both measures compared to the children without behavior problems, with the magnitude of the difference being moderate to large. See Table 4 for mean scores on the CSHQ for clinical and nonclinical samples.

The second research question addressed whether there are differences in the types of sleep disturbances exhibited by children with and without significant behavioral problems. To answer this question, two multivariate analyses of covariance (MANCOVA) were conducted with group status (children exhibiting significant behavior problems vs. children who do not exhibit significant behavior problems) as the independent variable and the subscale/item scores on the two sleep measures as the

Table 4

Mean Scores on the CBCL, SleepDiary, and the CSHQ for Clinically and Nonclinically Referred Children

Instrument	Nonclinically referred children	Clinically referred children
CBCL (raw scores)		
Mean	19.22	79.06
SD	12.36	20.17
CBCL (*T* scores		
Mean	42.19	70.26
SD	8.05	7.14
CBCL externalizing scale (raw scores)		
Mean	7.31	31.61
SD	6.15	6.82
CBCL externalizing scale (*T* scores)		
Mean	42.36	71.87
SD	9.20	8.46
CBCL internalizing scale (raw scores)		
Mean	4.71	19.65
SD	3.80	9.48
CBCL internalizing scale (*T* scores)		
Mean	42.83	64.42
SD	8.85	7.66
Sleep Diary		
Mean	6..74	9.68
SD	5.16	4.79
CSHQ		
Mean	40.14	52.39
SD	5.13	10.22

dependent variables. As with the previous MANCOVA, the child's age and familial gross annual income were used as covariates in order to control for group differences on these variables.

In the first MANCOVA, the six items on the Sleep Diary were the dependent variables. Results from this MANCOVA indicated significant differences, $F(6, 69) = 8.04$, $p = .000$, between children with behavior problems and children without behavior problems. Univariate analyses revealed that compared to children without behavior problems, children with behavior problems took longer to initiate sleep, they slept fewer hours during the night, and the duration of their night wakings was longer. These differences ranged from small to large in magnitude. (See Table 5 for means, standard deviations, and effect sizes.) No significant differences were found between children with behavior problems and children without behavior problems on the average number of wakings per night, average number of wakings per week, and time spent in parents' bed. However, the effect sizes for these comparisons fell within the small range, indicating there are small clinically meaningful differences between the groups on these items.

In the second MANCOVA, subscale scores from the CSHQ were used as the dependent variables. Results showed significant differences, $F(8, 66) = 7.49$, $p = .000$, between children with behavior problems and children without behavior problems. Univariate analyses revealed significant differences on the following subscales: bedtime resistance, sleep onset, sleep duration, sleep anxiety, night waking, parasomnia, and daytime sleepiness (see Table 6). On all scales, children with behavior problems were

Table 5

Mean Scores for the Sleep Diary Items for Clinical and Nonclinical Samples

Instrument	Nonclinically referred children ($N = 59$)	Clinically referred children ($N = 31$)	F-value	p-value	*ES*
Sleep onset					
Mean	1.49	1.93	.50	.028	.48
SD	.85	1.05			
Hours of sleep per night					
Mean	2.04	2.68	14.42	.000	.73
SD	.82	.98			
Nights child wakes per week					
Mean	1.22	1.75	1.78	.187	.44
SD	1.09	1.38			
Number of night wakings per night					
Mean	.53	.89	.93	.338	.40
SD	.74	1.13			
Duration of night wakings					
Mean	.24	1.43	23.90	.000	1.34
SD	.48	1.37			
Time in parents bed per week					
Mean	.63	1.04	.65	.424	.33
SD	1.07	1.55			

rated as experiencing more problematic sleep behaviors. The magnitude of these differences was moderate to large (see Table 6). No significant differences were found

Table 6

Mean Scores on the CSHQ Subscales for Clinical and Nonclinical Samples

Instrument	Nonclinically referred children ($N = 59$)	Clinically referred children ($N = 31$)	F-value	p-value	*ES*
Bedtime resistance					
Mean	7.71	10.82	22.65	.000	1.08
SD	2.19	3.90			
Sleep onset					
Mean	1.29	1.86	16.60	.000	.91
SD	.58	.71			
Sleep duration					
Mean	3.45	5.21	36.15	.000	1.24
SD	.91	2.08			
Sleep anxiety					
Mean	5.00	7.36	34.25	.000	1.45
SD	1.35	2.07			
Night waking					
Mean	4.16	5.39	9.18	.000	.83
SD	1.23	1.87			
Parasomnia					
Mean	8.43	11.29	21.17	.000	1.27
SD	1.68	3.07			
Disordered breathing					
Mean	3.20	3.75	2.81	.098	.59
SD	.58	1.38			
Daytime sleepiness					
Mean	9.01	10.89	8.27	.005	.74
SD	2.39	2.78			

between children with behavior problems and children without behavior problems on the sleep disordered breathing subscale; however, the effect size was moderate suggesting the differences are clinically meaningful. See Table 6 for mean scores on the CSHQ subscales for the clinical and nonclinical samples.

The Relationship Between Children's Sleep, and Behavior, and Maternal Stress, and Depression

To answer the third research question regarding the relationship between behavior problems, sleep problems, maternal depression, parenting stress, and general stress, Pearson correlation coefficients between the total scores on the CBCL, CSHQ, BDI-II, PSI-SF, and PSS were calculated. There were significant positive correlations between all of the measures, indicating higher scores on one measure are indicative of higher scores on other measures. These correlations were moderate-to-large in magnitude suggesting that mothers who reported higher rates of general stress, stress related to parenting and depression also reported higher rates of sleep disturbances in their children. The results of these analyses are presented in Table 7.

In order to determine which factors (e.g., stress, depression) are most predictive of sleep difficulties, two step-wise linear regression analyses were conducted to determine the relative contribution of various constructs to sleep problems, after controlling for children's age and household income. The regressions were conducted in two steps: in the first step, child's age and household income were entered. In the second step, the predictor variables included total scores on the following measures:

Table 7

Correlations Between the CBCL, CSHQ, BDI-II, PSI, and PSS-SF

Assessment	PSI-SF	PSS	BDI-II	CSHQ	Diary	CBCL
PSI-SF	--	.708[a]	.614[a]	.751[a]	.302[a]	.800[a]
PSS		--	.507[a]	.567[a]	.278[a]	.613[a]
BDI-II			--	.470[a]	.320[a]	.510[a]
CSHQ				--	.473[a]	.751[a]
Diary					--	.374[a]
CBCL						--

[a]Correlation is significant at the .01 level.

CBCL, PSS, PSF-SF, and the BDI. The criterion variables were the sleep measures (i.e., total scores on the Sleep Diary and CSHQ).

