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N3 SLOW WAVE DURATION CORRELATES WITH NEXT-DAY SAVORING BEHAVIOR IN PRE-PUBERTAL CHILDREN

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Introduction: Recent meta-analysis (Tomaso et al., 2020) indicates sleep loss to have more profound adverse effects on positive than negative emotion, and experimental studies in adults suggest disruption of slow wave sleep (SWS) in particular mediates these effects (Finan et al., 2015; 2017). In pre-pubertal children, greater SWS has been shown to protect against next day negative affect (Palmer & Alfano, 2017) as well as the development of depression years later (Silk et al., 2007); however specific emotion-based mechanisms underlying these effects have rarely been explored. Pre-pubertal years especially represent a critical developmental window for probing these relationships due to dramatic decreases in SWS that occur during pubertal transition (Carskadon & Dement, 2011).

Methods: We detected slow waves (0.5 – 4 Hz) during N3 sleep using an automated algorithm among N=18 pre-pubertal children (7-11 years) during a night of normal sleep in relation to next-day savoring; a positive emotion regulation strategy that includes using thoughts and actions to increase the intensity, duration, and appreciation of positive experiences and emotions. Healthy children without any psychiatric disorders completed a night of at-home PSG monitoring (10 hr sleep opportunity). The next morning at 11:00, children returned to the clinic for an in-lab emotional assessment. Before and during the assessment, children were told/reminded that they would be given a piece of chocolate to enjoy at the end of the assessment. After children consumed the chocolate, they were asked several questions about how much they ‘savored’ the experience. All analyses controlled for total sleep time on the PSG night and there were no differences in SWA based on gender.

Results: Results indicated that the average duration of detected N3 SWs (F3/F4) correlated significantly with the extent to which children enjoyed the chocolate overall ($r = .50$, $p < .05$), felt they did a good job enjoying the chocolate while eating it ($r = .44-.49$, $p < .05$) and looked forward to eating the chocolate during the assessment ($r = .46-.50$, $p < .05$).

Conclusion: Although preliminary, these novel findings suggest that greater intensity of SWS may have a modulatory effect on subsequent emotional responses to positive experiences/events, which could be protective for longer term affective health.

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0242

INTRAINDIVIDUAL VARIABILITY IN SLEEP DURATION BLUNTS RESPONSE TO ACADEMIC STRESSORS

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Introduction: Cross-sectional studies indicate that greater intra-individual variability (IIV) in sleep is correlated with poorer cognitive-emotional outcomes. Yet, the causal direction of these relationships is unclear. Therefore, we conducted an experimental study to compare cognitive and stress outcomes following random assignment to normal sleep, sleep restriction, and irregular/IIV sleep conditions.

Methods: Ninety college students (mean age=19.16, SD=0.98; 77.78% female) completed an Organic Chemistry virtual lecture during session 1. Then, for the next five days, participants were randomly assigned to the following conditions: normal sleep (8h in bed every night), sleep restriction (6h in bed every night), or IIV sleep (nightly oscillation between 6.5h and 9.5h in bed, with mean of 8h/night). Adherence was confirmed using actigraphy. On the sixth day (session 2), participants took a test on the Organic Chemistry lecture (retention measure) and then completed a new lecture and test (acquisition measure). Participants reported their stress levels across the lectures and tests.

Results: ANCOVA tests showed that sleep condition did not affect retention ($F=0.50$, $p=.611$) or acquisition of Organic Chemistry knowledge ($F=1.33$, $p=.275$; adjusted for Grade Point Average). Interestingly, participants in the IIV condition reported lower stress levels throughout session 2 than students in the normal sleep condition, adjusting for baseline stress levels ($p=.025$). Furthermore, when collapsing across conditions, correlation analyses confirmed that greater IIV in TST predicted lower stress throughout session 2, after adjusting for mean TST and baseline stress level ($r=-.33$, $p=.014$). This “blunted” stress response following nightly sleep fluctuations was in contrast to the heightened stress levels that were associated with shorter mean TST ($r=-.22$, $p=.051$).

Conclusion: Brief sleep variability and mild sleep restriction had minimal impact on laboratory measures of STEM knowledge retention and acquisition. However, greater sleep IIV blunted reactivity to academic stressors, which may reflect altered hypothalamic–pituitary–adrenal axis functions and have implications for student metacognition and course persistence. Future research should investigate the chronic effect of maintaining irregular sleep patterns and whether improving regularity of sleep across longer time intervals promotes cognitive and emotional functioning.

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0243

RELATIONSHIPS BETWEEN PRE-PANDEMIC TRAUMA AND STRESS WITH SLEEP DURING THE COVID-19 PANDEMIC IN YOUNG ADULTS

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Introduction: Young adults, particularly those with histories of interpersonal trauma or stress, are more likely to experience to adverse psychosocial outcomes (e.g., depression) during the COVID-19 pandemic, compared to those without these histories. However, few studies have examined sleep and most rely on retrospectively-reported pre-pandemic experiences. We tested whether pre-pandemic trauma and stress were prospectively related to worse ecological momentary assessment (EMA)-reported sleep during the pandemic.

Methods: The sample includes 114 regular drinkers aged 21-30 years from two ongoing studies of alcohol use and sleep who completed a shared assessment battery and a 10-17-day EMA protocol before and during the pandemic (conducted July-November 2020; M=13.9 months after baseline). Participants reported past-month perceived stress (10-item Perceived Stress Scale) and interpersonal traumas (e.g., abuse, conflict), via scores on the “Current Partner” and “Personal” (persons other than spouse/partner) subscales of the Difficult Life Circumstances Scale. The EMA protocol measured daily sleep (total sleep time [TST]; sleep

efficiency [SE]), relational stress (1-5 ratings for family, spouse/partner, friends), and alcohol use. Paired t-tests compared pre-pandemic vs. pandemic sleep. Separate linear regressions tested associations between pre-pandemic trauma and stress with average pandemic TST and SE, adjusted for baseline age and sleep, racial identity, assigned sex at birth, time between assessments, and drinking days (averaged across timepoints).

