PROJECT TITLE: *Cognitive and Behavioral Effects of Sleep Restriction in Adolescents with ADHD*

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**Project Description**

Teens with attention-deficit/hyperactivity disorder (ADHD) obtain less sleep than their peers, with up to 75% of youth with ADHD obtaining insufficient sleep. This is noteworthy since insufficient sleep is associated with a multitude of negative outcomes in typically developing teens, including academic underachievement, emotion dysregulation, and mental health problems—all outcomes that occur at higher rates among teens with ADHD. Our pilot work demonstrates that insufficient sleep is correlated with depression, behavior problems, and academic impairment in teens with ADHD specifically and insufficient sleep is clearly associated with greater attentional problems in typical teens. However, no experimental study has examined whether sleep duration is causally linked to attentional, behavioral, emotional, and academic impairments in teens diagnosed with ADHD. If sleep problems contribute to functional impairments in teens with ADHD, then they represent an overlooked treatment target. Experimental studies provide the strongest test of causality, and studies using at-home sleep restriction protocols in teens without ADHD show a causal link between shortened sleep duration and impairment. However, administering an at-home sleep restriction protocol may be especially challenging for teens with ADHD due to their difficulties with organizing bedtime and wake activities, as well as differences from healthy teens in biological circadian preference. Thus, a critical first step in examining sleep as causally related to impairment in teens with ADHD is documenting the feasibility of using an at-home sleep restriction protocol with this population. We propose to (1) evaluate the feasibility of using an at-home sleep restriction protocol in teens with...
ADHD, and (2) collect preliminary data examining whether shortened sleep duration is causally linked to attentional, behavioral, emotional, and academic impairment in teens with ADHD. These goals will be accomplished by recruiting 54 teens with ADHD who will undergo a three-week sleep manipulation protocol. Specifically, a cross-over design will be used that includes a week of typical sleep followed by weeks of sleep restriction or sleep extension. Sleep functioning will be assessed during these three weeks with daily sleep diary and objective sleep measurement (i.e., actigraphy). After each sleep condition, teens and their parents will complete subjective and objective measures of attention, behavior, mood, and academics. Findings from this study will allow us to identify and address barriers to administering an at-home sleep restriction and extension protocol to teens with ADHD and pursue larger-scale experimental research examining sleep problems as causally linked to impairment. This research is clinically significant since teens with ADHD frequently experience a range of impairments that extend well into adulthood. If short sleep duration contributes to functional impairments in teens with ADHD, then sleep represents a modifiable and overlooked treatment target. The long-term goal of this research program is to identify whether and how sleep problems contribute to impairment and are an important treatment target in teens with ADHD.

Interested students will be involved in administering research assessments with research participants including cognitive and academic testing. Students will also help implement the three-week sleep protocol. Students will also gain experience in experimental and coding methods by coding videos collected during the three-week sleep protocol. The trainee will be supervised by Dr. Becker as well as other researchers in the Cincinnati Children's Center for ADHD. Mentors will meet with the student regularly.