When the Sleep Diary was the criterion variable (see Table 8), the model was not significant at Step 1, $F(2, 84) = 1.38$, $p = .26$, $R^2 = .03$, indicating children's age and income did not significantly contribute to Sleep Diary scores. The model was significant at Step 2, $F(6, 80) = 3.17$, $p = .01$, R^2 change = .16; however, none of the individual construct measures contributed significantly to the model. When the criterion variable was the CSHQ (see Table 9) the model was significant at Step 1, $F(2, 84) = 3.02$, $p = .05$, $R^2 = .07$, with income contributing significantly to the CSHQ scores. The model was significant at Step 2, $F(6, 80) = 27.06$, $p = .000$, R^2 change = .60, with the PSI-SF and CBCL contributing significantly to the model, indicating parenting stress and child's behavior significantly contributed to CSHQ scores.

Table 8

Stepwise Regression with the Sleep Diary as the Outcome Variable

	Beta (*S.E.*)	*t*	*p*
Step 1			
Child's age	.06 (.52)	.13	.90
Income	<.01 (.01)	-1.66	.10
Step 2			
CBCL	.05 (.03)	1.91	.06
PSI-SF	.02 (.04)	-.55	.58
PSS	.03 (.08)	-.38	.70
BDI	.13 (.08)	1.68	.10

Table 9

Stepwise Regression with the CHSQ as the Outcome Variable

	Beta (*S.E.*)	*t*	*p*
Step 1			
Child's age	.20 (.93)	.21	.84
Income	<.01 (<.01)	-2.46	.02
Step 2			
CBCL	.09 (.03)	2.85	.01
PSI-SF	.18 (.05)	3.60	<.01
PSS	.09 (.09)	1.05	.30
BDI	.04 (.09)	.50	.62

Reliability and Validity of CHSQ

Although not the primary focus of this research, two secondary questions were posed in order to gain more knowledge about the assessment of sleep problems: what is

the internal consistency of the 8 subscales on the CSHQ when used for children within the preschool- and toddler-age range and what is the concurrent validity of the CSHQ and Sleep Diary? To determine the internal consistency of the subscales on the CSHQ when used on preschool- and toddler-age children, Cronbach's alpha coefficients for each of the 8 subscale scores were calculated and are listed in Table 10. Alpha coefficients for the subscales ranged from .552 (daytime sleepiness subscale) to .824 (sleep duration subscale). Item total correlations were calculated and included in Table 10 in order to determine the relationship of individual items to the total scale score. Some of the item total correlations were quite low (e.g., falls asleep while riding in the car, seems tired, wets the bed at night), suggesting that some items from the measure could likely be dropped when assessing general sleep problems in preschool- and toddler-age children.

Pearson correlation coefficients between the total scores on the CSHQ and the Sleep Diaries were calculated in order to determine the concurrent validity of these measures. The relationship between the total CSHQ score and the total Sleep Diary score was moderate (r = .487), suggesting that although the CSHQ and Sleep Diary are measuring a similar construct, they might be measuring different aspects of the overall construct of sleep. Pearson correlation coefficients were also calculated between the subscales on the CSHQ and items on the Sleep Diaries. Correlations between like subscales/items were moderate and scores between unlike subscales/items were low to moderate (see Table 11). For example, the relationship between the Sleep Diary item measuring sleep onset (e.g., average time taken to fall and average bedtime) and the sleep onset scale of the CSHQ was moderate (r = .326) as was the relationship between the sleep onset item of the diary and the Bedtime Resistance scale of the CSHQ (r = .326).

Table 10

Internal Consistency, Means, and SDs for the Subscales and Individual Items of the CSHQ

Subscale	Mean	*SD*	α	Item total correlations
Bedtime resistance	8.96	3.11	.81	
Goes to bed at same time	1.46	.65	-	.36
Falls asleep in own bed	1.48	.76	-	.45
Needs parent in room to sleep	1.44	.73	-	.43
Struggles at bedtime	1.65	.75	-	.61
Afraid of sleeping alone	1.53	.76	-	.55
Sleep onset delay				
Falls asleep in 20 minutes	1.47	.68	-	.50
Sleep duration	4.05	1.60	.82	
Sleeps too little	1.45	.67	-	.43
Sleeps the right amount	1.36	.65	-	.56
Sleeps same amount each day	1.24	.53	-	.49
Sleep anxiety	5.98	2.01	.59	
Needs parent in room to sleep	1.44	.73	-	.43
Afraid of sleeping in the dark	1.55	.82	-	.41
Afraid of sleeping alone	1.53	.76	-	.55
Trouble sleeping away	1.46	.68	-	.44
Night wakings	4.88	1.71	.68	
Moves to other's bed in night	1.60	.73	-	.49
Awakes once during night	1.84	.75	-	.34
Awakes more than once	1.44	.72	-	.57
Parasomnias	9.51	2.48	.69	
Wets the bed at night	1.64	.87	-	.11
Talks during sleep	1.33	.58	-	.33
Restless and moves a lot	1.76	.77	-	.57
Sleepwalks	1.05	.26	-	.34
Grinds teeth during sleep	1.14	.47	-	.34
Awakens screaming, sweating	1.26	.52	-	.54
Alarmed by scary dream	1.33	.55	-	.40
Sleep disordered breathing	3.38	.88	.63	
Snores loudly	1.23	.51	-	.24
Stops breathing	1.04	.24	-	.01
Snorts and gasps	1.11	.38	-	.13

(*table continues*)

Subscale	Mean	*SD*	α	Item total correlations
Daytime sleepiness	9.87	2.67	.55	
Wakes by himeself	1.27	.58	-	.18
Wakes up in negative mood	1.54	.65	-	.49
Others wake child	1.48	.65	-	.26
Hard time getting out of bed	1.18	.48	-	.23
Takes long time to be alert	1.28	.53	-	.17
Seems tired	1.74	.72	-	.05
Watching TV	.36	.74	-	.23
Riding in car	1.02	.95	-	.12

The Sleep Diary item that measured the average time slept at night in hours and the sleep duration scale of the CSHQ also showed a moderate relationship (r = .314). There was also a moderate correlation between the diary item that measured the average time spent in the parents' bed and the sleep anxiety scale of the CSHQ (r = .304). Stronger relationships were shown between the CSHQ night waking scale and the Sleep Diary item measuring the average number of night wakings per week (r = .675), the average number of wakings per night (r = .620), and the average weekly hours spent in parent's bed (r = .407). There was a moderate relationship between the CSHQ night waking scale and the diary item that measured the average time awake per waking (r = .382). See Table 11 for correlations between all subscales/items of the Sleep Diary and the CHSQ.

Table 11

Correlations Between Items/Subscales of Sleep Diary and CHSQ

Diary→ CHSQ↓	Sleep onset	Average time slept during night	Average number of wakings per week	Average number of wakings per night	Average time awake per waking	Average time spent in parent's bed per week
Bedtime resistance	.320[b]	.323[b]	.345[b]	.308[b]	.279[b]	.412[b]
Sleep onset	.326[b]	.282[b]	.26[b] 8	.240[a]	.176	.22[a] 0
Sleep duration	.201[a]	.314[b]	.170	.189	.395[b]	.092
Sleep anxiety	.225[a]	.248[a]	.354[b]	.281[b]	.323[b]	.304[b]
Night waking	.111	.381[b]	.675[b]	.620[b]	.382[b]	.407[b]
Parasomnias	.071	.196[b]	.339[b]	.287[b]	.573[b]	.091
Disordered breathing	-.034	.067	.140	.093	.236[b]	-.007
Daytime sleepiness	.237[a]	.271[b]	.149	.084	.223[b]	.087

[a]Correlation is significant at the .05 level; [b]Correlation is significant at the .01 level.

