

The Link Between Sleep Quantity and Academic Performance for the College Student

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There have been many studies that link “unhealthy sleep habits” with decreased cognitive functioning. The current study examined the relationship between grade-point average (GPA) and sleep, in terms of quality and quantity. Surveys were administered to college students around the campus of the University of Minnesota in order to assess the levels of sleep deprivation and sleep quality of collegiate sleeping behaviors. Six variables were analyzed from the participants' surveys: sleep quality as assessed by the Groninger Sleep Quality Questionnaire, academic success, and four different aspects of sleep quantity. These aspects included number of nights spent with less than five hours of sleep during the past week as well as during an average week, number of hours of sleep obtained in an average night, as well as the number of “all-nighters” the students had pulled in the past year. Results indicated a significant positive correlation between amount of sleep per night with GPA, and a significant negative correlation between average number of days per week that students obtained less than five hours of sleep and GPA.

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Healthy sleep habits can be defined in a number of ways. For example, Peters, Joireman, and Ridgeway (2005) have described “sleep patterns” in terms of four different factors: “self-rated satisfaction with sleep”, “sleeping during the day”, “difficulty sleeping at night”, and “oversleeping”. While people everywhere can struggle with sleep problems, poor sleep habits are clearly a problem on college campuses. Buboltz, Brown, and Soper (2001) reported that 15% of college students are unsatisfied with their quality of sleep. Many factors may contribute to the disturbances of sleep habits in college students. Late-night studying, all-nighters, parties, social obligations, work, and alcohol and/or drug abuse all likely play a role. If we can find a relationship between healthy sleep habits and academic success, we may be able to encourage college students to seek out healthier sleep habits by

using academic success as motivation. College students mindful of the importance of healthy sleep patterns may be able to improve their GPAs.

Correlations between alcohol consumption, sleep patterns, and academic performance have been reported by Singleton and Wolfson (2009). They distributed surveys at a liberal arts college with a random sample of students. Singleton and Wolfson (2009) found that alcohol consumption is a significant predictor for duration of sleep, the difference between weekday and weekend nighttime sleeping hours, timing of sleep, and the difference between weekday and weekend bedtimes. Furthermore, they found these sleep patterns to be directly correlated with GPA. Thus, Singleton and Wolfson (2009) have shown that alcohol consumption indirectly compromises academic performance by means of unhealthy sleep patterns.

Similarly, Peters et al. (2001) conducted a survey with a random sample of college students between the ages of 18 and 41, asking questions about sleep patterns and future goals using the Consideration of Future Consequences scale (CFC). High scores on the CFC scale meant that the individual surveyed is very conscientious and makes smart decisions now in order to successfully obtain rewards later in life. They found that higher scores on their CFC scale were associated with both more regular sleep schedules and higher grade point

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averages. This showed that regular sleep schedules, thinking of future goals, and higher GPA are all related to each other.

It is essential to include the topic of sleep deprivation when investigating sleep habits' effect on academic performance. Sleep deprivation affects cognitive and motor processes as well as emotional stability (Pilcher & Huffcutt, 1996). Given that sleep affects cognitive functioning, sleep quantity should be a major concern for college students, for whom academic performance is a priority. Pilcher and Huffcutt (1996) performed a meta-analysis on existing studies dealing with sleep deprivation and its effects upon various daytime functions. They define partial sleep deprivation as getting less than 5 hours of sleep in a night, short-term total sleep deprivation as a period of no sleep lasting less than or equal to 45 hours, and long-term total sleep deprivation as a period of no sleep lasting longer than 45 hours. Partial sleep deprivation is linked with decreased cognitive functioning, while long-term sleep deprivation is associated with mood disorders (Pilcher & Huffcutt, 1996).

There have been many studies that link "unhealthy sleep habits" with decreased cognitive functioning and academic performance. Our study separated these "unhealthy sleep habits" into two categories: quality of sleep and quantity of sleep. We administered surveys to college students on the campus of the University of Minnesota. The surveys asked questions pertaining to their sleep habits in terms of quality and quantity. These sections were separately assessed in order to break up the term of "unhealthy sleep habits" and to analyze this topic in a different way than past research. We hypothesized that those students who rarely deprive themselves of sleep would have higher GPAs. We also hypothesized that those students who received a more favorable score in the Groninger Sleep Quality Questionnaire would have higher GPAs.

METHOD

Participants

We administered a convenience sample of 103 surveys to undergraduate classes on the campus of the University of Minnesota. These classes included psychology, biology, and physiology classes. The participants consisted of 50 males and 53 females with ages ranging from 18 to 45 years old ($M=21.8$). Our sample was made up of 80.6% Caucasians, 11.7% Asians, 1.0% African Americans, 1.0% Hispanics/Latinos, and 5.8% other. Our participants received no compensation for this study.

