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What Consequences Result from a Lack of Sleep?

Authors: Bruna Hutchinson*

Supervising Instructor & Assistant: Michael Pollock and Kristina Andrew, Psyc 110 ("Experimental Psychology")

Department of Psychology, Camosun College, 3100 Foul Bay Road, Victoria, BC, Canada V8P 5J2

*Corresponding author email: bhutchinson9@shaw.ca

ABSTRACT

In this paper, I sought to uncover the ramifications that follow sleep loss and what actions are dependent on sleep to better understand its overall importance. Previous research has found that sleep deprivation can result in depressive moods, impaired decision-making, and weight gain. In my correlational study, I tested the strength of these relationships by examining naturalistic daily changes in their variables longitudinally over a two-week period. To measure the consequences that follow sleep deprivation, I monitored depressive moods, counted impaired decisions and calculated total calorie intake, and compared them to the number of hours of sleep attained. Data from this study showed a notable correlation of sleep with calorie intake but not with depressive moods nor with the ability to make decisions.

1. Introduction

1.1 Research Problem

We all need sleep to function; however, a loss of rest can result in various harmful repercussions. For instance, a lack of sleep can provoke unstable temperaments and could contribute to a poor emotional health. In addition, though sleep patterns differ between people, a lack of sleep is suspected to alter cognitive processes and impair our abilities to make moral decisions. Moreover, people who do not subject themselves to sufficient amounts of sleep are presumed to experience drastic fluctuations in their weight. I wish to develop a greater appreciation for the consequences that can follow a loss of sleep so that I do not belittle its powerful influences on human health.

1.2 Literature Review

Multiple factors can contribute to our emotions and state of mental health, but those who do not allow themselves ample rest can experience more dire moods. Sleep is an irreplaceable contributor to health and Paunio et al. (2015) found in their research that depression can arise in those who deprive themselves from sufficient sleep. Results in this article were obtained from a sample of 12,063 individuals who were chosen based on their common sleep tendencies; people with previous depressive moods were excluded from this sample. Participants completed self-reported questionnaires that assessed their sadness in relation to their sleep time; the obtained results served to demonstrate the impacts that sleep loss has on emotional health.

Paunio et al. (2015) concluded that depressive moods can often be experienced in those with persistent sleep loss tendencies. To obtain the most accurate results possible, conclusive data was attained from the participants over multiple decades. Sleep was determined to be critical for proper brain function and an essential component for health and happiness. When people neglect this fundamental human requirement, depression can arise with ease.

Proper cognitive function is dependent on sufficient rest and the repetition of habitual sleep patterns. As sleep is essential for alertness, its absence could result in an impaired stream of consciousness. Sleep helps to mediate cognitive functions and Killgore et al. (2006) observed that people who are awake on little sleep could become vulnerable decision-makers. The experiment conducted in this article involved 34 volunteers who completed the Iowa Gambling Task (IGT) as a manner to assess the cognitive functions that people demonstrate with and without sufficient rest. The IGT acts as a simulation, in which participant behaviours in response to decision-making scenarios are monitored. This test was completed at baseline and once again with the same participants after two nights with no sleep. The results of this experiment suggest that cognitive functions flounder with increased sleep loss; sleep affects performance in all areas and should not be dismissed in its benefits. Killgore et al. (2006) confirmed that the prefrontal cortex, which is an essential mediator in cognitive capacities, is reliant on sleep for its proper function. Overall, for conventional brain performance, people must credit sleep and recognize the irreplaceable role it fills in our quotidian activities.

When appropriate sleep duration is not attained, weight gain can be expected as a result. Markwald et al. (2013) determined that abnormal increases in weight can occur in association with restricted sleep tendencies. The experiment conducted in this article screened 16 volunteers for a health check and an interview to assess their qualifications to participate in the 5-d trial. These monitored individuals were given specific instructions on what to eat and how to exercise over the research period. The bedtimes and waketimes were modified over the trial to observe what resulted from a gradual decrease in sleep. Markwald et al. (2013) concluded that repetitive sleep loss slows a person's metabolism; this observation demonstrates a correlation between increased weight and a lack of sleep. People who failed to allow themselves adequate rest were found to depend on food for wakefulness rather than additional sleep. Sleep is vital for human health; however, when discounted, no matter their exterior health tendencies, people can expect an undesirable shift in their weight.

