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Convergent validity of the Child Behavior Checklist sleep items with validated sleep measures and sleep disorder diagnoses in children and adolescents referred to a sleep disorders center



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ABSTRACT

Objective: The Child Behavior Checklist (CBCL) is a commonly used measure of child and adolescent functioning, and a handful of items from the CBCL are often used to measure sleep functioning. The objective of this study was to examine the convergent, discriminant, and external validity of the individual CBCL sleep items and a CBCL sleep composite with validated measures of sleep functioning and youth adjustment as well as sleep disorder diagnoses.

Methods: The participants were 383 youths (ages 6–18 years; 52.5% male; 80% non-Hispanic White) evaluated in a behavioral sleep medicine clinic. A sleep psychologist diagnosed sleep disorders following a comprehensive evaluation. Parents completed the CBCL in addition to the Children's Sleep Habits Questionnaire (CSHQ) and the Sleep Disorders Inventory for Students (SDIS). Adolescents completed the Adolescent Sleep–Wake Scale (ASWS).

Results: Individual CBCL sleep items were generally associated with sleep scales on validated sleep measures and with sleep disorder diagnoses. The CBCL sleep composite was associated with total scores on each of the sleep-specific measures, as well as with the CBCL attention, social, internalizing, and externalizing problems scales.

Conclusions: Although the CBCL is inadequate for thoroughly assessing sleep problems and disorders, sleep items on the CBCL may be useful in epidemiological/archival studies that lack a more comprehensive sleep measure or to clinicians who do not use other validated sleep measures in their typical practice. Individual CBCL sleep items may be optimal when assessing specific facets of sleep functioning whereas the CBCL sleep composite may be optimal when examining overall sleep functioning and external correlates of sleep.

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1. Introduction

The *Child Behavior Checklist for Ages 6–18* (CBCL) [1] is a widely used measure to assess the mental health and social functioning of children and adolescents. For example, the CBCL is the most commonly used measure of psychopathology utilized by pediatric psychologists [2]. Although the CBCL includes multiple items that assess aspects of sleep, these items do not form a validated

specific sleep functioning scale on the CBCL. The seven items related to sleep are as follows: “nightmares” (Item 47), “overtired without good reason” (Item 54), “sleeps less than most kids” (Item 76), “sleeps more than most kids during day and/or night” (Item 77), “talks or walks in sleep” (Item 92), “trouble sleeping” (Item 100), and “wets the bed” (Item 108). Nonetheless, multiple studies have used these items to create a measure of sleep functioning (using either all seven items or all items except the “wets the bed” item) [3–5]. For instance, sleep items on the CBCL have been used to demonstrate sleep problems among children with anxiety [6], severe traumatic brain injury [7], seizures [8], and Tourette's syndrome and chronic tic disorder [9]. In addition, CBCL sleep items measured in childhood (and the “sleeps less than most kids” item in particular) have also been shown to longitudinally predict anxiety/depression and aggression in adolescence [10] and young adulthood [11].

The literature also indicates that the CBCL sleep items are more frequently endorsed among clinically distressed youths or youths experiencing sleep complaints in comparison to healthy control

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children. Specifically, Alfano et al. [6] examined the prevalence of CBCL sleep complaints in 35 anxious youths, 33 youths referred for sleep problems, and 38 healthy control youths. In this study, a sleep complaint was defined as at least one CBCL item being scored as occurring “sometimes” (a score of 1) or “often” (a score of 2). A sleep complaint was endorsed as present for 94% of the sleep-referred youths and 82% of the anxious youths in comparison to 29% of the control participants.

Despite these findings using the CBCL sleep items (either individually or together to form a “sleep problems” composite scale), very little empirical research has evaluated whether the CBCL sleep items correspond with other, validated measures of children’s sleep functioning. We are aware of only one study that has specifically examined the CBCL sleep items in relation to sleep measures commonly used in clinical sleep medicine practice, including sleep diaries, actigraphy, and polysomnography (PSG) [3]. Specifically, Gregory and colleagues [3] examined four CBCL sleep-related items (ie, overtired, sleeps less than other kids, sleeps more than other kids, and trouble sleeping) in a sample of 122 youths (ages 7–17) with an anxiety and/or depressive disorder or no psychiatric history. The authors found that, after controlling for age, gender, and psychiatric diagnostic status, the CBCL “trouble sleeping” item was significantly associated with sleep latency as assessed by both participants’ sleep diary and actigraphy ($r_s = 0.25$ and 0.21 , respectively). The CBCL “overtired” item was also positively correlated with the sleep diary sleep latency variable ($r = 0.19$) and the “sleeps more than other kids” item was negatively correlated with the actigraphy sleep latency variable ($r = -0.21$). Finally, the CBCL “sleeps more than other kids” item was negatively associated with the sleep diary ease of waking variable ($r = -0.25$), the “sleeps less than other kids” item was negatively associated with total sleep time as measured by the PSG electroencephalography (EEG) ($r = -0.23$), and the “overtired” item was (unexpectedly) negatively associated with the number of arousals as measured by the PSG EEG ($r = -0.22$). Other hypothesized associations were not significant, leading the authors [3] to conclude that “the CBCL is clearly not the measure of choice to assess sleep, [although] the correspondence between the CBCL sleep items and other measures of sleep lends preliminary support to the notion that the CBCL may be tapping certain aspects of sleep. . .the CBCL may be most useful as a measure of sleep onset problems.” [3].

