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The effects of cognitive-behavioral therapy for youth anxiety on sleep problems

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ABSTRACT

The present study examined (a) whether sleep related problems (SRPs) improved following cognitive-behavioral therapy (CBT) for youth with anxiety disorders, (b) whether variables that may link anxiety and SRPs (e.g., pre-sleep arousal, family accommodation, sleep hygiene) changed during treatment, and (c) whether such changes predicted SRPs at posttreatment. Youth were diagnosed with anxiety at pretreatment and received weekly CBT that targeted their principal anxiety diagnosis at one of two specialty clinics ($N = 69$ completers, Mage = 10.86). Results indicated that parent-reported SRPs improved from pre- to post-treatment and that treatment responders with regard to anxiety yielded greater SRP improvements than nonresponders. Parent report of bedtime resistance and sleep anxiety showed significant improvements. Youth reported lower rates of SRPs compared to their parents and did not demonstrate pre- to post-treatment changes in SRPs. Pre-sleep arousal and family accommodation decreased over treatment but did not predict lower SRPs at posttreatment. Higher accommodation was correlated with greater SRPs. Sleep hygiene evidenced no change and did not mediate links between accommodation and posttreatment SRPs.

1. Introduction

Sleep related problems (SRPs) represent a spectrum of sleep issues, including prolonged sleep onset latency (i.e., difficulty falling asleep), night wakings, bedtime resistance, nighttime anxiety, daytime sleepiness, and parasomnias/nightmares. SRPs are relatively common throughout youth development (Chorney, Detweiler, Morris, & Kuhn, 2008) but are particularly prevalent among youth with anxiety disorders (Leahy & Gradisar, 2012; Peterman, Carper, & Kendall, 2015). Studies show that anxiety and SRPs are positively correlated within samples of anxious youth (Alfano, Beidel, Turner, & Lewin, 2006; Alfano, Zakem, Costa, Taylor, & Weems, 2009; Weiner, Elkins, Pincus, & Comer, 2015) and that up to 90% of youth with an anxiety disorder endorse a SRP (Alfano, Ginsburg, & Kingery, 2007; Chase & Pincus, 2011). Additionally, research has found that samples of youth with anxiety show significantly higher levels of SRPs compared to controls on parent/self-report measures (Alfano et al., 2006; Hansen, Skirbekk, Oerbeck, Richter, & Kristensen, 2011; Ivaenko, McLaughlin-Crabtree, O'Brien, & Gozal, 2006), although differences may exist depending on the specific SRP being investigated (Hudson, Gradisar, Gamble, Schniering, & Rebelo, 2009). Further evidence comes from studies that use objective measurement of SRPs (e.g., actigraphy, polysomnigraphy; Alfano & Kim, 2011; Alfano, Reynolds, Scott, Dahl, & Mellman, 2012; Forbes et al., 2008), although findings are not unanimous (Alfano, Patriquin, & Reyes, 2015; Forbes et al., 2006).

Researchers have posited links between SRPs and anxiety. Conceptually, sleep and anxiety represent opponent processes, such that cognitive and/or physiological arousal from fear is incompatible with sleep initiation (Dahl, 1996). Youth with anxiety experience difficulties with emotion regulation (Hum, Manassis, & Lewis, 2013) and their ability to self-regulate can be particularly compromised at nighttime (Chorney et al., 2008). For example, evening catastrophizing has been linked to anxiety to predict insomnia in youth (Gregory, Noone, Eley, & Harvey, 2010; Hiller, Lovato, Gradisar, Oliver, & Slater, 2014). Fatigue resulting from SRPs can further exacerbate deficits in emotion regulation (i.e., the ability to inhibit anxiety), which in turn, can worsen sleep. Neuroscience research supports this bidirectional relationship. For

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example, underarousal of the prefrontal cortex has been observed in both elevated anxiety and SRPs (Campbell-Sills et al., 2011), and has been associated with increased amygdala activity (Yoo, Gujar, Hu, Jolesz, & Walker, 2007). Similarly, the higher levels of cortisol observed in anxiety-disordered youth at bedtime suggest greater sleep-incompatible arousal (Forbes et al., 2006). The findings are buttressed by parent/self-report research showing significant correlations between pre-sleep arousal and anxiety in youth (Alfano, Pina, Zerr, & Villalta, 2010). Other behavioral mechanisms have also been suggested, such as family accommodation of youth anxious symptoms (Storch et al., 2008). Allowance of anxious/avoidance behaviors at bedtime can promote unhealthy sleep habits (i.e., co-sleeping, staying up late, getting out of bed for reassurance seeking, permission to use electronics to distract from nighttime worries, inconsistent bedtime routines) that result in chronic poor sleep hygiene and SRPs (Peterman et al., 2015). Complementing this notion, sleep hygiene has been shown to mediate family disorganization and SRPs (Billows et al., 2009).

Unfortunately, youth with comorbid SRPs and anxiety are a particularly at-risk population. Youth with SRPs experience a range of functional impairment, such as problems in academic achievement, attention, impulse control, memory, mood regulation, and even physical health (Dewald, Meijer, Oort, Kerkhof, & Bögels, 2010; Heiser et al., 2000; Kopasz et al., 2010; Sadeh, 2007; Sadeh, Gruber, & Raviv, 2002). Disturbances from SRPs may further compound the negative outcomes regularly seen in anxious youth (Shanahan, Copeland, Costello, & Angold, 2008). Such consequences strongly suggest a need to further our understanding of and enhance our treatments for this population.