1.3 Hypotheses

Based on the above literature review, we predicted the following hypotheses:

- Hypothesis #1: If the amount of sleep that is attained decreases, then the occurrence of depressive moods will increase.
- Hypothesis #2: If the amount of sleep that is attained decreases, then decision-making ability will decrease.
- Hypothesis #3: If the amount of sleep that is attained decreases, then the total food consumed will increase.

2. Methods

2.1 Participants

The author of this paper served as a participant in its studies. The participant is

an 18-year-old, Canadian female. The participant was an undergraduate student at Camosun College who completed the current studies as an assignment for Psych 110 ("Experimental Psychology") and has an interest in the ramifications of sleep loss. The participant wanted to understand the impacts that sleep deprivation has on her own health.

2.2 Materials and Procedure

I first performed a correlational study to test concurrently all of our hypotheses by examining naturalistic daily changes in their variables longitudinally. The participant kept a study journal with her at all times over this study's two-week period in order to record self-observations of the following variables: (1) emotional distress, (2) cognitive impairment, (3) nutritional disruption, and (4) sleep attained.

To measure the depressive moods that follow sleep deprivation, the participant reported her attained sleep, in relation to her mental health over a 14-d period. The pParticipant monitored her qualitiy of sleep and determined whether or not depressive behaviours followed sleep loss. Sleep (hrs) was monitored with close attention and depressive moods were assessed (see Appendix A) on a 5-point scale: 1 = no change in mood, 2 = slight depressive moods experienced, 3 = depressive moods experienced, 4 = moderate depressive moods experienced and 5 = considerable depressive moods experienced. The participant did not allow her habitual mental health states to influence her status on the scale; scores were chosen based on observed fluctuations in mood from what is perceived as normal to them. The participant recorded her score on the 5-point scale prior to each sleep time in the 14-d trial.

To measure the impaired cognitive functions that follow sleep deprivation, the participant reported her attained sleep, in relation to her experienced impaired decisions over a 14-d period. When a conscious impaired decision (a decision that resulted in undesirable consequences) was made, the participant noted its occurrence for later examination. The participant did not to drink excessive amounts of caffeine over the trial. The participant kept a journal to record her impaired decision count over the 14-d period.

To measure the ramifications on nutrition that follow sleep deprivation, the participant reported her attained sleep, in relation to their calorie intake over a 14-d period. Prior to sleep, the participant monitored and wrote down all calories that had been consumed over the trial. The participant calculated her calorie intake with a calorie calculator (see Appendix B).

To measure the consequences that follow sleep deprivation, the participant recorded her attained sleep for a consecutive 14-d period. Sleep was reported in hours and was monitored with close consideration, as the attained amount was a critical component to collect data from the other procedures. The participant noted her bedtimes and waketimes and calculated the total attained sleep once awoken.

To assess the strength and statistical significance of associations between variables predicted by the 3 hypotheses, I performed Pearson product moment correlations of their outcome variables (emotional distress, cognitive impairment, and nutritional disruption) with their predictor variable (sleep attained). For testing Hypothesis #1, I correlated depressive moods with attained sleep. For testing Hypothesis #2, I correlated impaired decisions with attained sleep. For testing Hypothesis #3, I correlated calorie intake

with attained sleep. A correlation coefficient was considered statistically significant if the probability of its random occurrence (p) was < .05 (i.e., less than 5% of the time expected by chance alone).

3. Results

As shown in Table 1, attained sleep was associated with calorie intake but not with depressive moods or impaired decisions. Caloric intake was significantly negatively correlated with attained sleep (r = -0.64, p = 0.012226; see Figure 3). Depressive mood was not significantly associated with attained sleep (r = 0.46, p = 0.103282; see Figure 1). Impaired decisions were not significantly correlated with attained sleep (r = 0.14, p = 0.631941; see Figure 2). Based on a comparison between the correlation coefficients, attained sleep showed the most notable correlation with calorie intake.

4. Discussion

4.1 Summary of Results

Based on previous research, I hypothesized that some variables are reliant on sleep and that sleep loss can result in three specific ramifications: the experience of depressive moods (Hypothesis #1), the impairment of cognitive functions (Hypothesis #2) and the increase of total calories consumed (Hypothesis #3). Data attained from the correlational study supported a notable correlation between attained sleep and calorie intake (Hypothesis #3), but not with depressive moods and the abilities to formulate decisions (Hypothesis #1 and #2).