CHAPTER V

DISCUSSION

Sleep difficulties are one of the more common problems reported for preschool- and toddler-age children (Atkinson et al., 1995; Kataria et al., 1987; Lozoff et al., 1985; Richman et al., 1975; Smedje et al., 1998; Zuckerman et al., 1987). Children who exhibit externalizing problems during the day might be even more likely than other children to experience sleep difficulties (Lavigne et al., 1999; Richman, 1981). Indeed, research investigating the relationship between sleep and behavior problems has generally concluded that increased difficulties with sleep are associated with increased behavior problems (Owens-Stively et al., 1997; Richman). However, there has been little research conducted investigating sleep and behavior in clinically referred preschool- and toddler-age children with significant behavior problems. Additionally, different methodologies used in the existing research make it difficult to compare findings about the relationship between sleep and behavior across studies, especially for preschool- and toddler-age children (Owens-Stively et al.; Lavigne et al.; Weissbluth, 1984; Wiggs & Stores, 1999). This study aimed to further investigate sleep difficulties in toddler- and preschool-age children with and without significant behavior problems. Furthermore, the current study aimed to investigate the relationship between sleep difficulties and other psychological constructs (i.e., maternal general stress, maternal depression, and parenting stress), which have been previously shown to be related (Bates et al., 2002; Quine, 1992, Seifer et al., 1996).

To address the research questions of this study, mothers of clinically referred children with behavior problems and nonclinically referred children without behavior problems completed questionnaires regarding their child's sleep and behavior as well as their own general stress, parenting stress, and depressive symptomology. Mothers also completed a Sleep Diary chronicling several aspects of their child's sleep for 1 week.

Overall, children with behavior problems showed significantly more sleep difficulties, when measured by the total sleep scores on the Sleep Diary and the CSHQ, than children without behavior problems. These findings are consistent with previous research that has looked at sleep correlates in children with significant behavior problems. For example, Lavigne and colleagues (1999) found that a community sample of children (ages 2-5) who slept fewer hours showed higher rates of externalizing behavior (e.g., aggression). Similarly, other researchers (Dahl, 1996; Mindell et al., 1999) have concluded that children with sleep difficulties have an increased risk of difficulties with behavior regulation and future psychopathology. Also consistent with the findings of this study, Weissbluth and colleagues (1983) experienced that children with reported behavioral problems showed higher rates of sleep disturbances (e.g., night waking, sleep onset, shorter duration of sleep) compared to same-aged peers without behavior problems. Moreover, researchers using samples of clinically referred children with sleep problems (Owens-Stively et al., 1997) found that an increase in sleep problems was associated with an increase in behavior problems. Furthermore, previous research has used various approaches to assess sleep disruptions including Sleep Diaries, paper/pencil questionnaires (Owens-Stively et al.; Shang et al., 2006; Smedje et al., 2001; Stein et al., 2001), interviews (Hiscock et al., 2007; Zuckerman et al., 1987), or more

objective measures such as actigraphy (Aronen et al., 2000; El-Sheikh et al., 2006); only a few used a combination of more than one approach (Richman et al., 1985; Wiggs & Stores, 1999). Nevertheless, the findings of this study and those with diverse methodological approaches align to suggest an important relationship between sleep and behavior. This study and corroborating research provide a foundation for future research aimed at establishing a directional relationship between sleep and behavior.

Specific Sleep Problems

When looking at the different types of sleep disturbances exhibited by children in this study, children with behavior problems were found to have increased rates of a variety of specific sleep disturbances compared to children without behavior problems. Children with behavior problems took more time to initiate sleep than children without behavior problems when measured by both the Sleep Diary and the CSHQ. These differences between groups were not surprising given that initiation of sleep could be prolonged by bedtime resistance. The behavior problems a child exhibits in the context of going to bed could be an extension of behavior problems exhibited by the child during the day. While this possibility was not assessed with the Sleep Diary, results from the CSHQ showed that children with behavior problems exhibited higher rates of bedtime resistance. These results are commensurate with findings from previous research that concluded children who exhibited difficulties with settling showed higher rates of externalizing behavior problems (Scher et al., 2005). Therefore, difficulties with sleep might in fact be a continuation of daytime behavior problems in general.

Children with behavior problems also had shorter sleep durations than children without behavior problems when measured by both the Sleep Diary and the CSHQ. Differences in sleep duration between the groups could be related to the differences seen on the bedtime resistance and the sleep onset scales/items. For example, resistance at bedtime might result in a child taking longer to initiate sleep, thereby decreasing the amount of total time a child sleeps. These results suggest that shorter sleep durations might be a continuation of general behavior problems manifesting in the context of bedtime routines (i.e., bedtime resistance that increases the time taken to initiate sleep). Indeed, it has previously been shown that children who slept less during the night showed higher rates of externalizing behavior problems (Lavigne et al., 1999). Based on CSHQ scores, children with behavior problems also were reported to exhibit more daytime sleepiness compared to children without behavior problems. It could be that the increased daytime sleepiness is a result of the shorter sleep durations resulting from longer initiation of sleep onset in children with behavior problems.

There were no significant differences between groups in either the number of nights a child wakes per week or in the frequency with which the child wakes per night when using the Sleep Diary. However, when measuring night wakings with the CSHQ, there were significant differences between the two groups. The results from the Sleep Diary support other research that has concluded that children with and without behavior problems both wake during the night; however, good sleepers are able to self-soothe and re-initiate sleep without the aid of their parents, whereas bad sleepers are not (Benhamou, 2000; Dahl, 1995; Mindell, 1996). Therefore, it could be that children with and without behavior problems show similar rates of night wakings, but children with behavior

problems are more likely to show resistance (e.g., crying, refusing to go to bed) when re-initiating sleep. Similarly, these children might be more likely to initiate help (e.g., crying, waking parents) from their parents when they wake at night. Conversely, results from the CSHQ support other research findings that indicate children with behavior problems experience more night wakings than children without behavior problems. One explanation for the differences between the Sleep Diary and CSHQ might be reporting bias, where parents tended to rate both sleep and behavior as more problematic. For example, if a parent's perception of her child's behavior was problematic, she might be more likely to rate her child's sleep behavior as problematic. In contrast, the Sleep Diary could be viewed as more objective, where the parent is asked to rate the specific number of night wakings from the previous night, therefore, only relying on recall from the previous night as opposed to retrospective recall from the previous month of sleep. Another explanation might be that parents of children without behavior problems might not have been attuned to their child's night wakings prior to keeping the Sleep Diary and/or they rated the frequency of night wakings as lower on the CSHQ because they did not view them as problematic.

