

Sleep and fear extinction learning among youth receiving exposure therapy: Preliminary findings from a partial hospital program

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Anxiety and obsessive-compulsive disorder (OCD) are prevalent in youth and cause significant impairment and distress. Youth with anxiety and OCD also report high rates of sleep problems; initial evidence suggests that self-reported problems with sleep predict slower improvement and poorer treatment outcomes in youth participating in exposure-based CBT. Exposure works by facilitating fear extinction learning. Sleep plays a critical role in the consolidation and retrieval of emotional memories, and studies show that sleep manipulation alters the consolidation, retention, and generalization of fear extinction learning in lab tasks. To better understand the relationship between sleep and fear extinction learning, we are conducting a multi-method study in a clinical sample of adolescents (ages 13-17) participating in a CBT-based partial hospital program (PHP) for youth with anxiety and OCD. Participants complete a multi-method assessment (over 10 days during the early portion of their treatment), which includes standardized clinical interviews, sleep questionnaires, sleep diaries, actigraphy recordings, and overnight electroencephalogram (EEG) with a novel device that can be used in the home. During the last 3 days of the 10-day window, participants complete a computerized task assessing initial fear learning (day 1), fear extinction learning (day 2) and extinction recall (day 3) as measured by skin conductance responses (SCR). The central hypothesis is that shorter sleep quantity and greater sleep disruption will be associated with reduced fear extinction learning and reduced fear extinction recall in these adolescents. The aim of this submission is to report on the clinical characteristics of our sample, examine the feasibility of our protocol and data collection procedures, and report initial findings. To date, 10 participants have been enrolled ($M_{\text{age}} = 15.3 (0.43)$, 60% females); data collection is ongoing and we are anticipating a rate of three new participants per month. All participants provided a full set of actigraphy data. Full EEG data collection has been completed by 50% of participants, with an additional 20% having completed a portion of the recordings. At least two data points of the fear extinction task were completed by 80% of participants. Participants reported no concerns with the use of actigraphy devices. Feedback on the use of at-home EEG device has been mixed, with some participants reporting issues keeping the device in position for the whole night. No participant declined the fear extinction task. Preliminary results indicate that the protocol is feasible and tolerated in a youth PHP for anxiety and OCD. Data analysis will: 1) describe the characteristics of sleep in these youths and the patterns observed via direct sleep assessments and 2) estimate the strengths of association between skin conductance response (SCR) as a measure of fear conditionings and sleep variables extracted from the night before the administration of the task. Results from this work may serve as proof-of-concept for identifying sleep targets to guide the augmentation of behavioral treatments for anxiety and OCD.