4.2 Relation of Results to Past Research

Depressive moods were not found to be experienced as attained sleep decreased from the correlational research that I conducted. Paunio et al. (2015) determined that depression can result from sleep loss; however, the data that I obtained does not validate this statement. While Paunio et al. (2015) attained data from reported questionnaires that assessed the sadness of participants in relation to their sleep time, his sample consisted of 12,063 same-sex twins. In addition to this, Paunio et al. (2015) collected data over multiple decades to obtain the most accurate results possible. I completed personal reports in a similar fashion to past research, but the results were attained from one participant and the research period lasted for two weeks. Perhaps I would have produced more accurate results had the data been representative for a greater sample of people and collected over a longer period of time. The dissimilar results that our studies concluded stresses the idea that the relationship between attained sleep and mood is method dependent to a certain extent.

Cognitive impairment was not observed to occur as attained sleep decreased from the correlational research that I conducted. Killgore et al. (2006) observed that people who experienced sleep loss could become vulnerable decision-makers; however, the data that I concluded does not support this claim. While Killgore et al. (2006) attained data from a sample of 34 people he utilized a specific test on participants in order to draw conclusions. His participants completed the IGT at baseline as well as after two nights with no sleep. He manipulated the sleep that those involved attained to procure data whereas I did not alter sleep patterns. Had I experimented with sleep and forced the participant to receive a certain amount each night, then perhaps I would have produced

results that were more similar to those that Killgore et al. (2006) uncovered. The dissimilar results our studies concluded underscores the idea that the relationship between attained sleep and cognitive function is somewhat method dependent.

The data that I obtained from correlational research supported the claim that an increase in consumed calories occurred as a repercussion of a decrease in attained sleep. Markwald et al. (2013) determined that abnormal increases in weight can occur in association with sleep loss; moreover, the data that I procured backs up this declaration. While Markwald et al. (2013) attained data from a somewhat small (16 participants) sample, he instructed the involved individuals on what to eat and how to exercise over the 5-d research period. I did not conduct a similar test as nutritional products and attained exercise were not monitored as a means to collect data. In addition to this, Markwald et al. (2013) altered the bedtimes and waketimes that participants received over the trial to observe attained sleep tendencies in relation to calorie intake. Since Markwald et al. (2013) collected data over such a short period of time, she had to manipulate factors in order to obtain the most accurate data. I conducted research over a 14-d period and therefore was able to obtain similar results without the implementation of structured practices and processes. The similar results we both found support the idea that a nonexclusive relationship is prevalent between attained sleep and calorie intake

References

Killgore, W. D. S., Balkin, T. J., Wesensten, N. J. (2006). Impaired decision making following 49 h of sleep deprivation. *Journal of Sleep Research 15*, 7-13.

Markwald, R. R., Melanson, E. L., Smith, M. R., Higgins, J., Perreault, L., Eckel, R. H., & Wright, K. P. (2013). Impact of insufficient sleep on total daily energy expenditure, food intake, and weight gain. *Proceedings of the National Academy of Sciences, 110*(14), 5695-5700.

Paunio, T., Korhonen, T., Hublin, C., Partinen, M., Koskenvuo, K., Koskenvuo, M., Kaprio, J. (2015). Poor sleep predicts symptoms of depression and disability retirement due to depression. *Journal of Affective Disorders 172*, 381-389.

Table 1

Correlation coefficient (r) values, with number of daily trials (n) per correlation in brackets.

Variable Correlated	*r*(n)
Sleep attained & emotional distress	0.46(14)
Sleep attained & cognitive impairment	0.14(14)
Sleep attained & nutritional disruption	-0.64(14)*

* $p < .05$.

Figure 1

Scatterplot of attained sleep and depressive moods.