The CSHQ is a broader measure of sleep when compared to the Sleep Diary, as it also consists of subscales which measure sleep anxiety and parasomnias. Results showed that children with behavior problems exhibited more difficulties on both of these scales compared to children without behavior problems. Although anxiety is more commonly referred to as an internalizing behavior problem, children with externalizing behavior problems are at higher risk of experiencing concurrent internalizing problems, such as anxiety (Achenbach & Rescorla, 2000), which may explain differences on the Sleep

Anxiety scale. Additionally, it could be that parents interpret their child's crying and seeking of parental help to reinitiate sleep as anxiety rather than bedtime resistance. The current research included children who fell within the borderline or clinical range on the externalizing behavior scale, but did not exclude children who had both high internalizing and externalizing scores. Consequently, it is not known whether children with only internalizing difficulties experience different types of sleep problems than children with only externalizing or both externalizing and internalizing behavior problems. Results also showed that children with behavior problems had higher rates of parasomnias compared to children without behavior problems. The parasomnia scale consists of a variety of abnormal sleep difficulties (e.g., wakes up screaming, wets the bed at night). This is consistent with previous research that showed a relationship between behavioral and social/emotional problems and increased presentation of parasomnias. For example, Smedje and colleagues (2001) found that children who exhibited high rates of hyperactivity also exhibited more tossing and sleep walking. Also, children with emotional problems (symptoms of depression and anxiety) had higher rates of night terrors (Smedje et al.).

Overall, children with behavior problems were more likely than children without behavior problems to experience a variety of specific sleep disturbances. These findings may have important clinical implications. For example, given the overlap between sleep problems and behavior problems, it seems wise to assess sleep problems in children who are referred for behavior problems and vice versa. Additionally, it might be better to intervene with sleep problems first; if the sleep problems can be resolved quickly, there might not be a need for other interventions. On the other hand, if the sleep problems are

a symptom of daytime behavior problems (e.g., bedtime resistance), then intervention should target sleep and behavior simultaneously.

Maternal Stress and Depression

As noted in the review of literature, a variety of psychological constructs (i.e., behavior problems, maternal depression, parenting stress, and maternal general stress) have been found to be related to childhood sleep difficulties. In addition to evaluating child behavior problems, several of these maternal constructs, including stress and depression, were evaluated in the current study. Both measures of sleep (i.e., the Sleep Diary and CSHQ) showed modest-to-high correlations with measures of parenting stress and children's behavior. Furthermore, there were modest correlations between scores on the Sleep Diary and measures of general maternal stress and maternal depression. Maternal stress was also strongly related to child behavior problems as rated on the CBCL. These results suggest that other factors (i.e., maternal depression, family stress, parent-child relationship stress) likely contribute to and/or maintain sleep disturbances in children, illustrating the complex relationship between sleep, behavior, and various familial factors. The relationship between sleep, behavior, and maternal stress/ depression suggests that interventions designed to treat sleep problems and/or behavior problems might also lead to improvements in associated family problems.

In an effort to understand possible predictive relationships of various psychological constructs (i.e., parental stress, behavior, parental depression, and general stress) and sleep, stepwise linear regression analyses were performed. Both the child's age and household income were controlled for because of significant differences on these

factors between children with and without behavior problems. The predictive relationship of the aforementioned psychological constructs and sleep was different when sleep was measured by the Sleep Diary as opposed to the CSHQ. Child's age and family income did not significantly predict Sleep Diary scores. Similarly, maternal general stress, parenting stress, and maternal depression were not predictive of sleep problems in children when the Sleep Diary score was the outcome measure. However, when sleep was measured by the CSHQ, children from lower SES families were more likely to experience sleep difficulties. Additionally, mothers who reported higher rates of parenting stress and behavior problems in their children were more likely to report sleep difficulties on the CSHQ, therefore, indicating parenting stress and child behavior problems are predictive of sleep difficulties as rated on the CSHQ. These differences in findings across the two sleep measures might be explained by the nature of the questionnaires. For example, it could be that parents who rated their children as exhibiting more sleep difficulties on a paper/pencil questionnaire would also rate their child's behavior and stress related to parenting as more problematic on other questionnaires. This suggests mothers who rated their child's sleep and behavior as more problematic on subjective behavior measures were likely experiencing increased levels of stress related to parenting; however, when sleep was measured using a less subjective measure of sleep patterns (i.e., Sleep Diary), parental ratings of behavior and stress were not predictive of sleep difficulties.

There are potentially important clinical implications for these findings. For example, maternal stress and sleep concerns should also be queried when children are referred for behavior problems to gain a more global understanding of the relevant

factors contributing or maintaining the behavior problems. Additionally, if interventions solely target behavior problems in children with concurrent sleep difficulties, problems (e.g., maternal stress or depression) shown to be associated to sleep disturbances might persist. Furthermore, if sleep difficulties and behavior problems are caused and/or maintained by maternal stress and depression, interventions that target maternal mental health might lead to improvements in children's sleep and behavior.

Concurrent Validity of the CSHQ and Sleep Diary

Previous research has addressed the psychometric properties of the CSHQ as a measure of sleep disturbances when used on children between the ages of 4-10 (Owens et al., 2000); however there are no psychometric properties for the use of the CSHQ on preschool- and toddler-age children. Moreover, there are currently no paper/pencil sleep questionnaires that have sound psychometric properties for children between the ages of 2-4. For these reasons, the internal consistencies of the CSHQ total score and subscale scores were calculated in addition to the concurrent validity between the CSHQ and the Sleep Diary. The internal consistency of the total score was adequate ($\alpha = 0.852$) and 5 of 8 subscales (i.e., bedtime resistance, sleep duration, night wakings, parasomnias, sleep disordered breathing) could be considered adequate using the lenient cut-off of $\alpha = 0.60$ when used on preschool- and toddler-age children. The sleep anxiety and the daytime sleepiness subscales had lower internal consistency scores of 0.59 and 0.55, respectively. Internal consistency for the sleep onset Delay subscale could not be calculated because only one question is included on this subscale. A potential reason for the lower internal consistency scores on some subscales might be that some questions on the subscales are

more relevant to older children. For example, questions on the daytime sleepiness scale asks about the ease with which a child wakes in the morning and about the amount of sleepiness a child exhibits during the day. It is probable that a 2-year-old could wake easily in the morning, but also experience daytime sleepiness, as 2-year-olds commonly take afternoon naps (Anders et al., 1995; Weissbluth, 1995). The responses to these questions would likely be more consistent in older children. Given that some of the item total correlations were quite low in this sample of preschool-children, future users of the CSHQ with toddler- and preschool-age children might consider dropping some items with low item total correlations from the measure.