Materials

Our survey (see Appendix) contained 19 questions related to sleep quality and sleep deprivation. The first 15 questions were taken from the Groninger Sleep Quality Questionnaire (Leppamaki, Meesters, Haukka, Lonnqvist, & Partonen, 2003) with response choices of true or false, measuring the student's sleep quality. The Groninger Sleep Quality Questionnaire is primarily used to assess seasonal

affective disorder, mood disorders, and sleep disorders. This index had not previously been applied to the particular setting of our study. An example question from the Groninger Sleep Quality Questionnaire is "I felt rested after waking up this morning.", to which respondents respond by circling "TRUE" or "FALSE".

Questions 16-19 were created by the authors and assessed the student's level of partial sleep deprivation and quantity of sleep during the past week as well as in an average week. A question was also included about how many all-nighters the student had experienced in the past year. The four questions were open-ended questions with the expectation of whole numerical values in order to measure the student's sleep deprivation habits.

The second page of the survey included a question that assessed academic success by inquiring about the student's GPA. Other demographic information was also gathered, including their major area of study. Data were gathered anonymously.

Procedure

We distributed the surveys in classrooms on the University of Minnesota campus. An informed consent paragraph was attached to the distributed surveys (refer to Appendix). Upon giving consent, participants completed the survey. Surveys were then collected immediately upon completion, at which time the participants were debriefed and given the option of withdrawing their data.

RESULTS

Six variables were assessed from the participants' surveys: sleep quality, academic success, and four different aspects of sleep deprivation as assessed by our self-created questions. The first 15 questions were scored according to the Groninger Sleep Quality Questionnaire (Leppamaki et al., 2003) to obtain a sleep quality score. The first question was not scored, according to the scoring procedures of the questionnaire (Leppamaki et al., 2003). Students were given one point for every answer of "false" on questions 8, 10, and 12 and one point for every answer of "true" on the remaining 11 questions. A score of 0 meant that the student had the best quality of sleep. Questions 16-19, our self-created questions, measured the student's sleep deprivation with open-ended numerical responses. The students' GPAs were also measured with open-ended numerical responses. Correlations were calculated between GPA and the other five variables in our study.

Average amount of sleep per night was found to be significantly correlated with GPA, $r(101) = 0.20$, $p = 0.048$ (see Figure 2). The students who slept for more hours on an average night tended to obtain slightly better grades. Also, the average number of days per week that students got less than five hours of sleep was found to be weakly, but significantly negatively correlated with GPA, $r(101) = -0.29$, $p = 0.003$ (see Figure 1). Thus, as the average number of days per week

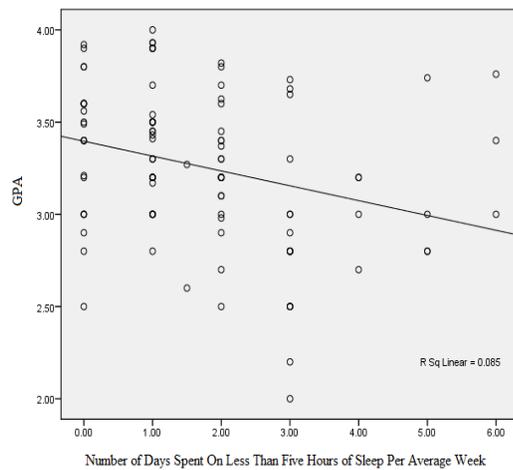


FIGURE 1. Scatter plot of GPA by average number of nights per week the students get less than five hours of sleep. Line of best fit included.

a student got less than five hours of sleep increased, GPA decreased. No correlation was found between students' GPA and the number of all-nighters students have experienced in the past year [$r(101) = 0.02, p = 0.857$], the number of days students got less than five hours of sleep in the past week [$r(101) = -0.07, p = 0.475$], and the students' scores on the Groninger Sleep Quality Questionnaire [$r(101) = 0.01, p = 0.993$].

DISCUSSION

Our results partially support our hypotheses. Quality of sleep, as assessed by the Groninger Sleep Quality Questionnaire, did not show a significant relationship with academic performance. However, quantity of sleep was significantly related. The average amount of sleep a student receives per night does seem to be tied to the student's GPA. Also, an increased number of nights in an average week that the student obtains less than five hours of sleep (our measure of sleep deprivation) seems to be negatively related to GPA.

These results pertaining to sleep deprivation are in agreement with past research. Our data support Pilcher and Huffcutt's (1996) statement that sleep deprivation affects cognitive processes. As noted earlier, sleep deprivation was defined by Pilcher and Huffcutt (1996) to be functioning with less than five hours of sleep from the previous night.