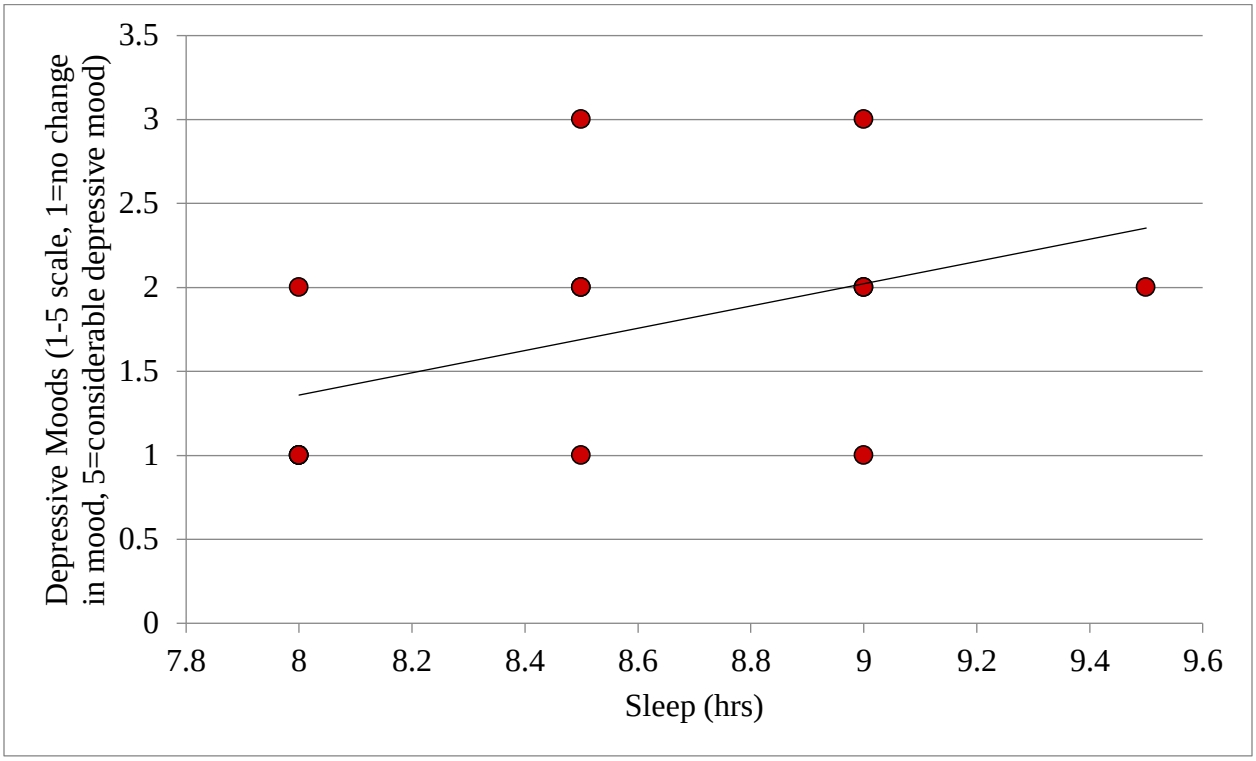


Figure 2

Scatterplot of attained sleep and impaired decisions.