Concurrent validity of the total scores on the Sleep Diary and the CSHQ was moderate, suggesting similarities between the constructs of sleep that the two sleep measures assessed. Similarly, there were moderate correlations between like subscales/items on the two sleep measures, indicating similarities between various aspects of sleep measured by the Sleep Diary and the CSHQ. Stronger relationships between the two measures would not be expected given that the CSHQ is a broader measure of sleep that includes specific types of sleep disturbances (i.e., parasomnia's, daytime sleepiness, disordered breathing, bedtime resistance, and sleep anxiety) not included in the Sleep Diary. Furthermore, stronger relationships would be unlikely given the differences in how the data are collected for each of the sleep measures as the CSHQ relies entirely of retrospective data. In conclusion, the current findings provide evidence for adequate internal consistency for the CSHQ and moderate concurrent validity between the total scores and the like items/subscales on the Sleep Diary and the CSHQ when used on the preschool- and toddler-aged children. Future research should continue

to focus on the development of sleep measures with sound psychometric data to accurately measure sleep in preschool- and toddler-age children.

Although the Sleep Diary and CSHQ are moderately correlated, as noted throughout the discussion, there were some differences in findings between these two measures. In addition, the magnitude of the differences in sleep disturbances exhibited by children with and without behavior problems varied depending on which sleep measure was used. Differences between the two groups of children were clinically larger when sleep was measured with the Sleep Diary as opposed to the CSHQ. These differences could be accounted for in a number of ways. First, the different magnitudes might be explained by differences in how questions were asked on the CSHQ compared to the Sleep Diary. The CSHQ required parents to report on sleep patterns based solely on retrospective recollection of their child's sleep patterns, as they were asked to rate the frequency with which their child exhibited various sleep problems. The Sleep Diary required parents to track sleep completing a journal. With the CSHQ, parents were required to include their child's sleep behavior in 1 of 3 possible categories (i.e., "rarely" = 0-1 nights per week, "sometimes" = 2-4 nights per week and "usually" = 5-7), where the Sleep Diary placed children's sleep behavior in one of four possible categories. Therefore, the CSHQ might have been a less sensitive measure of sleep behavior. Additionally, the Sleep Diary and CSHQ are used to assess different aspects of sleep. The Sleep Diary targets sleep onset, the frequency of waking, and total duration of sleep whereas the CSHQ targets eight different areas of sleep, some of which are not measured by the Sleep Diary (i.e., bedtime resistance, parasomnias, sleep disordered breathing, daytime sleepiness, sleep anxiety). As a result, the magnitude of differences shown

between the two sleep questionnaires could be a result of the different sleep constructs measured.

Similarly, differences in the strength of the relationships between the sleep measures (i.e., Sleep Diary, CSHQ) and other construct measures (i.e., behavior problems, maternal depression, general stress, and parenting stress) could potentially be due to reporter bias. Aside from the Sleep Diary, all other constructs were measured using paper-and-pencil questionnaires that relied on retrospective data. When completing the CSHQ and measures of parenting stress and behavior, the relationships between these measures were stronger than they were with the Sleep Diary. Measures relying on retrospective data might quantify different aspects of behavior compared to the potentially more objective Sleep Diary. Furthermore, the timing with which the parents completed the various measures might have contributed to differences in the strengths of correlations between the measures. Because parents completed all measures prior to completing the Sleep Diary, differences between the Sleep Diary and the CSHQ are explicable based on alterations in parental awareness. As discussed with differences found between the night waking scales/items on the CSHQ and the Sleep Diary, it could be that parents who did not view their child's sleep as problematic would have answered questions on the CSHQ accordingly, but might have become more aware of their child's sleep difficulties when asked to track sleep with a diary.

Limitations and Directions for Future Research

Several limitations of the current study should be considered when interpreting the results. It is necessary to recognize that the small sample size used in the present

study necessitates replications with larger sample sizes to cross-validate findings. Additionally, the ability to generalize the findings to the more diverse population at large is questionable. The samples used in the current study were quite homogenous based on ethnicity, age, income, medication use, and history of receiving mental health services. Also, a majority of the children in this study were selected from an early intervention program, with a majority of them having concurrent developmental delays. The children without behavior problems were primarily from middle-class families. Although the homogenous sample allowed for us to control for various variable effects (e.g., cultural factors), the results might not be generalizable to children from lower SES backgrounds, ethnic backgrounds, and/or urban populations. Future research that looks at the relationship between sleep difficulties and behavior in children from diverse populations could help gain a better understanding of any cultural differences that might exist. For example, in cultures where it is more common for children to co-sleep with parents, perceptions of behavior and sleep might differ from cultures where co-sleeping is not common.

Initially this study aimed to also assess the sleep behavior of clinically referred children who did not exhibit significant behavior problems and nonclinically referred children who did exhibit significant behavior problems, as measured by the CBCL. The inability to obtain large enough samples of these two groups did not allow quantitative analyses of sleep in these two populations. It will be important for future research to further investigate these additional populations in order to better understand the relationship between sleep and behavior problems. For example, there could be differences in sleep difficulties, maternal stress, and maternal depression between

children with behavior problems who are clinically referred, compared to those children with behavior problems who are not clinically referred.

Another potential limitation of the current study is that the data collected relied heavily on parental reports and perceptions of their children's sleep and behavioral difficulties. Parents were asked to complete a series of questionnaires related to their child's sleep habits, behavior, maternal stress levels, and maternal depressive symptoms. Previous research has suggested that traditional self-report measures of sleep are not highly correlated with objective measures of sleep such as an actigraph, which is a small monitor that attaches to the child's leg (Scher, Epstein, Sadeh, Tirosh, & Lavie, 1992). The low correlations between the subjective and objective measures indicates that parental report about sleep does not always accurately portray the child's sleep patterns; however, subjective parental report measures might more accurately portray their perception of their child's sleep, which could still provide valuable information. This makes it difficult to determine how much the results from the current study are impacted by differences in parental perceptions.

Although Sleep Diary information requires the use of parental report and will most likely vary in accuracy, it is believed that the Sleep Diary provides a more valid measure of sleep compared to solely asking the parents how the child sleeps or questions specific to sleep patterns. The use of a Sleep Diary allowed for sleep data to be collected in the child's naturalistic environment and, along with the CSHQ, likely provided information about parent's perceptions of their child's sleep. These measures could also indirectly reflect the quality of the parents sleep. For example, if parents are light sleepers, they might be more likely to hear their child wake in the night. Only one study

has investigated the quality of maternal sleep in children with and without sleep problems. Results from this study showed that sleep patterns (i.e., bedtime, wake time, total sleep time) did not differ between groups, however, mothers of children with night waking problems experienced more disrupted sleep (Meltzer & Mindell, 2007). While the current study did not address the relationship between parental sleep patterns and children's sleep, this is an interesting area for future research.