The aim of the present study was to expand upon the study by Gregory et al. [3] in order to further examine the clinical utility of the CBCL sleep-related items. First, Gregory and colleagues focused on four of the seven CBCL sleep items, noting that it was unclear how the “nightmares” or “talks or walks in sleep” items would correspond to the sleep diary, actigraphy, or EEG measurement used in their study. It therefore remains unclear if these items (as well as the “wets the bed” item) meaningfully relate to other measures of sleep functioning (and, specifically, parasomnias). Second, and relatedly, Gregory and colleagues focused on four individual sleep items and did not create a “sleep problems” composite score from the CBCL items as has been used in previous research. It would be helpful for researchers or clinicians interested in using the CBCL sleep items to know whether individual sleep items or a composite sleep scale is more strongly associated with other measures of sleep functioning. Third, Gregory et al. examined the CBCL sleep items in relation to three measures of sleep (ie, sleep diary, actigraphy, and PSG). Although these measures are often considered to be optimal self-report and objective measures of sleep, they are more time- and cost-intensive than rating scales, can lack specificity if clearly defined operational definitions are not utilized, and are typically only used in sleep-specific clinics and research studies. In addition, subjective and objective measures of sleep often do not correlate strongly with each other [11–13], in part because they “target different constructs and should not be considered as merely different operational definitions.” [14] It is thus reasonable to expect that the CBCL sleep

items would more closely correspond with other parent-report measures of sleep functioning than with self-report sleep diaries or objective actigraphy/PSG measures. This is especially true as parent-report measures are generally expected to correlate more strongly with other parent-report measures as opposed to correlating with objective measures or with measures completed by other informants (e.g., youth self-report and teachers). Finally, Gregory et al. [3] used a sample of youths with or without an anxiety/depressive disorder, and we sought to extend the literature by examining the CBCL sleep items (and their composite score) in relation to self- and parent-report measures of sleep functioning in a sample of children and adolescents seen within a specialty sleep clinic within a pediatric medical center.

2. Methods

2.1. Participants

The sample included 383 youths of ages 6–18 years ($M = 11.32$, standard deviation (SD) = 3.68) and their caregiver(s). The sample was approximately equally split between boys ($n = 201$; 52.5%) and girls ($n = 182$; 47.5%). The majority of children were non-Hispanic White (80%), with remaining participants being African American (9%), Asian/Asian American (2%), Hispanic (2%), or Multiracial/Other (7%). In terms of parents’ marital status, 64% were married, 14% were unmarried, 14% were divorced, 4% were separated, 3% were remarried, and 1% were widowed. The annual income of families was approximately evenly split across four levels: 23% reported an annual income <\$20,000 USD, 24% reported an annual income of \$20,000–49,000 USD, 25% reported an annual income of \$50,000–99,000 USD, and 29% reported an annual income >\$100,000 USD.

Patients were diagnosed with sleep disorders according to *International Classification of Sleep Disorders Diagnostic and Coding Manual, 2nd Edition* (ICSD-2) [15] criteria. Specifically, 176 participants (46%) were diagnosed with psychophysiological insomnia, 155 participants (40%) were diagnosed with a behavioral insomnia of childhood (sleep-onset association type, limit-setting type, or combined type), 88 participants (23%) were diagnosed with a parasomnia such as nightmares, sleepwalking, and/or sleep terrors, 42 participants (11%) were diagnosed with delayed sleep phase syndrome (DSPS), 19 participants (5%) were diagnosed with nocturnal enuresis, 11 participants (3%) were diagnosed with hypersomnia (narcolepsy and/or idiopathic hypersomnia), and four participants (1%) were diagnosed with rhythmic movement disorder. Two-thirds of participants ($n = 251$) had a sleep disorder diagnosis in only one of these seven categories, 30% of participants ($n = 116$) met criteria for a sleep disorder in ≥ 2 of these categories, and 4% ($n = 16$) were evaluated for sleep-related difficulties but did not meet the full criteria for any ICSD-2 sleep disorder.

2.2. Procedures

The study site was a pulmonary-based, accredited sleep disorders center (SDC) located in a tertiary-care pediatric hospital and staffed by board-certified sleep physicians and a licensed psychologist certified in behavioral sleep medicine. Patients referred to the SDC were triaged based on referral question and parent-reported history gathered during an intake telephone interview. Patients with a chief complaint of insomnia, parasomnia, or circadian rhythm disturbance without symptoms suggestive of an organic sleep disorder were triaged only to the Behavioral Sleep Medicine Clinic (BSMC). All primary caregivers and each patient ≥ 11 years of age completed pre-evaluation screening measures as part of routine clinical care. The comprehensive sleep evaluation conducted by the psychologist or a psychology trainee under direct supervision included

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