The Relationship Between Sleep, Stress and Circadian Rhythms

Julia Gabriel, Lucy McGloshen, & Kayci Strous
Lebanon Valley College

PSY 360: Analytic Seminar: Behavioral Neuroscience Spring 2021

Introduction

The expected relationship between duration of sleep and amount for stress an individual experiences is notably related to neurological aspects. Sleep disturbances amongst individuals are linked to many different health issues, stress being one of the most common (Amaral et al., 2018). Therefore, the behaviors being explored in this research study are sleep, stress and circadian preferences.

Previous research indicated that stress has a direct effect on sleep difficulties (Amaral, et al., 2018). Further research articles have not focused primarily on stress, which our research aims to emphasize over anything else.

We hypothesized that individuals who received more hours of sleep the night before the experiment, as well as those who have better qualities of sleep, will experience less stress than individuals who received less sleep and those who have poor qualities of sleep. It is also predicted that people who partake in the study during the time that aligns with their preferred Circadian rhythms will experience less stress than those taking it at a time that misaligns with their preferences.

Methods

Participants and Design:

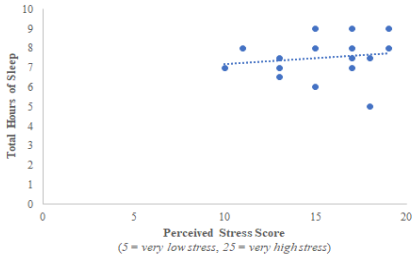
Participants consisted of volunteer college students (N= 16, 13 female). Exclusion criteria for this study would be individuals who have a preexisting, diagnosed sleep disorder. Participants completed four surveys designed to gain educational intellect for students enrolled in Psychology 360 at Lebanon Valley College.

Materials and Procedure:

Demographic information was collected as part of the survey. The first survey, previous night's sleep, was an open-ended answer (i.e., 6=6 hours of sleep). The second survey, sleep quality, asked questions to participants and it was scored on a scale of 0-15 (0=very good quality of sleep, 15=very bad quality of sleep). The third survey, circadian preferences, asked questions to participants and was rated on a scale from 5-20 (5=strongly a morning person, 20=strongly an evening person). The last survey, perceived stress evaluation, asked questions to participants and was rated on a scale from 0-20 (0=very low stress, 20=very high stress). Finally, participants were given a scenario and told to give a speech in front of a camera, with a survey following. This procedure is meant to induce stress within the moment.

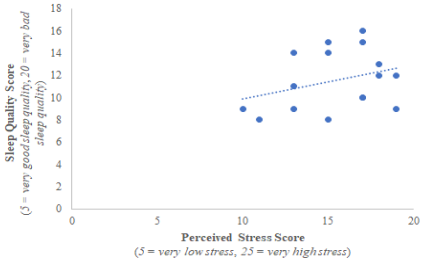
Results

Figure 1: *Relationship Between Participants' Total Hours of Sleep and Perceived Stress Score*



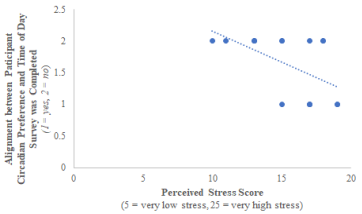
It was hypothesized that individuals who had more hours of sleep would experience less stress than individuals who received less sleep before the experiment. A Pearson analysis was used to determine the association of these variables. The results indicated a relatively weak, positive correlation (r = 0.153). This correlation was not significant with a p-value of 0.286.

Figure 2: *Relationship Between Participants' Sleep Quality Score and Perceived Stress Score*



It was hypothesized that people who had better sleep quality, would experience less stress than individuals who had poor sleep quality. A Pearson analysis was used and indicated a relatively weak, positive correlation between the associated variables (r = 0.313). Similarly, to the result for total hours of sleep and stress, the association was insignificant (p = 0.119).

Figure 3: *Relationship Between Participants Alignment and Perceived Stress Score*



It was hypothesized that individuals who complete the study during the time that aligns with their preferred circadian rhythm would experience less stress than those participating in the study at a time that misaligned with their preferences. A Pearson analysis was used to determine the relationship between these variables. The results found a relatively strong, negative correlation (r = -0.546) between alignment and stress. This correlation was deemed significant (p = 0.0145), unlike the two other correlations.

Discussion

The first hypothesis was that those who receive more hours of sleep and better quality of sleep, before an experiment, will experience less stress than individuals who receive less hours of sleep and poor quality of sleep. After analyzing the data, this hypothesis which indicated an inverse relationship between hours of sleep and stress was rejected. The correlation was insignificant, while trending positively, which was the opposite of what was initially predicted.

The second hypothesis was that those who partake in the study during the time that aligns with their preferred Circadian rhythms will be less stressed than those taking it at a time that misaligns with their preferences. Based on the data, it was concluded that this inverse relationship between quality of stress and sleep was also rejected for similar reasons. There was an insignificant relationship, trending towards a positive relationship.