The correlational design of the study does not allow for causality to be determined. It seems plausible that behavioral problems could contribute to sleep difficulties and/or that sleep problems might contribute negatively to a child's ability to regulate their behavior. Furthermore, findings showed that other factors (i.e., maternal depression, family stress, parent-child relationship stress) likely contribute to and/or maintain sleep disturbances in children, making the relationship between sleep, behavior, and various familial factors complex. The results of the current study and similar studies can help generate hypotheses about the potential relationships between sleep, behavior, and various other psychological constructs (i.e., maternal depression, family stress, parent-child relationship stress). Ultimately, this work may lead to the design of intervention studies that address where best to target interventions for children who experience concurrent daytime behavior problems and sleep difficulties. For example, research could investigate whether interventions designed to improve a child's sleep also improve daytime behavior or whether interventions designed to improve daytime behavior also result in improvements in a child's sleep. Additionally, future research could investigate whether interventions that target maternal mental health lead to improvements in children's sleep and behavior.

Summary

The results from the present study have added support to the existing research that imply a relationship between daytime behavior problems and sleep difficulties in preschool and toddler age children. Furthermore, the current research findings indicate that maternal reports of increased parenting stress, general stressc and depression are related to more sleep difficulties in children, although maternal parenting stress and child behavior problems were the only constructs found to be predictive of sleep difficulties. Therefore, it is informative to recognize correlates that might be impacted by, contribute to, and/or be maintained by sleep and behavior problems in children. Findings from this study and other corroborating data warrant future research that clarifies a directional relationship between sleep and behavior.

The relationship between sleep, behavior, and maternal mental health (i.e., general stress, parenting stress, and depression) implies that clinicians should also assess sleep disturbances and maternal mental health when children are referred for behavior problems. This will allow clinicians to gain an understanding of factors contributing to or maintaining the behavior problems. Additionally, findings from the current research could be used to assist in the development of interventions for preschool- and toddler-aged children who exhibit both sleep and behavior problems. For example, interventions that target sleep might also lead to improvements in daytime behavior problems and associated maternal problems (i.e., depression, stress, parenting stress). Alternatively, treatment interventions that target daytime behavior problems might also lead to improvements in sleep, as less bedtime resistance and a child's ability to self-soothe and

regulate their own behavior could result in increased total duration of sleep. Conversely, if interventions solely target a reduction in daytime behavior problems in children who also experience sleep difficulties, these children might continue to experience problems that are associated with sleep difficulties, and maternal stress and depression might also persist. Moreover, it might be important to target interventions to decrease sleep disturbances first, as quick resolution of sleep disturbances could diminish the need for interventions that target daytime behavior problems. However, there might be a need to address both sleep disruption and behavior at the same time if sleep problems are an extension of behavior problems. Finally, given the complex relationship between sleep, behavior, and various other psychological constructs, interventions that improve maternal mental health (i.e., stress and depression) might lead to improvements in sleep and behavior.

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APPENDIXES

Appendix A:

Demographic Information Form

Please answer the following questions about your child.

What is your child's age? _____

What is your child's gender?
Female
Male

What is your child's ethnicity?
Caucasian/White
African American / Black
Latino/a
Native American
Asian
Alaskan Native
Pacific Islander
Other: _____

Does your child have any disabilities (e.g., physical or psychological)? Yes No
If yes, please describe. _____
_____
_____
_____

Is your child currently receiving mental health services? Yes No
If yes, please describe. _____
_____

Have your child received mental health services in the past? Yes No
If yes, please describe. _____
_____

Is your child currently taking any prescription medication? Yes No
If yes, please list medications and reason for taking medications. _____
_____
_____

Please answer the following questions about yourself.

What is your age? _____

What is your gender?
Female
Male

What is your ethnicity?
Caucasian/White
African American / Black
Latino/a
Native American
Asian
Alaskan Native
Pacific Islander
Other: _____

What is your annual household gross income? _____

What is your highest level of education completed?
Did not complete high school or GED
GED
High School
Associate's degree
Bachelor's degree
Graduate degree

Are you currently receiving mental health services? Yes No
If yes, please describe. _____
_____

Have you received mental health services in the past? Yes No
If yes, please describe. _____
_____

Are you currently taking any prescription medications? Yes No
If yes, please list medications and reason for taking medications. _____
_____
_____
_____

Appendix B:

Scoring Guidelines for Sleep Diary

Average time taken to settle once in bed	
<15	0
16-29	1
30-44	2
45-60	3
>61	4

Average number of night wakings per week	
None	0
1-2	1
3-4	2
5-6	3
>7	4

Average number of wakings per night	
<.03	0
0.4-1.0	1
1.1-2.0	2
2.1-3.0	3
>3.0	4

Average duration of each night waking (minutes)	
0-5	0
6-15	1
16-30	2
31-60	3
>60	4

Average hours slept during 24-hour period	
12+	0
11+	1
10+	2
9+	3
<9	4

Average time child spent in parents' bed each week (Number of nights x average number of hours)	
None	0
1-6	1
7-20	2
21-34	3
>35	4

Appendix C:

Sleep Diary

Day	Time begin bedtime routine	Time in bed	Tme asleep	# of times child wakes during night	Day	Morning wake up time	Time spent in parents' bed during the night	Nap time(s)
Example	8:15 pm	8:50 pm	9:15 pm	3	20 min., ignored and let her cry herself back to sleep. 10 min., laid with her in her bed until she fell back asleep 5 min., laid with her in her bed until she fel back asleep	7:30 am	0 min.	1:00 pm - 3:00 pm
Sundaay								
Monday								
Tuesday								
Wednesday								
Thursday								
Friday								
Saturday								

Appendix D:

Consent Form

UtahState UNIVERSITY

DEPARTMENT OF PSYCHOLOGY
2810 Old Main Hill
Logan UT 84322-2810
Telephone: (435) 797-1460
FAX: (435) 797-1448

Page 1 of 2
Utah State University IRB Approved 01/13/2006
Approval terminates 01/12/2007
Protocol Number: 1438
IRB Password Protected per True M. Rubal, IRB Administrator

Informed Consent

Daytime behavior problems and sleep problems in toddler and preschool age children

Introduction

Penny Sneddon, a graduate student in the Department of Psychology at Utah State University, and Dr. Gretchen Gimpel Peacock, a faculty member in the Department of Psychology are conducting research to look at the relationship between behavior problems and sleep problems in toddler and preschool age children. We are interested in how sleep and behavior problems in children are related and how they might influence parents' well being. You have been asked to take part because you are the parent of a child between the ages of 2 and 5.

Procedures

If you agree to be in this study, you will complete 2 measures about your child's sleep and behavior and 3 measures about your level of stress and depressive feelings. Following this, you will complete a sleep diary on which you will track your child's sleep behaviors (bedtime, night wakings, etc.) for one week. You have a choice to complete an on-line version or a paper/pencil version of the sleep diary. If you complete an on-line version of the sleep diary, all information is secure and will be kept confidential. If you complete the paper/pencil version, you will be contacted by phone at the end of one week in order to obtain the results from the sleep diary. You can also choose to send us a copy of the sleep diary using an addressed and stamped envelope we will provide. If your child exhibits behavior problems, you will be offered the opportunity to attend a meeting to discuss behavioral interventions after you complete the study. This meeting will occur in a group setting with other parents who have children with behavior problems. If you complete this study you will be placed in a drawing for a $50 gift certificate to Wal-mart. You will be contacted via telephone if you win the $50 gift certificate.

