



A randomised controlled trial of cognitive-behaviour therapy for behavioural insomnia of childhood in school-aged children

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ABSTRACT

Chronic sleep problems can lead to the development of Behavioural Insomnia of Childhood – a sleep disorder involving problematic sleep-onset associations (i.e., parental presence), and resulting in impairments for children and family members. The aim of the present paper was to perform a controlled evaluation of cognitive-behaviour therapy (CBT) for Behavioural Insomnia. 42 children ($M = 9.3 \pm 1.9$ yrs, range 7–13 yrs, 18f, 24m) were randomised to CBT ($N = 21$) or waitlist control ($N = 21$). CBT consisted of 6 sessions, and combined behavioural sleep medicine techniques (e.g., sleep restriction) with anxiety treatment techniques (e.g., cognitive restructuring). Compared to waitlist controls, children receiving CBT showed significant improvements in sleep latency, wake after sleep onset, and sleep efficiency (all $p \leq .003$), but not total sleep time ($p > .05$). CBT was also associated with a reduction in problematic sleep associations ($p \leq .001$), child-reported total and separation anxiety (both $p \leq .01$), with all gains being maintained 6 months post-treatment. This is the first controlled study to demonstrate that multi-component CBT can be effective for the sleep, insomnia, and anxiety symptoms of Behavioural Insomnia of Childhood in school-aged children. Future research is needed to ascertain active treatment components.

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Introduction

Evidence suggests that 5–30% of primary school-aged children experience symptoms of insomnia (Blader, Koplewicz, Abikoff, & Foley, 1997; Bos et al., 2009; Liu, Liu, Owens, & Kaplan, 2005; Spruyt, O'Brien, Cluydts, Verleye, & Ferri, 2005). During this developmental period, insomnia may present as difficulties initiating, and to a lesser extent, maintaining sleep, as well behavioural difficulties including bedtime resistance and reluctance/refusal to sleep alone (American Academy of Sleep Medicine [AASM], 2005). These sleep difficulties are aptly captured by the diagnostic category

Behavioural Insomnia of Childhood (AASM, 2005). Developed over recent years, this diagnostic category describes a pattern of chronic, poor parental-limit setting associated with bedtime resistance, or problematic sleep-onset associations (AASM, 2001, 2005). Sleeping problems of this nature have been associated with schooling (e.g., attention/memory, delinquent behaviour; Fallone, Acebo, Arnedt, Seifer, & Carskadon, 2001; Sadeh, Gruber, & Raviv, 2002, 2003) and emotional difficulties (anxiety, mood; Alfano, Zakem, Costa, Taylor, & Weems, 2009), and affect multiple family members (Dahl & El-Sheikh, 2007). Given these consequences, there is a great need for effective treatment options to target this potentially pervasive childhood sleep disorder. Although the AASM typically provide practice parameters for the treatment of insomnia disorders, to the authors' knowledge none have yet been developed for the treatment of Behavioural Insomnia of Childhood in school-aged children. This is likely due to the lack of research evidence evaluating controlled treatments for this sleep disorder during this developmental period. Nonetheless, several studies using predominantly anxiety-based techniques have evaluated treatments to target children's night-time fears and associated sleep disturbance (e.g., bedtime resistance, and fear of sleeping alone; for a review, see Gordon, King, Gullone, Muris, & Ollendick, 2007). The results from these studies provide a useful starting point for examining possible treatment options for Behavioural Insomnia.

Abbreviations: SOL, sleep onset latency; WASO, wake after sleep onset; TST, total sleep time; SE, sleep efficiency; AASM, American Academy of Sleep Medicine; DSM-IV, Diagnostic and Statistical Manual of Mental Disorders, 4th edition; ICSD-2, International Classification of Sleep Disorders, 2nd edition; PDSS, Paediatric Daytime Sleepiness Scale; SCAS, Spence Children's Anxiety Scale; SMFQ, Short Mood and Feelings Questionnaire; BSM, behavioural sleep medicine; SWD, sleep/wake diary; Act, activity monitor; WL, waitlist; CBT, cognitive-behaviour therapy.

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Using either case-study, multiple baseline, or between-group designs, these studies evaluated therapeutic effects of multi-component treatments including self-control strategies, rewards and exposure hierarchies, hypnosis, strategic therapy, emotive therapy, and social stories (Gordon et al., 2007). Of these studies, several now 'dated' investigations have provided the most promising evidence of improvements in daytime 'fearfulness' and problematic sleep-onset associations using controlled designs (Friedman & Ollendick, 1989; Graziano & Mooney, 1980, 1982; Graziano, Mooney, Huber, & Ignasiak, 1979). Unfortunately, these studies did not report outcomes of night-time sleep that are conventional in sleep research (e.g., sleep onset latency [SOL], total sleep time [TST], wake after sleep onset [WASO]) alongside changes in anxiety. Thus, little is known about the extent to which these anxiety-focused treatments led to meaningful improvements in children's night-time sleep.