However, sleep quality was not correlated with GPA, contrary to past research. For example, Singleton and Wolfson (2009) concluded that alcohol use compromises college students' GPAs due to the effect of alcohol on sleep quality. Our lack of findings supporting the sleep quality – academic success link may have been due to only including questions about the previous night's sleep quality in our survey. Some of the classes to which these surveys were administered may not have gotten a good night's sleep the previous night because of tests or papers due in that class. This would affect the answers of all students in the class similarly. To improve this questionnaire, we could have asked questions about average

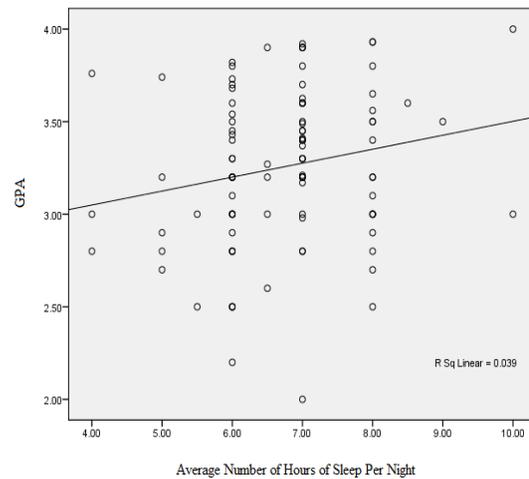


FIGURE 2. Scatter plot of GPA by number of hours slept by the student in an average night. Line of best fit included.

sleep quality, sampled in a more random manner, or scored the surveys using repeated measures. Future studies on this topic may be able to attain more reliable information if they administer the sleep quality index to the same students repeatedly. This may offer a more realistic measure of the student's quality of sleep as a whole rather than a measure of only one night's sleep which may be an exception to their regular sleep habits.

Further limitations of this study include the sample that we chose. There was a broad range of ages in our sample. An 18-year-old student may have different sleep requirements than a 41-year-old student. Also, our sample was over 80% Caucasian. Different cultures may view sleep habits in different ways and become accustomed to these habits. Further research on this topic should use a quota sampling technique. We believe that if this study were carried out in this manner, our hypothesis may be supported.

There were a few students in our study who by our definition were sleep deprived but who still performed academically at a higher level. It is possible that these students may be engaging in more positive behaviors in place of sleep, such as studying. However, these students do not follow the general trend that we found in our study.

We found support for our hypothesis that sleep quantity and academic performance are related. Partial sleep deprivation measures for the average week, as well as the average amount of sleep obtained in a night, were both shown to be related to GPA. This result holds many practical applications for the college student. Although we cannot conclude from the present study that more sleep causes better grades, we have shown that amount of sleep and academic success are positively correlated. Further research should be conducted on more specific healthy sleep behaviors, such as a student's sleeping environment and de-stressing techniques if the student has troubles falling asleep. It would help the aspiring student become aware of more specific ways they may be able to utilize their sleep habits in the hopes of improving their grades.

APPENDIX

You are being asked to participate in a study as part of a class project in a research methods course in the Department of Psychology at the University of Minnesota. It involves better understanding how sleep may have an effect on student life. If you choose to participate, no identifying information will be gathered from you, so it will be impossible to identify you as a participant. If you choose to participate, you may stop participating at any time. You may withdraw your data at any time, including after you have completed the study. You may ask me questions before or after you complete the study. I also can tell you how to contact the course instructor if you have questions for her.

SECTION 1: PLEASE CIRCLE "TRUE" OR "FALSE".

1. I had a deep sleep last night.
TRUE FALSE
2. I feel that I slept poorly last night.
TRUE FALSE
3. It took me more than half an hour to fall asleep last night.
TRUE FALSE
4. I woke up several times last night.
TRUE FALSE
5. I felt tired after waking up this morning.
TRUE FALSE
6. I feel that I didn't get enough sleep last night.
TRUE FALSE
7. I got up in the middle of the night.
TRUE FALSE
8. I felt rested after waking up this morning.
TRUE FALSE
9. I feel that I only had a couple of hours' sleep last night.
TRUE FALSE
10. I feel that I slept well last night.
TRUE FALSE
11. I didn't sleep a wink last night.
TRUE FALSE
12. I didn't have trouble falling asleep last night,
TRUE FALSE
13. After I woke up last night, I had trouble falling asleep again.
TRUE FALSE
14. I tossed and turned all night last night.
TRUE FALSE
15. I didn't get more than 5 hours' sleep last night.
TRUE FALSE

SECTION 2: PLEASE ANSWER EACH QUESTION WITH A WHOLE NUMBER ON THE LINE PROVIDED.

16. In an average week, how many nights do you get less than five hours of sleep? _____
17. In the past week, how many nights did you get less than five hours of sleep? _____
18. In an average night, how many hours of sleep do you get? _____
19. In the past year, how many all-nighters have you pulled? _____

SOME DEMOGRAPHIC INFORMATION PLEASE.

16. Are you male or female? _____
17. What is your ethnicity? (please circle)
CAUCASIAN ASIAN AFRICAN AMERICAN
HISPANIC/LATINO OTHER _____
18. What is your age? _____
19. What is your class? (please circle).
FRESHMAN SOPHOMORE JUNIOR SENIOR
20. What is your major? _____
21. Do you live on or off campus? (please circle)
ON CAMPUS OFF CAMPUS
22. What is your GPA? (note: this information is confidential) _____

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