New Findings

You will be told of any significant new findings discovered during the course of this study via either a mailed letter or a phone call.

Risks

There are no known serious risks associated with participating in the study. You might experience some slight psychological distress completing the rating scales on your child's behavior and your mental heath, but these risks are considered minimal.

Benefits

Although this research project may not provide you with any direct benefits your participation may lead to benefits to others. Potential benefits include a better understanding of the relationship between childhood sleep problems, childhood behavior problems and mothers' well being. This information could help clinicians and parents in their efforts to improve daytime behavior problems and sleep problems in children.

Explanation and Offer to Answer Questions

Penny Sneddon or a research assistant working with her has explained this study to you and answered any questions you have at this time. If you have other questions, you may reach Penny Sneddon at 797-3727 or Dr. Gretchen Gimpel Peacock at 797-0721.

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Page 2 of 2
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Protocol Number: 1438
IRB Password Protected per True M. Ruhal, IRB Administrator

Informed Consent

Daytime behavior problems and sleep problems in toddler and preschool age children

Voluntary Nature of Participation and Right to Withdraw Without Consequence

Participation in this research study is entirely voluntary. You may refuse to participate from the study. There is a chance that you might experience some psychological distress while completing the rating scales on your child's behavior and your mental health. You may withdraw from the study at any time without consequence.

Confidentiality

Information about you and your child will be kept confidential and will be available only to people directly involved in the project. All information about you and your child will be assigned a code number in order to keep information confidential. This number will be used when the data are stored in the computer. Public presentations on results of this study will in no way identify you or your child. At the completion of your participation in this study, all identifying information on the assessment measures you completed will be removed and all data will be kept in a locked file cabinet, which will be accessible only to people directly involved in the project.

IRB Approval Statement

This study has been reviewed and approved by the Institutional Review Board (IRB) for the protection of human participants at Utah State University. If you have questions regarding your rights as a research participant, or if problems arise which you do not feel can be discussed with the researchers, please feel free to contact the IRB at (435) 797-1821.

Copies of Consent

Two copies of this document have been provided for your signature. Please keep one for your files and return the second copy to the researcher.

Investigator Statement

"I certify that the research study has been explained to the above individual by me or my research staff, and that the individual understands the nature and purpose, the possible risks, and benefits associated with taking part in this research study. Any questions that have been raised, have been answered."

Signature of Principal Investigator and Student Investigator

Gretchen Gimpel Peacock, Ph.D.
Principal Investigator
(435) 797-0721

Penny L. Sneddon, M.S.
Student Investigator
(435) 797-3727

Signature of Subject

I have read and understand this consent form and I am willing to participate in this study.

Signature _____ Date _____

Printed Name _____ Phone Number _____

CURRICULUM VITAE

Penny L. Sneddon

Educational History

August 2002 – 2007	Ph.D., Clinical/School/Counseling Psychology, APA accredited program Degree requirements completed, August 2007 Utah State University, Logan, Utah
May 2004	M.S., School Psychology Utah State University, Logan, Utah
May 2000	B.S., Psychology Idaho State University, Pocatello, Idaho

Practicum Experience

August 2004 – May 2005	Utah State University Counseling Center (Logan, UT) Counseling Psychology Practicum Position: Practicum Counselor Responsibilities: Conducted both individual and group therapy. Gained experience with assessment, diagnosis, and formulation and implementation of interventions with college students who presented with diverse concerns (e.g., depression, anxiety, relationship problems, childhood abuse). Conducted therapy using a variety of theoretical orientations (e.g., CBT, IPT) Supervisor: Gwenna Coulliard, Ph.D. Hours: Total hours 304, Total direct service hours 89
August 2003-May 2004	Utah State Up to Three Early Intervention Program (Logan, UT) Child Clinical Practicum (Logan, UT) Position: Student Therapist

Responsibilities: Gained experience with assessment, formulation and implementation of behavioral interventions with children between the ages of birth to three. Worked with children who presented with diverse concerns (e.g., sleep problems, externalizing behavior problems, feeding problems, learning problems) Worked within an interdisciplinary team consisting of nurses, physical therapists, occupational therapists, social workers, teachers, nutritionists, speech therapists and parents.
Supervisor: Gretchen Gimpel, Ph.D.
Hours: Total hours 290, Total direct service hours 78

June 2003 – August 2003

Children's Hospital of Oklahoma (Oklahoma City, OK) Summer Practicum in Child Clinical Psychology

Position: Practicum Student
Responsibilities: Gained experience working with the pediatric population, using an interdisciplinary approach to both diagnosis and comprehensive treatment planning. Consulted with professionals from diverse disciplines (e.g., physicians, surgeons, pharmacists, nurses, administrative personal). Worked with children (ages 3–17) who presented with diverse concerns (e.g., trauma victims, abuse victims, eating disorders, behavioral problems associated with medical conditions, and externalizing and internalizing behavior problems).

Supervisor: Mary Beth Logue, Ph.D.
Hours: Total hours 166, Total direct service hours 61

August 2002 – May 2003

Utah State University Psychology Community Clinic (Logan, UT)
Adult Clinical Practicum

Position: Student Therapist
Responsibilities: Gained experience in assessment, diagnosis, and formulation and implementation of interventions with adults with diverse psychological problems (e.g., depression, anxiety, eating

disorders, history of abuse, relationship problems).
Supervisor: Susan Crowley, Ph.D.
Hours: Total hours 306, Total direct service hours 71

August 2001 – May 2002 Bear Lake, Idaho School District #33 (Paris, ID)
School Psychology Practicum

Position: Practicum Student
Responsibilities: Gained experience in assessment, classification decisions, formulation and implementation of academic and behavioral interventions, and consultation with parents and teachers.
Supervisor: Steven Heeder, Ph.D.
Hours: Total hours 288, Total direct service hours 131

January 2001 – May 2001 Utah State University Psychology Community Clinic (Logan, UT)
Child Clinical/School Psychology Practicum

Position: Practicum Student
Responsibilities: Assessment, diagnosis, and formulation and implementation of intervention services to children with diverse psychological (behavior disorders, anxiety, depression) and learning problems (e.g., learning disabilities, mental retardation).
Supervisor: Gretchen Gimpel, Ph.D.
Hours: Total hours 186, Total direct service hours 89

Other Clinical Training Experience

August 2004 – May 2005 Utah Leadership Education in Neurodevelopmental Disabilities (ULEND)

Position: Trainee
Responsibilities: Attended didactic seminars, participated in diverse clinical experiences, and conducted research on increasing awareness of mild traumatic brain injuries. Increased knowledge and skills about taking a collaborative

interdisciplinary approach when providing services to children with neurodevelopmental disabilities and their families.
Supervisor: Gretchen Gimpel, Ph.D.
Hours: Total hours 282, Didactic hours 72, Clinical hours 75, Research hours 21, Leadership hours 114

