

The effect of sleep duration and consistency on perceived stress and salivary cortisol levels

Alyssa Weninger, Pierce Whiteman, Ashlyn Tolbert, Sydney Wible, & Dr. Monica Gaudier-Diaz, PhD

Department of Psychology & Neuroscience
University of North Carolina at Chapel Hill

Introduction

- College students are particularly vulnerable to the effects of stress and sleep deprivation¹
- A lack of sleep tends to make individuals more prone to stress, and high stress levels tend to decrease sleep quality and quantity¹
- Cortisol secretion, a physiological marker of stress, is controlled by circadian rhythms, as is sleep²
- Research regarding sleep variability in relation to salivary cortisol levels and perceived stress levels remains relatively understudied
- This study aimed to explore the correlation between sleep duration and variance, with perceived stress and salivary cortisol levels

Hypothesis: Individuals with a longer sleep duration and more consistent sleep would have lower salivary cortisol levels and perceived stress scores.

Participants and Methods

Experimental Design

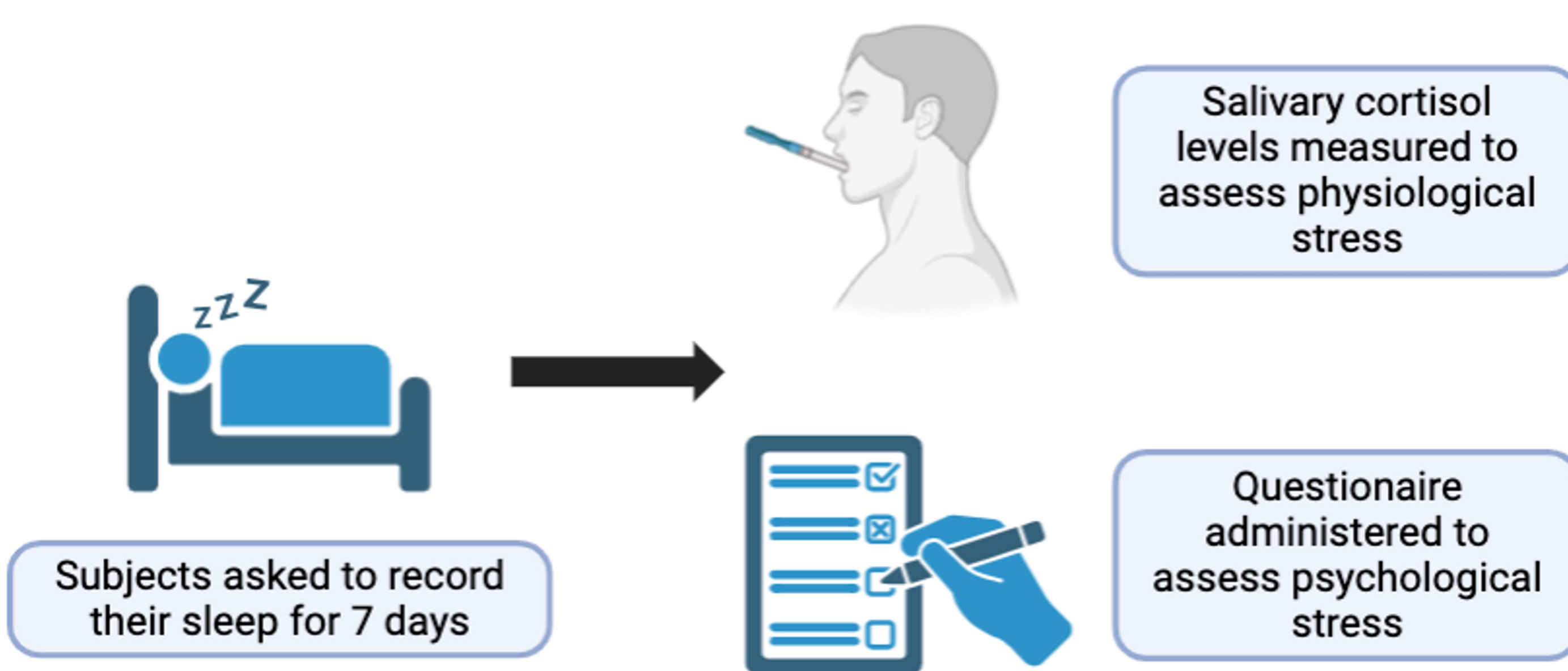


Figure 1. Study Design. Twenty-seven participants, representing all genders, recorded the number of hours they slept each night over the course of 7 nights. At the end of that week, a questionnaire was administered via Qualtrics to assess perceived stress levels on the Perceived Stress Scale (PSS) and Perceived Stress Questionnaire (PSQ). At the same time, saliva samples were collected in a salivette to assess salivary cortisol levels, indicative of physiological stress. Salivary cortisol levels were measured using a competitive enzyme immunoassay, ELISA.