Sound approaches to treatment are best guided by sound theories of aetiology. Unfortunately few studies have systematically examined factors that may contribute to childhood insomnia (Alfano et al., 2009). Thus, in the absence of a comprehensive theory, treatment techniques are proposed here to target factors believed to underlie this problem. Generally, insomnia across the lifespan is viewed as a complex disorder with multiple possible behavioural and cognitive aetiologies (Bootzin, Manber, Perlis, Salvio, & Wyatt, 1993; Glaze, 2004; Glaze, Rosen, & Owens, 2002; Harvey, 2002; Meltzer & Mindell, 2004), and a number of factors have been proposed to contribute to insomnia during middle childhood (Meltzer & Mindell, 2004). In terms of cognitive aetiologies, fears and worries experienced at night reach their peak during middle childhood (Muris, Murckelbach, Gadet, & Moulaert, 2000), and may represent a bias towards threat information (Alfano, Beidel, & Turner, 2002). Such fear/anxiety may increase children's cognitive and physiological arousal at night, thereby delaying sleep onset (Dahl, 1996; Forbes et al., 2006; Meltzer & Mindell, 2004, 2006). In terms of behavioural aetiologies, avoidant coping behaviours (i.e., sleeping with a parent) may serve to maintain children's fears of sleeping alone. Thus, cognitive and behavioural treatment components drawn from the anxiety literature (e.g., cognitive restructuring; relaxation training; graded exposure) would be appropriate to target the abovementioned aetiologies (reducing cognitive and physiological night-time arousal; providing the child with opportunities to attempt to sleep alone). However, there are some behavioural treatment components drawn from the insomnia literature that could also target underlying aetiologies, and help to strengthen improvements in children's sleep and anxiety.

Sleep schedules implemented by parents that are inappropriate (i.e., placing children to bed too early) and inconsistent (i.e., vary in timing each night) may contribute to childhood insomnia through maladaptive conditioning (e.g., Ferber, 1996, 1990). That is, children put to bed early are likely to have reduced homeostatic sleep pressure (Borbély, 1982), and learn to associate bedtime with alertness. Implementing consistent bedtimes for children that are timed later in the evening would help to dampen alertness (and arousal) and overcome maladaptive conditioning as children go to bed feeling sleepy. The field of behavioural sleep medicine offers a technique useful to overcome such maladaptive conditioning. In children, 'bedtime fading' (which involves gradually limiting a child's time in bed to more closely match their sleep need) has been described as a 'promising' technique in the treatment of childhood insomnia (Kuhn & Elliott, 2003; Spirito, 1999). Examinations of bedtime fading have been confined to several small studies of atypically-developing young children (for a review, see Kuhn & Elliott, 2003), yet would prove useful in the treatment of insomnia during middle childhood. Finally, inadequate sleep

hygiene behaviours (e.g., alerting pre-bedtime activities) have been linked to impaired sleep in middle childhood (Mindell, Meltzer, & Carskadon, 2009; Owens, France, & Wiggs, 1999). Sleep hygiene education (which educates individuals about factors believed to promote improved sleep; Hauri, 1991) is a common component in cognitive-behaviour therapy for insomnia (CBT-I; Morgenthaler et al., 2006) and would be a useful adjunct for school-aged children who, for instance, are prone to night-time technological stimulation (Cain & Gradisar, 2010).

Although treatment options for childhood insomnia can be considered in isolation, a multi-component approach to treatment using both "anxiety-focused" and behavioural sleep medicine techniques frequently emerges as the treatment of choice for adult insomnia (Morgenthaler et al., 2006), and has received preliminary support with sleep-disturbed adolescents (Bootzin & Stevens, 2005). Despite this, combined "anxiety-focused" and behavioural sleep medicine approaches to the treatment of insomnia in middle childhood are yet to be investigated. Such combined approaches for treating generally defined 'sleeping problems' are frequently recommended in review papers (Ferber, 1996; Glaze, 2004; Kuhn & Elliott, 2003; Meltzer & Mindell, 2004, 2006) and child sleep textbooks (Ferber, 1985; Mindell & Owens, 2003; Rabian & Bottjer, 2008; Sheldon, Ferber, & Kryger, 2005), and are thus likely to be heavily relied upon in clinical settings. Therefore, the current study aimed to provide a preliminary investigation into the efficacy of a multi-component cognitive-behaviour approach to the treatment of Behavioural Insomnia of Childhood in school-aged children.

As with other insomnia disorders, Behavioural Insomnia of Childhood involves not only the complaint of poor sleep, but also significant associated daytime difficulties (AASM, 2005). Little is currently known about factors that may be indicative of poor sleep in school-aged children (Iglowstein, Jenni, Molinari, & Largo, 2003). However, as children who are exposed to experimental sleep restriction reliably demonstrate signs of increased daytime sleepiness (Carskadon, Harvey, & Dement, 1981; Fallone et al., 2001), daytime sleepiness was assessed as an indicator of insufficient sleep and in particular of adaptive functioning. In addition, there is growing evidence of a particularly important relationship between childhood insomnia and emotional difficulties, so much so that insomnia may contribute to the ultimate development of affective disorders (Alfano et al., 2009; Dahl & Harvey, 2007; Gregory, Caspi, Eley, Moffitt, & O'Conner, 2005). Therefore, in the current study, symptoms of anxiety and depression were considered important indices of adaptive functioning. Overall it was thought that improvements in sleep and insomnia symptoms would be associated with decreases in daytime sleepiness, as well as symptoms of anxiety and depression.

In summary, the current study aimed to perform a controlled evaluation of a cognitive-behavioural therapy (CBT) for school-aged children with Behavioural Insomnia of Childhood. CBT included traditional behavioural sleep medicine and "anxiety" based treatment components as discussed above. To comprehensively evaluate sleep outcomes, validated objective and subjective week-long sleep monitoring was used, along with measures of insomnia and adaptive functioning (i.e., anxiety, depression and sleepiness). Based on information considered above, it was predicted that children who received CBT would demonstrate significantly greater improvements in (1) night-time sleep parameters (sleep onset latency, total sleep time, wake after sleep onset, sleep efficiency), (2) insomnia disorder features (diagnosis of Behavioural Insomnia of Childhood, and frequency and severity of sleep-onset and sleep-maintenance conditions), and (3) adaptive functioning (anxiety, depression and sleepiness) than children who remained on a waitlist control. We expect little variation in the sleep of children in the waitlist condition given that evidence demonstrates

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