Sept. 2001-August 2004 — Utah State University ADHD Study (Logan, UT)

Position: Student therapist
Responsibilities: Implement behavioral intervention and stress management programs with parents of children (ages 3-11) with ADHD. Administer and interpret various assessment measures.
Supervisor: Gretchen Gimpel, Ph.D.
Hours: Total hours 121, Total direct service hours 95

June 2001 – May 2006 — Utah State University Psychology Community Clinic (Logan, UT)

Position: Student Therapist
Responsibilities: Provided psychological services to both children and adults.
Supervisors: Gretchen Gimpel, Ph.D., Susan Crowley, Ph.D.
Hours: Total hours 155, Total direct service hours 86

Professional Positions

Paid Clinical Experience

Sept. 2006-August 2007 — British Columbia's Children's Hospital APA Pre-doctoral Internship

Position: Intern
Responsibilities: Gained experience working with the pediatric population, using an interdisciplinary approach to both diagnosis and comprehensive treatment planning. Consulted with professionals from diverse disciplines (e.g., physicians, surgeons, pharmacists, nurses, administrative personal). Worked with children (ages birth–17) who

presented with diverse concerns (e.g., oncology, neurology, genetics, behavioral problems associated with medical conditions, and externalizing and internalizing behavior problems). Also gained experience working in a rehabilitation center, conducting neuropsychological assessments and treatment with adults with acquired brain injuries.
Supervisor: Sandra Clark, Ph.D.

May 2004- July 2006 — Utah State Up to 3 Early Intervention Program (Logan, UT)

Responsibilities: Conduct assessment, formulate and implement behavioral interventions with children between the ages of birth to three. Work within an interdisciplinary team consisting of nurses, physical therapists, occupational therapists, social workers, teachers, nutritionists, speech therapists and parents.
Position: Behavior Specialist
Supervisor: Gretchen Gimpel, Ph.D., Sue Olsen, M.Ed.
Hours: Total hours 970, Total direct service hours 524

August 2002 – May 2003 — Tri-District Special Services (Saint Anthony, ID)

Position: School Psychologist Intern
Responsibilities: Worked for the Teton County, Sugar Salem, and Fremont County School Districts. Served as the primary developmental specialist for the preschools within the tri-district area. Conducted assessments for special education classification, aided in the formulation and implementation of academic and behavioral interventions, consulted with parents and teachers, and conducted individual therapy sessions with students in primary and secondary grade levels.
Supervisor: Robert Charlton, Ph.D.
Hours: Total hours 784, Total Direct Service Hours 541

Other Professional Positions

August 2004 – May 2005	Academic Skills Specialist Utah State University Academic Resource Center (Logan, UT) Responsibilities: Development and implementation of academic skills interventions for college age students, outcome assessment research, community outreach, and service learning activities Supervisor: Noelle Call, M.S.
August 2001 – May 2003	Teaching Assistant, Psychology 1010 Psychology Department: Utah State University (Logan, UT) Responsibilities: Assisted in the organization and taught classes for an Introduction to Psychology class. Supervisor: Tamara Ferguson, Ph.D.
January 2002 – May 2003	Academic tutor Student-Athlete Services (Logan, UT) Responsibilities: Aided student-athletes in understanding course content and communicated effective study and organizational skills Supervisor: Troy Kempa

Research Experience

May 2004-August 2007	Dissertation Research: The relationship between sleep and daytime behavior problems in children ages 2 – 5. This research includes the investigation of the relationship between sleep patterns in young children and daytime behavior. Supervisor: Gretchen A. Gimpel, Ph.D. June 2002-May 2004 Thesis Research: The effects of various auditory stimulation on the academic and behavioral performance of children with and without ADHD This research investigated the effects of auditory stimuli on academic performance and behavior in school age children. Supervisor: Gretchen A. Gimpel, Ph.D.

Sept. 2003 – Dec. 2003	Research assistant: Ethical issues with classroom extra credit. Responsibilities: Aided in research methodology and data collection Supervisor: Melanie Domenech Rodriguez, Ph.D.
Sept. 1999- May 2000	Research Assistant: The use of working memory strategies to improve reading comprehension. Responsibilities: ran subjects for 2 hour increments, administered the WM span task, the paper Nelson-Denny, the computer Nelson-Denny, and scored the two tests. Supervisor: Kandi Jo Turley-Ames, Ph.D.
January 1998- May 1999	Research Assistant: Does perpetrator type predict impact of sexual assault? Responsibilities: Collected data via a series of questionnaires. Supervisor: Kayleen Culbertson, Ph.D. student

Publication

G. A., Collett, B, R., Veeder, M. A., Gifford, J. A., Sneddon, P., Bushman, B., Hughes, K., & Odell, J. D. (2005). The effects of stimulant medication on the cognitive performance of children with ADHD. Clinical Pediatrics, 44, 405-411.

Professional Presentations

Nef, M. & Sneddon, P. L. (2005). *An Interdisciplinary Case Study: A Multiple Setting Approach In Family Centered Transition.* Poster session presented at the annual International Conference on Young Children with Special Needs and Their Families-Division of Early Childhood of the Council for Exceptional Children, Portland, OR.

Collins, S. & Sneddon, P. (2005). *Working with students with traumatic brain injuries and their families.* A paper presented at the Utah Conference of Effective Practices in Special Education, Logan, UT.

Sneddon, P. L. & Gimpel, G. (2004, November). *The effects of auditory stimulation on academic and behavioral performance in children with and without ADHD.* Poster session presented at the annual meeting of the Association for

Advancement of Behavior Therapy, New Orleans, LA.

Gimpel, G. S., Gifford, J., Veeder, M. A., Sneddon, P., Bushman, B. B., Carter, J., Brent, M., Hughes, K. N., Suzuki, E., Berglof, H. & Odell, D. (2004, July). *Addition of stress management training to parent training.* Poster session presented at the annual meeting of the American Psychological Association, Honolulu, HI.

Sneddon, P. L. & Turley-Ames, K. J. (2000, April). *The use of working memory strategies to improve reading comprehension.* Poster session presented at the Idaho State University Annual Poster Conference, Pocatello, ID.

Teaching Experience

August 2004 – May 2005	Instructor for Psychology 1730: Strategies for Academic Success
August 2003- May 2004	Instructor for Psychology 1010: Introduction to Psychology Organized course curriculum, lectured, and supervised teaching assistants
August 2001 – May 2003	Guest lecturer on numerous occasions for Psychology 1010 seminar class and Educational Psychology class at Utah State University

Volunteer Work

August 2002 - May 2003	Graduate Student Senate Representative Help to build a reciprocal relationship between the Utah State University graduate students and the administration of Utah State University.

Professional Affiliations

American Psychological Association-Student affiliate
National Association of School Psychologists- Student affiliate
Utah Association of School Psychologists- Student affiliate
Utah Psychological Association- Student affiliate