Results

Figure 2. Correlation between cortisol levels and average hours slept per night, variation in sleep quantity per night, PSS score and PSQ score. There was no correlation found between average nightly sleep and salivary cortisol levels ($r=0.02289$, $p=0.915$) (a). There was a nonsignificant negative trend observed between variation in sleep per night and salivary cortisol levels ($r= -0.2699$, $p=0.2368$) (b). There was no correlation between salivary cortisol level and PSS score ($r= -0.1903$, $p=0.4086$) (c). There was also no correlation between salivary cortisol level and PSQ score ($r= -0.2090$, $p=0.3633$) (d).

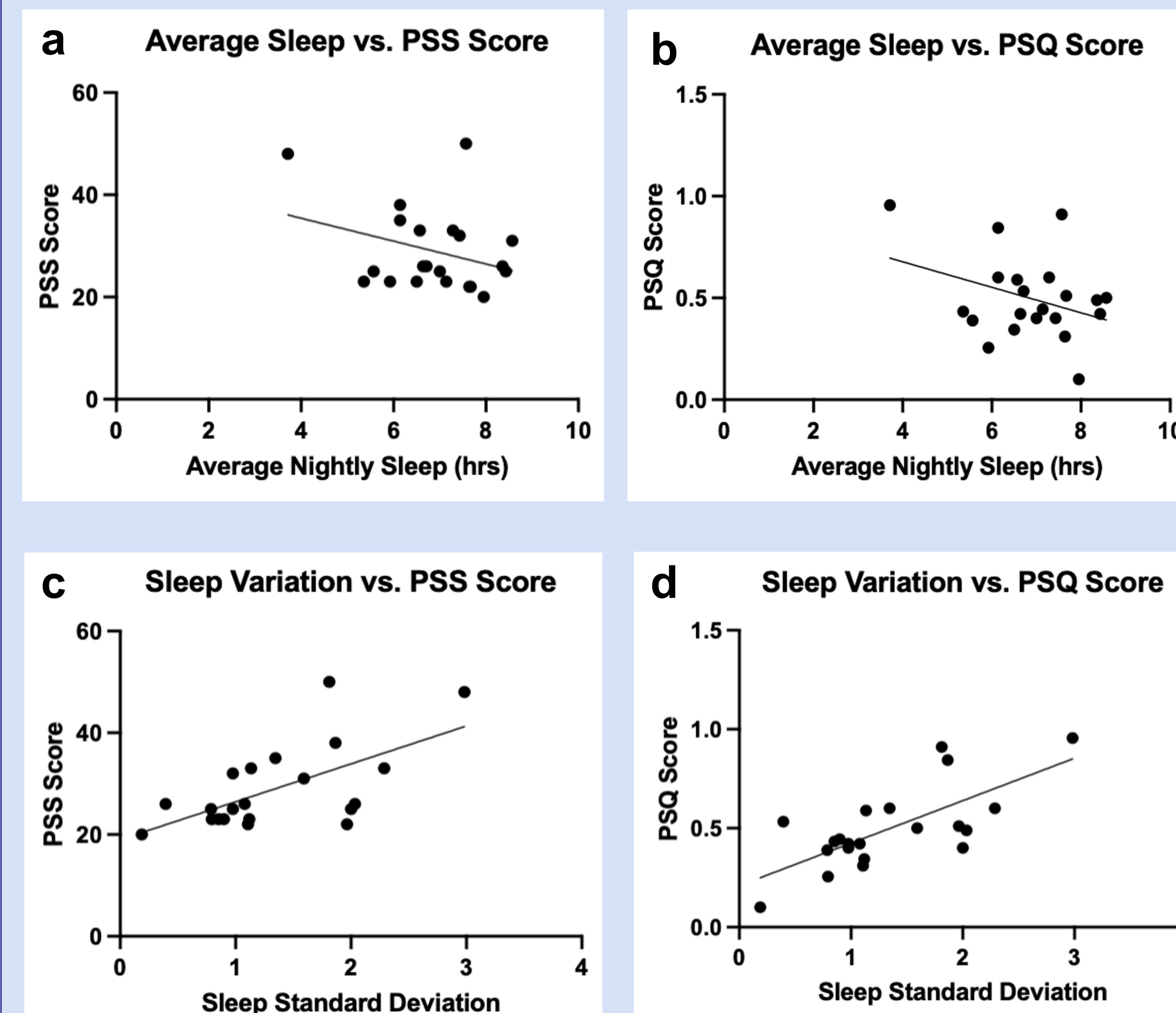
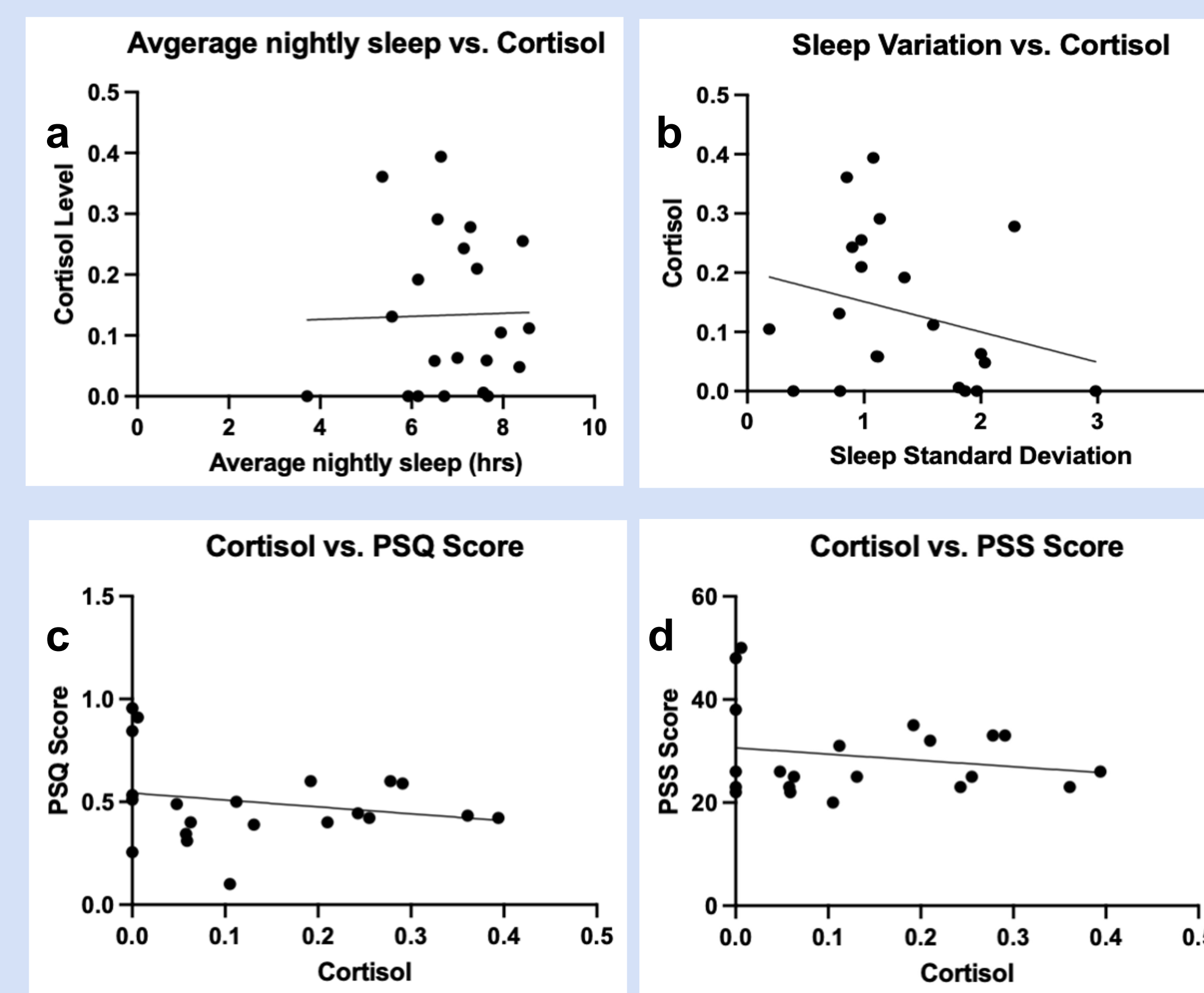


Figure 3. Correlation between average nightly sleep and sleep variation with PSS and PSQ scores. There was a slight nonsignificant negative correlation observed between average hours slept per night and PSS score ($r= -0.3162$, $p=0.1626$) (a). There was also a slight nonsignificant negative correlation between average sleep and PSQ score ($r= -0.3530$, $p=0.1165$) (b). There was a significant positive correlation between sleep variation and PSS score ($r=0.6128$, $p=0.0031$) (c). There was also a significant positive correlation between sleep variation and PSQ score ($r=0.7047$, $p=0.0004$) (d).

Conclusions

- No correlation found between cortisol and average sleep, cortisol and sleep variation, cortisol and PSS and PSQ scores, average sleep and PSS and PSQ scores
- Positive correlation found between sleep variation and both PSS and PSQ scores
- Possible limitations include sample size and self reporting
- Future directions could include more accurate sleep tracking to improve the precision and accuracy of these correlations
- This research will contribute to knowledge that is shaping interventions to help college students achieve improved sleep hygiene and reduced stress
- Future research is needed to further clarify the bi-directionality and cyclical nature of stress and sleep

References

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