The overlap between SRPs and anxiety has sparked preliminary interest in transdiagnostic treatment. Cognitive-behavioral therapy (CBT) is the empirically supported treatment (EST) for both anxiety and for SRPs (Hollon & Beck, 2013; Taylor & Roane, 2010). Although important distinctions exist, common features of standard CBTs targeting both anxiety and SRPs include parent management training, exposure, and contingency management. Findings support improvement in SRPs following the cognitive-behavioral treatment of specific nighttime fears (Gordon, King, Gullone, Muris, & Ollendick, 2007; Pincus, Weiner, & Friedman, 2012) and when SRPs and anxiety are treated conjointly (Clementi & Alfano, 2014; Paine & Gradisar, 2011). However, the extent to which standard CBTs for the range of anxiety disorders yields secondary improvement in SRPs remains largely unknown. Within the adult literature, a meta-analysis found moderate effects of CBT for anxiety on SRPs; however, residual SRPs were present at posttreatment (Belleville et al., 2010). Nevertheless, the authors concluded that there are too few studies on the topic to state that SRPs improve following CBT for anxiety. Only three studies have examined the issue in youth. One study found youth treated with CBT for generalized anxiety disorder showed improvement on a one-item marker of general sleep disturbance (Kendall & Pimentel, 2003). In the other two studies, youth treated for OCD experienced improvements in a variety of sleep problems per parent report (Storch et al., 2008; Ivarsson & Skarphedinsson, 2015). However, these studies are limited by the use of non-validated sleep measures, mono-method/reporter assessment, diagnostically homogeneous samples, and the limited scope of SRPs evaluated. Further, use of secondary data in these studies limits theory-driven research to investigate possible factors that mediate the sleep/anxiety relationship.

Although it has yet to be empirically corroborated, secondary effects on SRPs following CBT for anxiety may occur because (a) youth and parents may apply skills from standard CBTs for anxiety to SRPs (e.g., contingency management, relaxation), and/or (b) CBT may resolve underlying anxiety issues that had previously facilitated SRPs (e.g., reduction in pre-sleep arousal, firmer parental limits/decreased accommodation). The research to date has established clear links between sleep and anxiety in youth, both in theory and in clinical practice. Treatment that targets both problem areas has real clinical utility given interactive effects and impairment when comorbid. Although CBT for anxiety targets unique features of behavioral sleep problems (and vice-versa), there is significant overlap between the treatments in methods of intervention and mechanisms targeted. To date, no trial has investigated the effects of CBT for youth anxiety on SRPs among heterogeneous anxious youth using validated sleep questionnaires. Such research would help elucidate the relationship between anxiety and SRPs as well as provide practical information to clinicians and families regarding intervention for comorbid problems.

The present study examined (a) whether there are changes to SRPs following CBT for youth anxiety (without specific sleep intervention) and whether treatment response is associated with reduced SRPs at posttreatment, and (b) whether pre-sleep arousal similarly decreases over treatment and whether that change is associated with a reduction of SRPs at posttreatment. In addition, we explored change in (a) sleep hygiene (behaviors that promote good sleep, e.g., consistent wake/bedtimes, calming activities before bedtime, no electronics in bed) and (b) family accommodation pre- to post-treatment as predictors of SRPs, and whether sleep hygiene mediates the relationship between family accommodation and SRPs.

It was hypothesized that SRPs would improve from pre- to post-treatment and that favorable anxiety treatment response and reduction in pre-sleep arousal would predict better SRP outcome (with pre-sleep arousal also hypothesized to improve from pre- to post-treatment). Regarding exploratory analyses, it was hypothesized that reduced accommodation and improved sleep hygiene would predict SRPs at posttreatment and sleep hygiene would mediate the relationship between family accommodation and SRPs.

2. Methods

2.1. Participants

One-hundred and five youth (and their families) were screened for youth anxiety disorders and met eligibility criteria (intent-to-treat sample). Eligibility criteria included: (a) child was aged 7–17 years at the time of the assessment, (b) child met DSM-IV diagnostic criteria for a *principal* anxiety disorder (Separation Anxiety Disorder (SAD), Generalized Anxiety Disorder (GAD), Social Phobia (SoP), Specific Phobia (SP), Obsessive Compulsive Disorder (OCD), Panic Disorder (PD), Selective Mutism (SM), or Anxiety Disorder-Not Otherwise Specified (AD-NOS)), and (c) families read/spoke English. No exclusions on the basis of non-principal youth comorbidities or presence of medications were made with the purpose of increasing external validity. Likewise, youth who had a prior sleep assessment or intervention were included ($n = 6$) as long as anxiety was currently principal. Of those meeting initial eligibility, 36 families participated in too few sessions to receive an adequate dose of CBT to be reassessed at posttreatment (i.e., could not be reached after initial assessment, family decided on an alternative provider, child moved, family emergency resulting in drop-out). "Adequate dose" was defined as the therapist completing all major CBT skills (e.g., psychoeducation, skills training, contingency management, minimum of four in-session exposures). The present report only analyzed data on those who met that criteria ($N = 69$) to evaluate CBT's effect on sleep. Descriptive information on study participant variables and treatment variables are presented in Tables 1–3 .