Results: Participants were on average 23.8 years old (61% female; 7% Asian; 39% Black; 1.8% Mixed race; 0.9% Other race; 0.9% Pacific Islander; 55% White). Average TST increased from baseline to pandemic (7.5 vs. 7.8; $t(113)=-2.57$, $p=.01$); no change was observed in SE (95% vs. 94%; $t(113)=1.01$, $p=.31$). Pre-pandemic perceived stress ($B[SE]=-.003[.001]$, $p=.02$) and average EMA-reported family stress ($B[SE]=-.04[.02]$, $p=.05$) predicted worse pandemic SE. No associations emerged with friend or partner stress, trauma, or TST ($ps>.11$).

Conclusion: Pre-pandemic perceived stress (but not trauma nor relational stress) predicted worse sleep during the pandemic. Perceived stress reflects feeling overwhelmed and difficulty coping, which is relevant given dramatic pandemic-related impacts on daily life. The overall accumulation of stress, versus day-to-day stress in specific relationships, may be most detrimental for sleep during the pandemic. Perceived stress is amenable to evidence-based (and remotely-delivered) interventions, including mindfulness-based stress reduction.

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0244

ASSOCIATIONS AMONG PRE-SLEEP AROUSAL, FACETS OF EMOTION DYSREGULATION, AND SLEEP QUALITY AND EFFICIENCY DURING PREGNANCY

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Introduction: Pre-sleep arousal contributes to over 50% of pregnant people experiencing poor sleep quality and clinical insomnia. Given that poor sleep during pregnancy is associated with depression and suicide ideation, there is a critical need to identify intervention targets, such as difficulties with emotion regulation. However, emotion dysregulation is multifaceted and warrants further investigation in sleep research, particularly during pregnancy. Thus, the present study examined associations among pre-sleep arousal, various dimensions of emotion dysregulation, and sleep outcomes during pregnancy.

Methods: Participants ($N = 62$; Mage = 29.89, SD = 4.19 years) were recruited during pregnancy and enrolled to represent a range of scores on the Difficulties in Emotion Regulation Scale. For 7 days during the 3rd trimester, they wore CamNtech MotionWatch-8 wrist actigraphs and completed the Pre-Sleep Arousal Scale and Consensus Sleep Diary.

Results: Hierarchical linear regression analyses indicated that high pre-sleep arousal predicted low sleep efficiency (measured via actigraphy) above and beyond facets of emotion dysregulation ($B = -.316$, $p = .026$). High pre-sleep arousal also predicted poor sleep quality (measured via diary) above and beyond total emotion dysregulation ($B = -.038$, $p = .010$). However, an interaction emerged between pre-sleep arousal and one particular facet of emotion dysregulation: access to emotion regulation strategies ($B = -.005$, $p = .023$). Specifically, high pre-sleep arousal was associated with poor sleep quality only among those who reported

limited abilities to use emotion regulation strategies. Among participants who reported that they could access effective emotion regulation strategies, pre-sleep arousal did not predict sleep quality.

Conclusion: This study indicates that high pre-sleep arousal may not always be associated with poor sleep quality during pregnancy. Equipping pregnant people with emotion regulation strategies may buffer this association and promote long-term health. It is recommended that perinatal sleep scientists continue investigating relations between facets of emotion dysregulation and sleep.

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WHEN DO EMOTIONS IMPACT SLEEP? A STATE OF THE EVIDENCE

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Introduction: While theories often highlight the bi-directional nature of sleep and emotional processes, the impact of emotions on sleep has been comparatively neglected. To appraise the state of evidence for the causal influence of emotions on sleep, a meta-analysis of the existing literature was conducted, alongside a diary study to estimate naturalistic effects.

Methods: First, a pre-registered meta-analysis using PRISMA guidelines evaluated the strength, form, and context of experimental effects of emotion inductions on sleep parameters ($k=27$). Quality of primary experiments was evaluated by independent raters, and theoretically-relevant features were extracted and examined as moderating factors of observed effects (i.e., sleep parameter, design, sleep context, types of emotion inductions and emotions). Random-effect models were used to aggregate effects for each parameter. Second, a complementary pre-registered diary study of young adults ($N=89$) tracked the links of their global emotions (reported separately in the evening and morning) with actiwatch-assessed sleep across two weeks (Nobs=1,188).

Results: First, across the meta-analyzed experiments, there was a significant impact of emotion inductions on delayed sleep onset latency ($D=2.80$ min, 95%CI 1.01, 4.52, $g = .47$), but no significant effects on other sleep parameters. While there was little evidence of publication bias, the studies overall were often of weak methodological quality and the typical study could only detect moderate-to-large impacts. There was also large heterogeneity pointing to substantive differences in effects. Second, multi-level regressions of sleep parameters on emotions reported in the evening from the diary study provided some evidence for delayed sleep on evenings with higher negative affect ($b = .05$, $p < .10$), with again no changes in other sleep parameters. Also, higher positive emotions predicted earlier and shorter sleep. The estimates were robust to accounting for emotions at the previous point.

Conclusion: These pre-registered investigations support the hypothesis that negative emotions delay sleep onset, but evidence regarding other sleep parameters was not conclusive. A diary study of real-life functioning partially replicated delayed sleep onset following more negative emotions, but the effect was modest. The results call for more targeted investigation that disambiguate distinct features of emotions and sleep.

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