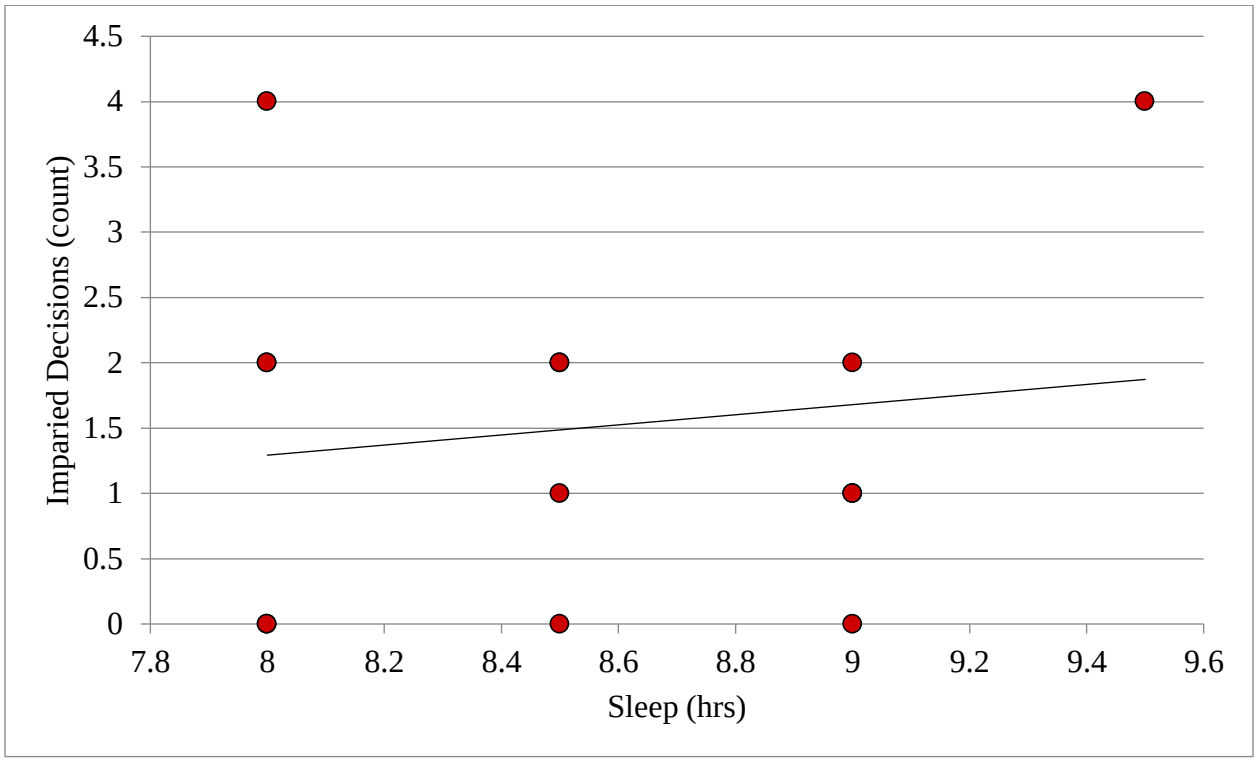
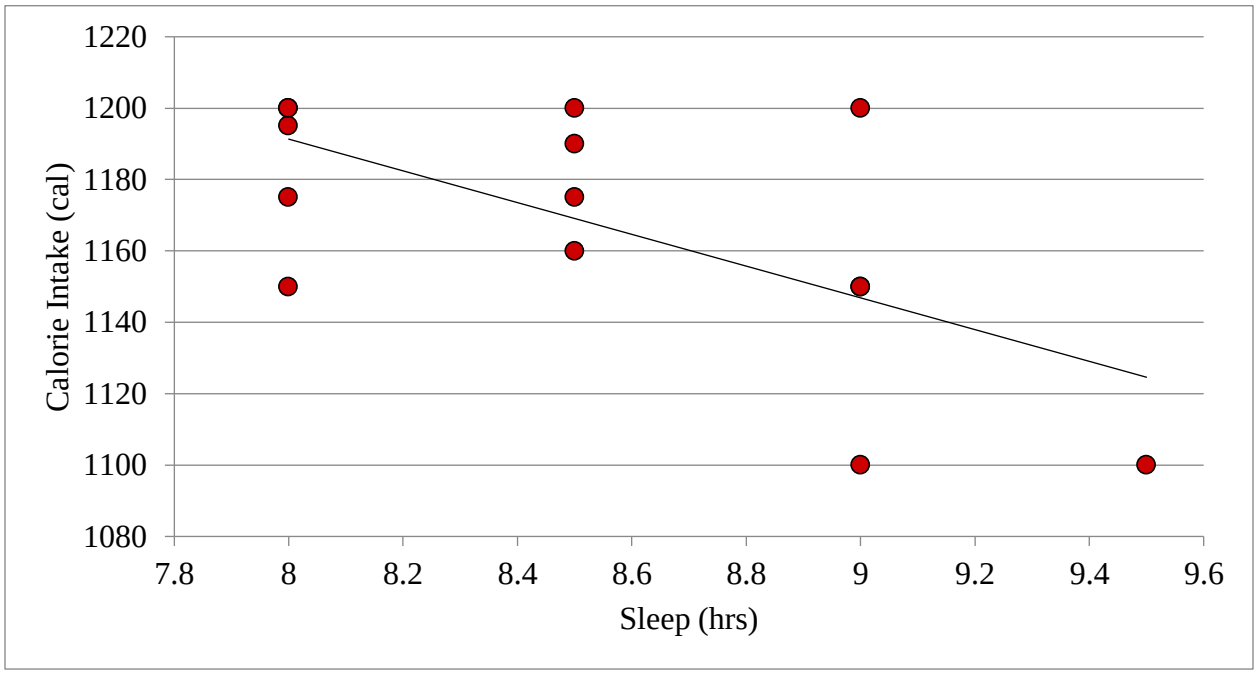


Figure 3

Scatterplot of attained sleep and calorie intake using raw data.



Appendix A

5-point scale used to assess depressive moods experienced.

No Change in Mood **1**	**Slight Depressive Moods Experienced** **2**	**Depressive Moods Experienced** **3**	**Moderate Depressive Moods Experienced** **4**	**Considerable Depressive Moods Experienced** **5**

Appendix B

Calorie calculator to calculate total calories consumed.

https://www.myfooddiary.com/foods/search